MI800

Intel® Atom® 945GC

Mini-ITX Motherboard

USER'S MANUAL

Version 1.0A

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Table of Contents

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Introduction

Product Description

The MI800 Mini ITX board incorporates the Intel® 945GC Express Chipset for Embedded Computing comes built in with the Intel® GMA950 graphics. The new Intel® Graphics Media Accelerator 950 (Intel® GMA 950) graphics core is an intelligent and responsive graphics engine built into the chipset that is on the motherboard. This integration provides incredible visual quality, faster graphics performance and flexible display options without the need for a separate graphics card.

The main features of the MI800 Mini ITX Motherboard are:
- Supports Intel Atom 230 processor with 1.6GHz speed
- Two DDRII SDRAM DIMM supports up to 2GB of DDR2 400/533MHz memory
- Onboard 10/100 BaseT and Intel 82574L PCI-Express Gigabit LAN
- Intel® 945GC VGA for CRT, SDVO port supports LVDS and DVI
- 2x SATA, 6x USB 2.0, 4x COM, Watchdog timer
- 1x PCI, 1x MiniPCIe, CF socket, DC-in for +12V/+19V input

Dimensions of the board are 170mm x 170mm.

Ordering Information:
MI800F: Intel Atom, 1.6GHz, 945GC chipset with DVI, LVDS, 1x 10/100 LAN, 1x Gigabit LAN, Mini PCI-E, PCI
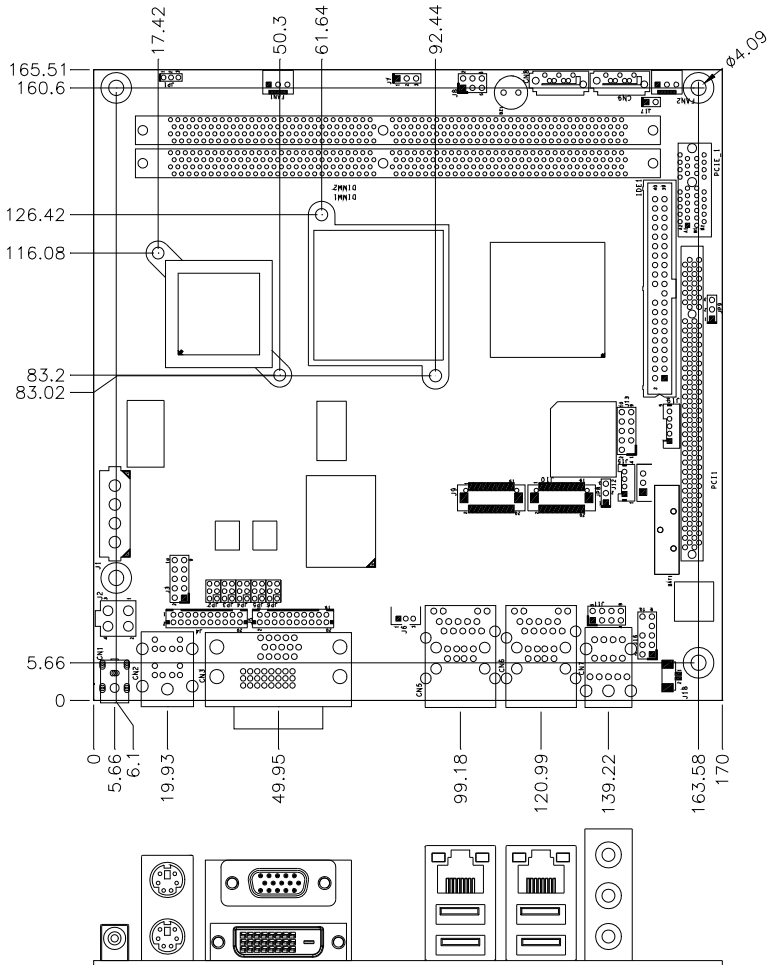
Checklist

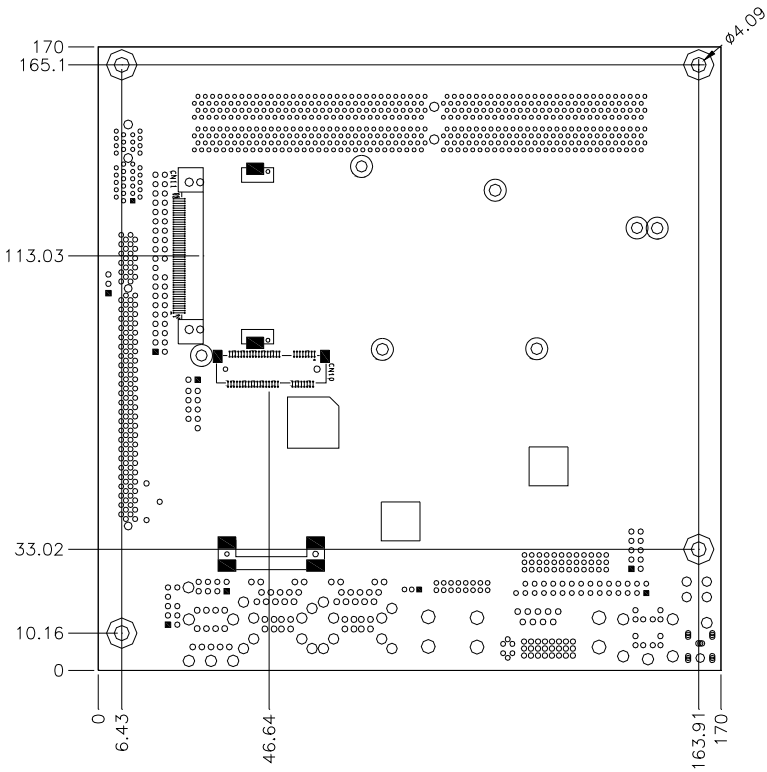Your MI800 package should include the items listed below.

