MI920

Intel® Celeron® M 910GML

Intel® Pentium® M/915GME

Mini-ITX Motherboard

USER'S MANUAL

Version 1.0B

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Introduction

Product Description

The MI920 Mini ITX board incorporates the Mobile Intel® 910GML/915GME Express Chipset for Embedded Computing, consisting of the Intel® 910GML/915GME Graphic Memory Controller Hub (GMCH) and Intel® I/O Controller Hub 6-M (ICH6-M), is an optimized integrated graphics solution with a 400/533MHz front-side bus.

The integrated 32-bit 3D graphics engine, based on Intel® Graphics Media Accelerator 900 (Intel® GMA 900) architecture, operates at core speeds of up to 320 MHz. It features a low-power design, is validated with Intel® Pentium M/Celeron® M processors on 130nm or 90nm process. With one DIMM socket on board, the board supports up to 1GB of DDR2 system memory (400MHz for 910GML, 400/533MHz for 915GME chipset).

Intel® Graphics supports a unique intelligent memory management scheme called Dynamic Video Memory Technology (DVMT). DVMT handles diverse applications by providing the maximum availability of system memory for general computer usage, while supplying additional graphics memory when a 3D-intensive application requests it. The Intel GMA 900 graphics architecture also takes advantage of the high-performance Intel processor. Intel GMA 900 graphics supports Dual Independent Display technology.

The main features of the board are:
- Supports Celeron® M processors, 400MHz FSB (910GML chipset)
- Supports Socket 479, 533/400MHz FSB (915GME chipset)
- One DDRII SDRAM DIMM supports up to 1GB of DDR2 400MHz (910GML chipset), DDR2 400/533MHz (915GME chipset)
- Onboard 10/100 BaseT and Marvell PCI-Express Gigabit LAN
- Intel® 915 Express VGA for CRT, SDVO port supports LVDS and DVI / LVDS
- 2x SATA, 6x USB 2.0, 4x COM, Watchdog timer
- 1x PCI, 1x MiniPCIe, CF socket, DC-in for +12V input

Dimensions of the board are 170mm x 170mm.

Ordering Information:
MI920F: Socket 479, 915GME, ICH6M, supports DVI, LVDS, 1x 10/100 LAN, 1x Gigabit LAN, Mini PCI-E
MI920L-C6K: Celeron M 600M/512K , 910GML, ICH6M, supports DVI, LVDS, 1x 10/100 LAN
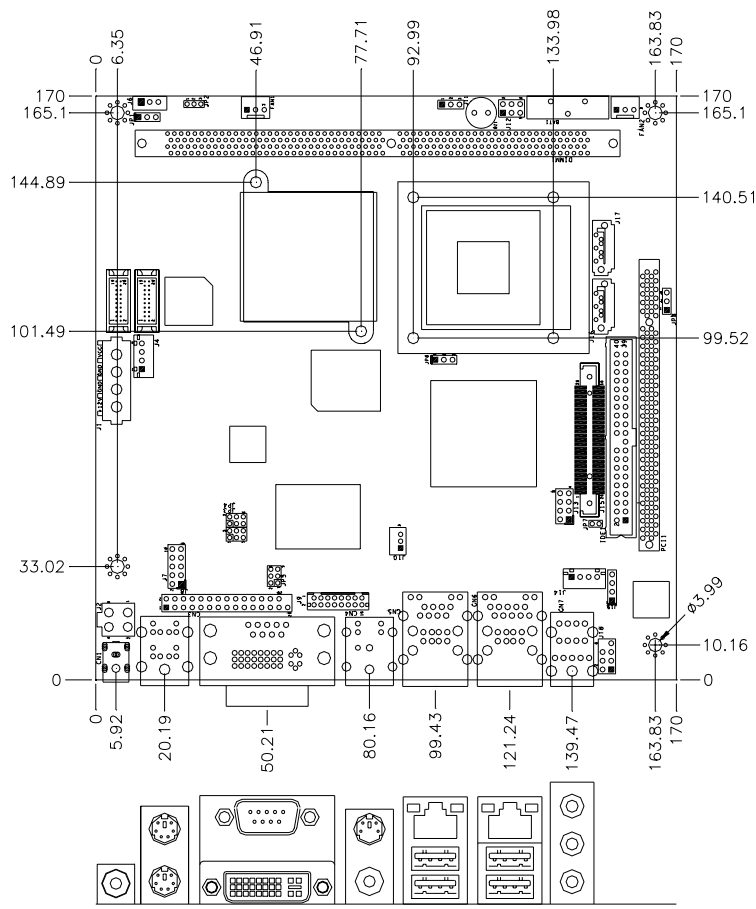
Checklist

Your MI920 package should include the items listed below.

