MI935

LGA775 Core™ 2 Duo
Intel® Q35 Chipset
Mini-ITX Motherboard

USER'S MANUAL

Version 1.0

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Table of Contents

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Introduction

Checklist

Your MI935 Core 2 Duo motherboard package should include the items listed below:

- The MI935 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 MI935 Mini-ITX motherboard is designed for either the Intel® Core™2 Duo or Core™2 Quad processors of up to 1333MHz FSB. It is based on the Intel's Q35 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® Q35 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.

MI935 is expandable, with the use of an adaptor card, ID394, to support 2 or 4 serial ports, or ID395 to support TPM 1.2 security function. Other useful features on the board include two SATA II ports, one eSATA port, eight 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.)
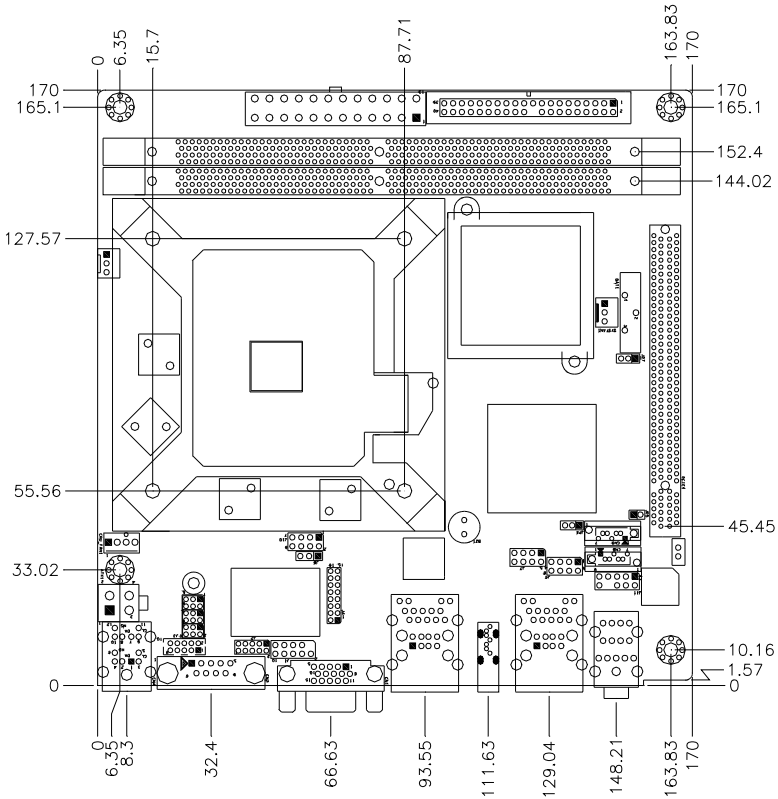
MI935 FEATURES

- Intel® Q35 Express Chipset Based
- Support LGA775 Intel® Core™2 Duo/Quad CPU
- Support up to 1333MHz FSB
- Support up to 4GB DDRII 800/667 memory
- 1 x PCI Express (x16)
- Support one 10/100 or two Gigabit LAN on board
- 2x SATA II, 1x eSATA, 1x IDE, 8x USB 2.0,
  2x COM, 7.1Ch.HD Audio

