PT332-DRM

System Board
User's Manual

A-156-M-2008

Copyright

Trademarks

FCC and DOC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

Table of Contents

About this Manual

This manual can be downloaded from the website, or acquired as an electronic file included in the optional CD/DVD. The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.

2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.

3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.

4. We will not be liable for any indirect, special, incidental or consequencial damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.

2. Wear an antistatic wrist strap.

3. Do all preparation work on a static-free surface.

4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.

5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

Important:
Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

To avoid damage to the system:
- Use the correct AC input voltage range.

To reduce the risk of electric shock:
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

Battery:
- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

About the Package

The system board package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

☑ One system board
☑ Two USB cables
☑ Two Serial ATA data cables
☑ Two Serial ATA power cables
☑ One I/O shield
☑ One QR (Quick Reference)

The system board and accessories in the package may not come similar to the information listed above. This may differ in accordance to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Before Using the System Board

Before using the system board, prepare basic system components.

If you are installing the system board in a new system, you will need at least the following internal components.

- A CPU
- Memory module
- Storage devices such as hard disk drive, CD-ROM, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

Chapter 1 - Introduction

Specifications

Processor	• LGA 1156 socket for: - Intel® Core™ i7-860 2.80GHz/8M - Intel® Core™ i5-750 2.66GHz/8M - Intel® Core™ i5-660 3.33GHz/4M - Intel® Core™ i3-540 3.06GHz/4M - Intel® Pentium® G6950 2.80GHz/3M
Chipset	• Intel® Q57 PCH (Platform Controller Hub)
System Memory	• Four 240-pin DDR3 DIMM sockets • Supports DDR3 1066/1333MHz • Supports maximum memory bandwidth of 21GB/s in dual-channel mode when using DDR3 1333MHz • Supports dual channel memory interface • Supports up to 16GB system memory
Expansion Slots	• 1 PCI Express x16 slot (PCIe 2.0) • 1 PCI Express x4 slot (PCIe 1.0) • 2 PCI slots (PCI 2.3)
Graphics	• Intel® HD Graphics • VGA display resolution up to 2048x1536 • Supports 3D, 2D and video capabilities Note: Both Intel® Core™ i7-860 and Core™ i5-750 CPUs do not support integrated graphics.
Audio	• Realtek ALC262 2-channel High Definition Audio • Two 24-bit stereo DACs and three 20-bit stereo ADCs • S/PDIF audio interface
LAN	• One Realtek RTL8111DL PCI Express Gigabit Ethernet controller • One Intel W82578DM iAMT6.0 Gigabit Ethernet PHY • Supports 10Mbps, 100Mbps and 1Gbps data transmission • IEEE 802.3 (10/100Mbps) and IEEE 802.3ab (1Gbps) compliant
Serial ATA	• 6 Serial ATA ports compliant with SATA 1.0 specification • SATA speed up to 3Gb/s (SATA 2.0) • Supports RAID 0/1/5/10
INTEL ACTIVE MANAGEMENT TECHNOLOGY (AMT)	• Supports iAMT6.0 • Out-of-band system access • Remote troubleshooting and recovery • Hardware-based agent presence checking • Proactive alerting • Remote hardware and software asset tracking

TPM - TRUSTED PLATFORM MODULE (optional)	• Provides a Trusted PC for secure transactions • Provides software license protection, enforcement and password protection
Rear Panel I/O Ports	• 1 mini-DIN-6 PS/2 mouse port • 1 mini-DIN-6 PS/2 keyboard port • 2 DB-9 RS232 serial ports • 1 DB-15 VGA port • 1 DVI-I port (DVI-D signal only) • 2 RJ45 LAN ports • 4 USB 2.0/1.1 ports • Mic-in, line-in and line-out
I/O Connectors	• 4 connectors for 8 external USB 2.0/1.1 ports • 1 8-bit Digital I/O connector • 1 front audio connector for line-out and mic-in jacks • 1 CD-in connector • 1 S/PDIF connector • 6 Serial ATA ports • 1 FDD connector • 2 2-pin LAN LED connectors • 1 2-pin Flash BIOS connector • 1 24-pin ATX power connector • 1 8-pin 12V power connector • 1 chassis intrusion connector • 1 front panel connector • 2 fan connectors
BIOS	• AMI BIOS • 64Mbit SPI BIOS
Energy Efficient Design	• ACPI v3.0 specification • System Power Management • Wake-On-Events include: - Wake-On-PS/2 Keyboard/Mouse - Wake-On-USB Keyboard/Mouse - Wake-On-LAN • AC power failure recovery
Damage Free Intelligence	• Monitors CPU/system temperature and overheat alarm • Monitors VCORE/5V/3.3V/V_DIMM/12V/5VSB voltages and failure alarm • Monitors CPU/system fan speed and failure alarm • Read back capability that displays temperature, voltage and fan speed • Watchdog timer function
Temperature	• 0°C to 60°C
Humidity	• 10% to 90%
PCB	• microATX form factor • 244mm (9.6”) x 244mm (9.6”)

Features

Watchdog Timer

The Watchdog Timer function allows your application to regularly "clear" the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

DDR3

DDR3 delivers increased system bandwidth and improved performance. It offers peak data transfer rate of up to 21 Gb/s bandwidth. The advantages of DDR3 are its higher bandwidth and its increase in performance at a lower power than DDR2.

Graphics

The Intel Clarkdale CPU comes integrated with the Graphics Processing Unit delivering exceptional 3D, 2D and video capabilities. It supports VGA and DVI interfaces.

PCI Express

PCI Express is a high bandwidth I/O infrastructure that possesses the ability to scale speeds by forming multiple lanes. The x4 PCI Express lane supports transfer rate of 1 Gigabyte per second. The PCI Express architecture also provides a high performance graphics infrastructure by enhancing the capability of a x16 PCI Express lane to provide 4 Gigabytes per second transfer rate.

Intel Active Management Technology (AMT)

Intel Active Management Technology (Intel® AMT) allows remote access and management of networked systems even while PCs are powered off, remotely repair systems after OS failures and has the capability to remotely update all systems with the latest security software.

Audio

The Realtek ALC262 audio codec provides 2-channel High Definition audio output.

S/PDIF

S/PDIF is a standard audio file transfer format that transfers digital audio signals to a device without having to be converted first to an analog format. This prevents the quality of the audio signal from degrading whenever it is converted to analog. S/PDIF is usually found on digital audio equipment such as a DAT machine or audio processing device. The S/PDIF connector on the system board sends surround sound and 3D audio signal outputs to amplifiers and speakers and to digital recording devices like CD recorders.

Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 3Gbps, it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s. It supports RAID 0/1/5/10.

Gigabit LAN

The Intel W82578DM PHY and Realtek RTL8111DL PCI Express Gigabit controllers support up to 1Gbps data transmission.

USB

The system board supports USB 2.0 and USB 1.1 ports. USB 1.1 supports 12Mb/second bandwidth while USB 2.0 supports 480Mb/second bandwidth providing a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

Wake-On-LAN

This feature allows the network to remotely wake up a Soft Power Down (Soft-Off) PC. It is supported via the onboard LAN port or via a PCI LAN card that uses the PCI PME (Power Management Event) signal. However, if your system is in the Suspend mode, you can power-on the system only through an IRQ or DMA interrupt.

Important:
The 5V_standby power source of your power supply must support ≥720mA.

Wake-On-PS/2

This function allows you to use the PS/2 keyboard or PS/2 mouse to power-on the system.

Important:
The 5V_standby power source of your power supply must support ≥720mA.

Wake-On-USB

This function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.

Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the 5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the 5V_standby power source of your power supply must support ≥2A.

ACPI STR

The system board is designed to meet the ACPI (Advanced Configuration and Power Interface) specification. ACPI has energy saving features that enables PCs to implement Power Management and Plug-and-Play with operating systems that support OS Direct Power Management. ACPI when enabled in the Power Management Setup will allow you to use the Suspend to RAM function.

With the Suspend to RAM function enabled, you can power-off the system at once by pressing the power button or selecting "Standby" when you shut down Windows® without having to go through the sometimes tiresome process of closing files, applications and operating system. This is because the system is capable of storing all programs and data files during the entire operating session into RAM (Random Access Memory) when it powers-off. The operating session will resume exactly where you left off the next time you power-on the system.

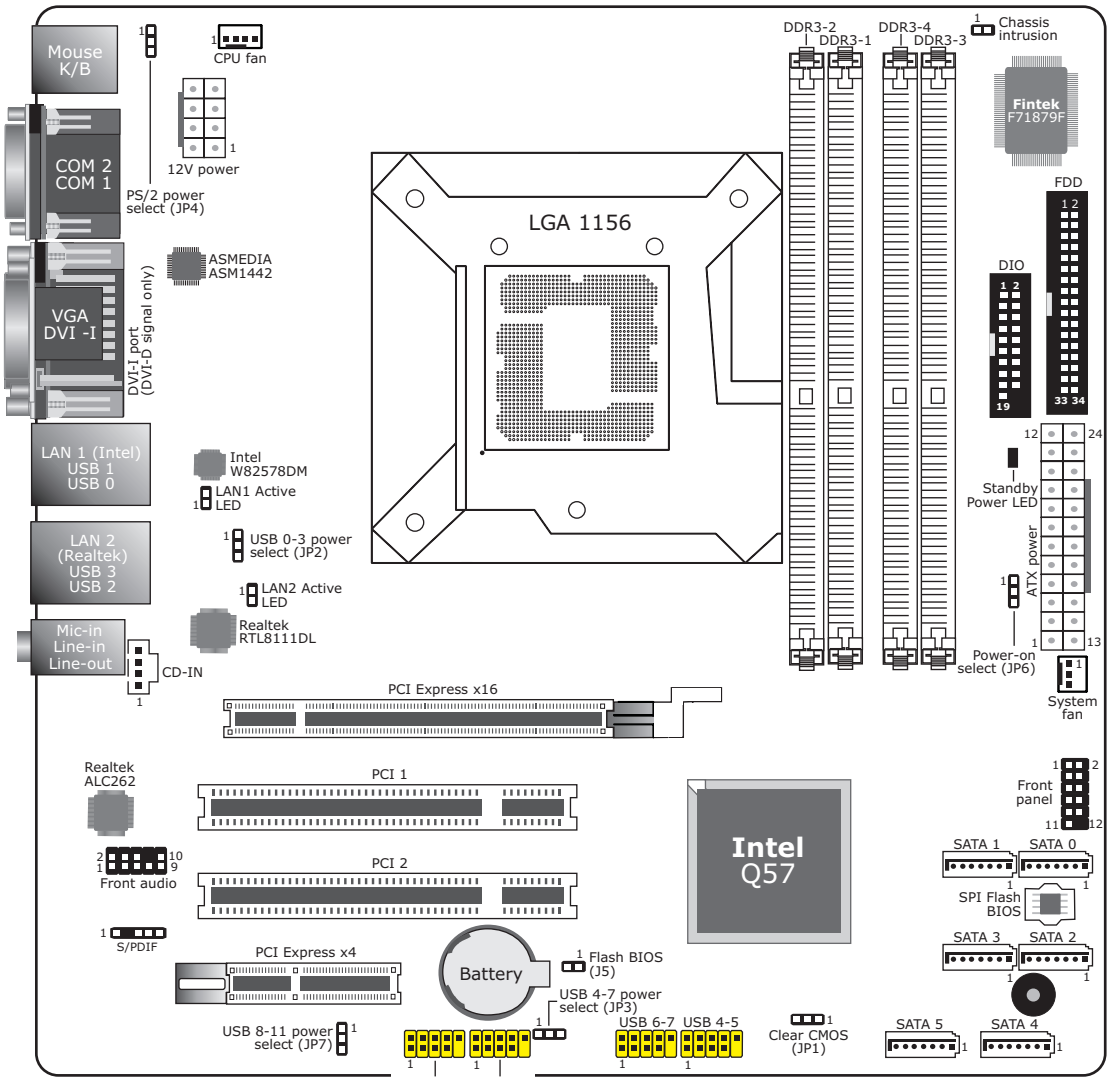
Important:
The 5V_standby power source of your power supply must support ≥720mA.

Power Failure Recovery

When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.

Chapter 2 - Hardware Installation

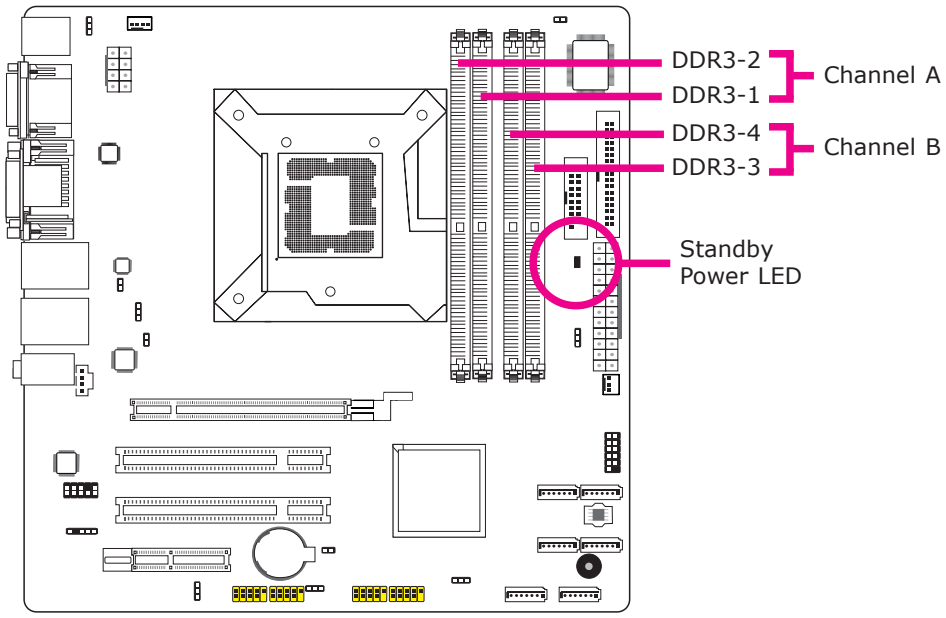
System Board Layout



Important:
Electrostatic discharge (ESD) can damage your system board, processor, disk drives, add-in boards, and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

System Memory

Important:
When the Standby Power LED lit red, it indicates that there is power on the system board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.



The four DIMM sockets are divided into 2 channels:

Channel A - DIMM 1 and DIMM 2
Channel B - DIMM 3 and DIMM 4

The system board supports the following memory interface.

Single Channel (SC)

Data will be accessed in chunks of 64 bits from the memory channels.

Dual Channel (DC)

Data will be accessed in chunks of 128 bits from the memory channels. Dual channel provides better system performance because it doubles the data transfer rate.

Single Channel	DIMMs are on the same channel. DIMMs in a channel can be identical or completely different. However, we highly recommend using identical DIMMs. Not all slots need to be populated.
Dual Channel	DIMMs of the same memory configuration are on different channels.

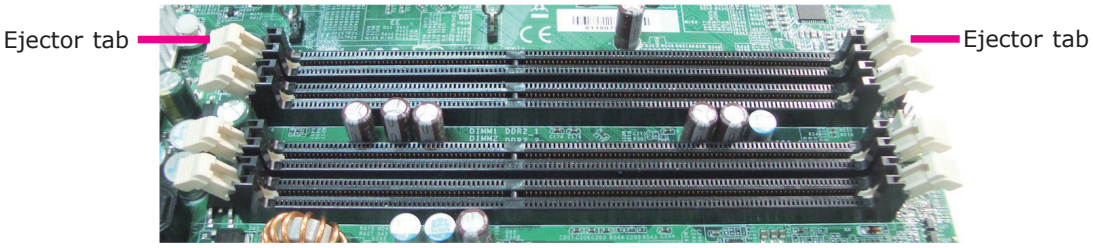
Important:

1. You can populate either Channel A or Channel B first.
2. When installing a DIMM in Channel A or Channel B, always populate the socket that is farthest the CPU. This will mean populating DDR3-1 and/or DDR3-3 first.
3. If you intend to use dual channel, the same rule applies - always the socket farthest the CPU. Populate DDR3-1 and/or DDR3-3 first; not DDR3-1 and DDR3-4 and not DDR3-3 and DDR3-2.

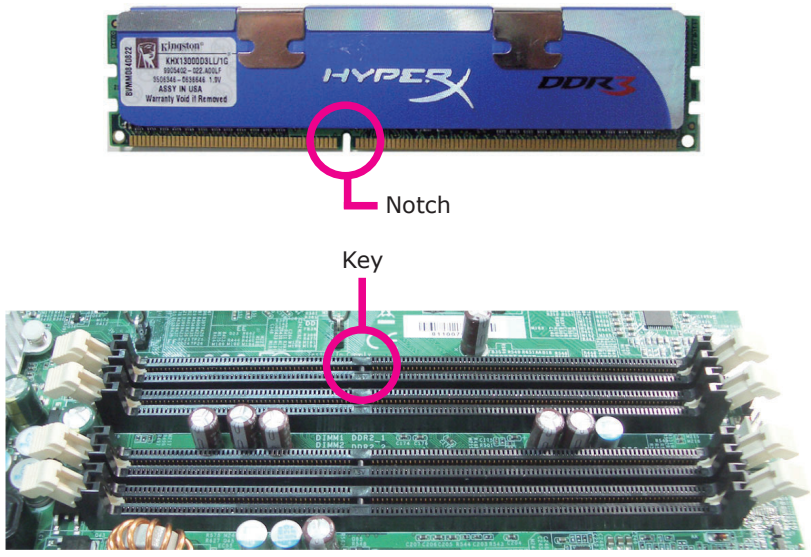
Installing the DIMM Module

Note:
The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.

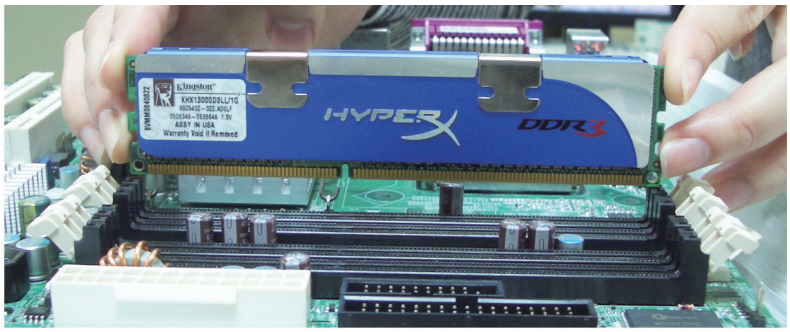
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the DIMM socket on the system board.
4. Push the "ejector tabs" which are at the ends of the socket to the side.