- The MI920 Celeron® M Mini-ITX motherboard
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Cable kit (IDE, Serial port, Serial ATA, VGA)

MI920 Specifications

Form Factor	Mini ITX
CPU Type	Intel Celeron M / Pentium M (on Socket 479) processor (Banias or Dothan core): - Banias: ULV Celeron M 600MHz (512KB L2 Cache), - Dothan: Zero L2 cache Celeron M 1GHz or Celeron M 373
CPU Voltage	0.700V ~ 1.708V
CPU FSB	400MHz (910GML); 400/533MHz (915GME)
CPU Socket	Socket 479 co-layout with micro-FCBGA
Chipset	Intel 910GML/915GME chipset ICH6M: 82801FBM
BIOS /APM	Award BIOS, support ACPI Function & APM1.2
Memory	DDRII 400/533 SDRAM DIMM socket x1 (w/o ECC function), Max. 1GB
VGA	910GML built-in, supports dual display with CRT, LVDS & TV-Out
DVI	Chrontel CH7307 x1 for DVI
LVDS	Chrontel CH7308 x1 for 18 or 24-bit single/dual channel LVDS
LAN	LAN1: ICH6M built-in 10/100BT MAC + Intel 82562ET PHY Optional LAN2: Marvell 88E8053 PCI Express Gigabit LAN controller
USB	ICH6M built-in USB 2.0 host controller, support 6 ports
Serial ATA	ICH6M built-in SATA controller, supports 2 ports
Parallel IDE	ICH6M built-in one channel Ultra DMA 33/66/100 for IDE & CF
Audio	ICH6M built-in Audio controller + AC97 Codec ALC655 w/ 6 channels (Line-out, Line-in & Mic.) + ADI SSM2304 4ohm 2W, class D, stereo audio power amplifier (note: 1.4W for 8 ohm)
LPC I/O	Winbond W83627EHG: PS/2 Keyboard/Mouse, 2x serial (RS232) & Hardware monitor (3 thermal inputs, 4 voltage monitor inputs, VID0-4 & 2 fan headers)
2nd I/O	Fintek F81216DG x1 for COM3, 4 (RS-232)
Expansion Slots	PCI (33MHz/32-bit) slot x1 Optional Mini PCI-express (1 lane) socket x1 (for wireless module)
Edge Connectors	DC-in power connector (Jack type) x1 PS/2 stack connector x1 for keyboard/mouse DVI + DB9 stack connector x1 for DVI & COM 1 RJ45 (10/100) + dual USB stack connector x1 for LAN1 & USB1, 2 S-Video connector x1 for S-Video RJ45 (GbE) + dual USB stack connector x1 for LAN2 & USB3, 4 *** Option with dual USB stack connector (LAN2 option) 3x1 phone jack stack connector x1 for Audio (Line-Out, Line-In & Mic)
Onboard Headers / Connectors	Compact flash socket (vertical type) x1 @component side SATA connector x2 for 2 SATA ports DF13-20 (20-pin) header x2 for LVDS 15 pins pin-header x1 for VGA 40 pins box-header x1 for IDE 30 pins pin-header x1 for COM2~4 8 pins pin-header x1 for USB 5~6 3 pins pin-header x1 for power LED 6 pins pin-header x1 for Reset, HDD LED & power button
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec/min)
System Voltage	+5V, +3.3V, +12V, -12V, 5VSB
Other	LAN Wakeup
Digital I/O	4 in + 4 out (TTL level)
Power In / Out	Power Input: +12V DC power input Power Output: 4-pin power connector x1 for HDD/CD-ROM/DVD
Board Size	170mm x 170mm

