ET820

Intel Atom 945GSE
ETX CPU Module

USER'S MANUAL

Version 1.0

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Introduction

Product Description

The ET820 is an ETX CPU module based computer that is configured with the Intel Atom processor N270 at 1.6GHz, FSB533 and the Mobile Intel 945GSE Express Chipset with the ICH7M.

System memory is provided by a SO-DIMM socket that supports up to 2GB of DDR memory. The on board Award BIOS facilitates easy system configuration and peripheral setup. Other features include two SATA ports, two RS232 serial ports, one parallel port, four USB ports support, watchdog timer and PCI to ISA bridge. Board size is 95mm by 114mm.

The ET820 has four board-to-board high-density interface connectors for I/O signals that plug onto baseboards specific to customer's applications. ETX embedded solutions provide fast time-to-market through the interchangeability and scalability of both the ETX module and the baseboard.

ETX stands for Embedded Technology extended, a technology or form factor that offers flexible time-to-market solution, enabling product development time to shrink from four months to just four weeks. It also features low power consumption and low heat emission, eliminating the need for a CPU fan.

Below are the main features of the ET820 ETX CPU module.

● Supports Intel Atom processor N270 at 1.6GHz, FSB533
● DDR2 SO-DIMM 533/667 for advanced system performance
● Integrated Intel® Graphic Media Accelerator 950
● Chrontel CH7308 Dual channel LVDS
● Integrated ICH7M 10/100 BaseT Ethernet
● SATA x2, USB 2.0 x4, COM x2, PCI x4

Checklist

Your ET820 package should include the items listed below.

- The ET820 CPU Module
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Serial ATA cable
- Heat spreader

ET820 Specifications

Form Factor	ETX 3.0 CPU module
CPU Type	Intel New architecture CPU on 45nm processor - Intel® Atom™ processor N270 (code name Diamondville SC processor)
CPU Voltage	0.700V ~ 1.5V
CPU Operate Frequency	CPU Clock speed = 1.60GHz FSB=533MHz L2 Cache=512K Cores/Treads=1/2 threads. TDP=2.5W
Cache	2MB
Green /APM	APM1.2
Chipset	Intel 945GSE Chipset GMCH: 82945GSE 27 mm x 27 mm -998-pin FCBGA ICH7M: 82801GBM 31mm x 31mm -652-pin BGA
BIOS	Award BIOS, support ACPI function
Memory	DDRII 667/533 SO-DIMM x1 (w/o ECC function), Max. 2GB
VGA	945GSE built-in, Intel® Graphics Media Accelerator 950 Graphics Core, Supports CRT & 24 bits single/dual channels LVDS interface
LVDS	Chrontel ch7308 24-bit single/dual channel display
LAN	ICH7M built-in 10/100BT MAC + Intel EP82562ET PHY
USB	ICH7M built-in USB 2.0 host controller, supports 4 ports
Serial ATA Ports	ICH7M built-in SATA controller, supports 2 ports
Parallel IDE	ICH7M built-in one channel Ultra DMA 33/66/100 for HDDs, CF or DOM on carrier board
2nd IDE	JMicron JM368 (PCI-e to IDE) x1 for 2nd IDE (reserved)
LPC I/O	Winbond W83627EHG: COM1, COM2 (RS232), & Hardware monitor (3 thermal inputs, 3 voltage monitor inputs)
Audio	ICH7M built-in audio controller + HD Codec ALC662 (Line-out, Line-in, Mic.)
RTC	ICH7M built-in RTC with on board battery
PCI to ISA	ITE IT8888G x1 (slave ISA only)
Watch-Dog Timer	Yes (256 segments, 0, 1, 2…255. sec/min)
Connector to Carrier Board	Hirose FX8-100P-SV ETX connector x4 for PCI bus, USB, audio, VGA/CRT, LVDS, LAN, COM ports, parallel port, IDE, PS/2 Keyboard/Mouse & ISA bus
Power	+5V, 5VSB & 3V for RTC
RoHS Compliant	Yes
Board Size	95mm x 114mm

IMPORTANT NOTE:

Before installing the heatsink, the four (4) pieces of protective sheaths on the thermal pads should be removed first. Please refer to the following pictures:
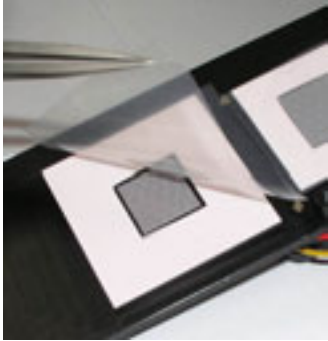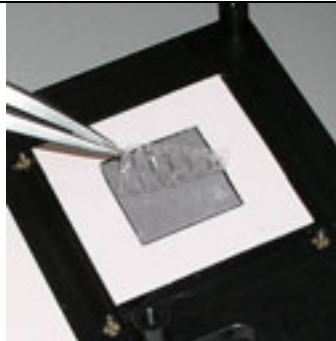