Specifications

|	
Form Factor	Mini ITX (for performance desktop market)
Processor	Socket LGA775, Supports the Intel Core 2 Duo and Intel Core2 Quad processors, and Intel Celeron 400 (Conroe-L) Sequence processor.
FSB	800/1066/1333 MHz
Chipset	Intel Q35 Chipset: • Intel Q35 Graphic Memory Controller Hub (GMCH) • Intel ICH9/ICH9R I/O Controller Hub
BIOS	• Award BIOS: footprint from SPI, supports ACPI, SMBIOS
Memory	• **2** x 240-pin DDRII 667/800 DIMM sockets, support one channels, • Supports max. **4 GB** system memory
Video	Intel Q35 integrated graphic subsystem (GMA3100), 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: •Intel 82566DM Nineveh 10/100/1000 LAN •Intel 82562V Ekron-N 10/100 LAN2: Marvell 88E8053 PCI-express Gigabit LAN controller x1
USB	Intel ICH9/ICH9R built-in USB 2.0 host controller, supports 8 ports: •4 ports in the rear I/O region •4 ports with on-board headers
SATA II	Intel ICH9 built-in SATA II controller (3.0Gb/sec) w/ 2 ports. ICh9R Built-in raid 0,1 or AHCI (for eSATA)
IDE	Jmicron JM368 (PCI-e to PATA) x1 for 1 PATA channel
Audio	Intel ICH9/ICH9R built-in high definition audio w/ Realtek ALC888 Codec
LPC I/O	Winbond W83627EHG: COM1 (RS232), COM2 (RS232/422/485) & Hardware monitor
Hardware Monitor	• Two fan connectors with tachometer support • CPU fan connector supports 4-wire fan with PWM control • Supports three thermal diodes (CPU die + 2 on-board) • Voltage monitoring for VCC (processor), 3.3V, 5V, and 12V
Edge Connectors	• Mini-DIN x 1 for PS/2 KB & MS • Esata connectorx1(for ICH9R) • DB9 + DB15 stack connector x 1 for COM1 & VGA • RJ45 + dual USB stack connector x2 for LAN1~2 and USB1~4 • Triple (3x1) phone jack connector x1 for High-Definition Audio
On Board Headers / Connectors	• Standard SATA (7-pin shrouded vertical) connector x2 • 4x2 pins pin-header x2 for USB 5-6,7-8. • 5x2 pins DF11-10 x1 for COM2 (RS232/422/485) • 5x2 pins pin-header x1 for Digital I/O • 5X2 pins pin-headerx1 for audio front. • 40 pins box-header x1 for IDE • 4 pins pin--header x1 for CPU fan & system fan • 3 pins pin--header x2 for system fan
Expansion	PCI-express (x16) slot x1 8x2 pins pin header x1 for adaptor card: - ID394 (2 or 4 serial ports) - ID395 (TPM function)
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
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 MI935 in order to set up a workable system. The topics covered are:

Installing the CPU

The MI935 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.*
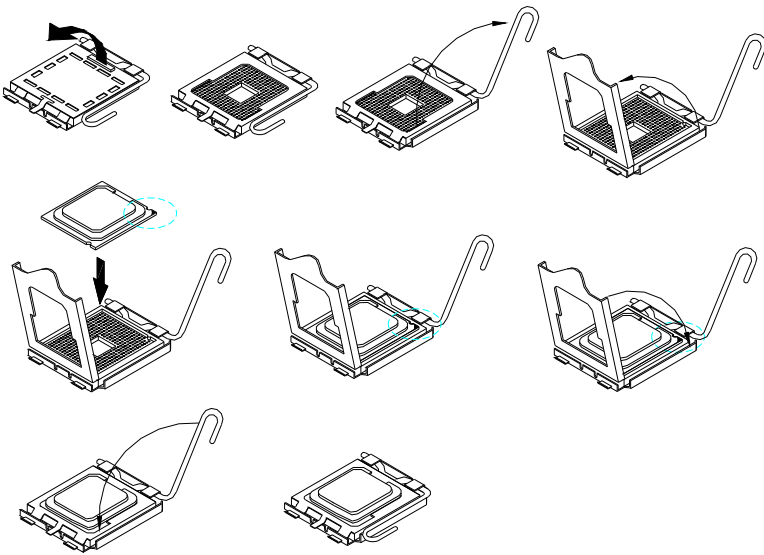
ATX Power Installation

The system power is provided to the motherboard with the ATX2 and ATX1 power connectors. ATX2 is a 24-pin power connector and ATX1 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 MI935 motherboard supports four DDR2 memory sockets for a maximum total memory of 4GB in DDR memory type. It supports DDR2 667/800MHz.

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 two-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 MI935/MI935F/MI935RF

JP7: Clear CMOS Contents

Use JP7, a 3-pin header, to clear the CMOS contents. *Note that the ATX-power connector should be disconnected from the motherboard before clearing CMOS.*

JP7	Setting	Function
□ □ □ 1 2 3	Pin 1-2 Short/Closed	Normal
□ □ □ 1 2 3	Pin 2-3 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.