- The MI800 Intel® Atom Mini-ITX motherboard
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Cable kit (IDE, 2x Serial port, Serial ATA)

MI800 Specifications

CPU Type	Intel New architecture CPU on 45nm processor - Atom 230 (Diamondville Single Core) - Atom 330 (Diamondville Dual Core)
CPU FSB	CPU Clock speed = 1.60GHz FSB=533MHz L2 Cache=512K for SC / 1M for DC Cores/Treads=1/2 threads. TDP=4W for SC / 8W for DC
CPU Socket	473 pins micro-FCBGA on board
Chipset	Intel 945GC Chipset GMCH: 82945GC 34 mm x 34 mm -1202 balls FCBGA ICH7: 82801GH: 31mm x 31mm -652-pin BGA
BIOS	Award BIOS, support ACPI Function
Memory	DDRII 400/533 DIMM x 2 (w/o ECC function), supports Dual channel. Max. 2GB
VGA	The 82945GC GMCH provides an integrated graphics device (IGD) delivering cost competitive 3D, 2D, and video capabilities.
DVI + LVDS	Chrontel CH7307 + Chrontel CH7308C
LAN	1. ICH7 built-in 10/100BT MAC + Intel 82562ET PHY 2. Intel 82574L PCI Express Gigabit LAN controller x1
USB	ICH7 built-in USB 2.0 host controller, support 6 ports
Serial ATA	ICH7 built-in SATA controller, supports 2 ports
Parallel IDE	ICH7 built-in one channel Ultra DMA 33/66/100, CF
Audio	ICH7 built -in Audio controller ALC 662 5.1-Channel (Line-in, Line-out & MIC)
LPC I/O	Winbond W83627EHG: COM1 (RS232), COM2 (RS232/422/485), Hardware monitor (3 thermal inputs, 4 voltage monitor inputs, VID0-4 & 2 Fan Headers)
2'nd LPC I/O	Fintek F81216DG COM3 & COM4 (RS232)
Digital IO	4 in & 4 out
Keyboard/Mouse Connector	Supports PS/2 Keyboard/Mouse
Expansion	PCI slot x1, PCI-E (x1) slot x1 and Mini PCI-E (x1) socket x1
Power Connector	DC Power jack x1 for +12V/+19V DC-in
Edge Connector	PS/2 Connector x1 for keyboard/mouse Gigabit LAN RJ-45 + dual USB stack connector 10/100 LAN RJ45 + dual USB stack connector VGA+DVI-D stack connector 3x1 stack mini jacks (0.125") for HD audio (Line-in, Line-Out, Mic) DC-IN jack
On Board Header/ Connector	40 pins box-header x1 for IDE1 CF Connector x1 @ solder side 10 pins pin-headerx1 for Digital I/O 20 pins DF11 connector x2 for COM1/COM2, COM3/COM4 (Pin 9 can be powered with 5V or 12V or as ring-in) 8 pins pin-header x 1 for USB 5,6 10 pins pin-header x1 for audio Line-Out & Mic SATA connector x2 for 2 SATA ports DF13 Connector x2 for LVDS
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec/min)
Other	Modem Wakeup, LAN Wakeup
RoHS	Yes
Form Factor4	Mini ITX
Board Size	170mm x 170mm

Board Dimensions

170
165.1
ø4.09
113.03
33.02
10.16
0
0
6.43
46.64
163.91
170
CN1
CN2

Installations

This section provides information on how to use the jumpers and connectors on the MI800 in order to set up a workable system. The topics covered are:

Installing the Memory

The MI800 board supports two DDR2 memory socket for a maximum total memory of 2GB in DDR2 memory type.

Installing and Removing Memory Modules

To install the DDR2 modules, locate the memory slot on the board and perform the following steps:

1. Hold the DDR2 module so that the key of the DDR2 module align with those on the memory slot.

2. Gently push the DDR2 module in an upright position until the clips of the slot close to hold the DDR2 module in place when the DDR2 module touches the bottom of the slot.

3. To remove the DDR2 module, press the clips with both hands.
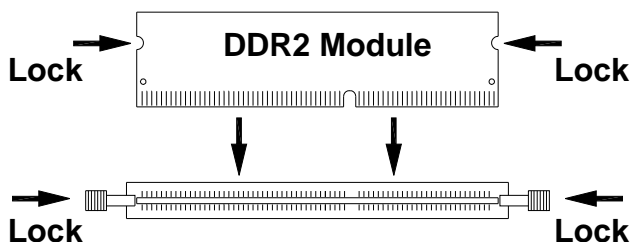
Setting the Jumpers

Jumpers are used on MI800 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 on MI800 and their respective functions.