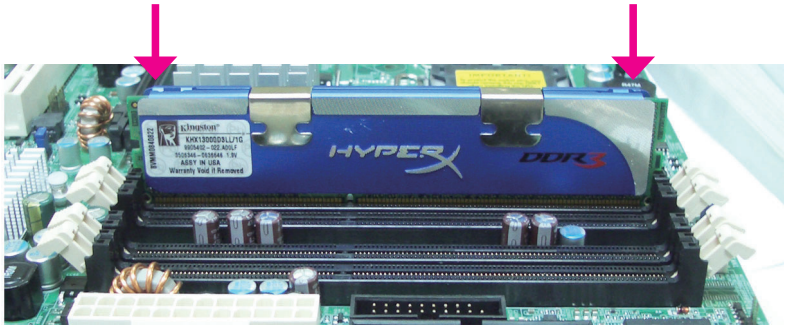
5. Note how the module is keyed to the socket.



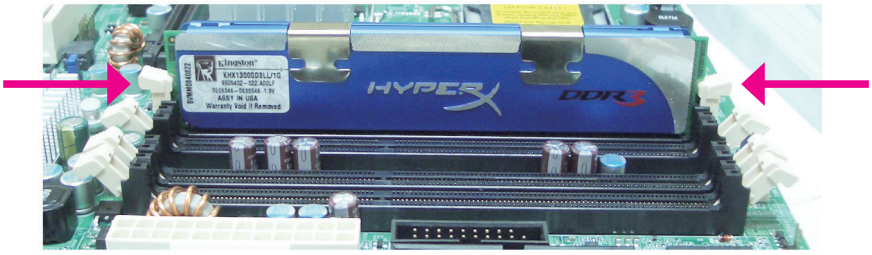
6. Grasping the module by its edges, position the module above the socket with the "notch" in the module aligned with the "key" on the socket. The keying mechanism ensures the module can be plugged into the socket in only one way.



7. Seat the module vertically, pressing it down firmly until it is completely seated in the socket.



8. The ejector tabs at the ends of the socket will automatically snap into the locked position to hold the module in place.

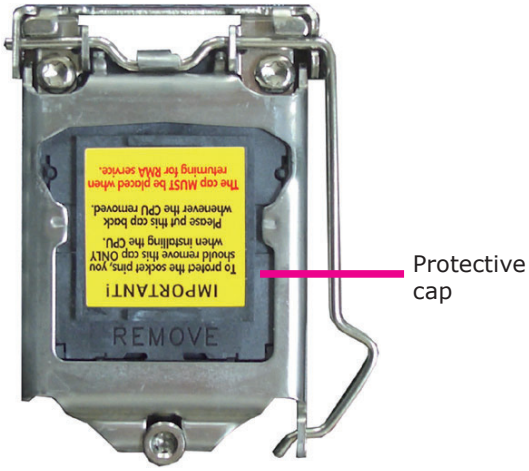


CPU

The system board is equipped with a surface mount LGA 1156 socket. This socket is exclusively designed for installing a LGA 1156 packaged Intel CPU.

Important:

1. Before you proceed, make sure (1) the LGA 1156 socket comes with a protective cap, (2) the cap is not damaged and (3) the socket's contact pins are not bent. If the cap is missing or the cap and/or contact pins are damaged, contact your dealer immediately.
2. Make sure to keep the protective cap. RMA requests will be accepted and processed only if the LGA 1156 socket comes with the protective cap.

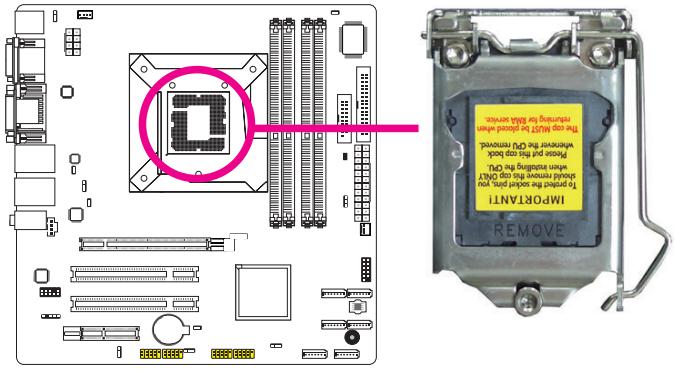


Installing the CPU

1. Make sure the PC and all other peripheral devices connected to it has been powered down.

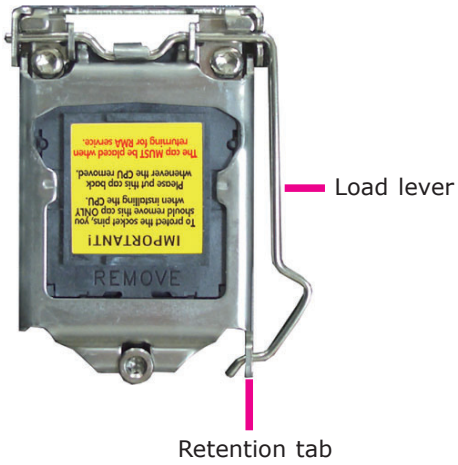
2. Disconnect all power cords and cables.

3. Locate the LGA 1156 CPU socket on the system board.



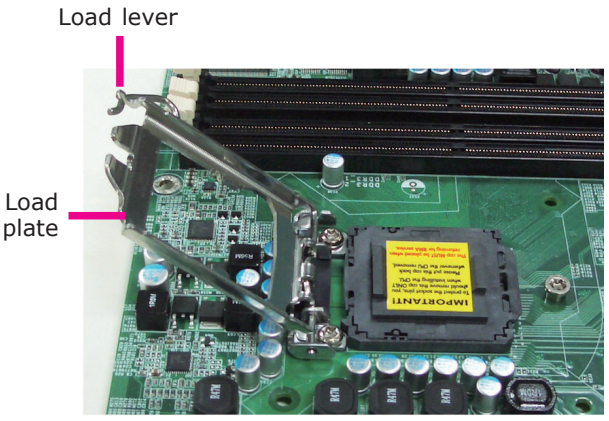
Important:
The CPU socket must not come in contact with anything other than the CPU. Avoid unnecessary exposure. Remove the protective cap only when you are about to install the CPU.

4. Unlock the socket by pushing the load lever down, moving it sideways until it is released from the retention tab; then lift the load lever up.

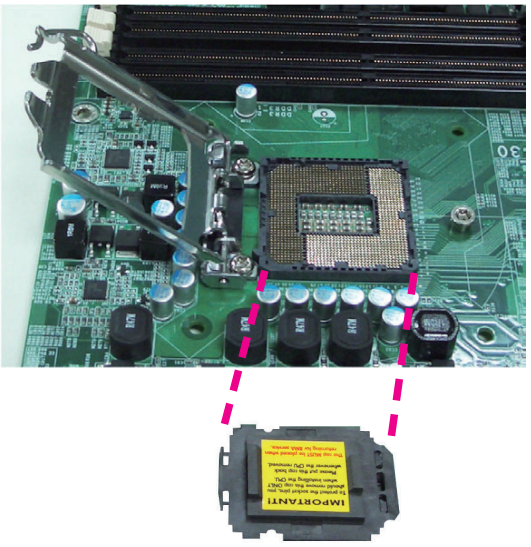


5. Lifting the load lever will at the same time lift the load plate.

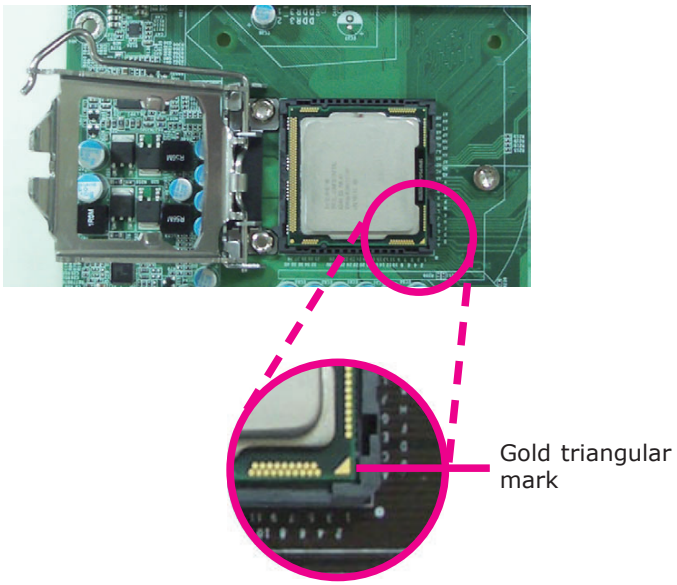
   Lift the load lever up to the angle shown on the photo.



6. Remove the protective cap from the CPU socket. The cap is used to protect the CPU socket against dust and harmful particles. Remove the protective cap only when you are about to install the CPU.

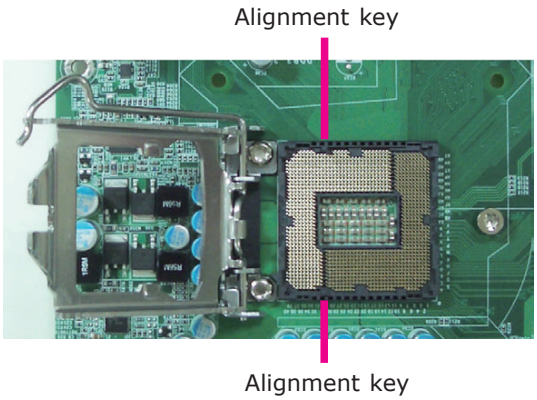


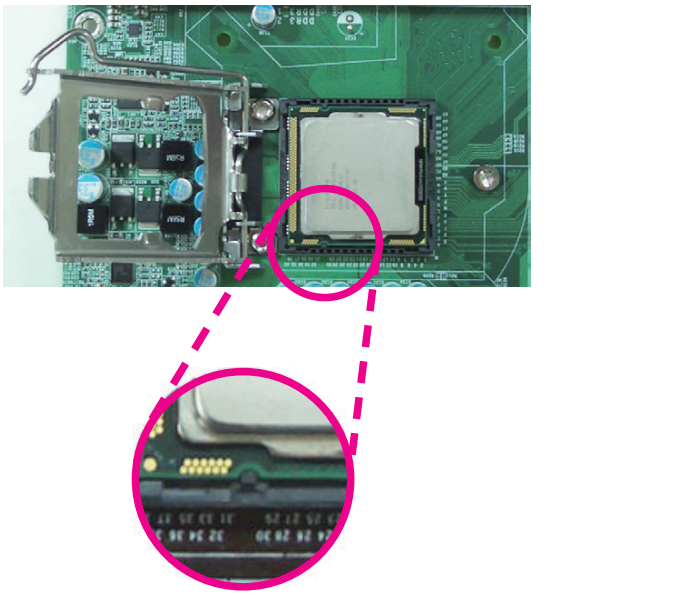
7. Insert the CPU into the socket. The gold triangular mark on the CPU must align with the corner of the CPU socket shown on the photo.



The CPU's notch will at the same time fit into the socket's alignment key.

Important:
The CPU will fit in only one orientation and can easily be inserted without exerting any force.

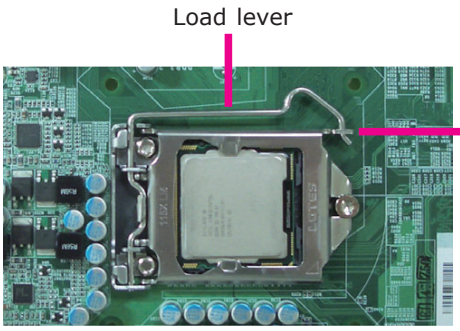




8. Close the load plate then push the load lever down.

   While closing the load plate, make sure the front edge of the load plate slides under the retention knob.

9. Hook the load lever under the retention tab.



Installing the Fan and Heat Sink

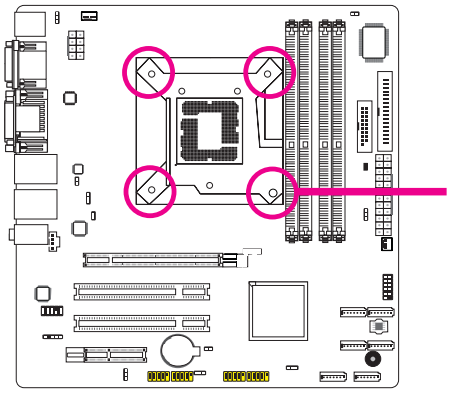
The CPU must be kept cool by using a CPU fan with heat sink. Without sufficient air circulation across the CPU and heat sink, the CPU will overheat damaging both the CPU and system board.

Note:
A boxed Intel® processor already includes the CPU fan and heat sink assembly. If your CPU was purchased separately, make sure to only use Intel®-certified fan and heat sink.

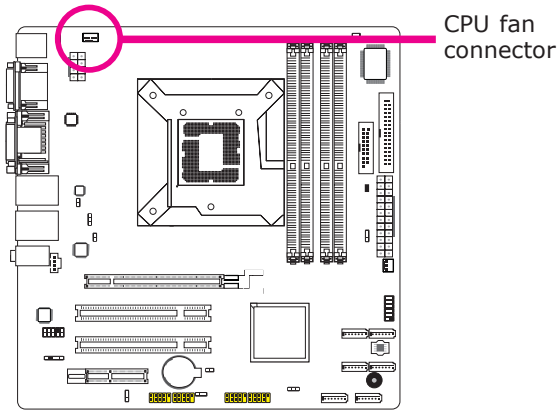
1. Before you install the fan / heat sink, you must apply a thermal paste onto the top of the CPU. The thermal paste is usually supplied when you purchase the fan / heat sink assembly. Do not spread the paste all over the surface. When you later place the heat sink on top of the CPU, the compound will disperse evenly.

   Some heat sinks come with a patch of pre-applied thermal paste. Do not apply thermal paste if the fan / heat sink already has a patch of thermal paste on its underside. Peel the strip that covers the paste before you place the fan / heat sink on top of the CPU.

2. Place the heat sink on top of the CPU. The 4 push-pins around the heat sink, which are used to secure the heat sink onto the system board, must match the 4 mounting holes around the socket.

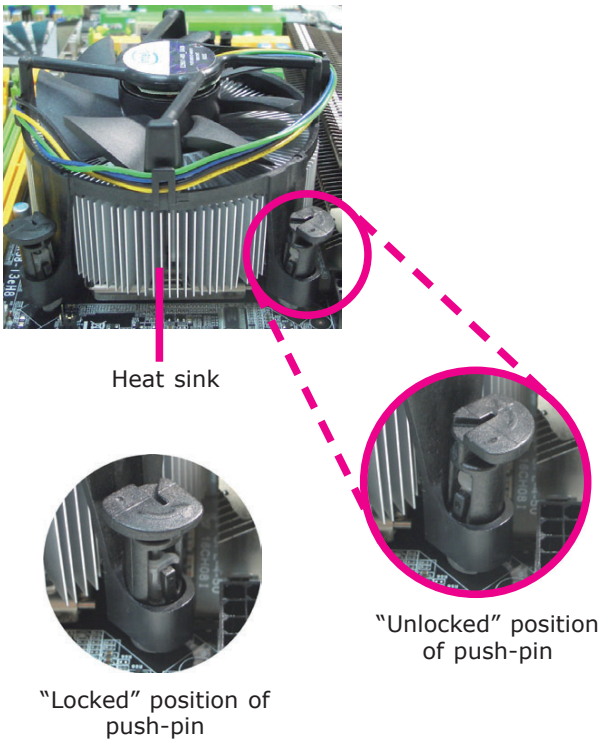


3. Orient the heat sink such that the CPU fan's cable is nearest the CPU fan connector.

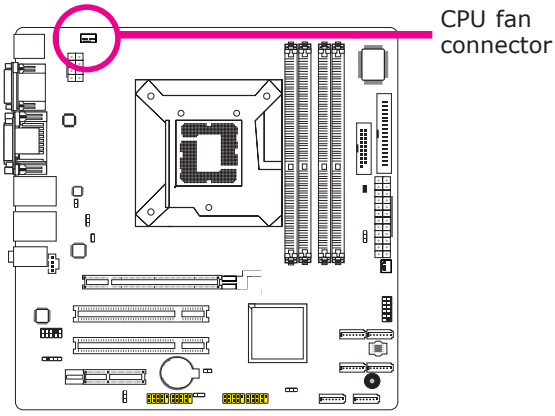


4. Rotate each push-pin according to the direction of the arrow shown on top of the pin.

   Push down two pushpins that are diagonally across the heat sink. Perform the same procedure for the other two push-pins.

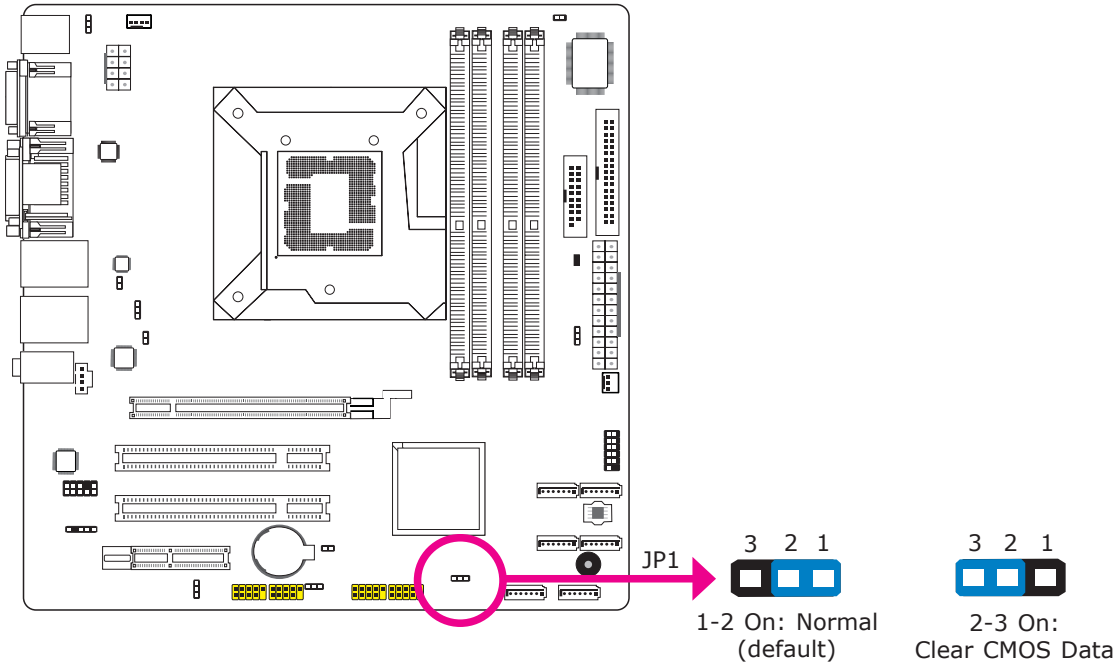


5. Connect the CPU fan's cable to the CPU fan connector on the system board.



Jumper Settings

Clear CMOS Data



If you encounter the following,

a) CMOS data becomes corrupted.
b) You forgot the supervisor or user password.

you can reconfigure the system with the default values stored in the ROM BIOS.