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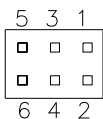
COM2 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP3: 1-2 JP1: 3-5 & 4-6 JP2: 3-5 & 4-6	JP3: 3-4 JP1: 1-3 & 2-4 JP2: 1-3 & 2-4	JP3: 5-6 JP1: 1-3 & 2-4 JP2: 1-3 & 2-4

Connectors on MI935

The connectors on MI935 allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on MI935 and their respective functions.

Connector Locations on MI935/MI935F/MI935RF
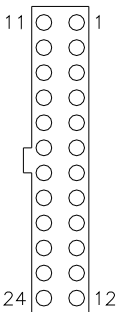
ATX2: 24-pin ATX Power Connector

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
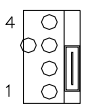
ATX1: ATX 12V Power Connector

This connector supplies the CPU operation voltage
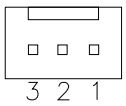
Pin #	Signal Name
1	Ground
2	Ground
3	+12V
4	+12V

CPU_FAN1: CPU Fan Power Connector

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

SYS FAN1, 2: System Fan Power Connectors

Pin #	Signal Name
1	Ground
2	+12V
3	Sense
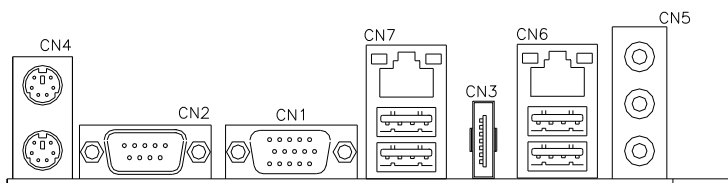
CN4: PS/2 Keyboard and PS/2 Mouse Connectors
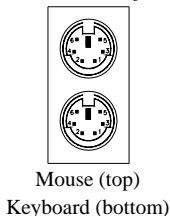
Mouse (top)
Keyboard (bottom)

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.

CN2, J3: COM1/2 Serial Ports

CN2 (COM1) is a DB-9 connector, while J3 is a COM pin-header connector.

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	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC
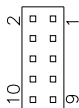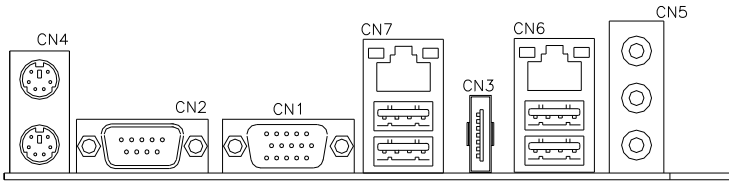
CN1: VGA CRT Connector
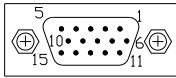
Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
VCC	9	10	GND
N.C.	11	12	DDCDATA
HSYNC	13	14	VSYNC
DDCCLK	15		

CN6: Marvell 88E8053 PCI-express Gigabit LAN and USB2/3 Connector

CN7: Intel 82562V 10/100 or Intel 82566DM GbE RJ-45 and USB0/1 Connector
Note: 10/100 LAN for MI935; Dual Gigabit LAN for MI935F

CN5: Audio Connector

Line in
Line out
Microphone
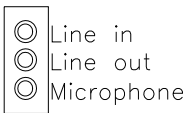
CN4 is a 3-jack audio connector

CN3: eSATA HDD Connector

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

CN9, CN8: SATA HDD Connectors
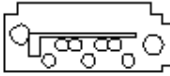
Pin #	Signal Name
1	Ground
2	TX+
3	TX-
4	Ground
5	RX-
6	RX+
7	Ground
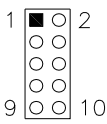
IDE1: Primary IDE Connectors
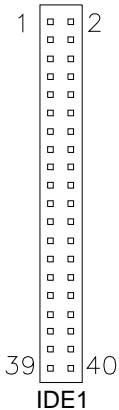
Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	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