Chipset thermal pad 1
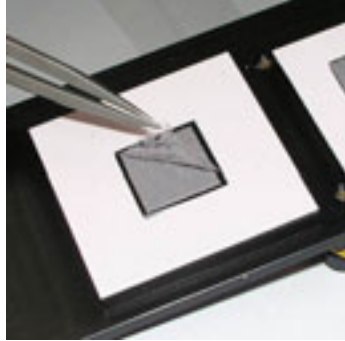
Chipset thermal pad 2
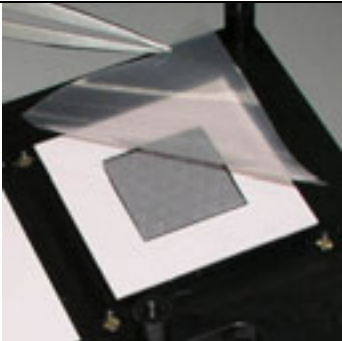
CPU thermal pad 1

CPU thermal pad 2

Board Dimensions
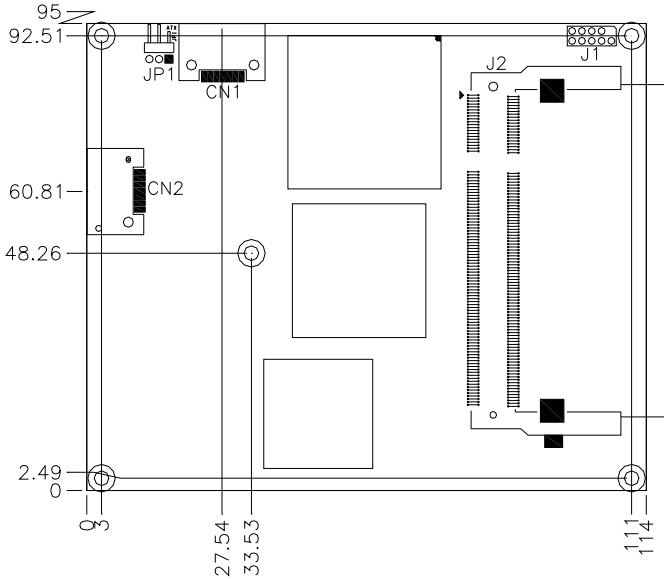
Top View
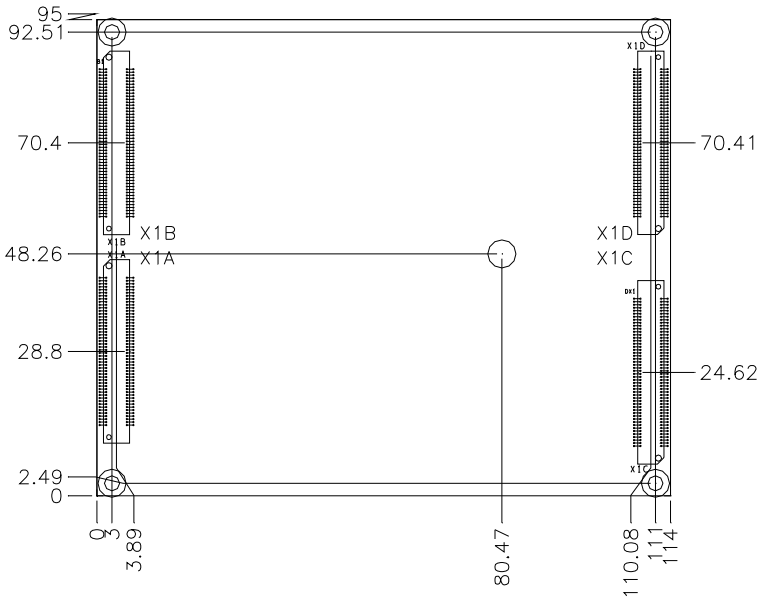
Bottom

Installations

This section provides information on how to use the jumpers and connectors on the ET820 in order to set up a workable system. The topics covered are:

Installing the Memory

The ET820 board supports one DDR2 memory socket that can support up to 1GB memory, DDR2 400/533 (w/o ECC function).

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 aligns with that on the memory slot. Insert the module into the socket at a slight angle (approximately 30 degrees). Note that the socket and module are both keyed, which means that the module can be installed only in one direction.

2. To seat the memory module into the socket, apply firm and even pressure to each end of the module until you feel it slip down into the socket.

3. With the module properly seated in the socket, rotate the module downward. Continue pressing downward until the clips at each end lock into position.