Board Dimensions

Installations

This section provides information on how to use the jumpers and connectors on the MI920 in order to set up a workable system. The topics covered are:
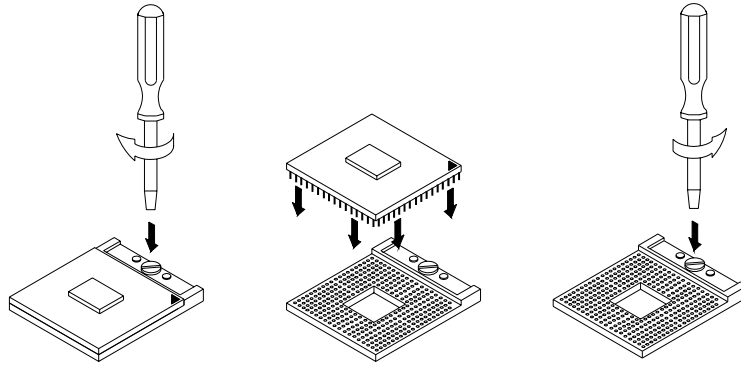
Installing the CPU

The MI920 board supports a Socket 479 processor socket for Intel®
Pentium® M or Celeron® M processors.

The processor socket comes with a screw to secure the processor. As
shown in the left picture below, loosen the screw first before inserting
the processor. Place the processor into the socket by making sure the
notch on the corner of the CPU corresponds with the notch on the inside
of the socket. Once the processor has slide into the socket, fasten the
screw. Refer to the figures below.

NOTE: *Ensure that the CPU heat sink and the CPU top surface are in
total contact to avoid CPU overheating problem that would
cause your system to hang or be unstable.*

Installing the Memory

The MI920 board supports one DDR2 memory socket for a maximum total memory of 1GB 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.
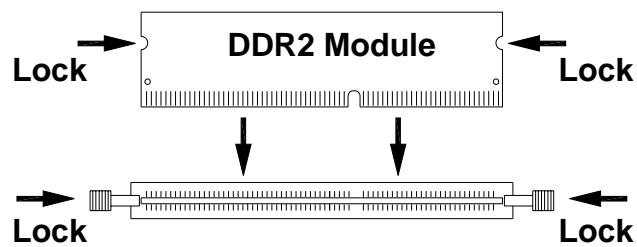
Setting the Jumpers

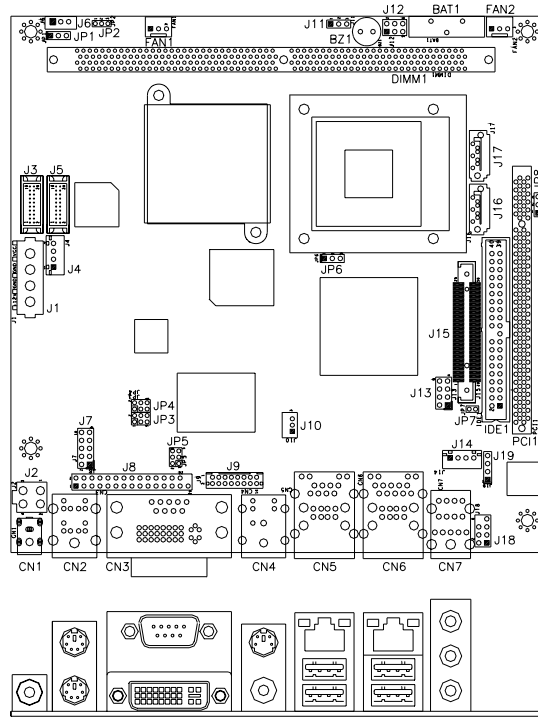Jumpers are used on MI920 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on MI920 and their respective functions.