1 2

39 40

IDE1

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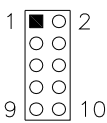
Signal Name	Pin #	Pin #	Signal Name
Ground	1	2	+5V
Out3	3	4	Out1
Out2	5	6	Out0
IN3	7	8	IN1
IN2	9	10	IN0

J4: For LPC I/F Adaptor Card
Supports ID394 with Fintek F81216, 2 or 4 serial ports

J5: Audio Front Header

Signal Name	Pin #	Pin #	Signal Name
MIC2_L	1	2	Ground
MIC2_R	3	4	Presence#
Line2_R	5	6	MIC2_ID
Sense	7	8	NC
Line2_L	9	10	Line2_ID

J6, J7: USB4/5, USB6/7 Connectors

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

J8: Power LED
The power LED indicates the status of the main power switch.

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

J9: SPDIF Out Connector

Pin #	Signal Name
1	SPDIF out
2	Ground

J10: System Function Connector

Pin 1/2 ATX Power On Switch
Pin 3/4 HDD LED connector
Pin 5/6 Reset Switch
Pin 7/8 +5V and 5VSB signals
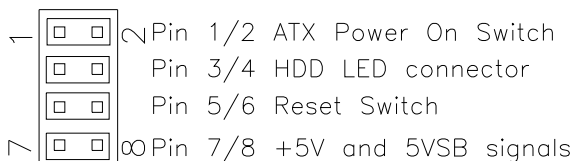
ATX Power ON Switch: Pins 1 and 2
This 2-pin connector is an "ATX Power Supply On/Off Switch" on the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.

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 Adapter (option)
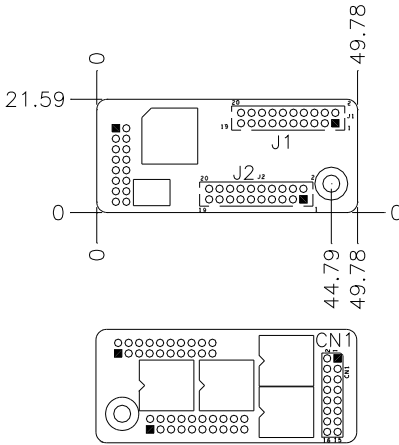
J1 J2: COM3/4/5/6 Serial Ports
    J1 - COM3/4 pin-header connector.
        PIN1~PIN10 COM3
        PIN11~PIN20 COM4
    J2 - COM5/6 pin-header connector.
        PIN1~PIN10 COM5
        PIN11~PIN20 COM6

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

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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

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

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	
CPUL3 Cache	Enabled	
Quick Power On Self Test	Enabled	
First Boot Device	Removable	
Second Boot Device	Hard Disk	
Third Boot Device	CDROM	
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.

CPU 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*.