4. To remove the DDR2 module, press the clips with both hands.
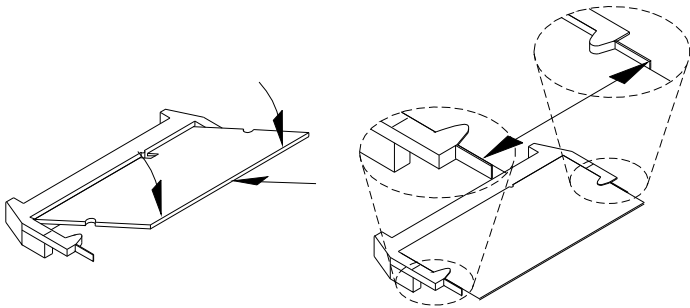
Connector Pin Assignments

    1. X1 (PCI-Bus, USB, Sound)
    2. X2 (ISA-Bus)
    3. X3 (VGA, LCD, Video, COM, COM2, LPT/Floppy, IrDA, Mouse, Keyboard, LCD)
    4. X4 (IDE 1, IDE 2, Ethernet, Misc)
    5. CN1, CN2: Serial ATA Connectors

1. X1 (PCI-Bus, USB, Sound)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	VCC	52	VCC
3	PCICLK3	4	PCICLK4	53	PAR	54	SERRJ
5	GND	6	GND	55	GPERRJ	56	N C
7	PCICLK1	8	PCICLK2	57	PMEJ	58	USB20
9	REQJ3	10	GNTJ3	59	LOCKJ	60	DEVSELJ
11	GNTJ2	12	3V	61	TRDYJ	62	USB30
13	REQJ2	14	GNTJ1	63	IRDYJ	64	STOPJ
15	REQJ 1	16	3V	65	FRAMEJ	66	USB21
17	GNTJ0	18	NC	67	GND	68	GND
19	VCC	20	VCC	69	AD16	70	CBEJ2
21	SERIRQ	22	REQJ0	71	AD17	72	USB31
23	AD0	24	3V	73	AD19	74	AD18
25	AD1	26	AD2	75	AD20	76	USB00
27	AD4	28	AD3	77	AD22	78	AD21
29	AD6	30	AD5	79	AD23	80	USB10
31	CBFJ0	32	AD7	81	AD24	82	CBEJ3
33	AD8	34	AD9	83	VCC	84	VCC
35	GND	36	GND	85	AD25	86	AD26
37	AD10	38	AUXAL	87	AD28	88	USB01
39	AD11	40	MIC	89	AD27	90	AD29
41	AD12	42	AUXAR	91	AD30	92	USB11
43	AD13	44	ASVCC	93	PCIRSTJ	94	AD31
45	AD14	46	SNDL	95	IRQY	96	IRQZ
47	AD15	48	ASGND	97	IRQW	98	IRQX
49	CBEJ1	50	SNDR	99	GND	100	GND

2. X2 (ISA-Bus)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	VCC	52	VCC
3	SD14	4	SD15	53	SA6	54	IRQ5
5	SD13	6	MASTERJ	55	SA7	56	IR06
7	SD12	8	DREQ7	57	SA8	58	IRQ7
9	SD11	10	DACKJ7	59	SA9	60	SYSCLK
11	SD10	12	DREQ6	61	SA10	62	REFSHJ
13	SD9	14	DACKJ6	63	SA11	64	DREQ1
15	SD8	16	DREQ5	65	SA12	66	DACKJ 1
17	MEMWJ	18	DACKJ5	67	GND	68	GND
19	MEMRJ	20	DREQ0	69	SA13	70	DREQ3
21	LA17	22	DACKJ0	71	SA14	72	DACKJ3
23	LA18	24	IRQ14	73	SA15	74	IORJ
25	LA19	26	IR015	75	SA16	76	IOWJ
27	LA20	28	IRQ12	77	SA18	78	SA17
29	LA21	30	IRQ11	79	SA19	80	SMEMRJ
31	LA22	32	IRQ10	81	IOCHRDY	82	AEN
33	LA23	34	I016J	83	VCC	84	VCC
35	GND	36	GND	85	SD0	86	SMEMWJ
37	SBHEJ	38	M16J	87	SD2	88	SD1
39	SA0	40	OSC	89	SD3	90	NOWSJ
41	SA1	42	BALE	91	DREQ2	92	SD4
43	SA2	44	TC	93	SD5	94	IRQ9
45	SA3	46	DACKJ2	95	SD6	96	SD7
47	SA4	48	IR03	97	IOCHKJ	98	RSTDRV
49	SA5	50	IRQ4	99	GND	100	GND