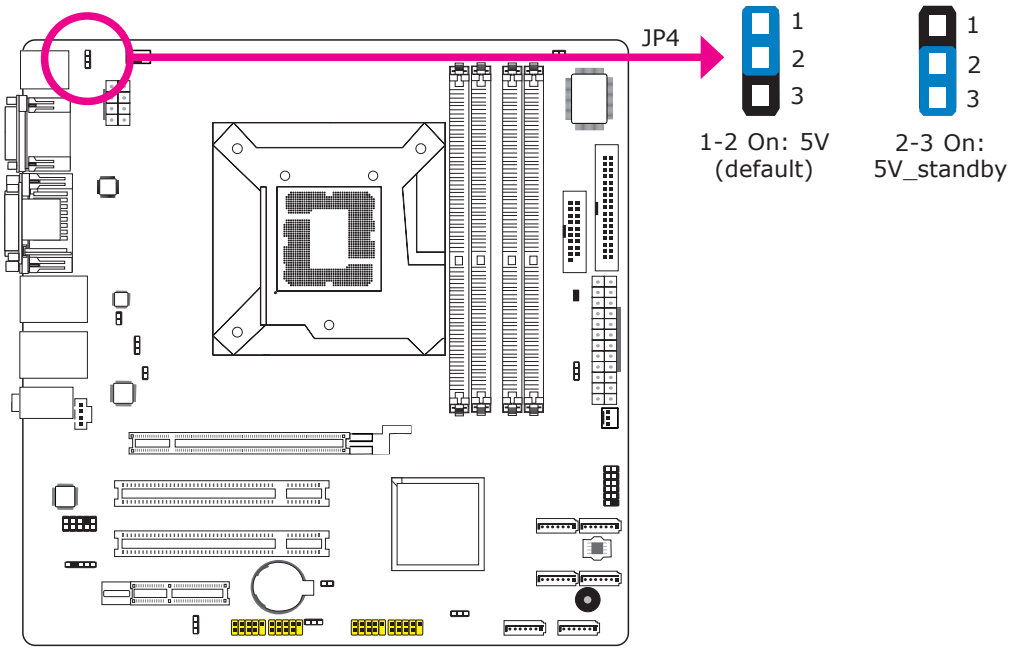
To load the default values stored in the ROM BIOS, please follow the steps below.

1. Power-off the system and unplug the power cord.

2. Set JP1 pins 2 and 3 to On. Wait for a few seconds and set JP1 back to its default setting, pins 1 and 2 On.

3. Now plug the power cord and power-on the system.

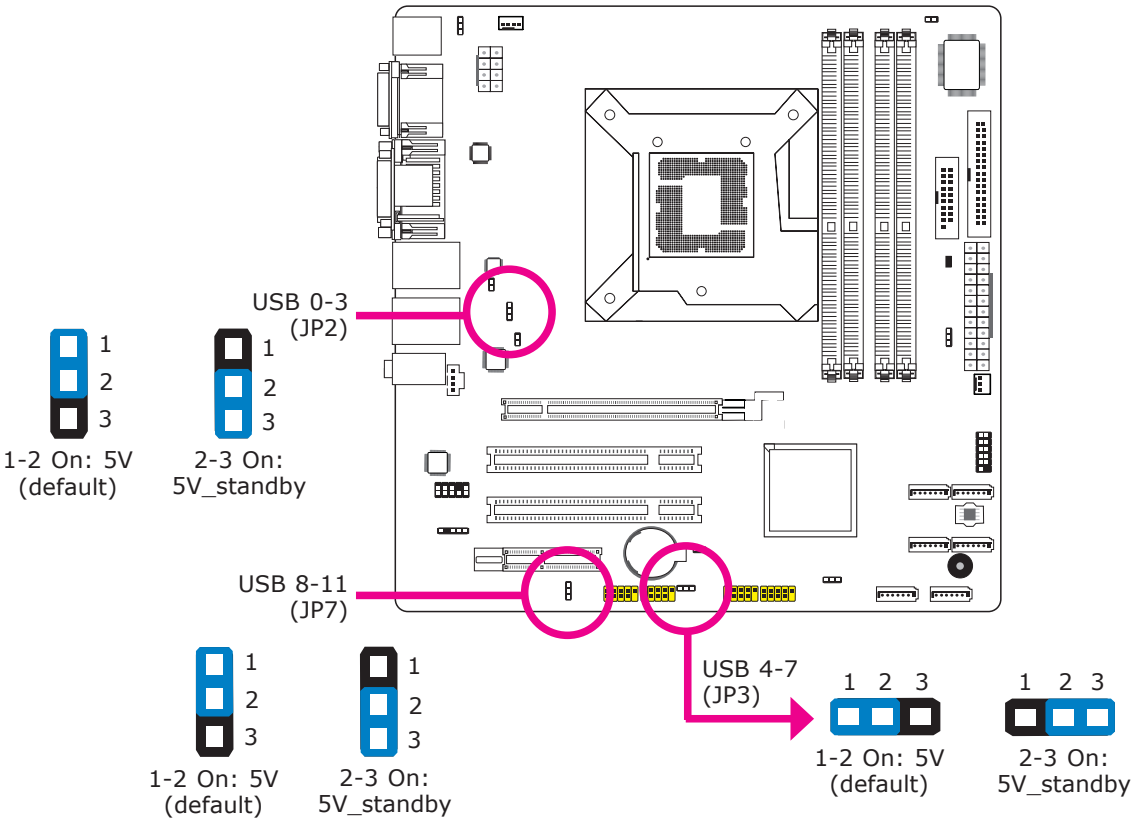
PS/2 Power Select



JP4 is used to select the power of the PS/2 keyboard/mouse port. Selecting 5V_standby will allow you to use a PS/2 keyboard or PS/2 mouse to wake up the system.

Important:
The 5VSB power source of your power supply must support ≥720mA.

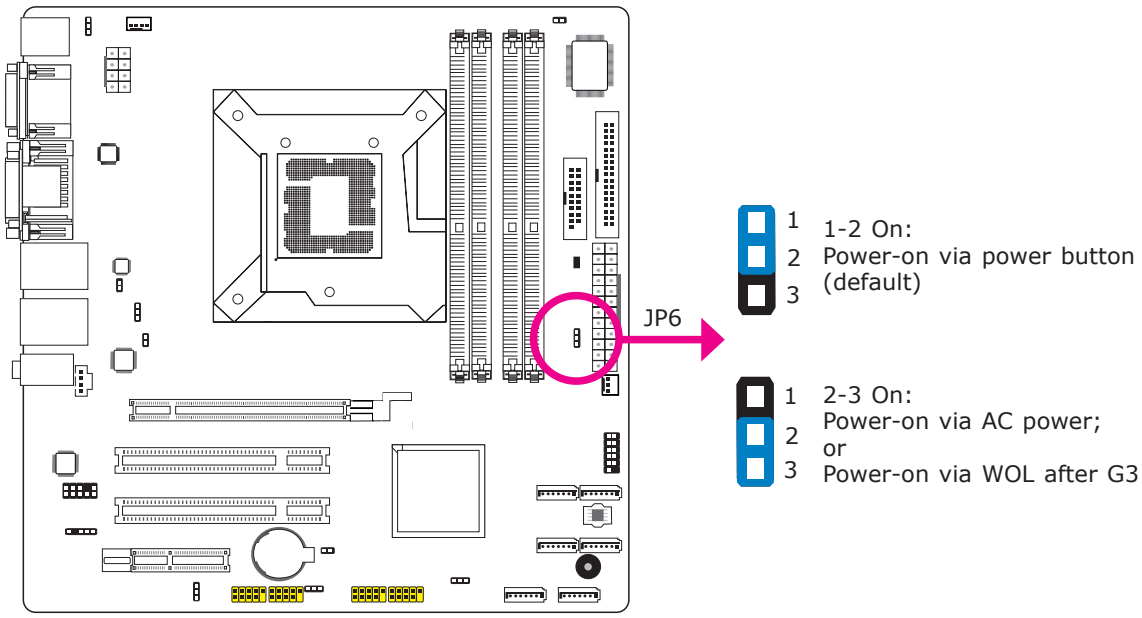
USB Power Select



These jumpers are used to select the power of the USB ports. Selecting 5V_ standby will allow you to use a USB device to wake up the system.

Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the 5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the 5V_standby power source of your power supply must support ≥2A.

Power-on Select



To power-on via WOL after G3:

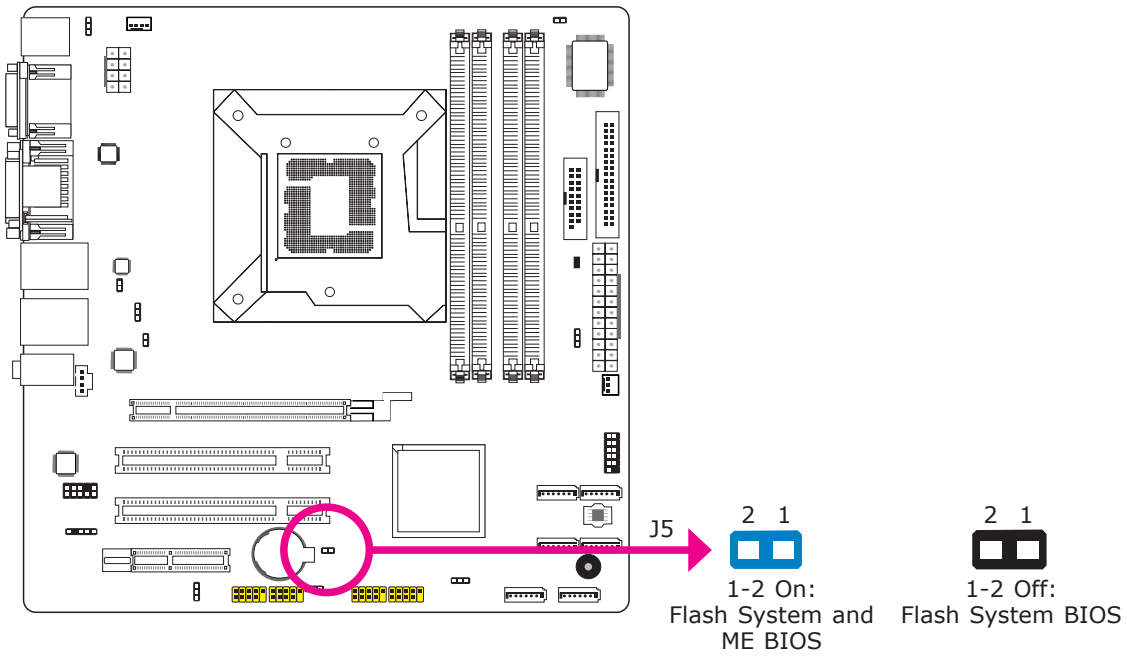
1. Set JP6 pins 2 and 3 to On.
2. Set the "After G3" field to **Power Off/WOL**.
3. Set the "GbE Wake Up From S5" to **Enabled**.

The BIOS fields are in the "South Bridge Configuration" submenu (Chipset menu) of the AMI BIOS utility.

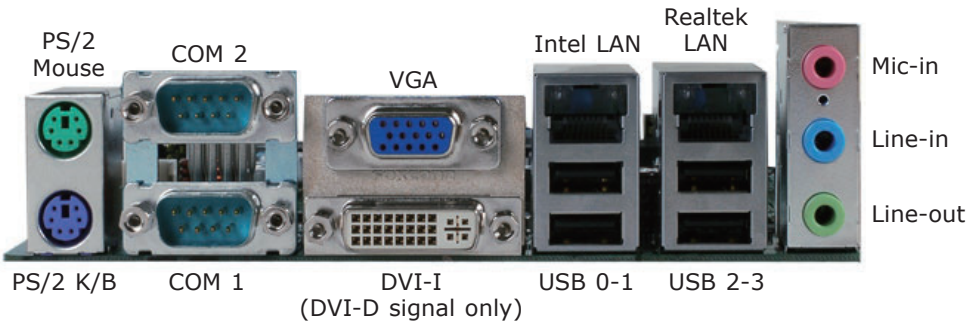
To power-on via AC Power:

1. Set JP6 pins 2 and 3 to On.
2. Set the "After G3" field to **Power On**.

Flash BIOS Select



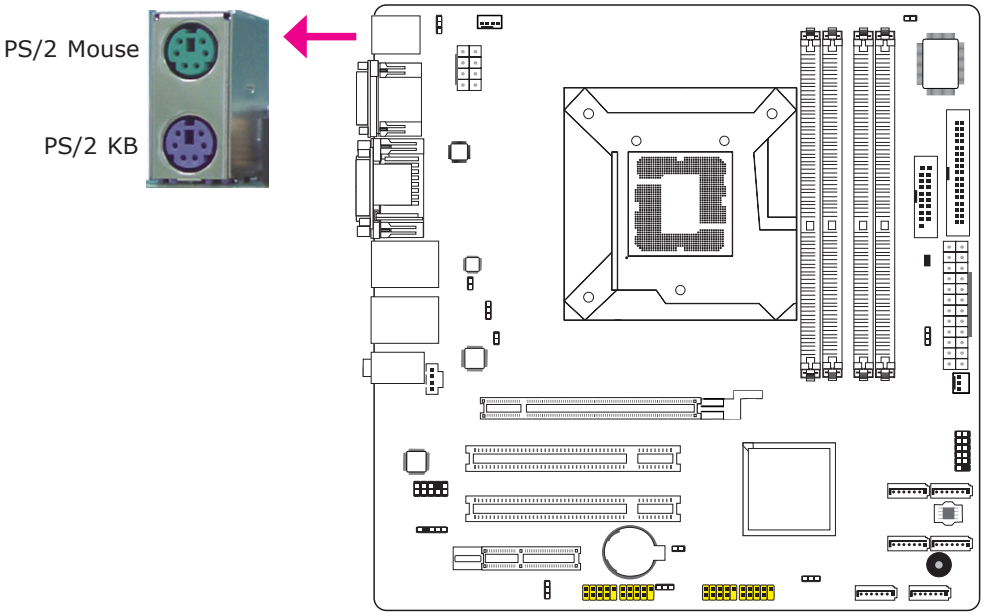
Rear Panel I/O Ports



The rear panel I/O ports consist of the following:

- PS/2 mouse port
- PS/2 keyboard port
- 2 COM ports
- VGA port
- DVI-I port (DVI-D signal only)
- Intel LAN port
- Realtek LAN port
- 4 USB ports
- Mic-in jack
- Line-in jack
- Line-out jack

PS/2 Mouse and PS/2 Keyboard Ports



These ports are used to connect a PS/2 mouse and a PS/2 keyboard. The PS/2 mouse port uses IRQ12.

Wake-On-PS/2 Keyboard/Mouse

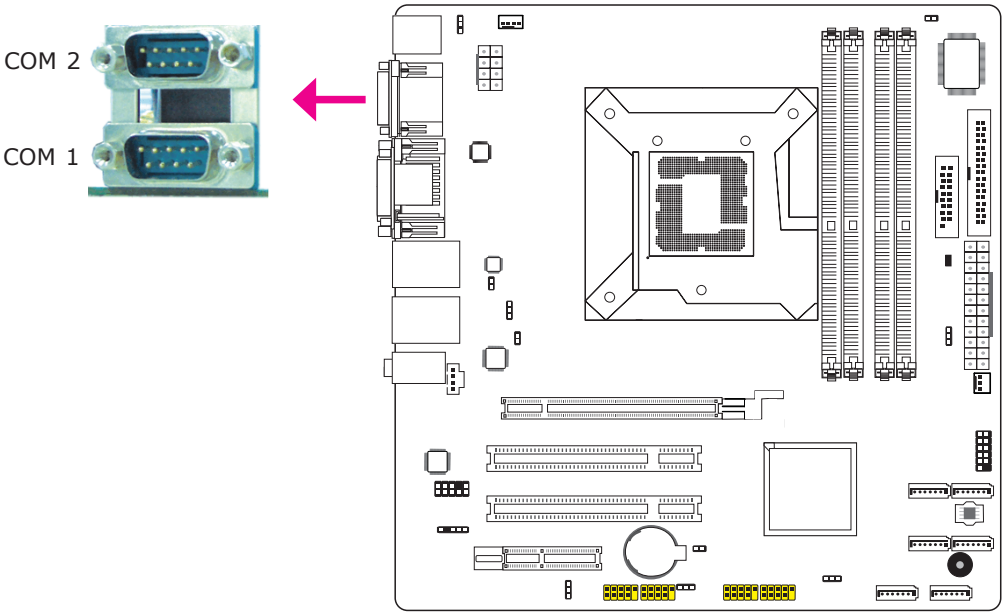
The Wake-On-PS/2 Keyboard/Mouse function allows you to use the PS/2 keyboard or PS/2 mouse to power-on the system. To use this function:

- Jumper Setting

  JP4 must be set to "2-3 On: 5V_standby". Refer to "PS/2 Power Select" in this chapter for more information.

Important:
The 5V_standby power source of your power supply must support ≥720mA.

COM (Serial) Ports

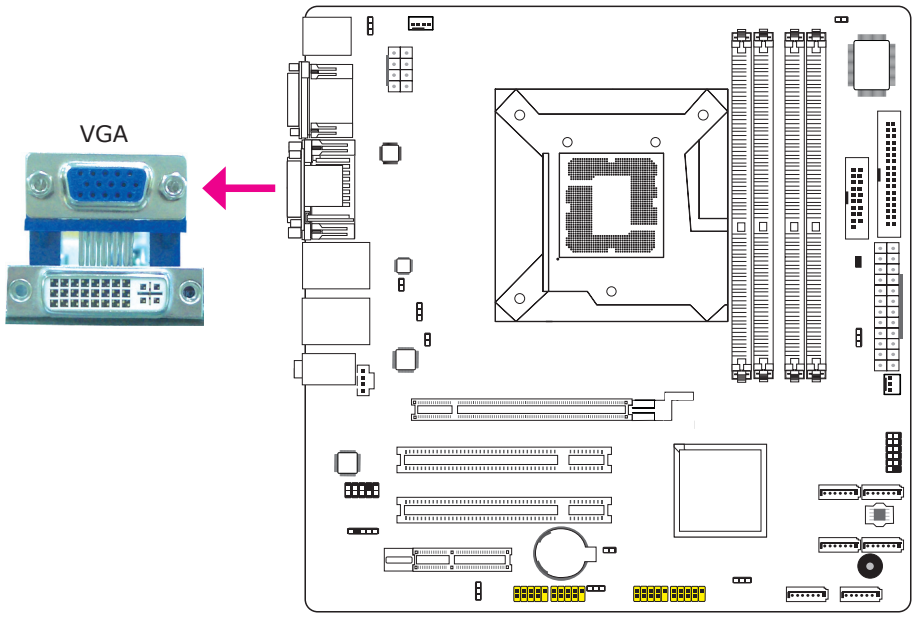


The serial ports are RS232 asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

BIOS Setting

Configure the serial ports in the Advanced menu of the BIOS. Refer to chapter 3 for more information.