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 *Removable*, *Hard Disk*, *CDROM, Legacy LAN* 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
┌──────────────────────────────────────────────┬───────────────────┐
│  DRAM Timing Selectable         By SPD        │      ITEM HELP     │
│  CAS Latency Time               Auto          │  Menu Level  >     │
│  DRAM RAS# to CAS# Delay        Auto          │                   │
│  DRAM RAS# Precharge            Auto          │                   │
│  Precharge dealy (tRAS)         Auto          │                   │
│  System Memory Frequency        By SPD        │                   │
│  System BIOS Cacheable          Enabled       │                   │
│  Memory Hole at 15M-16M         Disabled      │                   │
│  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         │                   │
│  SDVO Device Setting            None          │                   │
│  SDVO LVDS Protocol             1CH  18 bit   │                   │
│  SDVO Panel                     1024x768      │                   │
│  Boot Display                   CRT+LVDS      │                   │
│  TV Standard                    Off           │                   │
│  Video Connector                Automatic     │                   │
│  TV Format                      Auto          │                   │
└──────────────────────────────────────────────┴───────────────────┘
```

DRAM Timing Selectable

This option refers to the method by which the DRAM timing is selected. The default is *By SPD*.

CAS Latency Time

You can select CAS latency time in HCLKs of 3/3 or 4/4. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU. The choices are 3, 4 and 5.

DRAM RAS# to CAS# Delay

This option allows you to insert a delay between the RAS (Row Address Strobe) and CAS (Column Address Strobe) signals. This delay occurs when the SDRAM is written to, read from or refreshed. Reducing the delay improves the performance of the SDRAM.

DRAM RAS# Precharge

This option sets the number of cycles required for the RAS to accumulate its charge before the SDRAM refreshes.

Precharge delay (tRAS)
The default setting for the Active to Precharge Delay is Auto.

System Memory Frequency
This field sets the frequency of the DRAM memory installed. The default setting is *Auto*. The other settings are *DDR667* and *DDR800*.

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*.

PCI Express Root Port Func
Press Enter to configure this field.

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
    SDVO Device Setting: None
       To use the single DVI setting, install the IBP192-R DVI module; to use the dual DVI setting, install the IBP192D-R DVI module; and to use the LVDS+TV or LVDS or TV-out setting, install the IBP190 module.
    SDVO LVDS Protocol: 1CH 18bit
    SDVO Panel: 1024x768
    Boot Display: CRT+LVDS
    TV Standard: Off
    Video Connector: Automatic
    TV Format: Auto

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

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

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device

		ITEM HELP
IDE HDD Block Mode	Enabled	
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

		ITEM HELP
POWER ON Function	BUTTON ONLY	
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	
UART Mode Select	Normal	
PWRON After PWR-Fail	Off	

Phoenix - AwardBIOS CMOS Setup Utility
USB Device Setting

		ITEM HELP
USB 1.0 Controller	Enabled	
USB 2.0 Controller	Enabled	Menu Level >
USB Keyboard Function	Disabled	
USB Mouse Function	Disabled	