Jumper Locations on MI920

JP1: LCD Panel Power Selection

JP1	LCD Panel Power
1 2 3	3.3V
1 2 3	5V

JP8: Clear CMOS Setting

JP8	Setting
1 2 3	Normal
1 2 3	Clear CMOS

JP7: CompactFlash Slave/Master Selection

JP7	CF Setting
Short	Master
Open	Slave

JP2: ATX/AT Mode Select

JP2	ATX / AT
1 2 3	ATX mode
1 2 3	AT mode

JP3: COM3 RS232 +5V / +12V Power Setting

Pin #	Signal Name	JP3	Signal Name	Pin #
1	RI		+12V	2
3	RI (Default)		RI (Default)	4
5	RI		+5V	6
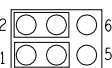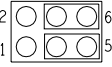
COM3 Settings: Pin 1-2 short = +12V, Pin 5-6 short = +5V, Pin 3-4 Standard COM Port

JP4: COM4 RS232 +5V / +12V Power Setting

Pin #	Signal Name	JP4	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

JP5: VGA/DVI DDCDATA and DDCCLK Signal Select

JP5	VGA/DVI Select
	VGA
	DVI

JP6: CPU FSB Selection (915GME only)

JP6	FSB
	400MHz
	533MHz

Connectors on MI920

The connectors on MI920 allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on MI920 and their respective functions.

Connector Locations on MI920

FAN1: CPU Fan Power Connector

FAN1 is a 3-pin header for the CPU fan. The fan must be a 12V fan.

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 (500mA).

Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection
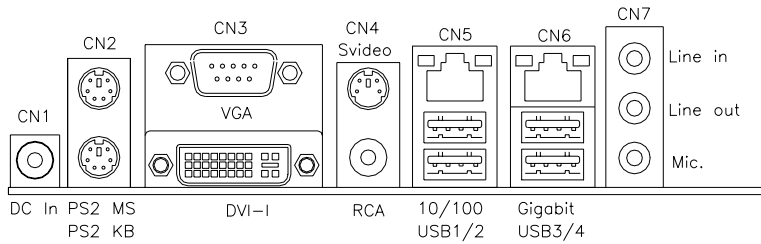
CN1: DC Jack (DC in, 12V only)

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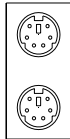
PS/2 Mouse

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.
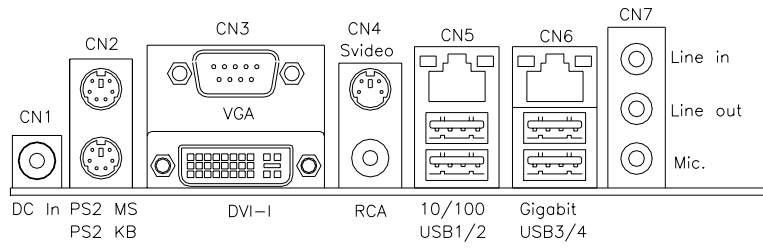
CN3: COM1 and DVI-I Connector
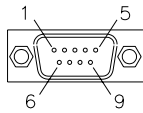
Signal Name	Pin #	Pin #	Signal Name
DCD	1	6	DSR
RXD	2	7	RTS
TXD	3	8	CTS
DTR	4	9	RI
GND	5	10	Not Used
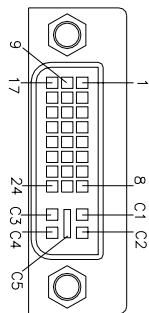
Signal Name	Pin #	Pin #	Signal Name
DATA 2-	1	16	HOT POWER
DATA 2+	2	17	DATA 0-
Shield 2/4	3	18	DATA 0+
DATA 4-	4	19	SHIELD 0/5
DATA 4+	5	20	DATA 5-
DDC CLOCK	6	21	DATA 5+
DDC DATA	7	22	SHIELD CLK
VSYNC	8	23	CLOCK -
DATA 1-	9	24	CLOCK +
DATA 1+	10	C1	A RED
SHIELD 1/3	11	C2	A GREEN
DATA 3-	12	C3	A BLUE
DATA 3+	13	C4	HYNC
DDC POWER	14	C5	A GROUND2
A GROUND 1	15	C6	A GROUND3

CN4: S-Video and RCA Connector for TV out

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

CN6: GbE RJ-45 and USB3/4 Ports

CN7: Audio Connector

J1: HDD Power Connector
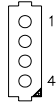
Pin #	Signal Name
1	+12V
2	Ground
3	Ground
4	5V

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

J2: ATX_12V Connector

J2 can be used in situations where the 12V current from the ATX power is insufficient to supply needed current.