VGA Port



The VGA port is used for connecting a VGA monitor. Connect the monitor's 15-pin D-shell cable connector to the VGA port. After you plug the monitor's cable connector into the VGA port, gently tighten the cable screws to hold the connector in place.

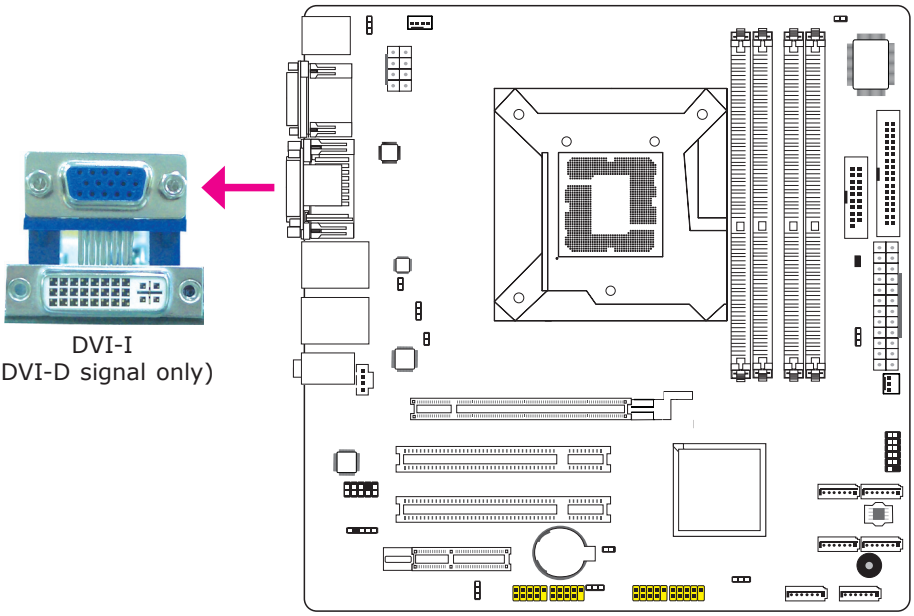
BIOS Setting

Configure the onboard graphics in the Chipset menu of the BIOS. Refer to chapter 3 for more information.

Driver Installation

Install the graphics driver. Refer to chapter 4 for more information.

DVI-I Port



DVI-I
(DVI-D signal only)

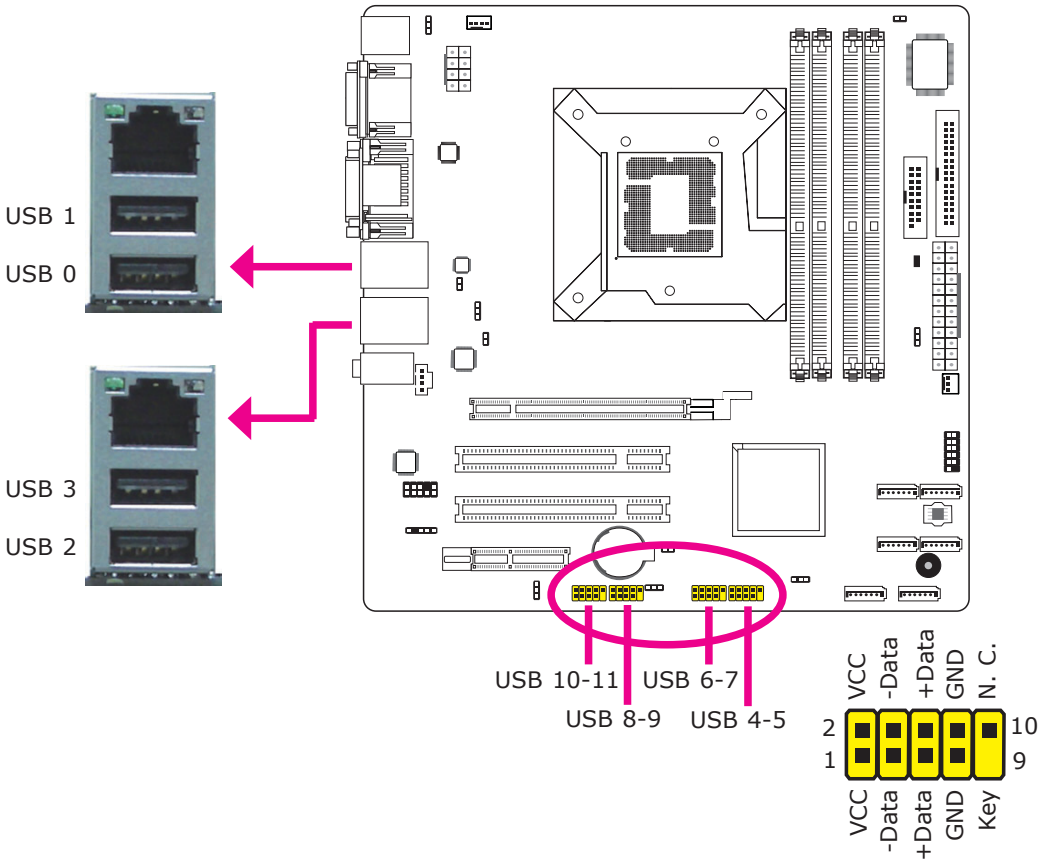
The DVI-I port is used to connect an LCD monitor. This port supports DVI-D signal only.

Connect the display device's cable connector to the DVI-I port. After you plug the cable connector into the port, gently tighten the cable screws to hold the connector in place.

BIOS Setting

Configure the display device in the Chipset menu of the BIOS. Refer to chapter 3 for more information.

USB Ports



USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with four onboard USB 2.0/1.1 ports. The four 10-pin connectors allow you to connect 8 additional USB 2.0/1.1 ports. The additional USB ports may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then insert the USB port cables to a connector.

BIOS Setting

Configure the onboard USB in the Advanced menu of the BIOS. Refer to chapter 3 for more information.

Driver Installation

You may need to install the proper drivers in your operating system to use the USB device. Refer to your operating system's manual or documentation for more information.

Wake-On-USB Keyboard/Mouse

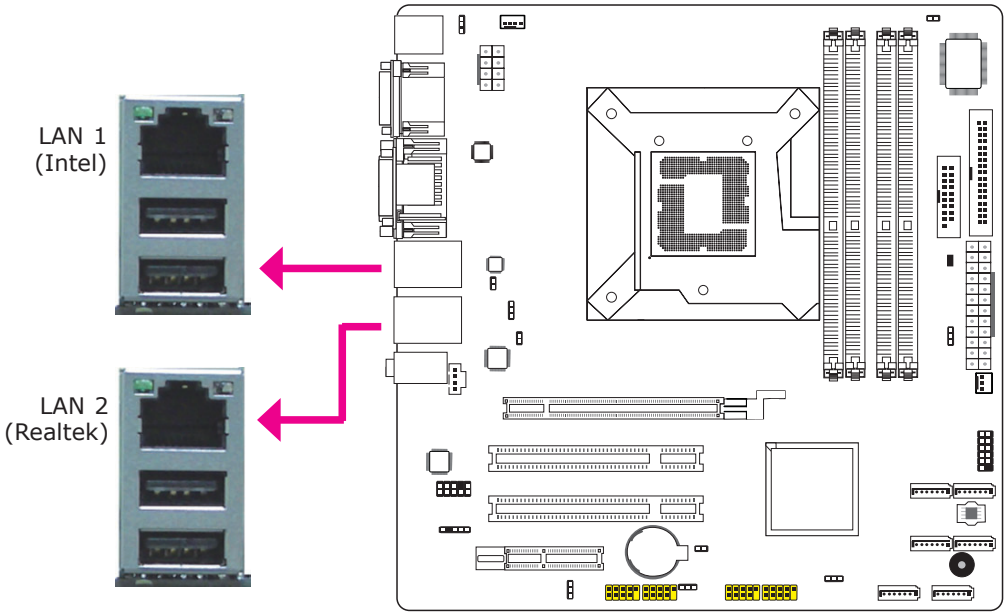
The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function:

- Jumper Setting

  JP2, JP3 and/or JP7 must be set to "2-3 On: 5V_standby". Refer to "USB Power Select" in this chapter for more information.

Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the 5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the 5V_standby power source of your power supply must support ≥2A.

RJ45 LAN Ports



The LAN ports allow the system board to connect to a local area network by means of a network hub.

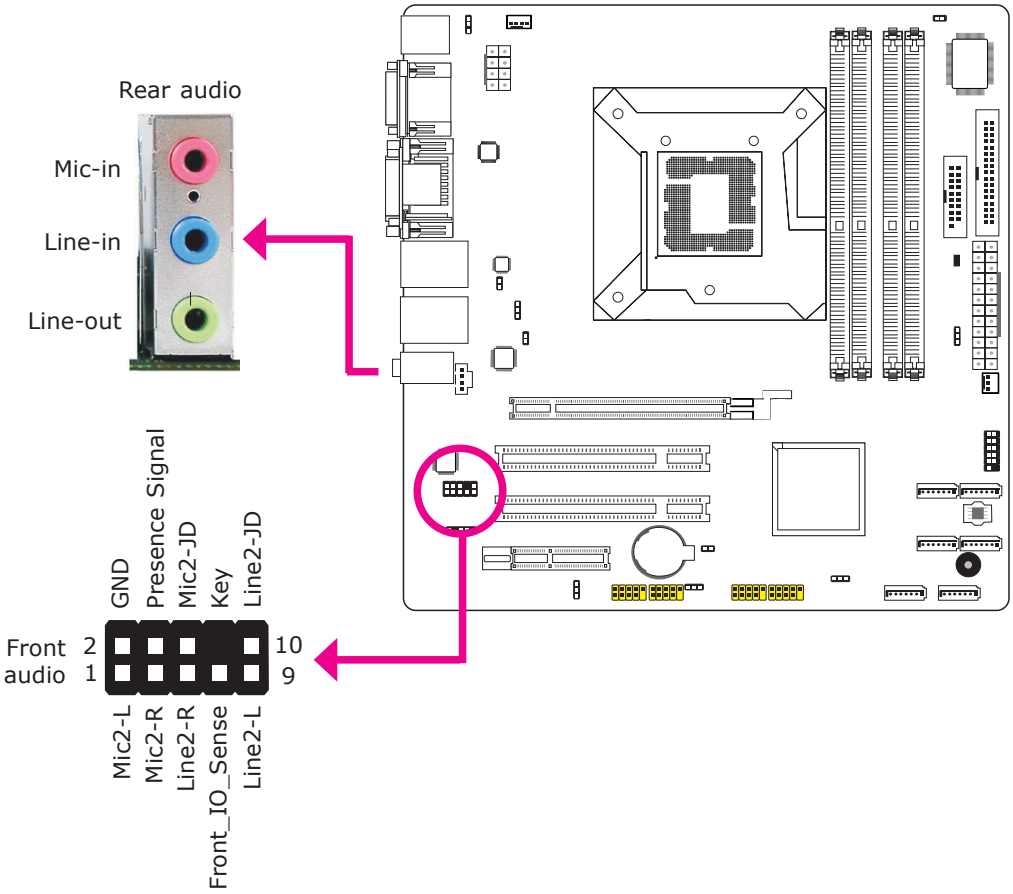
BIOS Setting

Configure the onboard LAN in the Chipset menu of the BIOS. Refer to chapter 3 for more information.

Driver Installation

Install the LAN drivers. Refer to chapter 4 for more information.

Audio



Rear Audio

The system board is equipped with 3 audio jacks. A jack is a one-hole connecting interface for inserting a plug.

- Mic-in Jack (Pink)
  This jack is used to connect an external microphone.

- Line-in Jack (Light Blue)
  This jack is used to connect any audio devices such as Hi-fi set, CD player, tape player, AM/FM radio tuner, synthesizer, etc.

- Line-out Jack (Lime)
  This jack is used to connect a headphone or external speakers.

Front Audio

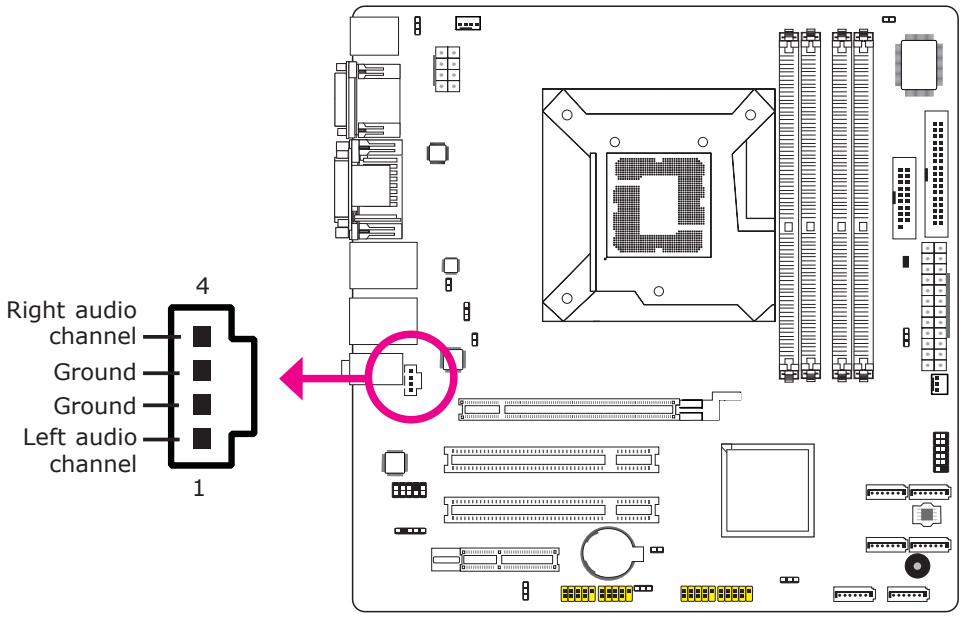
The front audio connector allows you to connect to the second line-out and mic-in jacks that are at the front panel of your system.

Driver Installation

Install the audio driver. Refer to chapter 4 for more information.

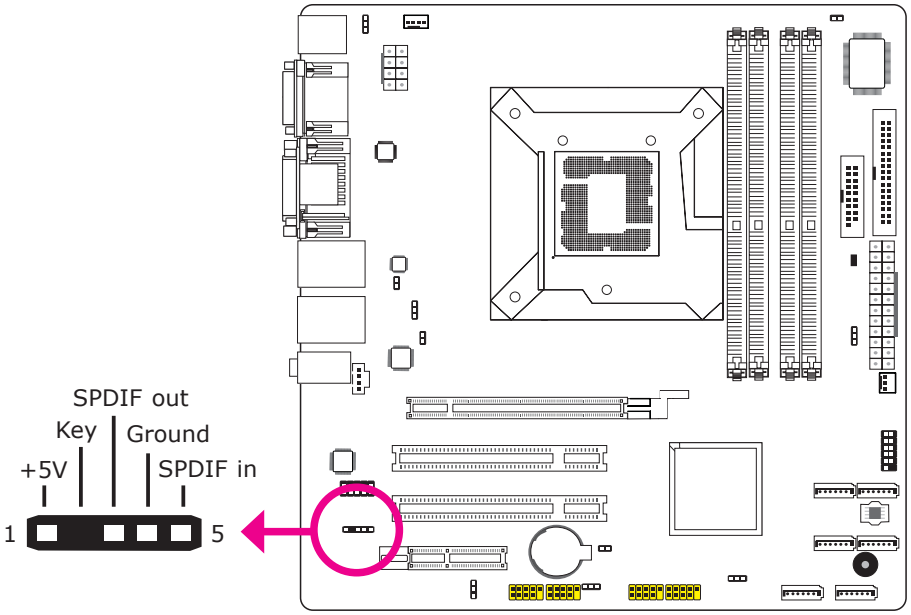
I/O Connectors

CD-in Internal Audio Connector



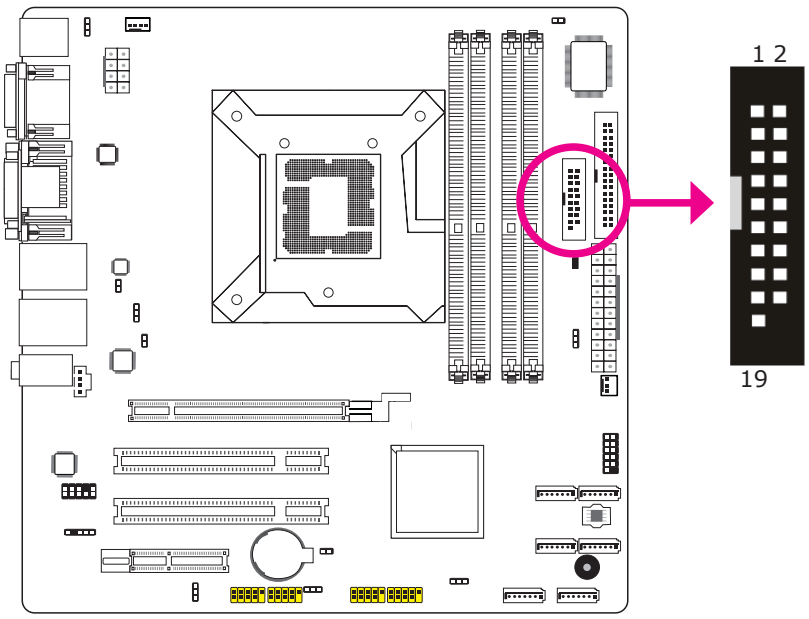
The CD-in connector is used to receive audio from a CD-ROM drive, TV tuner or MPEG card.

S/PDIF Connector



The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned with pin 1 of the S/PDIF connector.