Jumper Locations on MI800

JP1: ATX/AT Mode
JP2, JP3, JP4: RS232/422/485 (COM2)
JP5: COM4 RS232 +5V / +12V Power
JP6: COM3 RS232 +5V / +12V Power
JP8: LCD Panel Power
JP9: Clear CMOS
J17: CompactFlash Slave/Master

JP1: ATX/AT Mode Select

JP1	ATX / AT
1 2 3	ATX mode
1 2 3	AT mode

JP2, JP3, JP4: RS232/422/485 (COM2) Selection

COM1/3/4 is fixed for RS-232 use only.
COM2 is selectable for RS232, RS-422 and RS-485.
The following table describes the jumper settings for COM2 selection.
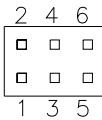
COM2 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP4: 1-2 JP3: 3-5 & 4-6 JP2: 3-5 & 4-6	JP4: 3-4 JP3: 1-3 & 2-4 JP2: 1-3 & 2-4	JP4: 5-6 JP3: 1-3 & 2-4 JP2: 1-3 & 2-4

COM2 is jumper selectable for RS-232, RS-422 and RS-485.
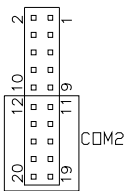
Pin #	Signal Name		
	RS-232	R2-422	RS-485
11	DCD	TX-	DATA-
13	RX	TX+	DATA+
15	TX	RX+	NC
17	DTR	RX-	NC
19	Ground	Ground	Ground
12	DSR	RTS-	NC
14	RTS	RTS+	NC
16	CTS	CTS+	NC
18	RI	CTS-	NC
20	NC	NC	NC

JP5: COM4 RS232 +5V / +12V Power Setting

Pin #	Signal Name	JP5	Signal Name	Pin #
1	RI		+12V	2
3	RI (Default)		RI (Default)	4
5	RI		+5V	6

COM4 Settings: Pin 1-2 short = +12V, Pin 5-6 short = +5V, Pin 3-4
Standard COM Port

JP6: COM3 RS232 +5V / +12V Power Setting

Pin #	Signal Name	JP6	Signal Name	Pin #
1	RI		+12V	2
3	RI (Default)		RI (Default)	4
5	RI		+5V	6

COM3 Settings: Pin 1-2 short = +12V, Pin 5-6 short = +5V, Pin 3-4
Standard COM Port

JP8: LCD Panel Power Selection

JP8	LCD Panel Power
1 2 3	3.3V
1 2 3	5V

JP9: Clear CMOS Setting

JP9	Setting
1 2 3	Normal
1 2 3	Clear CMOS

J17: CompactFlash Slave/Master Selection

J17	CF Setting
Short	Master
Open	Slave

Connectors on MI800

The connectors on MI800 allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on MI800 and their respective functions.

Connector Locations on MI800

FAN1: CPU Fan Power Connector
J7: Power LED Connector
J8: System Function Connector

CN8, CN9: Serial ATA Connectors
FAN2: System Fan Power Connector
IDE1: IDE Connector
PCI1: PCI Slot (supports 2 Master)

J13: SPI Debug Tools Port (Factory use only)
J19: Smart Battery Connector
J9, J10: LVDS Connectors (1st channel, 2nd channel)
J12, J15: LCD Backlight Connector

J1: HDD Power Connector (Output: Max. 2A)
J2: ATX_12V Connector
J3: Digital I/O
J4: COM1, COM2 Serial Ports
J5: COM3, COM4 Serial Ports
J6: Wake On LAN Connector

J11: USB5/6 Port Pin Header
J16: Audio Front Header
J18: SPDIF Out Connector

CN1: DC Jack (DC in, 12V or 19V)
CN2: PS/2 Keyboard and PS/2 Mouse Connectors
CN3: VGA and DVI Connector
CN5: 10/100 RJ-45 and USB1/2 Ports
CN6: GbE RJ-45 and USB3/4 Ports

CN7: Audio Connector
CN10: Mini PCI- E(x1) Connector (bottom side)
CN11: Compact Flash Connector (bottom side)

CN11

CN10: Mini PCI— E(x1) Connector
CN11: Compact Flash Connector

CN10

FAN1: CPU Fan Power Connector

FAN1 is a 3-pin header for the CPU fan. The fan must be 12V (Max. 500mA).

Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection

FAN2: System Fan Power Connector

FAN2 is a 3-pin header for system fans. The fan must be 12V (Max. 500mA).

Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection

CN1: DC Jack (DC in, 12V or 19V)

Remarks: CN1 and J2 connectors cannot be connected at the same time.

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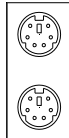
PS/2 Mouse

PS/2 Keyboard

Signal Name	Keyboard	Mouse	Signal Name
Keyboard data	1	1	Mouse data
N.C.	2	2	N.C.
GND	3	3	GND
5V	4	4	5V
Keyboard clock	5	5	Mouse clock
N.C.	6	6	N.C.