3. X3 (VGA, LCD, Video, COM, COM2, LPT/Floppy, IrDA, Mouse, Keyboard, LCD)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	NC	52	NC
3	R	4	B	53	VCC	54	GND
5	HSY	6	G	55	/STB	5 6	/AFD
7	VSY	8	DDCK	57	NC	58	PD7
9	NC	10	DDDA	59	IRRX	60	/ERR
11	LCD DO16	12	NC	61	IRTX	62	PD7
13	LCD DO17	14	NC	63	RXD2	64	/INIT
15	GND	16	GND	65	GND	66	GND
17	LCD DO13	18	LCD DO15	67	RTS2J	68	PD5
19	LCD DO12	20	LCD DO14	69	DTR2J	70	/SLIN
21	GND	22	GND	71	DCD2J	72	PD4
23	NC	24	LCD DO11	73	DSR2J	74	PD3
25	NC	26	LCD DO10	75	CTS2J	76	PD2
27	GND	28	GND	77	TXD2J	78	PD1
29	LCD DO4	30	LCD DO7	79	RI2J	80	PD0
31	LCD DO5	32	LCD DO6	81	VCC	82	VCC
33	GND	34	GND	83	RXD1	84	/ACK
35	LCD DO1	36	LCD DO3	85	RTS1J	86	/BUSY
37	LCD DO0	38	LCD DO2	87	DTR1J	88	PE
39	VCC	40	VCC	89	DCD1J	90	/SLCT
41	NC	42	LTGIO0	91	DSR1J	92	MSCLK
43	NC	44	BLON#	93	CTS1J	94	MSDAT
45	BIASON	46	DIGON	95	TXD1	96	KBCLK
47	COMP	48	Y	97	RI1J	98	KBDAT
49	NC	50	C	99	GND	100	GND

4. X4 (IDE 1, IDE 2, Ethernet, Misc)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	SIDE IOWJ	52	PIDE_IORJ
3	5V SB	4	PWGIN	53	SIDE DRQ	54	PIDE IOWJ
5	PS ON	6	SPEAKER	55	SIDE D15	56	PIDE DRQ
7	NC	8	BATT	57	SIDE DO	58	PIDE D15
9	RSMRST#	10	LILED	59	SIDE D14	60	PIDE DO
11	NC	12	ACTLED	61	SIDE D1	62	PIDE D14
13	NC	14	SPEEDLED	63	SIDE D13	64	PIDE D1
15	NC	16	NC	65	GND	66	GND
17	VCC	18	VCC	67	SIDE D2	68	PIDE D13
19	OVCRJ	20	NC	69	SIDE D12	70	PIDE D2
21	EXTSMI	22	NC	71	SIDE D3	72	PIDE D12
23	SMBCLK	24	SMBDATA	73	SIDE-D 1	74	PIDE D3
25	SIDE_CS3J	26	NC	75	SIDE D4	76	PIDE D11
27	SIDE CS1J	28	NC	77	SIDE D10	78	PIDE D4
29	SIDE A2	30	PIDE_CS3J	79	SIDE D5	80	PIDE D10
31	SIDE AO	32	PIDE CS1J	81	VCC	82	VCC
33	GND	34	GND	83	SIDE-D9	84	PIDE D5
35	SIDE_DIAG	36	PIDE_A2	85	SIDE D6	86	PIDE D9
37	SIDE AI	38	PIDE_A0	87	SIDE-D8	88	PIDE D6
39	SIDE INTRO	40	PIDE A1	89	NC	90	CBLID_P
41	BATLOW	42	NC	91	RXD-	92	PIDE D8
43	SIDE_AKJ	44	PIDE INTRO	93	RXD+	94	SIDE D7
45	SIDE_RDY	46	PIDE_AKJ	95	TXD-	96	PIDE D7
47	SIDE_IORJ	48	PIDE RDY	97	TXD+	98	HDRSTJ
49	VCC	50	VCC	99	GND	100	GND

5. CN1, CN2: Serial ATA Connectors
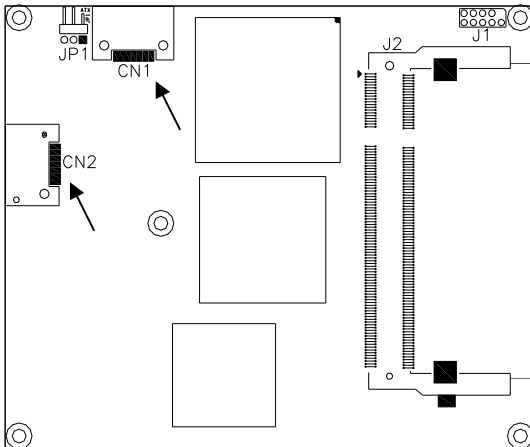
Setting the Jumpers

JP1: ATX or AT Power Selection

JP4	ATX Power
□ □ □ 1 2 3	ATX
□ □ □ 1 2 3	AT
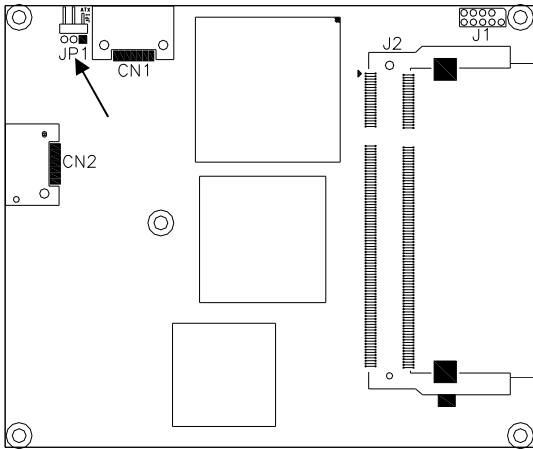
BIOS Setup

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 board 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)	Wed, Apr 28, 2004	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	129024K	
Total Memory	130048K	

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.