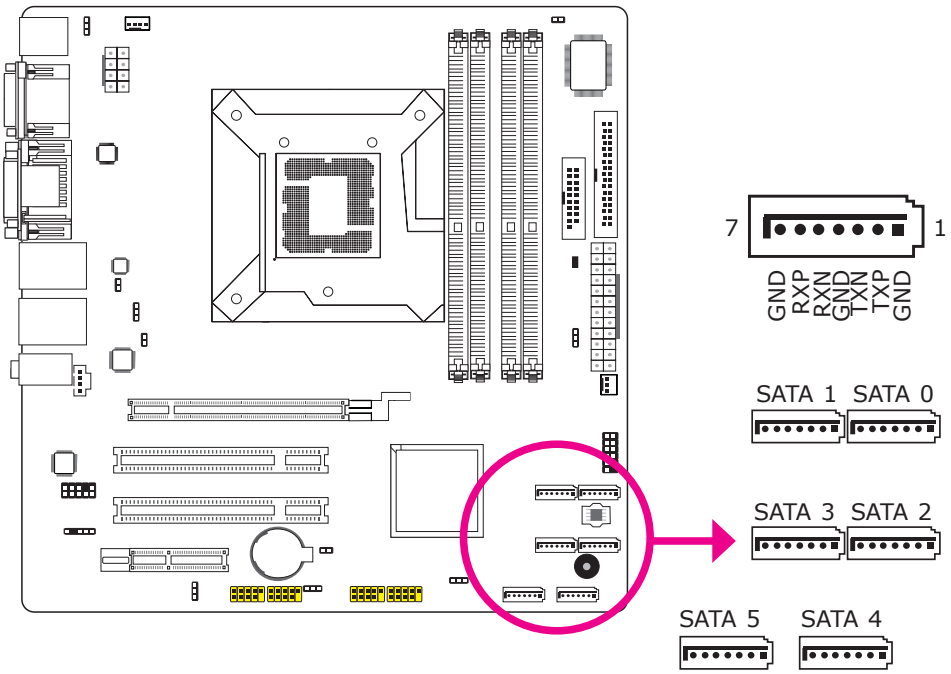
Digital I/O Connector



The Digital I/O connector provides powering-on function to an external device that is connected to this connector.

Pin	Pin Assignment	Pin	Pin Assignment
1	GND	2	+12V
3	DIO7	4	+12V
5	DIO6	6	GND
7	DIO5	8	VCC
9	DIO4	10	VCC
11	DIO3	12	GND
13	DIO2	14	V_5P0_STBY
15	DIO1	16	V_5P0_STBY
17	DIO0	18	GND
19	GND		

SATA (Serial ATA) Ports

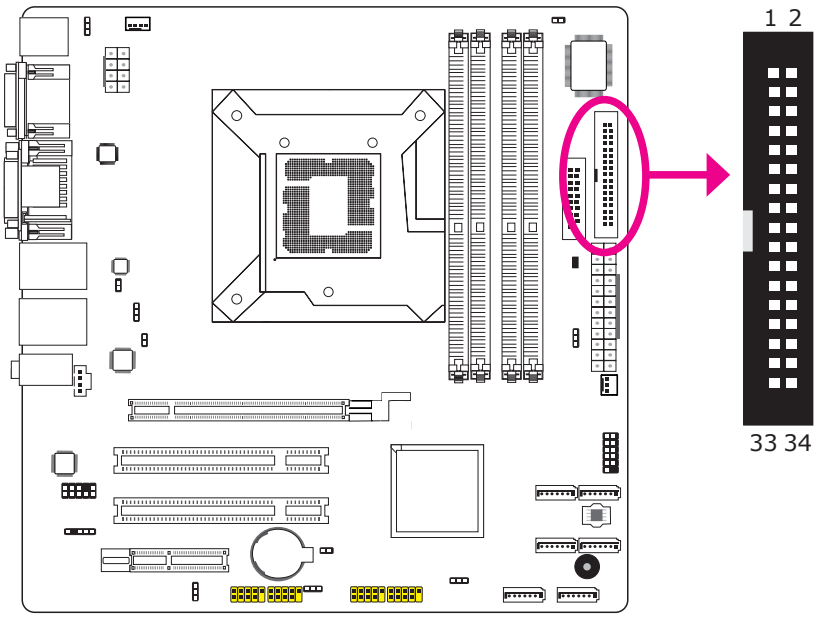


The Serial ATA ports are used to connect Serial ATA devices. Connect one end of the Serial ATA cable to a SATA port and the other end to your Serial ATA device.

BIOS Setting

Configure the Serial ATA drives in the Advanced menu of the BIOS. Refer to chapter 3 for more information.

FDD (Floppy Disk Drive) Connector



The FDD connector supports a standard floppy disk drive. The floppy cable can be inserted into this connector only if pin 1 of the cable is aligned with pin 1 of this connector.

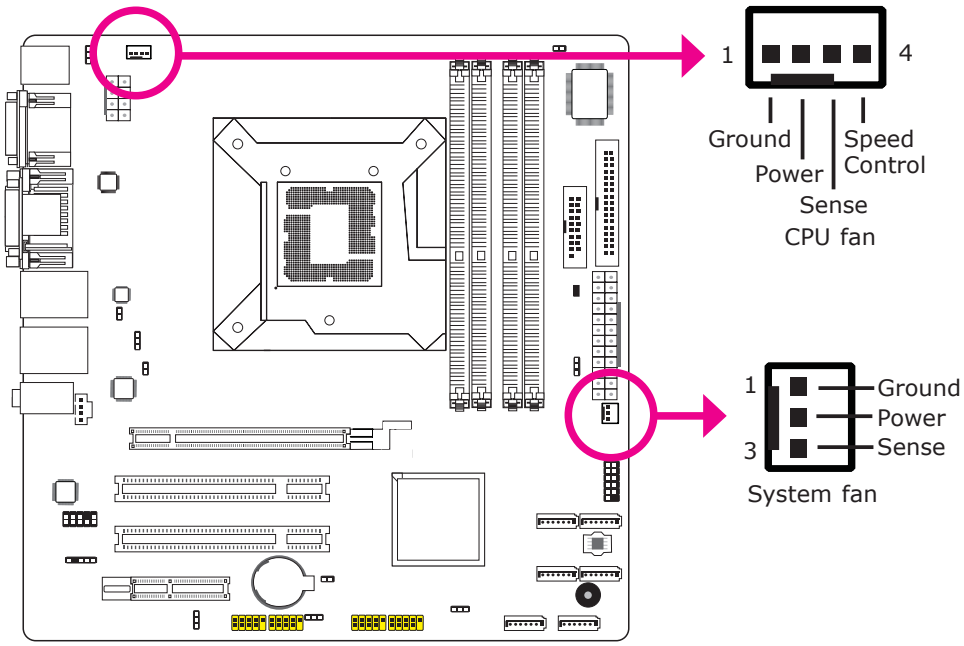
Connecting the FDD Cable

Insert one end of the FDD cable into the FDD connector and the other end of the cable to the floppy drive. Pin 1 of the cable must align with pin 1 of the FDD connector.

BIOS Setting

Enable or disable this function in the Advanced menu of the BIOS. Refer to chapter 3 for more information.

Cooling Fan Connectors

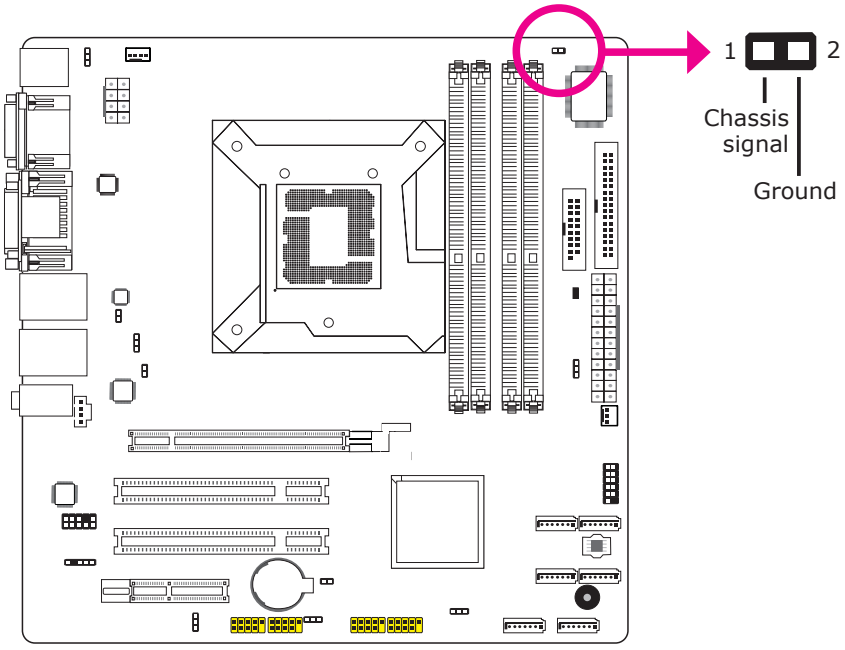


The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

The Advanced menu of the BIOS will display the current speed of the cooling fans. Refer to chapter 3 for more information.

Chassis Instrusion Connector

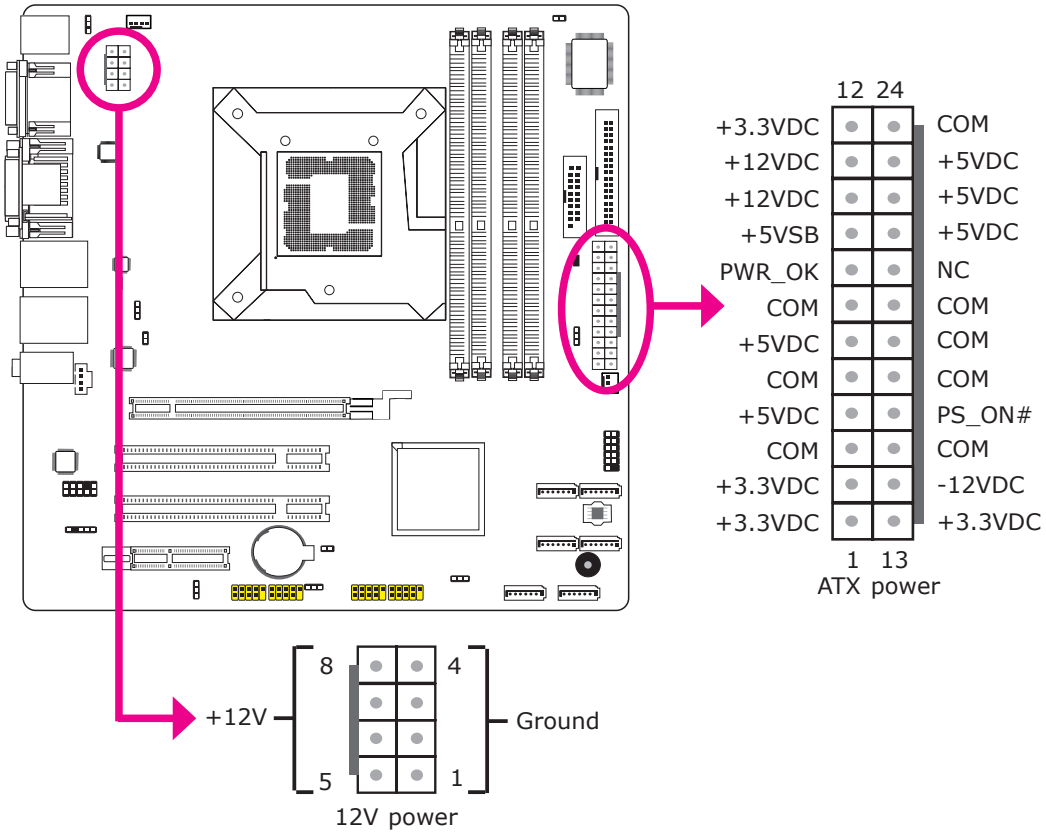


The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will sound only when the system restarts.

MyGuard Hardware Monitor

Install the "MyGuard Hardware Monitor" utility. By default, the chassis intrusion detection function is disabled. When enabled, a warning message will appear when the chassis is open. The utility can also be configured so that a beeping alarm will sound when the chassis is open. Refer to the "MyGuard Hardware Monitor" section in chapter 4 for more information.

Power Connectors



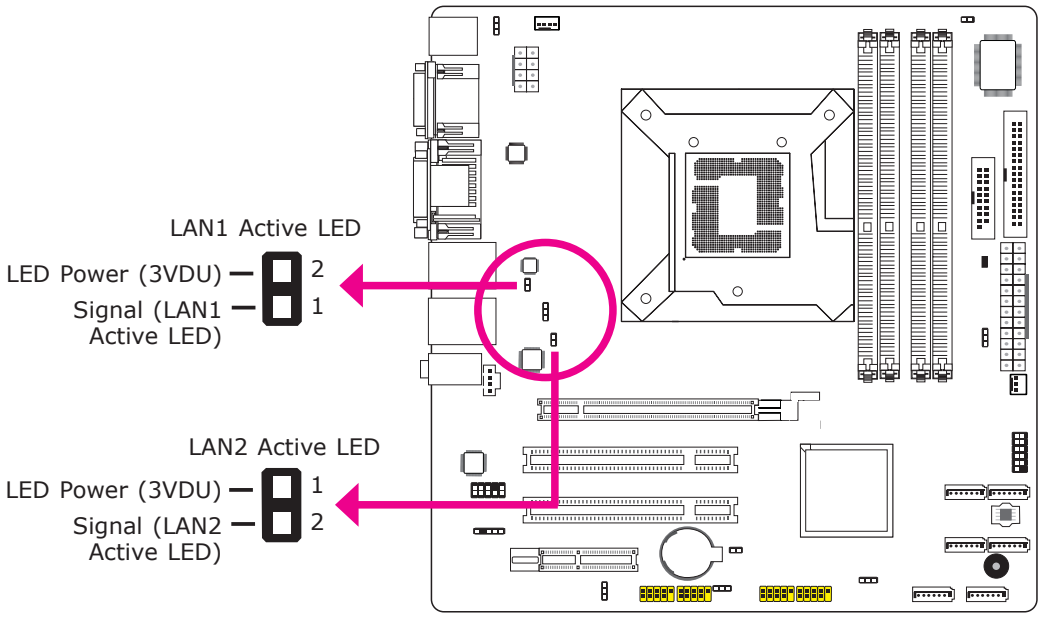
Use a power supply that complies with the ATX12V Power Supply Design Guide Version 2.0. An ATX12V power supply unit has a standard 24-pin ATX main power connector that must be inserted into the 24-pin connector. The 8-pin +12V power connector enables the delivery of more +12VDC current to the processor's Voltage Regulator Module (VRM).

The power connectors from the power supply unit are designed to fit the 24-pin and 8-pin connectors in only one orientation. Make sure to find the proper orientation before plugging the connectors.

The system board requires a minimum of 300 Watt power supply to operate. Your system configuration (CPU power, amount of memory, add-in cards, peripherals, etc.) may exceed the minimum power requirement. To ensure that adequate power is provided, we strongly recommend that you use a minimum of 400 Watt (or greater) power supply.

Important:
Insufficient power supplied to the system may result in instability or the add-in boards and peripherals not functioning properly. Calculating the system's approximate power usage is important to ensure that the power supply meets the system's consumption requirements.

LAN Active LED Connectors



The LAN Active LED connectors are used to connect to the LAN LEDs that are usually located at the front panel of the chassis.

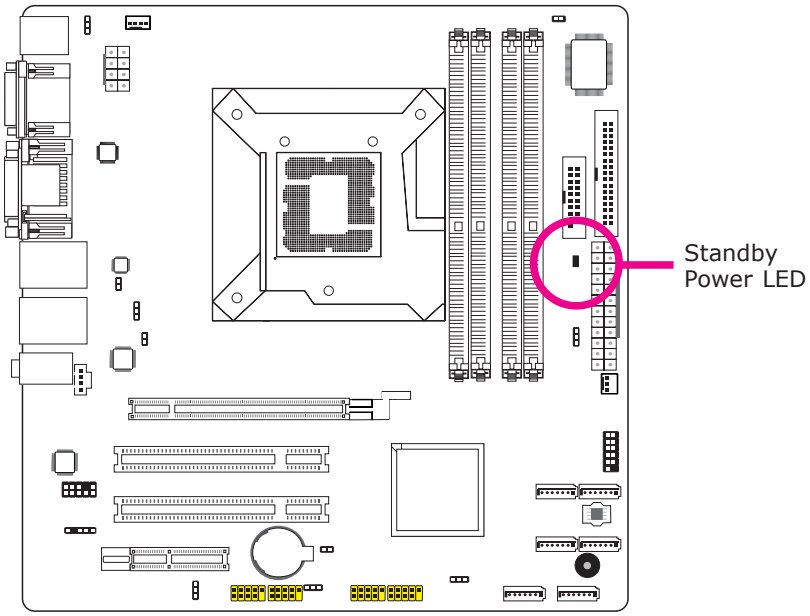
LAN1 Active LED

LAN1 Active LED will light when the Intel LAN (LAN1) is being accessed.

LAN2 Active LED

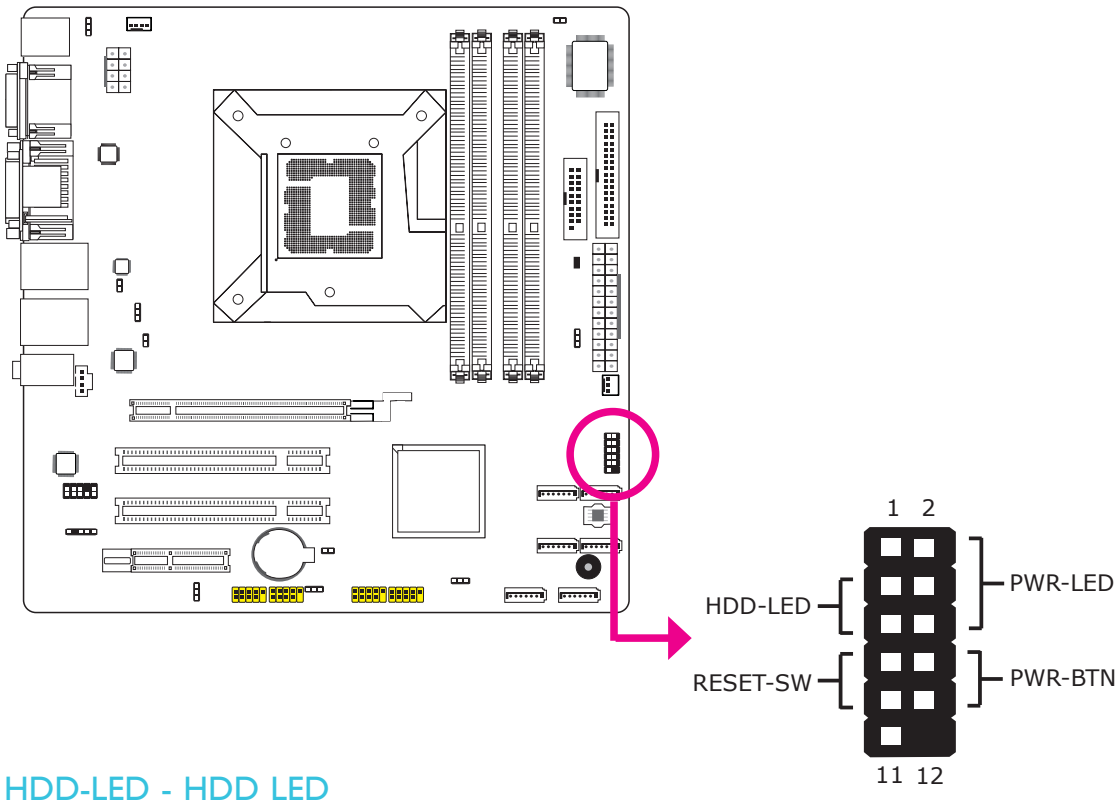
LAN2 Active LED will light when the Realtek LAN (LAN2) is being accessed.