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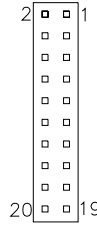
IDE1: IDE Connector
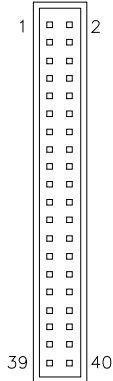
Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground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

J3, J5: LVDS Connectors (1st channel, 2nd channel)

The LVDS connectors on board consist of the first channel (J3) and second channel (J5) 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

J6: LCD Backlight Connector

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

J7: Digital I/O
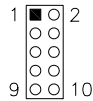
Signal Name	Pin	Pin	Signal Name
GND	1	2	VCC
OUT3	3	4	OUT1
OUT2	5	6	OUT0
IN3	7	8	IN1
IN2	9	10	IN0

J8: COM2, COM3, COM4 Serial Ports
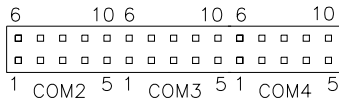
Pin #	Signal Name (RS-232)
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	Ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator
10	No Connect.

J9: VGA Connector
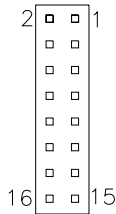
Signal Name	Pin #	Pin #	Signal Name
+5V	2	1	RED
Ground	4	3	GREEN
N.C.	6	5	BLUE
SDA	8	7	N.C.
HSYNC	10	9	Ground
VSYNC	12	11	Ground
SCL	14	13	Ground
N.C.	16	15	Ground

J10: Wake On LAN Connector

J10 is a 3-pin header for the Wake On LAN function. Wake On LAN will function properly only with an ATX power supply with 5VSB that has 200mA.

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

J11: Power LED Connector

Pin #	Signal Name
1	Vcc
2	NC
3	PLED

J12: 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

J13: 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

J14: Speaker Connector
The J14 connector supports 2W/8ohm stereo audio power amplifier.
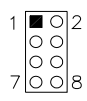
Pin #	Signal Name
1	Audio L
2	Ground
3	Ground
4	Audio R

J15: Compact Flash Connector

J16, J17: Serial ATA Connectors

J18: Front Audio Connector

Signal Name	Pin	Pin	Signal Name
Rear Audio R	1	5	Rear Audio L
Front Audio R	2	6	Front Audio L
Mic In	3	7	VREF Out
Ground	4	8	

REMARKS: To use the front audio connector, the jumpers on pin 1-3 and pin 2-4 must be removed.

J19: CD-In Pin Header

Pin #	Signal Name
1	CD Audio R
2	Ground
3	Ground
4	CD Audio L

PCI1: PCI Slot (supports 2 Master)

U38: Mini PCI- E(x1) Connector (bottom side)