   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	
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	LS120	
Boot Other Device	Enabled	
Boot Up NumLock Status	On	
Gate A20 Option	Fast	
Typematic Rate Setting	Disabled	
Typematic Rate (Chars/Sec)	6	
Typematic Delay (Msec)	250	
Security Option	Setup	
APIC Mode	Enabled	
MPS Version Control for OS	1.4	
OS Select For DRAM>64MB	Non-OS2	
Small Logo (EPA) Show	Disabled	

CPU Feature
Press Enter to configure the settings relevant to CPU Feature.

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

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

CPU L1/L2/L3 Cache
Cache memory is additional memory that is 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 allow you to enable (speed up memory access) or disable the cache function.

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

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

First/Second/Third Boot Device
These fields determine the drive that the system searches first for an operating system. The options available include *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.

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 *Enabled*.

Advanced Chipset Features

This Setup menu controls the configuration of the chipset.

```
                      Phoenix - AwardBIOS CMOS Setup Utility
                            Advanced Chipset Features
┌──────────────────────────────────────────────────┬──────────────────────┐
│ DRAM Timing Selectable         By SPD              │      ITEM HELP       │
│ CAS Latency Time               Auto                │ Menu Level  >        │
│ DRAM RAS# to CAS# Delay        Auto                │                      │
│ DRAM RAS# Precharge            Auto                │                      │
│ Precharge 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 **                          │                      │
│ On-Chip Frame Buffer Size      8MB                 │                      │
│ DVMT Mode                      DVMT                 │                      │
│ DVMT/FIXED memory Size         128MB               │                      │
│ SDVO Device Seting             LVDS                │                      │
│ SDVO LVDS Protocal             1Ch       18bit     │                      │
│ SDVO Panel Number              852 x 480           │                      │
│ Boot Display                   Auto                │                      │
│ Panel Scaling                  Auto                │                      │
└──────────────────────────────────────────────────┴──────────────────────┘
```

DRAM Timing Selectable

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

CAS Latency Time

You can 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 *4*.

Precharge Delay (tRAS)

The default setting for the Precharge Delay is *12*.

System Memory Frequency

The default setting is *533MHz*.

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*.

VGA Setting

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

    On-Chip Frame Buffer Size: 8MB
    DVMT Mode: DVMT
    DVMT/FIXED Memory Size: 128MB
    SDVO Device Setting: LVDS
    SDVO LVDS Protocol: 1Ch   18bit
    SDVO Panel Number: 852X480
    Boot Display: Auto
    Panel Scaling: Auto

SDVO LVDS Protocol

These fields allow you to select the LVDS Protocol type. The default values for these ports are:

1Ch	18bit
2Ch	18bit
1Ch SPGW	24bit
2Ch SPGW	24bit
1CH OpenLDI	24bit
2CH OpenLDI	24bit

SDVO Panel Number

These fields allow you to select the LCD Panel type. The default values for these ports are:

852x480
1024x768
1280x768
1280x1024
1366x768
1400x1050
1440x900
1600x1200
1920x1080
1080x1920
1920x1200

Panel Scaling

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

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	

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	
SATA PORT Speed ATA	Disabled	
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	Disabled	
AC97 Audio Select	Auto	

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device

		ITEM HELP
POWER ON Function	BUTTON ONLY	
KB Power ON Password	Enter	
Hot Key power ON	Ctrl-F1	
Onboard Serial Port 1	3F8/IRQ4	Menu Level >
Onboard Serial Port 2	2F8/IRQ3	
UART Mode Select	Normal	
RxD , TxD Active	Hi, Lo	
IR Transmission Delay	Disabled	
UR2 Duplex Mode	Half	
Use IR Pins	IR-Rx2Tx2	
Onboard Parallel Port	3BC/IRQ7	
Parallel Port Mode	SPP	
EPP Mode Select	EPP1.7	
ECP Mode Use DMA	3	
PWRON After PWR-Fail	Off	

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 ***Disabled***.

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

UART Mode Select

This field determines the UART 2 mode in your computer. The default value is *Normal*. Other options include *IrDA* and *ASKIR*.

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

		ITEM HELP
ACPI Function	Enabled	
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 Wake-Up 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. 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.

USB KB Wake-Up From S3

Resume by Alarm

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

Reload Global Timer Events

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

PNP/PCI Configurations

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

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

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

PNP OS Installed
This option configures the PCI bus system. ALL PCI bus system on the system use INT#, thus all installed PCI cards must be set to this value.

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	
Current CPU Temp	45°C/113°F	Menu Level >
Fan1 Speed	0 RPM	
Fan2 Speed	0 RPM	
Vcore(V)	0.91V	
1.8V	1.88V	
+5V	5.33V	
3.3V	3.31V	
1st Smart Fan Temperature	Disabled	
Fan1 Tolerance Value	5	
2nd Smart Fan Temperature	Disabled	
Fan2 Tolerance Value	5	
LCD Back Light Control	63	

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 main board. The values are read-only values as monitored by the system and show the PC health status.