Standby Power LED



This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

Front Panel Connectors



HDD-LED - HDD LED

This LED will light when the hard drive is being accessed.

RESET SW - Reset Switch

This switch allows you to reboot without having to power off the system.

PWR-BTN - Power Switch

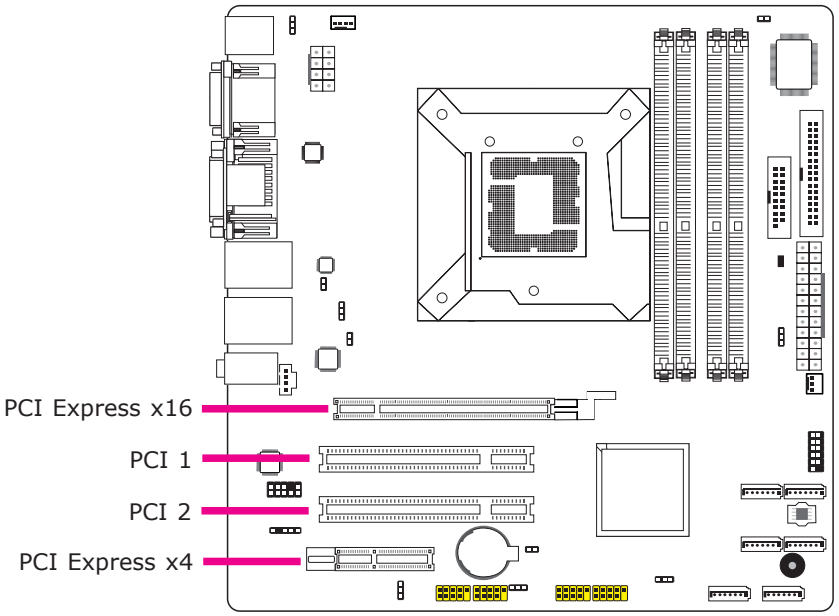
This switch is used to power on or off the system.

PWR-LED - Power/Standby LED

When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 2 seconds.

	Pin	Pin Assignment		Pin	Pin Assignment
HDD-LED	3	HDD Power	**PWR-LED**	2	LED Power
	5	Signal		4	LED Power
RESET SW	7	Ground		6	Signal
	9	RST Signal	**PWR-BTN**	8	Ground
	11	N.C.		10	Signal

Expansion Slots



PCI Express x16 Slot

Install PCI Express x16 graphics card, that comply to the PCI Express specifications, into the PCI Express x16 slot. To install a graphics card into the x16 slot, align the graphics card above the slot then press it down firmly until it is completely seated in the slot. The retaining clip of the slot will automatically hold the graphics card in place.

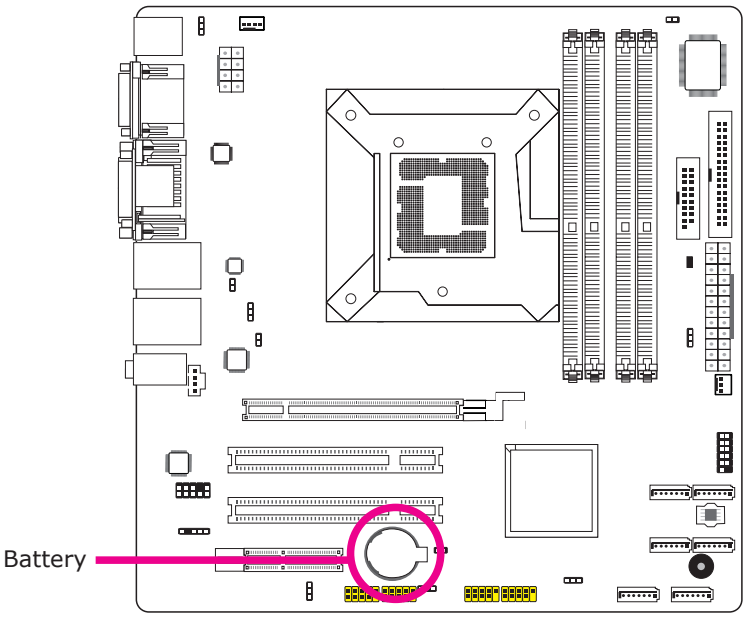
PCI Express x4 Slot

Install PCI Express cards such as network cards or other cards that comply to the PCI Express specifications into the PCI Express x4 slot.

PCI Slots

The PCI slots support expansion cards that comply with PCI specifications.

Battery



The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

Safety Measures

- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

Chapter 3 - BIOS Setup

Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.

Note:
The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

Keys	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the highlight up or down between submenus or fields.
<Esc>	Exits to the BIOS Setup Utility.
+ (plus key)	Scrolls forward through the values or options of the highlighted field.
- (minus key)	Scrolls backward through the values or options of the highlighted field.
Tab	Selects a field.
<F1>	Displays General Help.
<F10>	Saves and exits the Setup program.
<Enter>	Press <Enter> to enter the highlighted submenu.

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

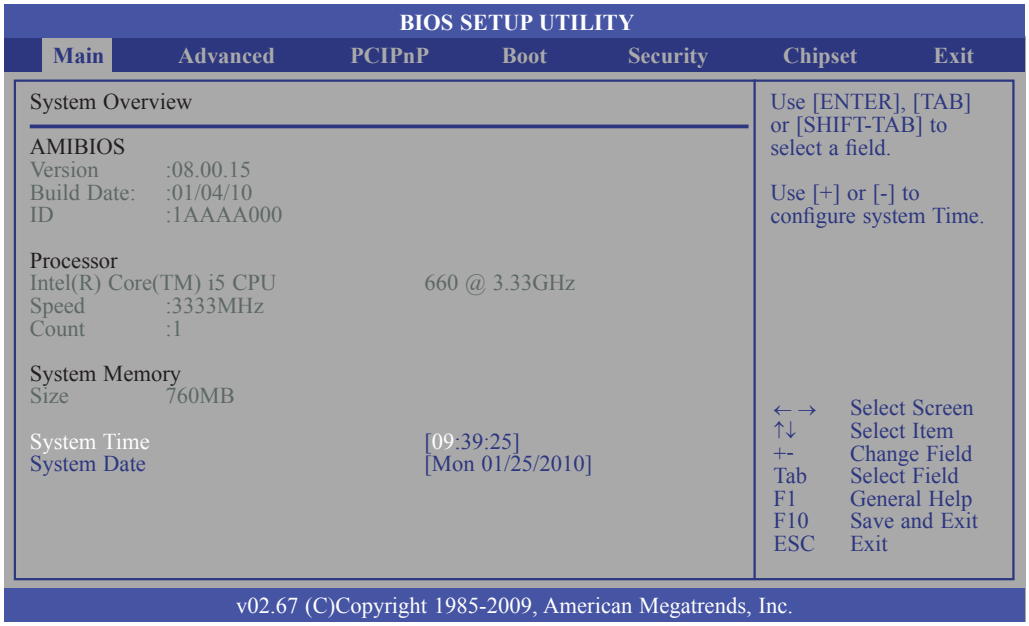
Submenu

When "▸" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

AMI BIOS Setup Utility

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



AMI BIOS

Displays the detected BIOS information.

Processor

Displays the detected processor information.

System Memory

Displays the detected system memory information.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

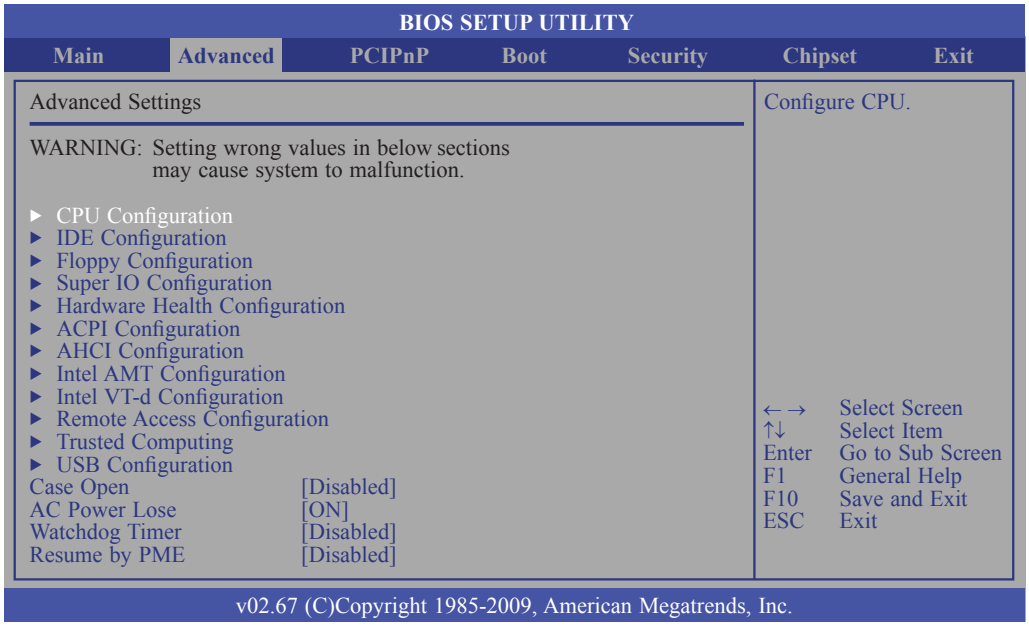
System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Important:
Setting incorrect field values may cause the system to malfunction.



CPU Configuration to USB Configuration

Refer to the following pages for information about these submenus.

Case Open

Set this field to Enabled to allow the system to alert you of a chassis intrusion event.

AC Power Lose

Off
When power returns after an AC power failure, the system's power is off. You must press the Power button to power-on the system.

On
When power returns after an AC power failure, the system will automatically power-on.

Last State
When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

Watchdog Timer

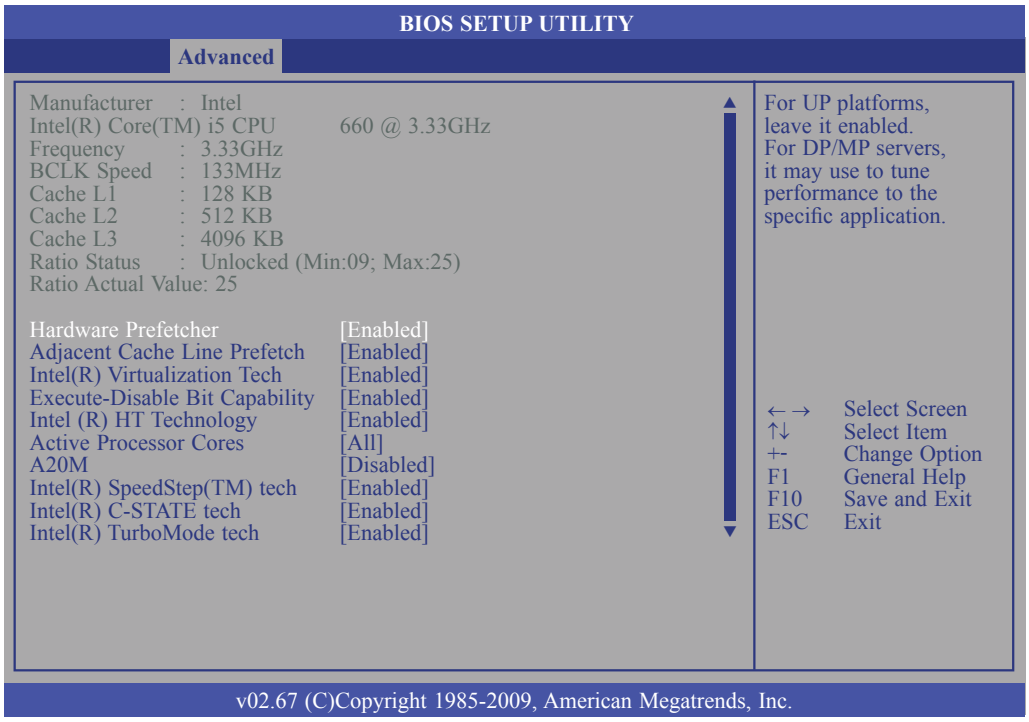
This field is used to select the time interval of the Watchdog timer. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

Resume by PME

Enable this field to use the PME signal to wake up the system.

CPU Configuration

This section is used to configure the CPU. It will also display detected CPU information.



Hardware Prefetcher

For UP platforms, leave it enabled. For DP/MP servers, it may be used to tune performance to the specific application.

Adjacent Cache Line Prefetch

Enables or disables the Adjacent Cache Line Prefetch feature.

Intel(R) Virtualization Tech

When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Execute Disable Bit Capability

When this field is set to Disabled, it will force the XD feature flag to always return to 0.

Intel HT Technology

When disabled, only one thread per enabled core is enabled.

Active Processor Cores

This field is used to enter the number of cores to enable in each processor package.

A20M

Enable this for legacy operating systems and APs.

Intel(R) SpeedStep(tm) Tech

Enables or disables GV3.

Intel(R) C-STATE Tech

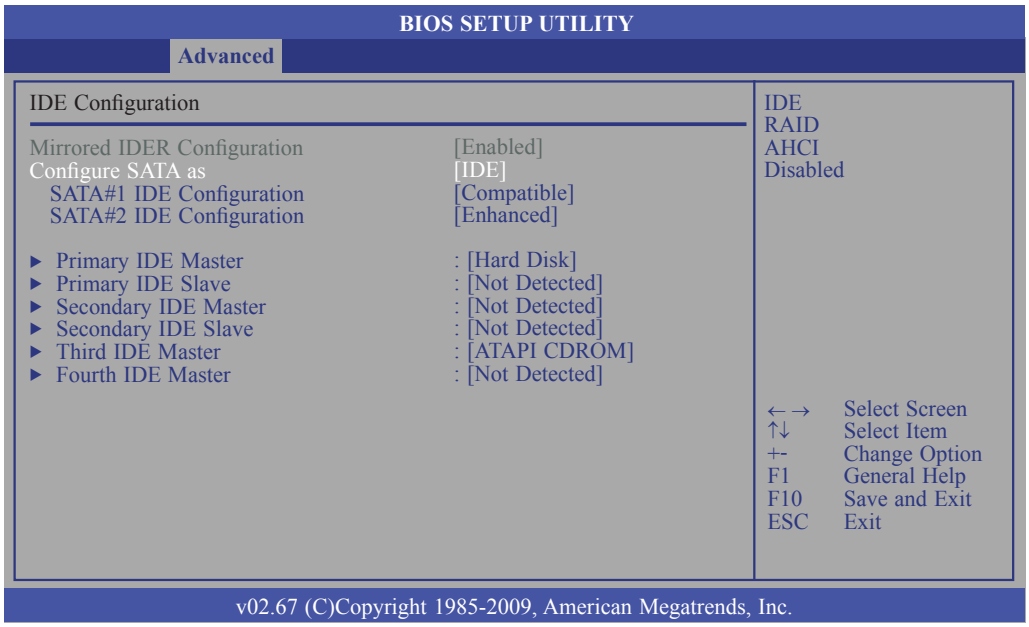
When enabled, CPU idle is set to C2/C3/C4.

Intel(R) TurboMode Tech

When Enabled, Turbo mode allows processor cores to run faster than marked frequency in specific conditions.

IDE Configuration

This section is used to configure the IDE drives.



Mirrored IDER Configuration

Enables or disables the IDER feature.

Configure SATA as

IDE
This option configures the Serial ATA drives as Parallel ATA storage devices.

RAID
This option allows you to create RAID or Intel Matrix Storage configuration on Serial ATA devices.

AHCI
This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).

SATA#1 IDE Configuration / SATA#2 IDE Configuration

These fields are used to configure the IDE device mode.

SATA#1 IDE Configuration

The options are Compatible and Enhanced.

SATA#2 IDE Configuration

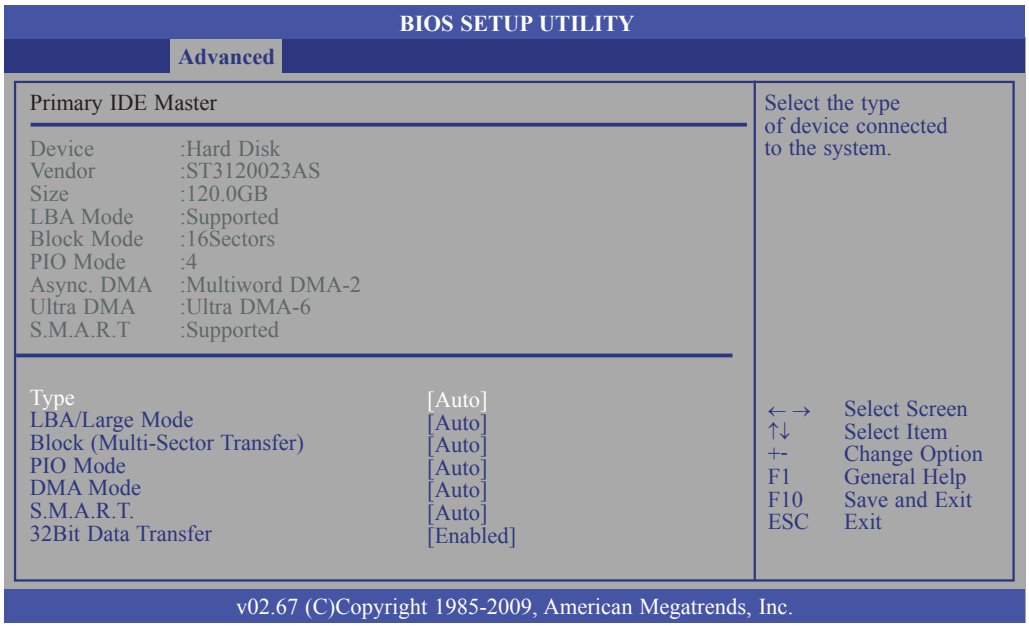
The options are Disabled and Enhanced.