CN3: VGA and DVI Connectors
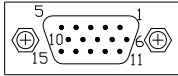
Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
VCC	9	10	GND
N.C.	11	12	DDCDATA
HSYNC	13	14	VSYNC
DDCCLK	15		
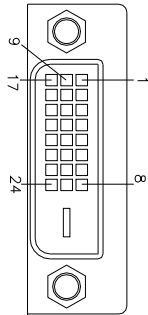
Signal Name	Pin #	Pin #	Signal Name
DATA 2-	1	16	HOT POWER
DATA 2+	2	17	DATA 0-
Shield 2/4	3	18	DATA 0+
DATA 4-	4	19	SHIELD 0/5
DATA 4+	5	20	DATA 5-
DDC CLOCK	6	21	DATA 5+
DDC DATA	7	22	SHIELD CLK
VSYNC	8	23	CLOCK -
DATA 1-	9	24	CLOCK +
DATA 1+	10		
SHIELD 1/3	11		
DATA 3-	12		
DATA 3+	13		
DDC POWER	14		
A GROUND 1	15		

CN5: 10/100 RJ-45 and USB1/2 Ports

CN6: GbE RJ-45 and USB3/4 Ports

CN7: Audio Connector

CN8, CN9: Serial ATA Connectors

CN10: Mini PCI- E(x1) Connector (bottom side)

CN11: Compact Flash Connector (bottom side)

PCI1: PCI Slot (supports 2 Master)

IDE1: IDE Connector
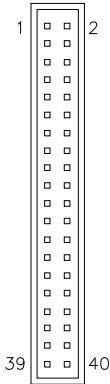
Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	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

J1: HDD Power Connector (Output: Max. 2A)

Pin #	Signal Name
1	+12V
2	Ground
3	Ground
4	5V

Note: +12V power is provided with 2A maximum load.

J2: ATX_12V Connector
J2 is a DC-in internal connector supporting +12V or +19V.
Remarks: CN1 and J2 connectors cannot be connected at the same time.

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

J3: Digital I/O
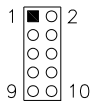
Signal Name	Pin	Pin	Signal Name
GND	1	2	VCC
OUT3	3	4	OUT1
OUT2	5	6	OUT0
IN3	7	8	IN1
IN2	9	10	IN0

J4: COM1, COM2 Serial Ports
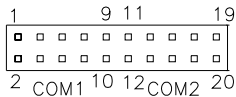
Pin #	Signal Name (RS-232)
1/11	DCD, Data carrier detect
3/13	RXD, Receive data
5/15	TXD, Transmit data
7/17	DTR, Data terminal ready
9/19	Ground
2/12	DSR, Data set ready
4/14	RTS, Request to send
6/16	CTS, Clear to send
8/18	RI, Ring indicator
10/20	No Connect.

*COM2 supports RS-232/422/485.

J5: COM3, COM4 Serial Ports
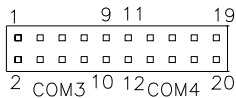
Pin #	Signal Name (RS-232)
1/11	DCD, Data carrier detect
3/13	RXD, Receive data
5/15	TXD, Transmit data
7/17	DTR, Data terminal ready
9/19	Ground
2/12	DSR, Data set ready
4/14	RTS, Request to send
6/16	CTS, Clear to send
8/18	RI, Ring indicator
10/20	No Connect.

J6: Wake On LAN Connector

J6 is a 3-pin header for the Wake On LAN function.

Pin #	Signal Name
1	+5VSB
2	Ground
3	-PME

J7: Power LED Connector

Pin #	Signal Name
1	Vcc
2	NC
3	PLED

J8: System Function Connector

Signal Name	Pin	Pin	Signal Name
5VDUAL	1	2	PS_ON
5V	3	4	HDD Active
Ground	5	7	Reset

ATX power on switch: Pins 1-2
HDD LED: Pins 3-4
Reset switch: Pins 5-6

J9, J10: LVDS Connectors (1st channel, 2nd channel)

The LVDS connectors on board consist of the first channel and second channel and supports 18-bit or 24-bit.
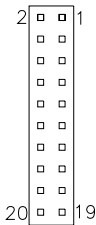
Signal Name	Pin #	Pin #	Signal Name
TX0-	2	1	TX0+
Ground	4	3	Ground
TX1-	6	5	TX1+
5V/3.3V	8	7	Ground
TX3-	10	9	TX3+
TX2-	12	11	TX2+
Ground	14	13	Ground
TXC-	16	15	TXC+
5V/3.3V	18	17	ENABKL
+12V	20	19	+12V

J11: USB5/6 Port Pin Header

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

J12, J15: LCD Backlight Connector

Pin #	Signal Name
1	+12V
2	Backlight Enable
3	Backlight ADJ
4	Ground

J12

Pin #	Signal Name
1	+12V
2	Backlight Enable
3	Ground

J15

J13: SPI Debug Tools Port (Factory use only)

J16: Audio Front Header
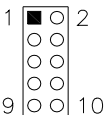
Signal Name	Pin #	Pin #	Signal Name
MIC2_L	1	2	Ground
MIC2_R	3	4	Presence#
Line2_R	5	6	MIC2_ID
Sense	7	8	NC
Line2_L	9	10	Line2_ID

J18: SPDIF Out Connector

Pin #	Signal Name
1	SPDIF out
2	Ground

J19: Smart Battery Connector
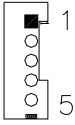
Pin #	Signal Name
1	PCIRST-
2	EMTSMI-
3	Ground
4	SMBDATA
5	SMBCLK

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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, Mar 23, 2007	Item Help
Time (hh:mm:ss)	00 : 00 : 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	
Video	EGA/VGA	
Halt On	All, Errors	
Base Memory	640K	
Extended Memory	514048K	
Total Memory	515072K	

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 PCI IDE connector provides Primary and Secondary
channels for connecting up to two IDE hard disks or other IDE devices.