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 ***ICH9R, 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

UART Mode Select

This field determines the UART 2 mode in your computer. The default value is *Normal*.

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

ACPI Function	Enabled	ITEM HELP
ACPI Suspend	S3(STR)	
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	Disabled	
Primary IDE 1	Disabled	
Secondary IDE 0	Disabled	
Secondary IDE 1	Disabled	
FDD, COM, LPT Port	Disabled	
PCI PIRQ[A-D] #	Disabled	
HPET Support	Disabled	
HPET Mode	32-bit mode	

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

ACPI Suspend
The default setting of the ACPI Suspend mode is *S3(STR)*.

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

PNP OS Installed	No	
Init Display First	PCI Slot	ITEM HELP
Reset Configuration Data	Disabled	
		Menu Level >
Resources Controlled By	Auto (ESCD)	
IRQ Resources	Press Enter	
DMA Resources	Press Enter	
PCI/VGA Palette Snoop	Disabled	
PCI Express relative items		
Maximum Payload Size	128	

PNP OS Install

Enable the PNP OS Install option if it is supported by the operating system installed. The default value is *No.*

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	
North Bridge Temp.	32°C/89°F	Menu Level >
CPU Temp.	39°C/102°F	
System Temp.	39°C/102°F	
System Fan Speed	0 RPM	
CPU Fan Speed	4440 RPM	
Chassis Fan Speed	0 RPM	
Vcore	1.24 V	
12 V	12.03 V	
1.8 V	1.92 V	
5 V	4.99 V	
-12V	-11.62 V	
3.3 V	3.15 V	
VBAT (V)	3.13 V	
5VSB(V)	5.29 V	
Smart Fan2 Temperature	Disabled	
Fan2 Tolerance Value	5	
Smart Fan3 Temperature	Disabled	
Fan3 Tolerance Value	5	

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

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

Phoenix - AwardBIOS CMOS Setup Utility
2nd SuperIO Device

		ITEM HELP
Onboard Serial Port 3	230h	
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

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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:

IMPORTANT NOTES:

1. 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.

2. How to create an AHCI driver disk, when your board supports the RAID/AHC function:
   1. Put an empty disc into your floppy disk drive
   2. Execute the f6flpy32.exe that is in the Driver CD you have received. The path is 8.1A\Intel\Q35\Raid\

Intel Chipset Software Installation Utility

The Intel® 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/Vista. (Before installed Intel Chipset Software Installation Utility,Please update your system to Windows 2000 SP4 or Windows XP SP1A)

1. Insert the DVD that comes with the board. Click *Intel Chipsets* and then *Intel(R) Bearlake Chipset Family Drivers*.

2. Click *Intel(R) Chipset Software Installation Utility.*
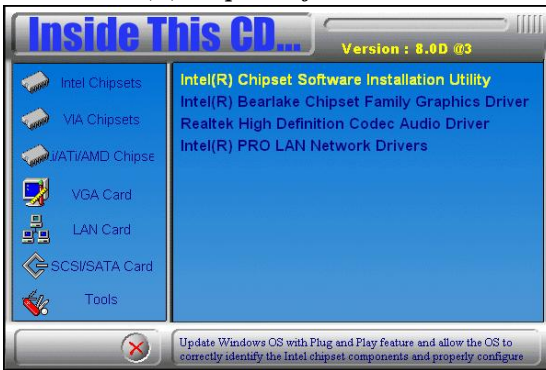
3. When the Welcome screen appears, click *Next* to continue.

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

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

6. When the Setup Progress screen appears, click *Next* to continue.

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

Intel Graphics Driver Installation

To install the Graphics drivers, follow the steps below to proceed with the installation.

1. Insert the DVD that comes with the board. Click *Intel Chipsets* and then *Intel(R) Bearlake Chipset Family Drivers*.

2. Click *Intel(R) Bearlake Chipset Family Graphics Driver.*
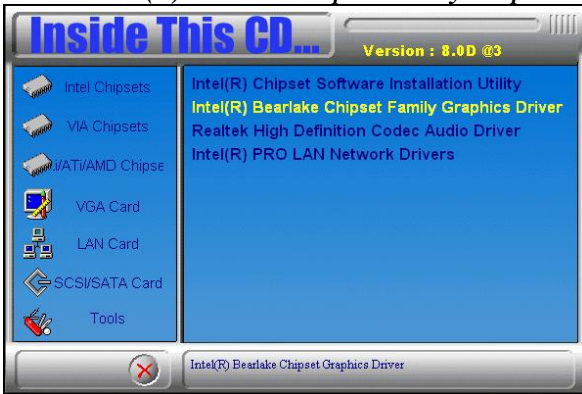
3. When the Welcome screen appears, click *Next* to continue.

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

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