Compatible
Legacy IDE channels will appear allowing you to configure the devices.

Enhanced
”Configure SATA as” will appear allowing you to configure the devices.

Primary IDE Master to Fourth IDE Master

When you enter the BIOS Setup Utility, the BIOS will auto detect the existing IDE devices then displays the status of the detected devices. To configure an IDE drive, move the cursor to a field then press <Enter>.



Type

Selects the type of IDE drive connected to the system.

LBA/Large Mode

Auto
The LBA mode will automatically be enabled, that is, if the LBA mode was not previously disabled.

Disabled
Disables the LBA mode.

Block (Multi-Sector Transfer)

Auto
Data transfer from and to the device occurs multiple sectors at a time.

Disabled
Data transfer from and to the device occurs one sector at a time.

PIO Mode

Selects the data transfer mode. PIO means Programmed Input/Output. Rather than have the BIOS issue a series of commands to effect a transfer to or from the disk drive, PIO allows the BIOS to tell the controller what it wants and then let the controller and the CPU perform the complete task by themselves. Your system supports five modes, 0 to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode after checking your drive.

Auto
The default is Auto. The BIOS will automatically set the system according to your hard disk drive's timing.

Mode 0-4
You can select a mode that matches your hard disk drive's timing. Caution: Do not use the wrong setting or you will have drive errors.

DMA Mode

This field allows you to set the Ultra DMA in use. When Auto is selected, the BIOS will select the best available option after checking your hard drive or CD-ROM.

Auto
Automatically detects the DMA mode.

SWDMAn
SingleWord DMAn.

MWDMAn
MultiWord DMAn.

UDMAn
Ultra DMAn.

S.M.A.R.T.

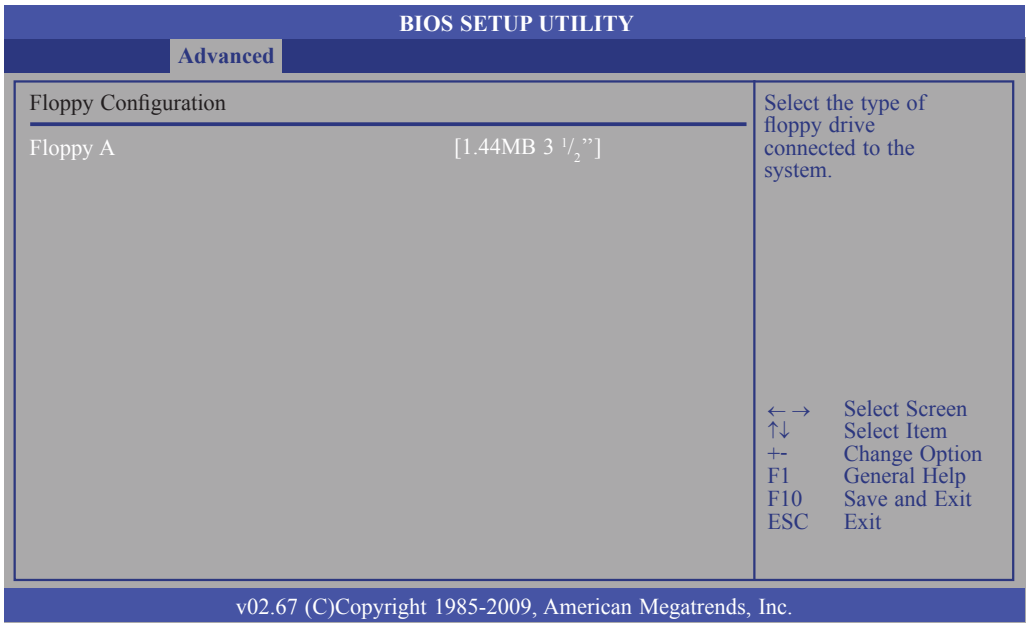
The system board supports SMART (Self-Monitoring, Analysis and Reporting Technology) hard drives. SMART is a reliability prediction technology for ATA/IDE and SCSI drives. The drive will provide sufficient notice to the system or user to backup data prior to the drive's failure. SMART is supported in ATA/33 or later hard drives. The options are Auto (default), Enabled and Disabled.

32Bit Data Transfer

Enables or disables 32-bit data transfer.

Floppy Configuration

This section is used to configure the floppy drives.



Floppy A

This field identifies the type of floppy disk drive installed.

Disabled
Disables the floppy drive

360K, 5.25 in.
5-1/4 in. standard drive; 360KB capacity

1.2M, 5.25 in.
5-1/4 in. AT-type high-density drive; 1.2MB capacity

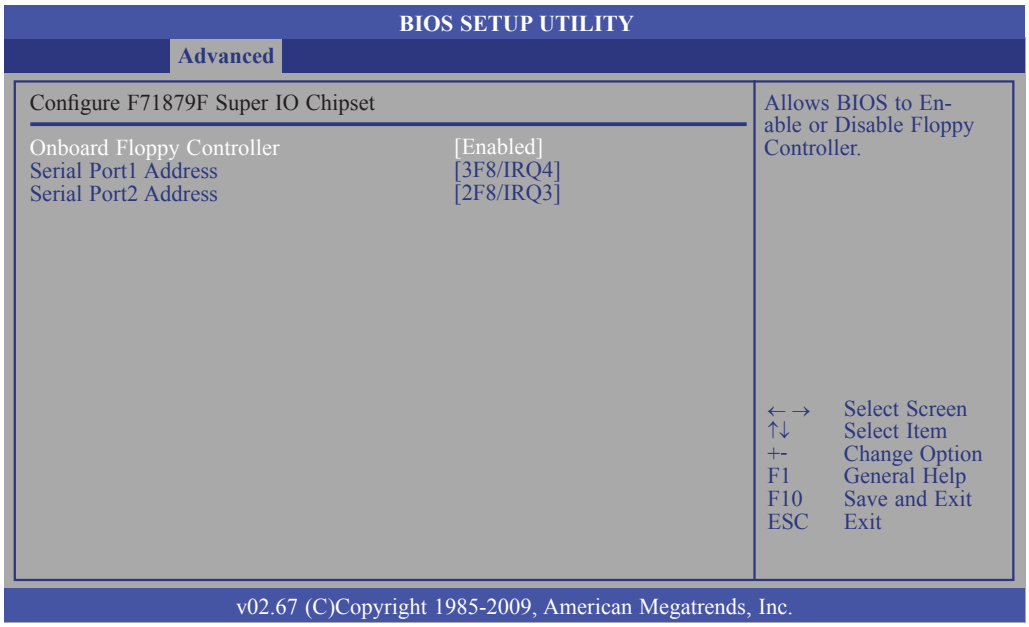
720K, 3.5 in.
3-1/2 in. double-sided drive; 720KB capacity

1.44M, 3.5 in.
3-1/2 in. double-sided drive; 1.44MB capacity

2.88M, 3.5 in.
3-1/2 in. double-sided drive; 2.88MB capacity

Super IO Configuration

This section is used to configure the I/O functions.



Onboard Floppy Controller

Enabled
Enables the onboard floppy disk controller.

Disabled
Disables the onboard floppy disk controller.

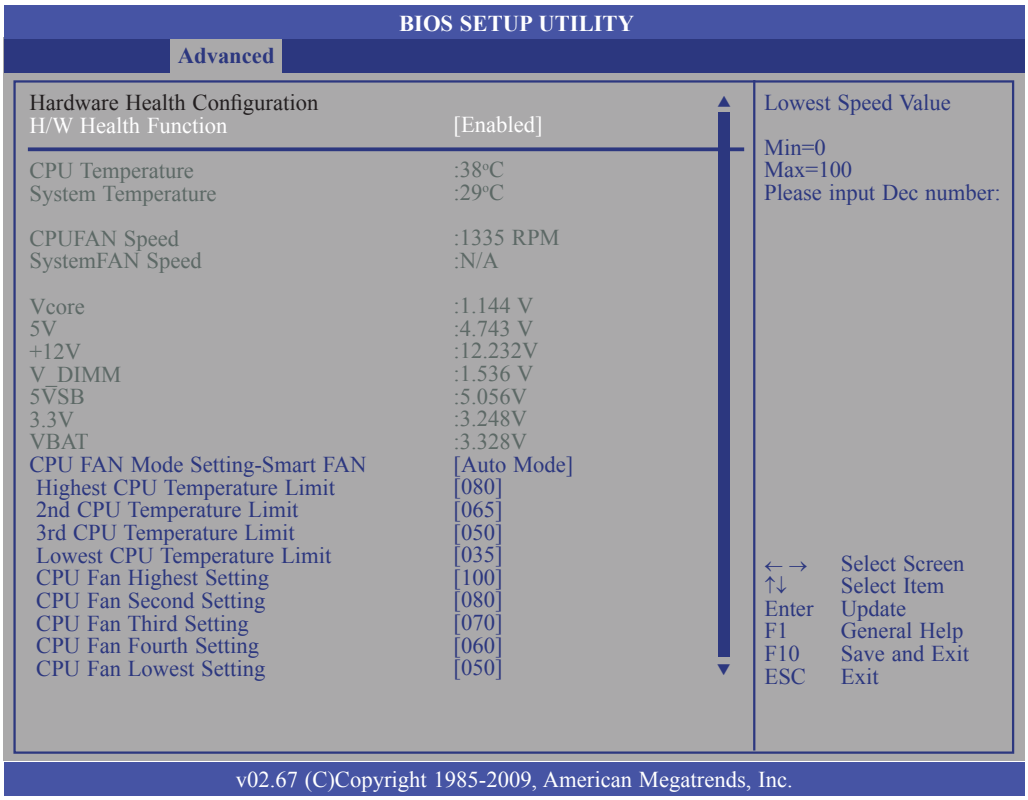
Serial Port1 Address and Serial Port2 Address

3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4, 2E8/IRQ3
Allows you to manually select an I/O address for the onboard serial port 1 and serial port 2.

Disabled
Disables the onboard serial port 1 and/or serial port 2.

Hardware Health Configuration

This section is used to configure the hardware monitor function.



H/W Health Function

Enables or disables the hardware monitoring function.

CPU Temperature to VBAT

These fields will show the temperature, fan speed and output voltage of the monitored devices or components.

CPU Fan Mode Setting-Smart Fan

Enable this function to configure the CPU temperature's limit and the CPU fan's settings.

Highest CPU Temperature Limit to Lowest CPU Temperature Limit

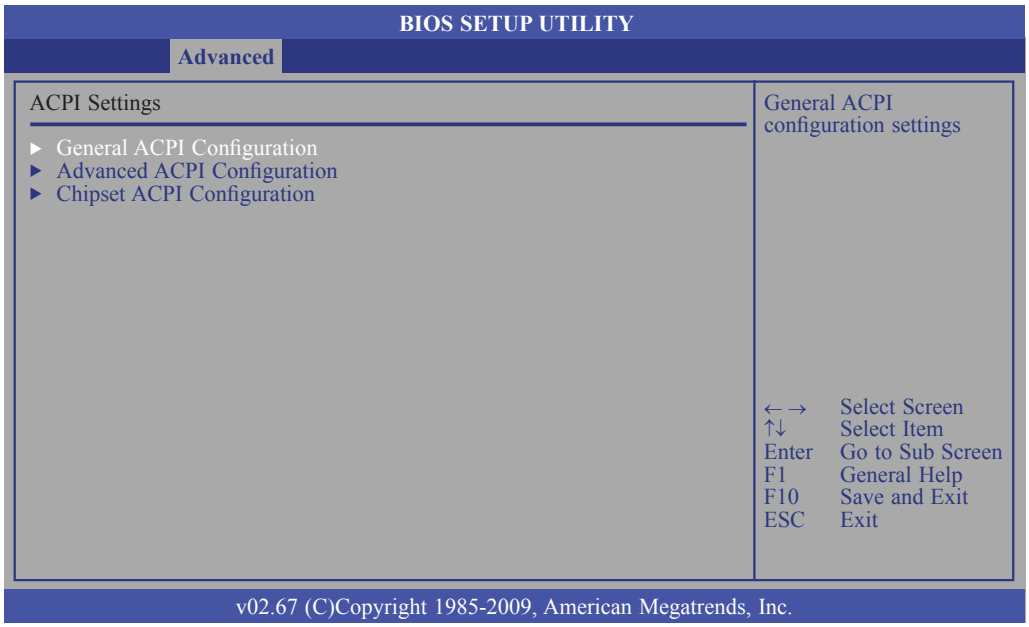
Sets the CPU's highest, 2nd, 3rd and lowest temperature limit.

CPU Fan Highest Setting to CPU Fan Lowest Setting

Sets the CPU fan's highest, 2nd, 3rd, 4th and lowest fan speed limit.

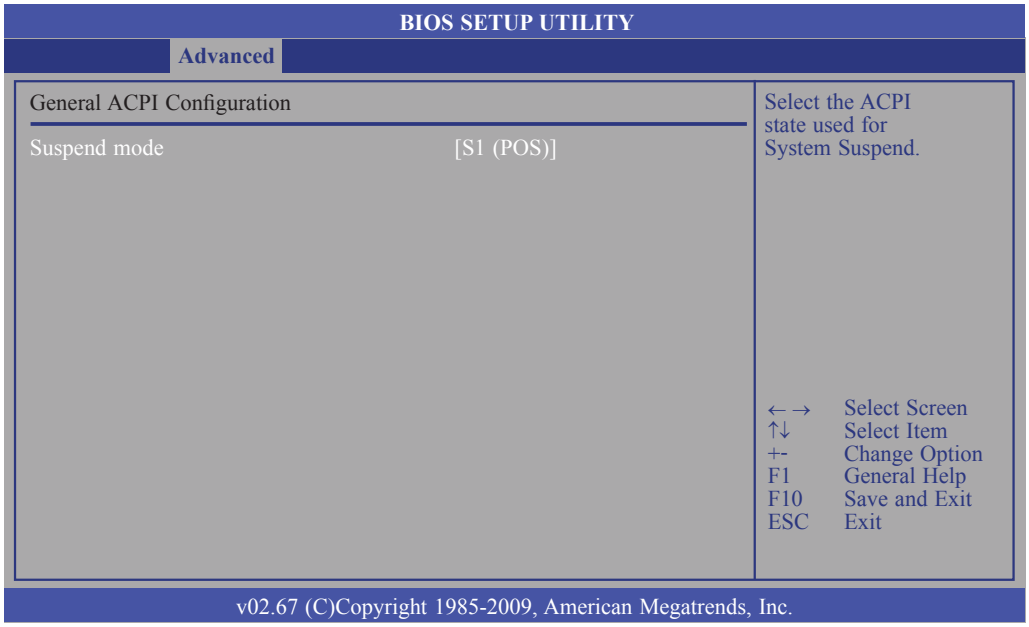
ACPI Configuration

This section is used to configure ACPI.



General ACPI Configuration

Configures the general ACPI settings.



Suspend Mode

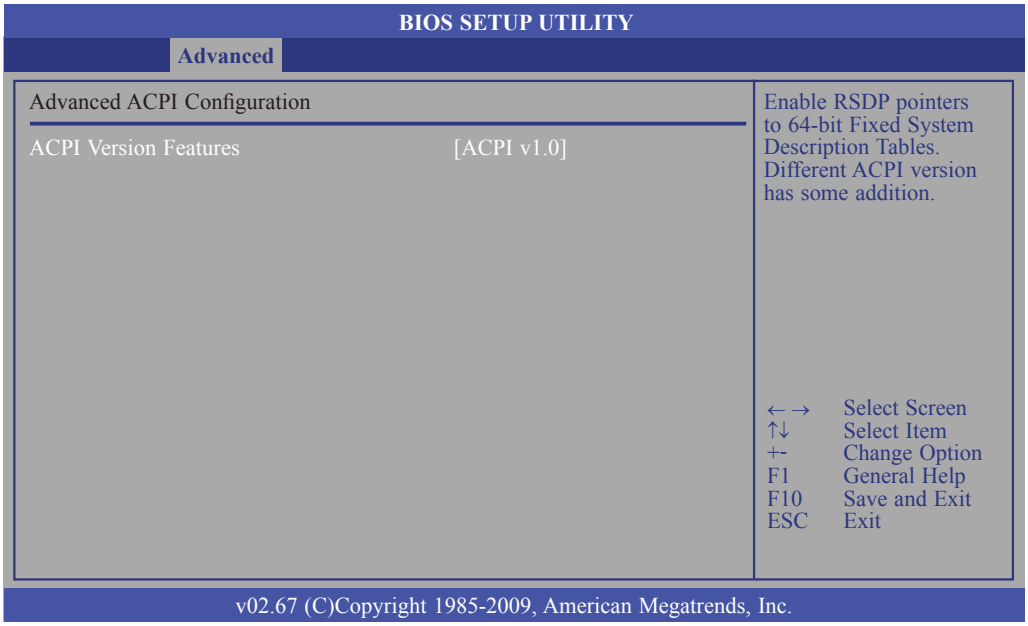
This field is used to select the type of Suspend mode.

S1(POS)
Enables the Power On Suspend function.

S3(STR)
Enables the Suspend to RAM function.

Advanced ACPI Configuration

Configures additional ACPI functions.