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
  CYLS :   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
Remarks: The main board supports two serial ATA ports and are
represented in this setting as IDE Channel 0.

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

		ITEM HELP
CPU Feature	Press Enter	
Hard Disk Boot Priority	Press Enter	
Virus Warning	Disabled	Menu Level >
CPU L1 and L2 Cache	Enabled	
CPU L3 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	
Swap Floppy Drive	Disabled	
Boot Up Floppy Seek	Disabled	
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	
Report No FDD For WIN 95	No	
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 / L3 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
By default, this function is 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 *Floppy*, *LS120*, *Hard Disk*, *CDROM, ZIP100*, *USB-Floppy, USB-ZIP*, *USB-CDROM, LAN* and *Disable*.

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.

Swap Floppy Drive
This item allows you to determine whether or not to enable Swap Floppy Drive. When enabled, the BIOS swaps floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A. By default, this field is set to *Disabled.*

Boot Up Floppy Seek
This feature controls whether the BIOS checks for a floppy drive while booting up. If it cannot detect one (either due to improper configuration or its absence), it will flash an error message.

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 your operating system. 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*.

Report No FDD For WIN 95

If you are using Windows 95/98 without a floppy disk drive, select Enabled to release IRQ6. This is required to pass Windows 95/98's SCT test. You should also disable the Onboard FDC Controller in the Integrated Peripherals screen when there's no floppy drive in the system. If you set this feature to Disabled, the BIOS will not report the missing floppy drive to Win95/98.

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

		ITEM HELP
DRAM Timing Selectable	By SPD	
CAS Latency Time	Auto	Menu Level >
DRAM RAS# to CAS# Delay	Auto	
DRAM RAS# Precharge	Auto	
Precharge delay (tRAS)	Auto	
System Memory Frequency	Auto	
SLP_S4# Assertion Width	4 to 5 Sec	
System BIOS Cacheable	Enabled	
Video BIOS Cacheable	Disabled	
Memory Hole at 15M-16M	Disabled	
PCI Express Root Port Func	Press Enter	
** On-Chip VGA Setting **		
PEG/On Chip VGA Control	Auto	
On-Chip Frame Buffer Size	8MB	
DVMT Mode	DVMT	
DVMT/FIXED memory Size	128MB	
SDVO LVDS Protocol	1 ch 18 bit	
SDVO Panel Number	1024 x 768	
Boot Display	CRT	

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 configure CAS latency time in HCLKs as 2 or 2.5 or 3. 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.

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. The default setting for the Active to Precharge Delay is Auto.

Precharge Delay (tRAS)

The default setting for the Precharge Delay is *Auto*.

System Memory Frequency

The default setting is *Auto*.

SLP_S4# Assertion Width

The default setting is *4 to 5 Sec*.

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.

Video BIOS Cacheable

The Setting *Enabled* allows caching of the video BIOS ROM at C0000h-F7FFFh, resulting in better video 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
    SDVO LVDS Protocol: 1 ch 18 bit
    SDVO Panel Number: 1024 x 768
    Boot Display: CRT

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
Onboard Device	Press Enter	Menu Level >
SuperIO Device	Press Enter	
2nd SuperIO Device	Press Enter	

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device

IDE HDD Block Mode	Enabled	ITEM HELP
IDE DMA transfer access	Enabled	
On-chip Primary PCI IDE	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	
*** On-Chip Serial ATA Setting ***		
On-Chip Serial ATA	Auto	
SATA Port Speed Settings	Disabled	
PATA IDE Mode	Primary	
SATA port	P1, P3 is Secondary	

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device

USB Controller	Enabled	ITEM HELP
USB 2.0 Controller	Enabled	Menu Level >
USB Keyboard Function	Enabled	
Azalia AC97 Audio Select	Auto	

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	
Onboard FDC Controller	Disabled	
Onboard Serial Port 1	3F8/IRQ4	Menu Level >
Onboard Serial Port 2	2F8/IRQ3	
PWRON After PWR-Fail	Off	

Onboard Serial Port 3	2B0h	ITEM HELP
Serial Port 3 Use IRQ	IRQ11	Menu Level >
Onboard Serial Port 4	2B8h	
Serial Port 4 Use IRQ	IRQ10a	

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

On-chip Primary PCI IDE Enabled

This field, by default, is enabled

OnChip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately.

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*.

On-Chip Serial ATA Setting
The fields under the SATA setting includes SATA Mode (IDE), On-Chip Serial ATA (Auto), PATA IDE Mode (Secondary) and SATA Port (PO, P2 is Primary).