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

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

Realtek HD Code Audio Driver Installation

Follow the steps below to install the Realtek High Definition Codec Audio Driver.

1. Insert the DVD that comes with the board. Click *Intel Chipsets* and then *Intel(R) Bearlake Chipset Family Drivers*.

2. Click *Realtek High Definition Codec Audio Driver.*
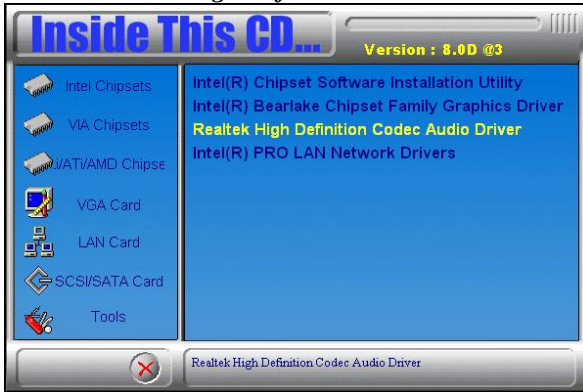
3. When the Welcome screen appears, click *Next* to continue.
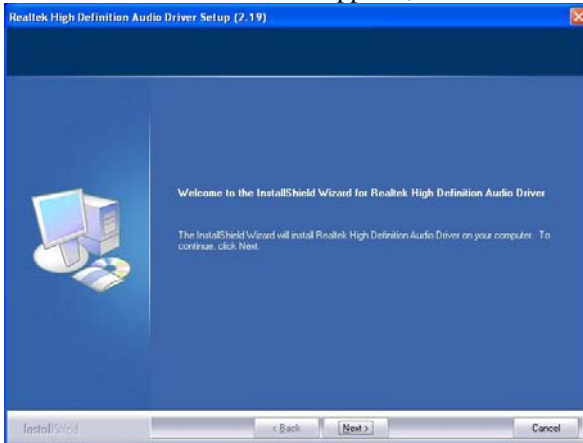
4. The Setup process is now complete. Restart the computer when prompted for changes to take effect.

LAN Drivers Installation

Follow the steps below to start installing the Intel 82566DM or Intel 82562V drivers.

1. Insert the DVD that comes with the board. Click **Intel Chipsets** and then **Intel(R) Bearlake Chipset Family Drivers**.

2. Click **Intel(R) PRO LAN Network Drivers.**

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

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

5. 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.

6. When the Setup Options appears, click **Install Drivers only** and **Next** to continue.

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

8. 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.

Follow the steps below to use the wake up function by Intel 82566DM or Intel 82562V.

1. The BIOS Setup item "Wake-Up by PCI card" has to be set as [Enabled] .

2. Go to the Device Manager under Windows and select Network adapters. The following window will appear (Intel(R) 82566DM Gigabit Network Connection Properties). Click *Power Management* and select *Wake on Magic Packet from power off states* .
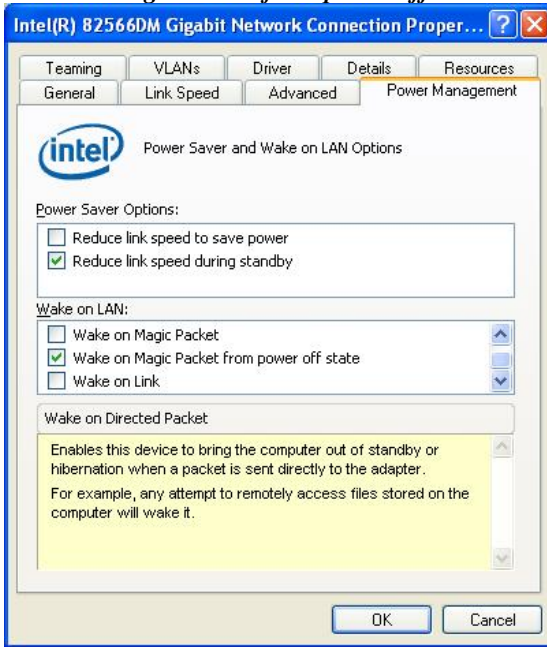
3. Turn off computer .

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

1. Insert the DVD that comes with the board. Click *LAN Card* and then *Marvell LAN Controller Driver*.

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

3. Click *Next* to agree with the license agreement.

4. Click *Install when the Ready* to Install the Program screen appears to proceed with the drives installation process.

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

6. To use the wake up function by Marvell Gigabit LAN, go to the *Device Manager* under Windows and select *Network adapters*. The following window will appear (Generic Marvell Yukon Chipset based Ethernet Controller Properties). Click *Advanced* and select *Wake From Shutdown*. In the Value field on the right, select *On*.
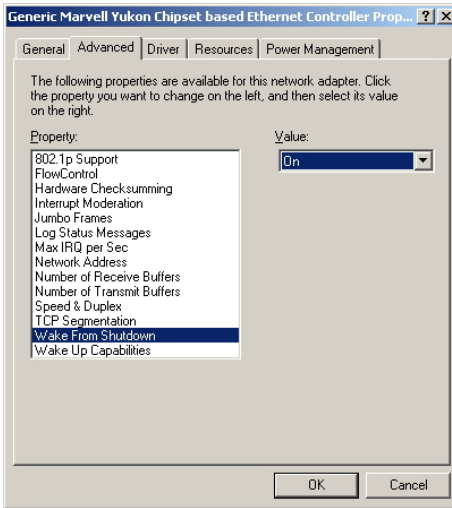
7. Then, also in the Advanced section, click on *Wake Up Capabilities*. In the Value field on the right, select *Magic Packet*, then click *OK*.

8. Turn off computer.

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
}
//=======================================================================
```

```
//=====================================================================
//
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// 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;
}
//========================================================================




//========================================================================
//
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// 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
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// 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();      }
}
//----------------------------------------------------------------------
```

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