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

		Item Help
Date (mm:dd:yy)	Fri, Mar 23, 2007	
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 , But Keyboard	
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
┌─────────────────────────────────────────────┬──────────────────────┐
│ CPU Feature                    Press Enter   │      ITEM HELP       │
│ Hard Disk Boot Priority        Press Enter   │                      │
│ Virus Warning                  Disabled      │ Menu Level  >        │
│ CPU L1 and L2 Cache            Enabled       │                      │
│ Quick Power On Self Test       Enabled       │                      │
│ First Boot Device              Hard Disk     │                      │
│ Second Boot Device             CDROM         │                      │
│ Third Boot Device              USB-FDD       │                      │
│ Boot Other Device              Enabled       │                      │
│ Boot Up NumLock Status         On            │                      │
│ Gate A20 Option                Fast          │                      │
│ Typematic Rate Setting         Disabled      │                      │
│ Typematic Rate (Chars/Sec)     6            │                      │
│ Typematic Delay (Msec)         250           │                      │
│ Security Option                Setup         │                      │
│ APIC Mode                      Enabled       │                      │
│ MPS Version Control for OS     1.4           │                      │
│ OS Select For DRAM>64MB        Non-OS2       │                      │
│ Small Logo (EPA) Show          Disabled      │                      │
└─────────────────────────────────────────────┴──────────────────────┘
```

CPU Feature

Press Enter to configure the settings relevant to CPU Feature.

Hard Disk Boot Priority

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

Virus Warning

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

CPU L1 and L2 Cache

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

Quick Power On Self Test

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

First/Second/Third Boot Device

These fields determine the drive that the system searches first for an operating system. The options available include *LS120*, *Hard Disk*, *CDROM, ZIP100*, *USB-FDD, USB-ZIP*, *USB-CDROM, 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.

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*.

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	3	Menu Level >
DRAM RAS# to CAS# Delay	3	
DRAM RAS# Precharge	3	
Precharge delay (tRAS)	9	
System Memory Frequency	400MHZ	
SLP_S4# Assertion Width	1 to 2 Sec	
System BIOS Cacheable	Enabled	
Video BIOS Cacheable	Ensabled	
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	LVDS + DVI	
SDVO LVDS Protocol	1CH SPGW, 24bit	
SDVO Panel Number	1024x768	
Boot Display	CRT+DVI	
Panel Scaling	Auto	
TV Standard	Off	
Video Connector	Automatic	
TV Format	Auto	
Onboard PCI-E LAN	Enable	
LAN PXE Option ROM	All Disable	

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 3 or 4 or 5. 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 *3*.

Precharge Delay (tRAS)
The default setting for the Precharge Delay is *9*.

System Memory Frequency
The default setting is *400MHz*.

SLP_S4# Assertion Width
The default setting is *1 to 2 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: DVTM
    DVMT/Fixed Memory Size: 128MB
    SDVO Device Setting: LVDS+DVI
    SDVO LVDS Protocol: 1Ch SPGW, 24bit
    SDVO Panel Number: 1024x768
    Boot Display: CRT+DVI
    Panel Scaling: Auto
    TV Standard: Off
    Video Connector: Automatic
    TV Format: Auto

Panel Scaling

The default setting is *Auto*. The options available include *On* and *Off*.

Onboard PCI-E LAN

By default, this setting is enabled.

LAN PXE Option ROM

By default, this setting is All Disabled. The options available include All Disabled and ICH6 integrated Lan.

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
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 ***		
SATA Mode	IDE	
On-Chip Serial ATA	Auto	
PATA IDE Mode	Secondary	
SATA port	P0, P2 is Primary	

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device

USB Controller	Enabled	ITEM HELP
USB 2.0 Controller	Enabled	Menu Level >
USB Keyboard Support	Ensabled	
Azalia/AC97 Audio Select	Auto	

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device

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

Phoenix - AwardBIOS CMOS Setup Utility
2nd SuperIO Device

		ITEM HELP
Onboard Serial Port 3	2B0H	
Serial Port 3 Use IRQ	IRQ11	Menu Level >
Onboard Serial Port 4	2B8H	
Serial Port 4 Use IRQ	IRQ10	

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.

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 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 Support
The options for this field are *Enabled* and *Disabled*. By default, this field is set to *Enabled*.

Azalia/AC97 Audio Select
This field, by default, is set to *Auto*.

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 ports and their addresses. The default values for these ports are:

Serial Port 1	3F8/IRQ4
Serial Port 2	2F8/IRQ3
Serial Port 3	2B0/IRQ11
Serial Port 4	2B8/IRQ10

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

ACPI Function	Enabled	ITEM HELP
ACPI Suspend	S1(POS)	Menu Level >
RUN VGABIOS if S3 Resume	Auto	
Power Management	User Define	
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	
Wake-Up by PCI Card	Disabled	
Power On by Ring	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	Enabled	
Primary IDE 1	Enabled	
Secondary IDE 0	Enabled	
Secondary IDE 1	Enabled	
FDD, COM, LPT Port	Enabled	
PCI PIRQ[A-D] #	Enabled	

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

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

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. The default setting is *Yes*.

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.

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)	
IRQ Resources	Press Enter	Select Yes if you are using a Plug and Play capable operating system Select No if you need the BIOS to configure non-boot devices
PCI/VGA Palette Snoop	Disabled	
INT Pin 1 Assignment	Auto	
INT Pin 2 Assignment	Auto	
INT Pin 3 Assignment	Auto	
INT Pin 4 Assignment	Auto	
INT Pin 5 Assignment	Auto	
INT Pin 6 Assignment	Auto	
INT Pin 7 Assignment	Auto	
INT Pin 8 Assignment	Auto	
PCI Express relative items		
Maximum Payload Size	4096	

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

Shutdown Temperature	Disabled	ITEM HELP
CPU Warning Temperature	Disabled	
Current System Temp	45°C/113°F	Menu Level >
Current CPU Temp	45°C/113°F	
FAN2 Speed	5400 RPM	
FAN1 Speed	5400 RPM	
Vcore	0.94 V	
+12 V	11.92 V	
+1.8V	1.83V	
+5 V	5.25 V	
+3.3V	3.37V	
VBAT (V)	3.21 V	
5VSB(V)	5.50 V	
Smart FAN1 Temperature	Disabled	
FAN1 Tolerance Value	1	

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.

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 FAN1 Temperature

This field enables or disables the smart fan feature. At a certain temperature, the fan starts turning. Once the temperature drops to a certain level, it stops turning again.

FAN1 Tolerance Value

The default value is 1.

Frequency/Voltage Control

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

Auto Detect PCI Clk	Disabled	ITEM HELP
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.

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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 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) 915GME Chipset Drivers**.

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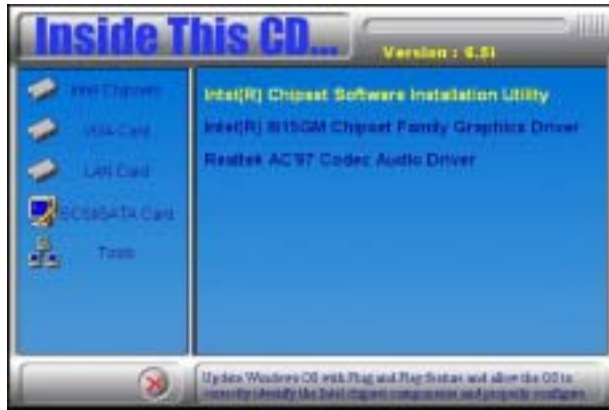
3. When the Welcome screen appears, click *Next* to continue.

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 is now complete. Click *Finish* then restart the computer and for changes to take effect. When the computer has restarted, the system will be able to find some devices. Restart your computer when prompted.

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 motherboard. Click *Intel Chipsets* and then *Intel(R) 915GME Chipset Drivers*.

2. Click *Intel(R) 915GME Chipset Family Graphics Driver.*
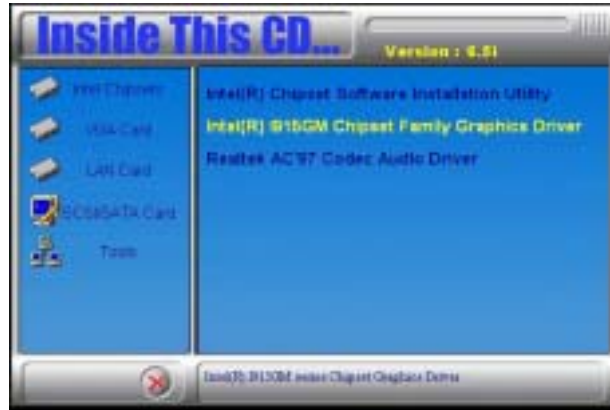
3. When the Welcome screen appears, click *Next* to continue.

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

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.

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 Chipsets* and then *Intel(R) 915GME Chipset Drivers*.

2. Click *Realtek AC'97 Codec Audio Driver.*

3. Click *Finish* to restart the computer and for changes to take effect. .

LAN Drivers Installation

Follow the steps below to complete the installation of the Intel PRO LAN drivers.

1. Insert the CD that comes with the motherboard. Click *LAN Card* and then *Intel(R) PRO LAN Drivers*.

2. Click *Install Base Software* to continue.

3. When prompted, please to restart the computer for new settings 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 Driver*.

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

3. Click Next to agree with the license agreement.

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

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

Appendix

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses 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
}
//=====================================================================
```

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

        W627EHF_BASE = 0x2E;
        result = W627EHF_BASE;

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

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

        W627EHF_BASE = 0x00;
        result = W627EHF_BASE;

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

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




//==============================================================================
//
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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.
//
//==============================================================================
#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
```