USB 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 Function
By default, the USB keyboard function is set to **Enabled**.

Azalia AC97 Audio Select
This field, by default, is set to **Auto**. The selections are *Azalia*, *AC97 Audio and Modem*, *AC97 Audio only, AC97 Modem only*, and *All Disabled*.

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 FDD Controller
By default, this field is disabled.

Onboard Serial Port
These fields allow you to select the onboard serial 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.

Power Management Setup

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup

ACPI Function	Enabled	ITEM HELP
ACPI Suspend	S1(POS)	
RUN VGABIOS if S3 Resume	Auto	Menu Level >
Power Management	User Define	
Video Off Method	DPMS	
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	
Wake-Up by PCI Card	Disabled	
Power On by Ring	Disabled	
USB KB Wakeup from S3	Disabled	
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	

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)*.

RUN VGABIOS if S3 Resume
The default setting of this field is *Auto*.

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.

Wake up by PCI Card

By default, this field is disabled.

Power On by Ring

This field enables or disables the power on of the system through the modem connected to the serial port or LAN.

USB KB Wakeup from S3

By default, this field is disabled.

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

		ITEM HELP
Init Display First	PCI Slot	
Reset Configuration Data	Disabled	Menu Level
Resources Controlled By	Auto (ESCD)	Select Yes if you are
IRQ Resources	Press Enter	using a Plug and Play
		capable operating
PCI Express relative items		system Select No if
Maximum Payload Size	4096	you need the BIOS to
		configure non-boot
		devices

Init Display First
The default setting is *PCI Card*.

Reset Configuration Data
This field allows you to determine whether to reset the configuration data or not. 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 4096.

PC Health Status

This section shows the parameters in determining the PC Health Status. These parameters include temperatures, fan speeds and voltages.

Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status

		ITEM HELP
Shutdown Temperature	Disabled	
CPU Warning Temperature	Disabled	
System Temp	45°C/113°F	
CPU TEMP	45°C/113°F	Menu Level >
FAN2 Speed	5400 RPM	
FAN1 Speed	5400 RPM	
Vcore(V)	1.02 V	
+12 V	1.32 V	
Vmem	1.8V	
+5V	5.25 V	
3.3V	3.37V	
VBAT (V)	3.21 V	
5VSB(V)	5.67 V	
Smart Fan 1		
1st Smart Fan Temperature	Disabled	
2nd Smart Fan Temperature	Disabled	

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.

Temperatures/Voltages

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

Smart Fan Temperature

There are two smart fan functions available. When enabled, the user is allowed to set a threshold temperature which determines when the CPU/system fan would stop rotating.

Frequency/Voltage Control

This section shows the user how to configure the processor frequency.

Phoenix - AwardBIOS CMOS Setup Utility
Frequency/Voltage Control

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

Auto Detect PCI Clk

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

Spread Spectrum Modulated

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 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.

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 motherboard. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

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 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.

1. Insert the CD that comes with the board. Click *Intel Chipsets* and then *Intel(R) I945G/GC Chipset 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 Readme Information screen, click *Next* to continue the installation.

6. The setup process will be in progress. When Setup completed, click *Finish* to restart the computer and for changes to take effect.

VGA Drivers Installation

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

1. Insert the CD that comes with the board. Click **Intel Chipsets** and then **Intel(R) I945G/GC Chipset Drivers**. Click **Intel(R) I945G/GC Chipset Family Graphics Driver.**
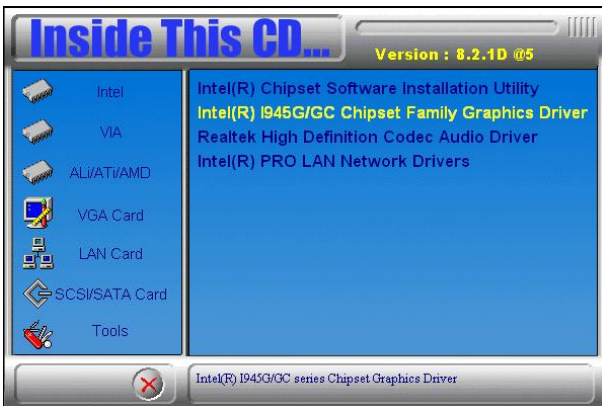
2. When the Welcome screen appears, click *Next* to continue.

3. Click *Yes* to to agree with the license agreement and continue the installation.

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.

AC97 Codec Audio Driver Installation

Follow the steps below to install the Realtek AC97 Codec Audio Drivers.