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.

Frequency/Voltage Control

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

Phoenix - AwardBIOS CMOS Setup Utility
Frequency/Voltage Control

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

IMPORTANT NOTE:
After installing your Windows operating system, 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.
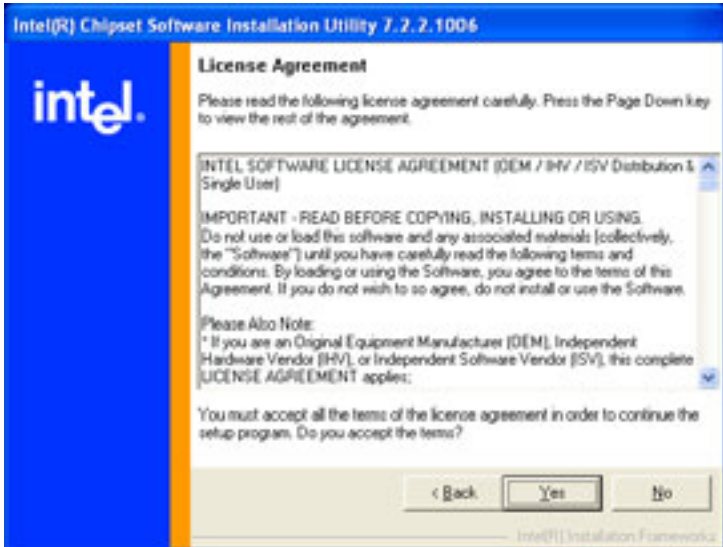
1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) I945GM/GME/GSE Chipset Drivers*.

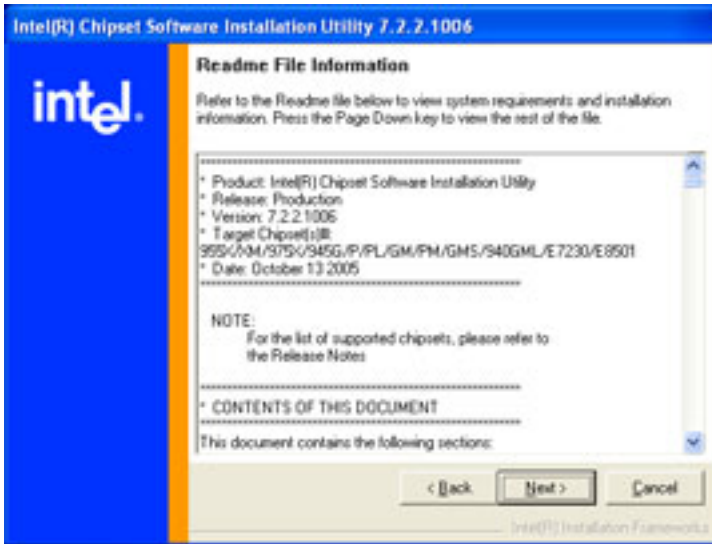2. Click *Intel(R) Chipset Software Installation Utility.*
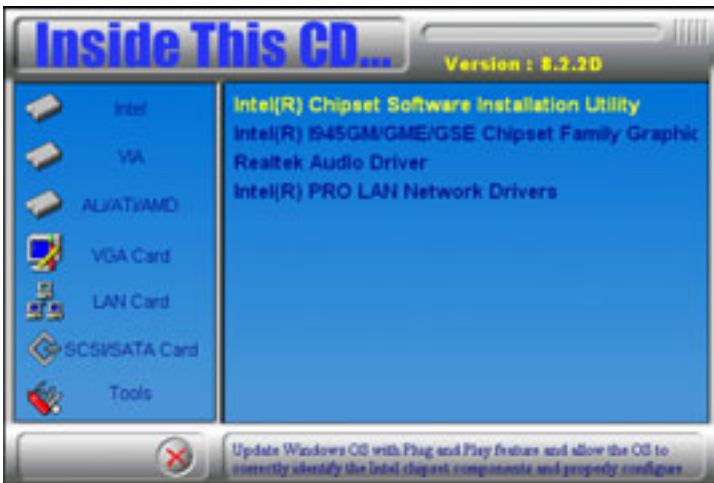
3. When the Welcome screen appears, click *Next* to continue.
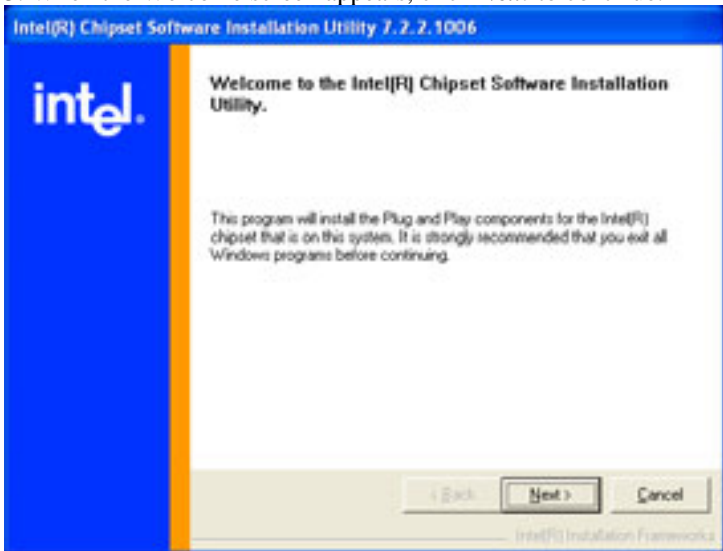
4. Click *Yes* to accept the software license agreement and proceed with the installation process.