1. Insert the CD that comes with the motherboard. Click *Intel Chipsets* and then *Intel(R) I945G/GC Chipset Drivers*. Click *Realtek AC'97 Codec Audio Driver.*
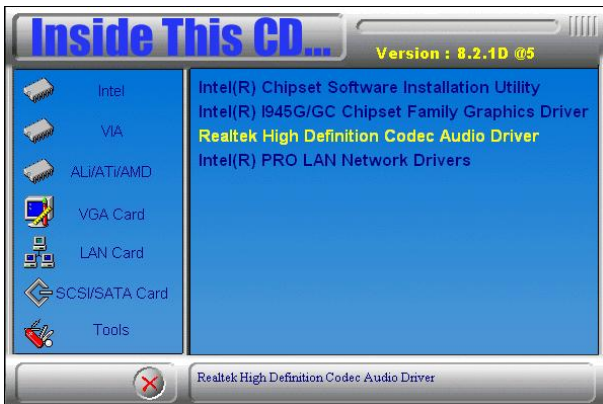
2. When the Welcome screen appears, click *Next* to continue.
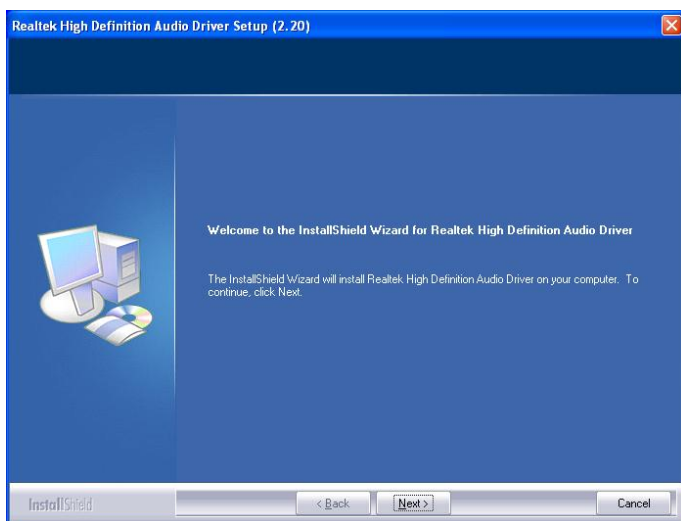
3. Setup has finished installing Realtek High Definition Audio Driver on your computer. Click *Finish* to restart the computer and for changes to take effect.

LAN Drivers Installation

Follow the steps below to install the **Intel 82574L LAN Drivers**.

1. Insert the CD that comes with the board. Click *LAN Card* and then *Intel(R) PRO 82574L LAN Drivers*.
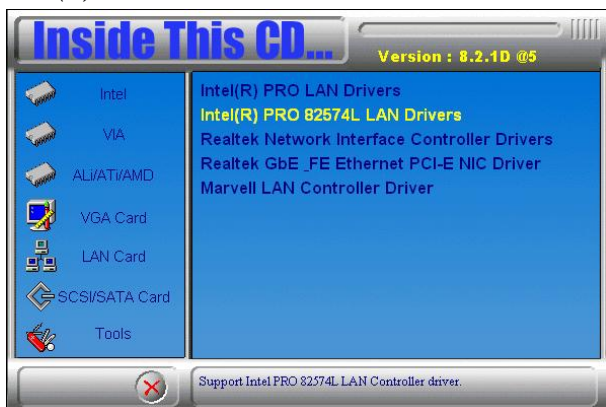
2. In the next screen, click *Install Drivers*.
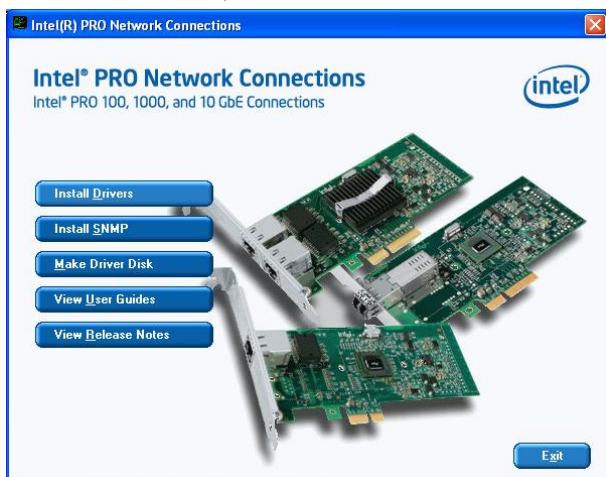
3. In the Welcome screen to the InstallShield Wizard for Intel(R) Network Connections, click *Next*.

4. In the License Agreement screen, click *Next* to accept the terms in the license agreement.

5. In the Setup Options screen, click the checkbox of Drivers to select it and then click *Next*.
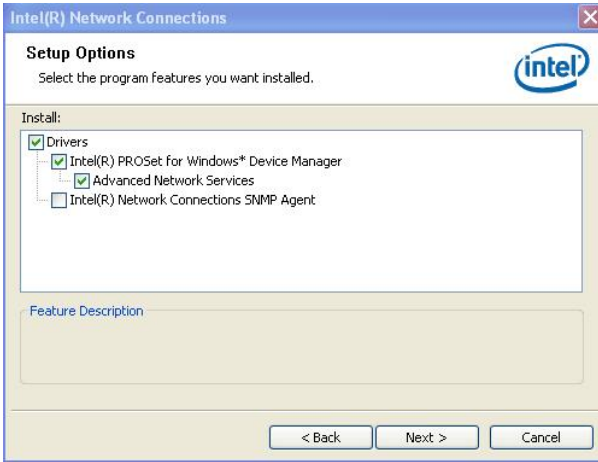
6. Click *Next* to begin installation of the drivers.

7. When the InstallShield Wizard is completed, click *Finish*.
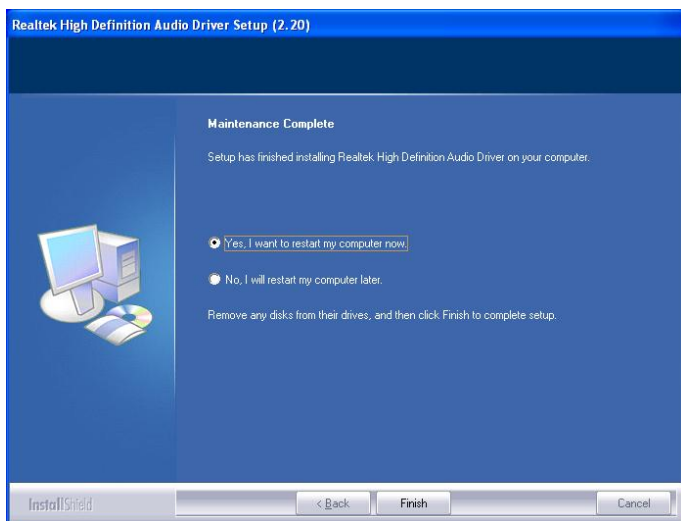
Follow the steps below to install the **Intel PRO LAN Network Drivers**.

1. Insert the CD that comes with the motherboard. Click *Intel Chipsets* and then *Intel(R) I945G/GC Chipset Drivers*. Click *Intel® PRO LAN Network Drivers.*

2. In the next screen, click *Install Drivers*.
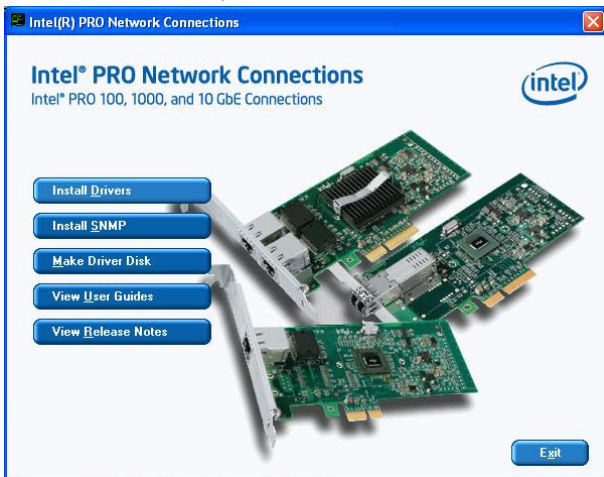
2. In the Welcome screen, click *Next*. In the License Agreement screen, click *Next* to accept the agreement and continue the Setup process. In the Setup Type screen of the InstallShield Wizard, select *Complete* and click *Next* to go to *Ready to Install the Program* screen. Click *Install*.
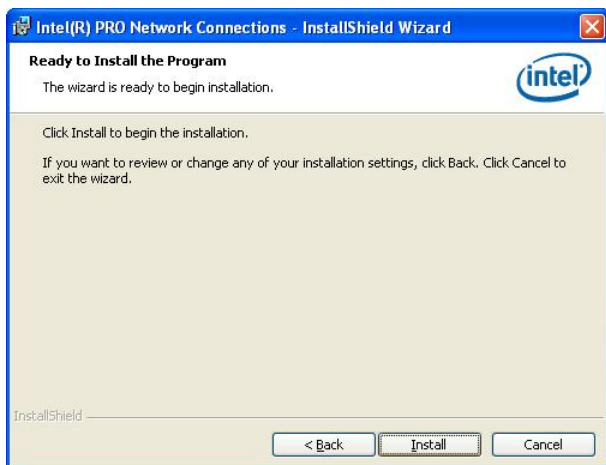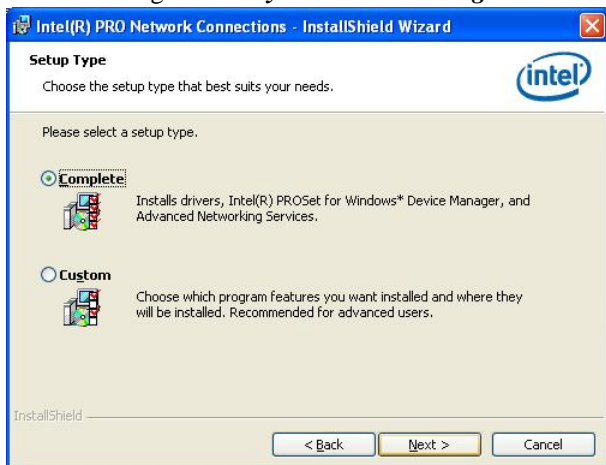
3. When the Installation is complete, click *Finish*.

Appendix

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which 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
278 - 27F	Parallel Port #2(LPT2)
2F8h - 2FFh	Serial Port #2(COM2)
2B0 - 2DF	Graphics adapter Controller
378h - 3FFh	Parallel Port #1(LPT1)
360 - 36F	Network Ports
3B0 - 3BF	Monochrome & Printer adapter
3C0 - 3CF	EGA adapter
3D0 - 3DF	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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// 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;
}
//=============================================================================




//=============================================================================
//
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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
```