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

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

Intel Graphics Driver Installation

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

1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) I945GM/GME/GSE Chipset Drivers*.

2. Click *Intel(R) I945GM/GME/GSE Chipset Family Graphics Driver.*
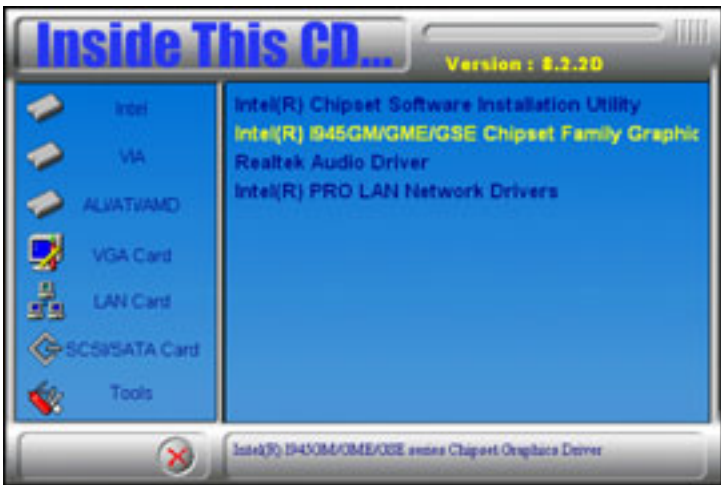
3. When the Welcome screen appears, click *Next* to continue.

4. When setup is complete, restart the computer as prompted and for changes to take effect.

Realtek HD Codec Audio Driver Installation

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

1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) I945GM/GME/GSE Chipset Drivers*, and then *Realtek Audio Drive*r.

2. Click *Realtek High Definition Codec Audio Audio Driver.*

3.When the welcome screen to InstallShield Wizard for *Realtek High Definition Codec Audio Audio Driver* appears, click *Next* to start the installation.

4.When the InstallShieldWizard has finished performing maintenance operations on Realtek High Definition Codec Audio Audio Driver, click *Finish* to restart the computer.
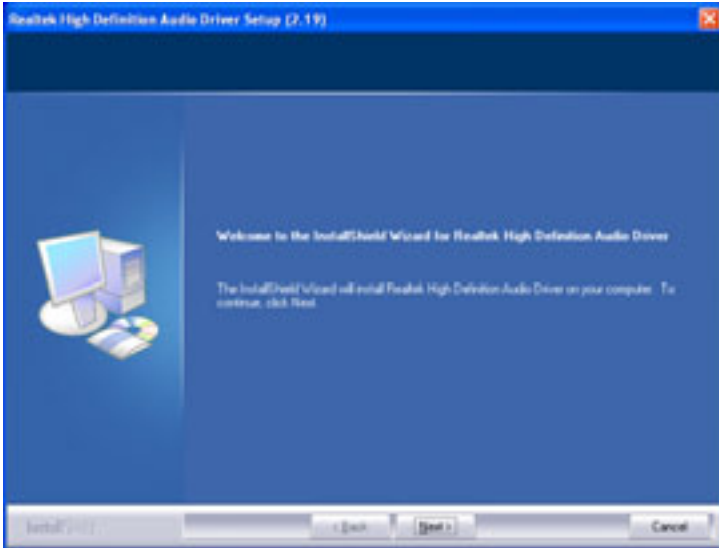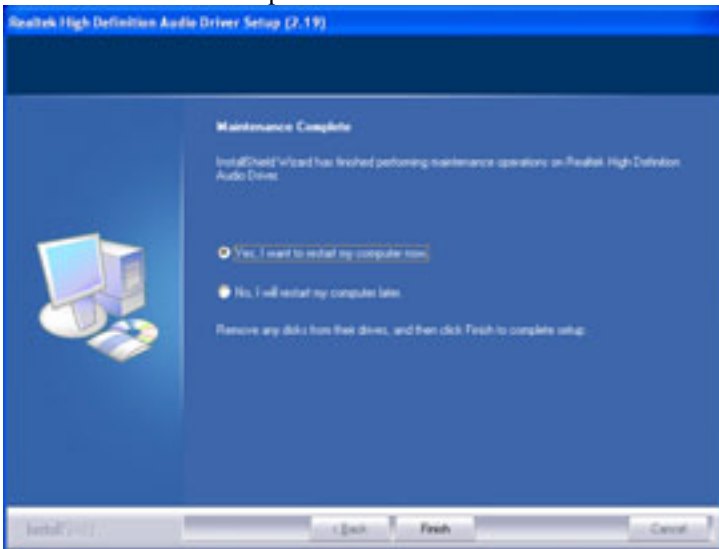
Intel PRO LAN Drivers Installation

1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) I945GM/GME/GSE Chipset Drivers*. Then, click *Intel(R) PRO LAN Network Drivers*.

2. Click *Install Drivers* to continue.

3. When License Agreement screen appears, click *Yes* to accept the software license agreement and proceed with the process. Click *Next* to continue.
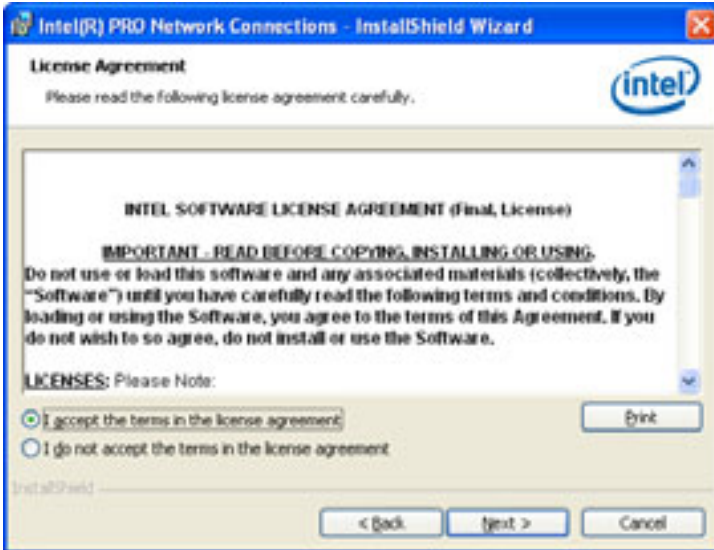
4.On Setup Type screen, select *Complete* type. And click *Next* type to continue
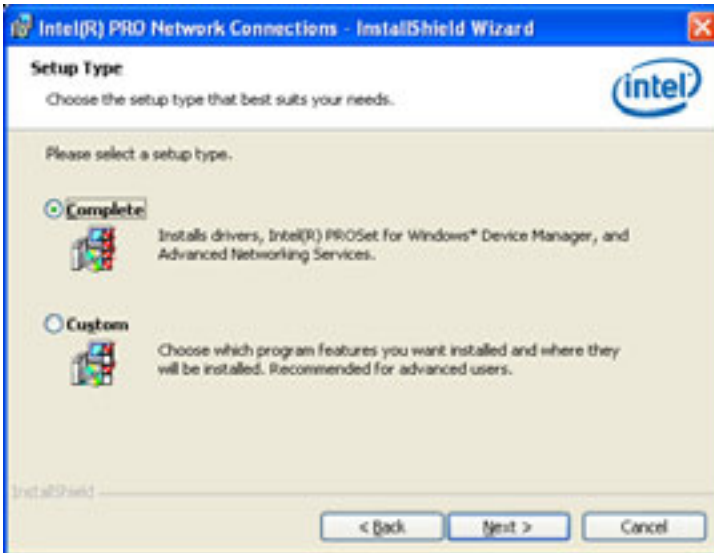
5.The wizard is ready to begin installation Now, click *install* to continue.
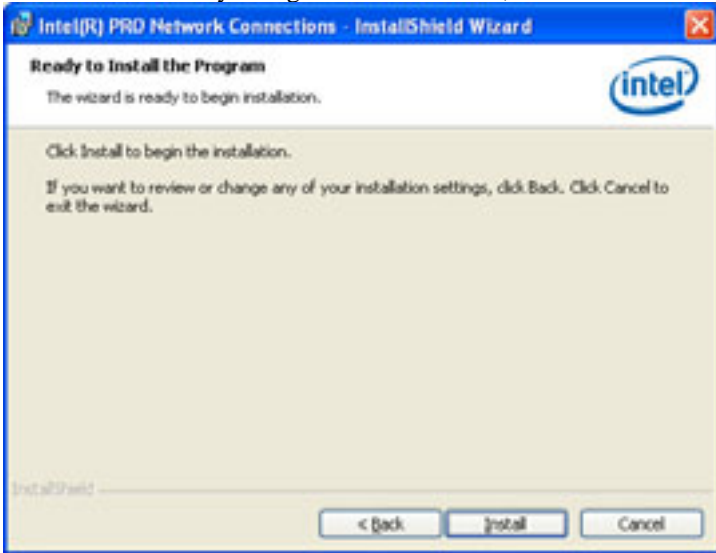
6.InstallShield wizard is complete. Click *Finish*.

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




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