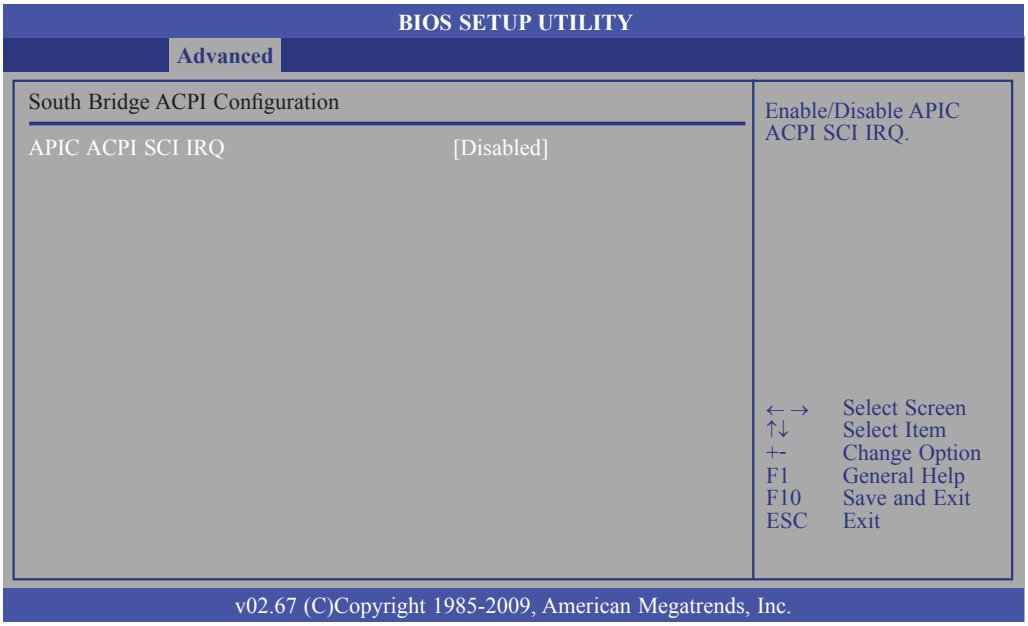


ACPI Version Features

Selects the ACPI version. The options are ACPI v1.0, ACPI v2.0 and ACPI v3.0.

Chipset ACPI Configuration

Configures relevant chipset ACPI functions.

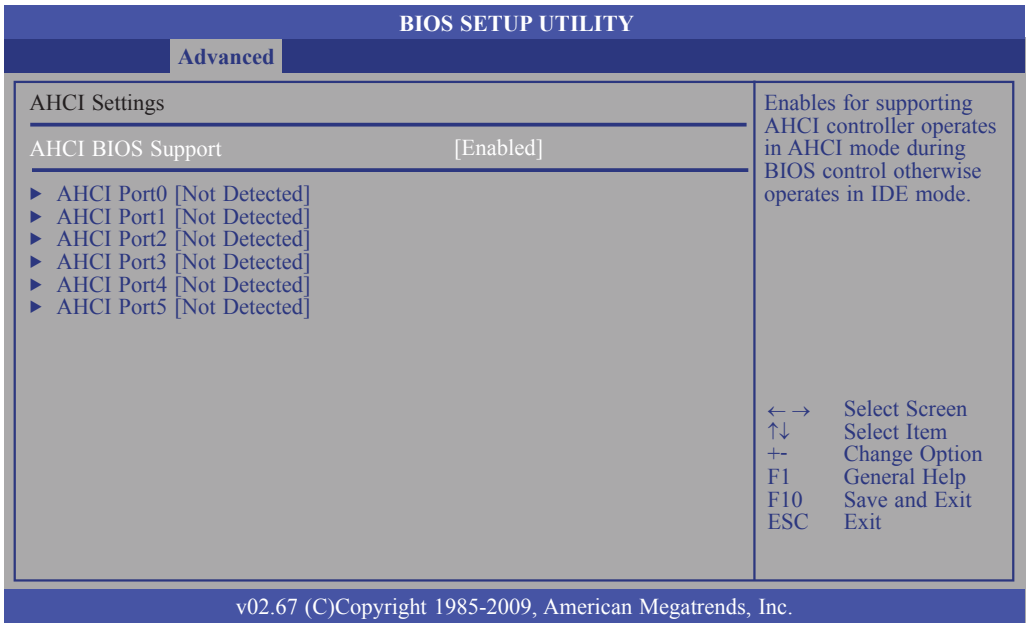


APIC ACPI SCI IRQ

Enables or disables the APIC ACPI SCI IRQ.

AHCI Configuration

This section is used to configure AHCI.

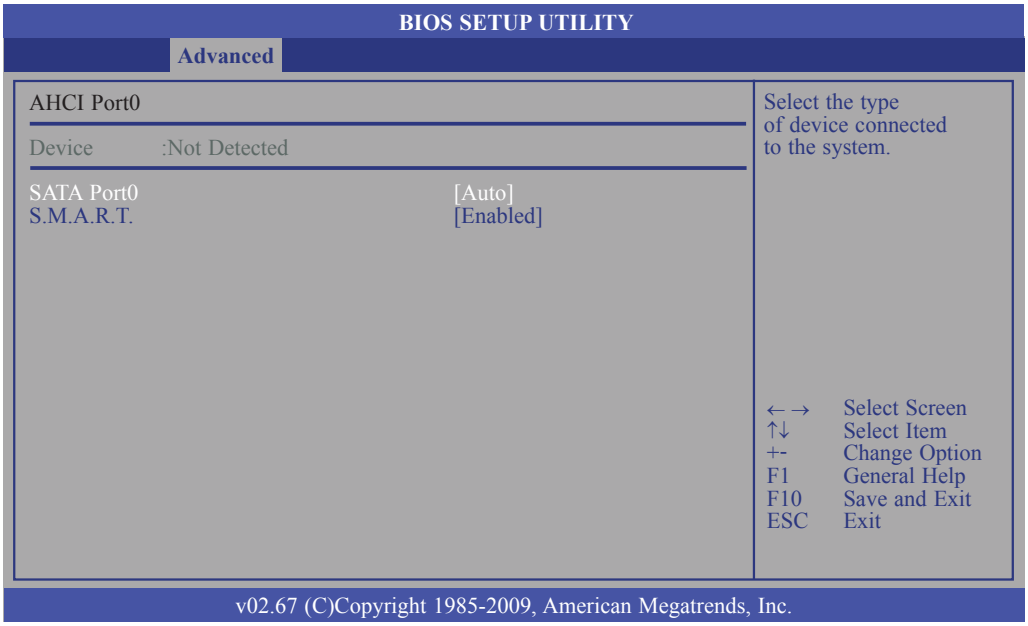


AHCI BIOS Support

Enable this field to allow the AHCI controller to operate in AHCI mode during BIOS control otherwise it will operate in IDE mode.

AHCI Port0 to AHCI Port5

When entering the setup utility, the BIOS auto detects the presence of any IDE devices. It displays the status of the auto detected IDE devices.



SATA Port0

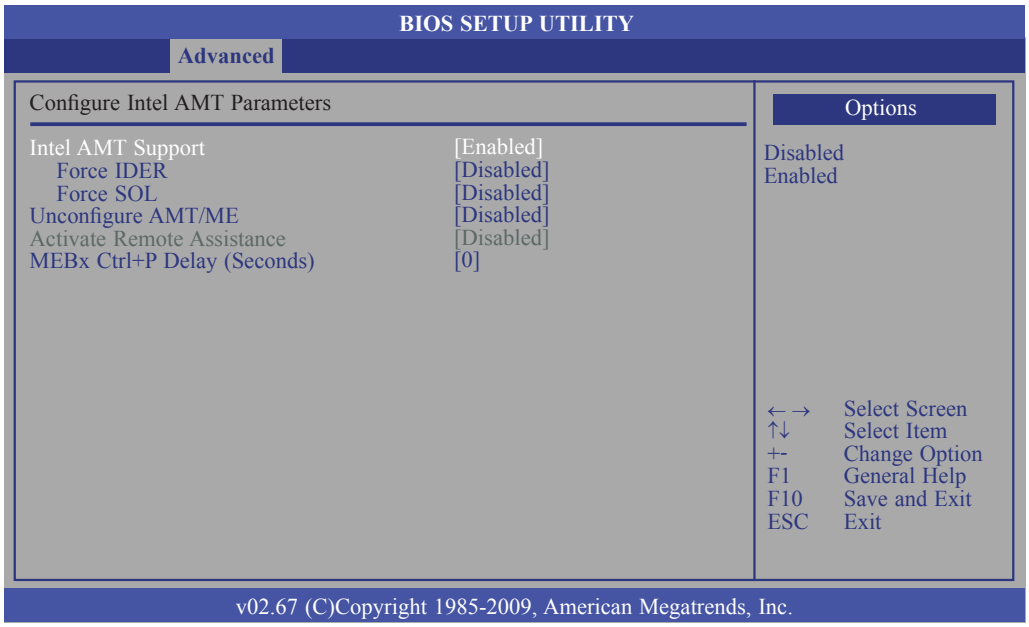
Selects the type of device connected to the system.

S.M.A.R.T.

The system board supports SMART (Self-Monitoring, Analysis and Reporting Technology) hard drives. SMART is a reliability prediction technology for ATA/IDE and SCSI drives. The drive will provide sufficient notice to the system or user to backup data prior to the drive's failure. The default is Disabled. If you are using hard drives that support S.M.A.R.T., set this field to Enabled. SMART is supported in ATA/33 or later hard drives. The options are Enabled and Disabled.

Intel AMT Configuration

This section is used to configure AMT.



Intel AMT Support

Enables or disables Intel's AMT (Active Management Technology) function.

Force IDER

The options are:

Disabled
IDER Pri. Master
IDER Pri. Slave
IDER Sec. Master
IDER Sec. Slave

Force SOL

The options are Enabled and Disabled.

Unconfigure AMT/ME

Set this field to Enabled and MEBx setup will load the default values.

Activate Remote Assistance

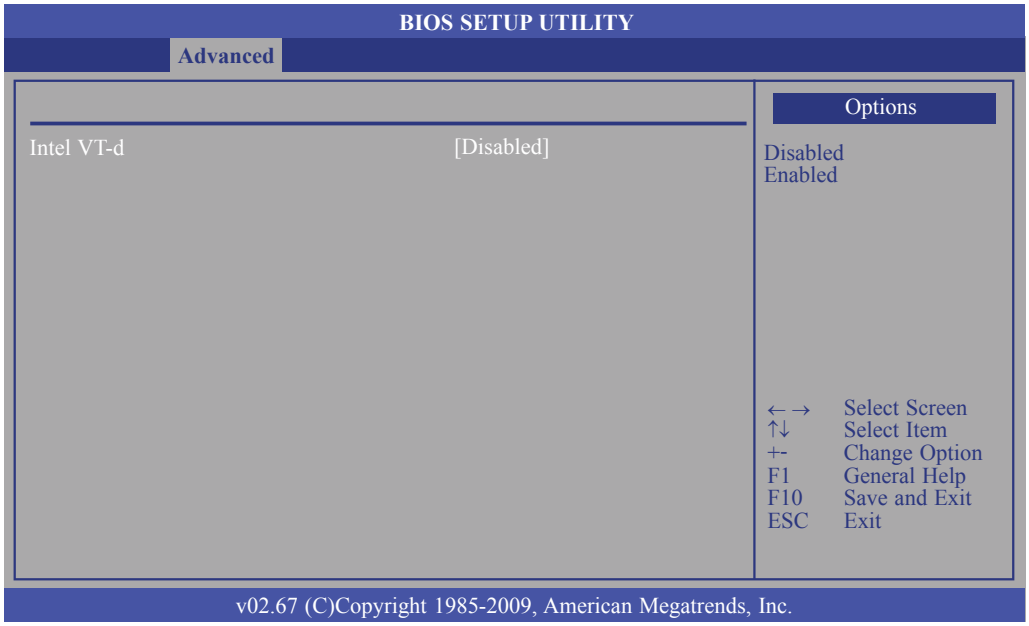
The options are Enabled and Disabled.

MEBx Ctrl+P Delay (Seconds)

Enters the delay time of MEBx.

Intel VT-d Configuration

This section is used to configure VT-d.

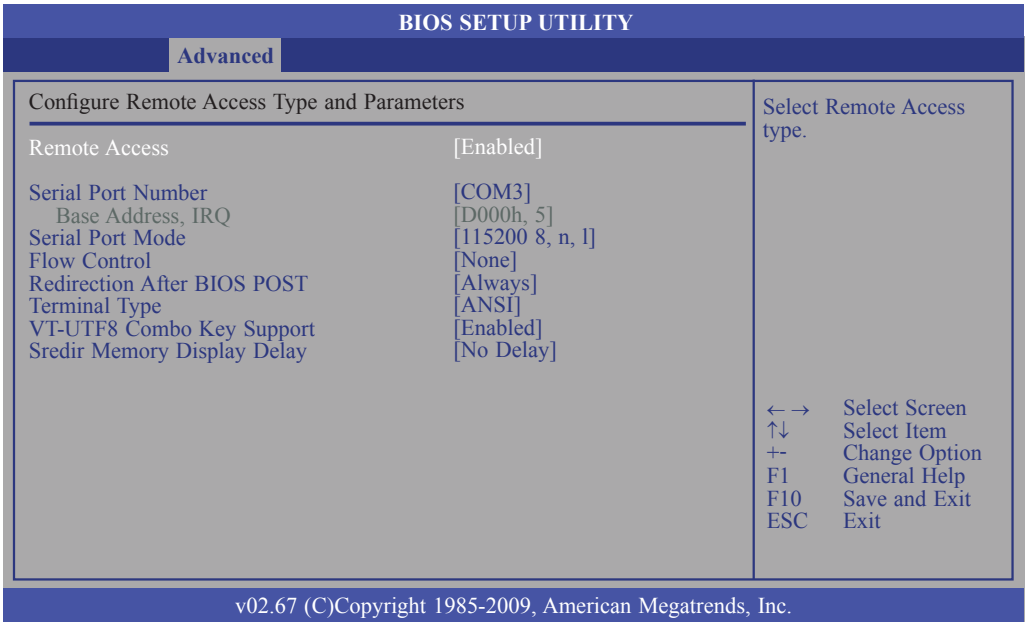


Intel VT-d

The options are Enabled and Disabled.

Remote Access Configuration

This section is used to configure the remote access.



Remote Access

Enables or disables the remote access feature.

Serial Port Number

Selects the serial port.

Base Address, IRQ

Selects an IRQ for the serial port.

Serial Port Mode

Selects a mode for the serial port.

Flow Control

Selects the flow control for console redirection.

Redirection After BIOS POST

Boot Loader
Redirection is active during POST and during Boot Loader.

Always
Redirection is always active. Some OSes may not work when this field is set to Always.

Disable
Turns off the redirection after POST.

Terminal Type

Selects the target terminal type.

VT-UTF8 Combo Key Support

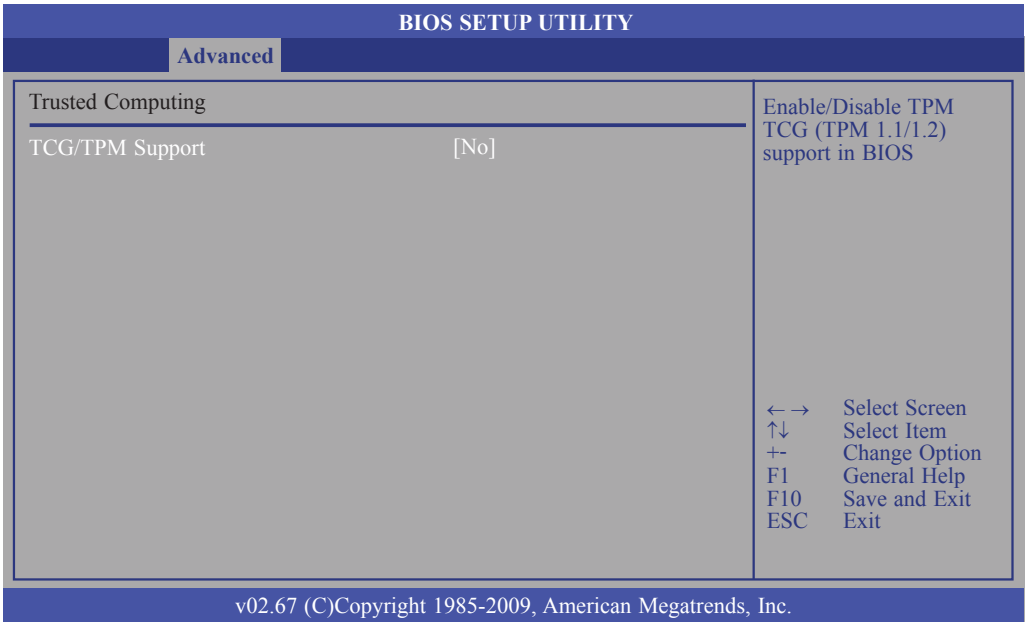
Enables or disables VT-UTF8 combination key support for ANSI/VT100 terminals.

Sredir Memory Display Delay

Selects the delay time (in seconds) before displaying the memory information.

Trusted Computing (optional)

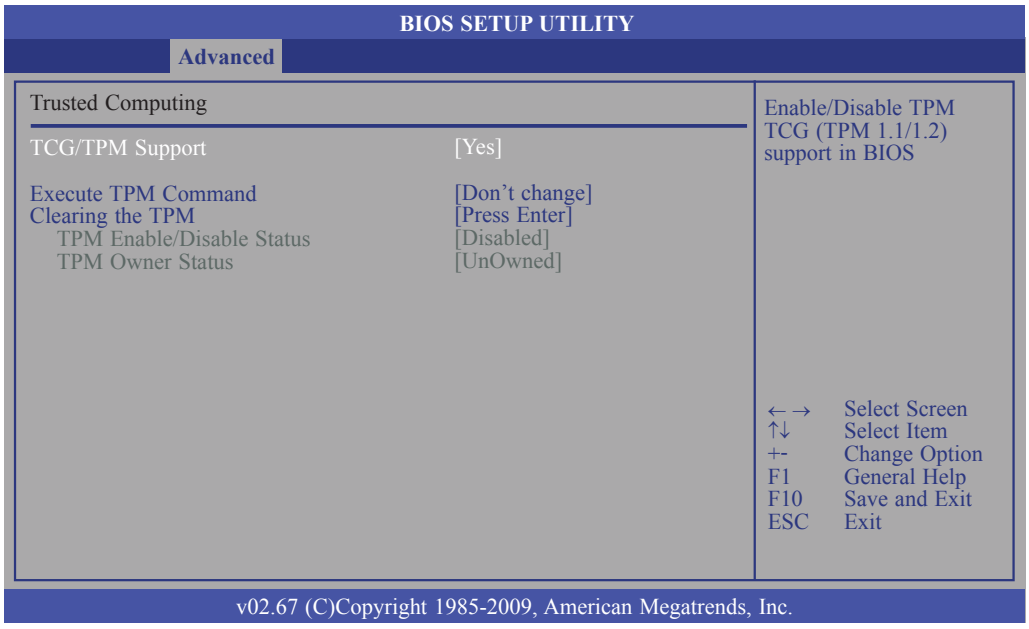
This section configures settings relevant to Trusted Computing innovations.



TCG/TPM Support

Enables or disables TPM TCG. The options are Yes and No.

If you selected Yes, additional fields will appear.



Execute TPM Command

Enables (activates) or disables (deactivates) command to TPM.

Clearing the TPM

This field allows you to clear the user information saved in the TPM security chip. When you press <Enter>, a warning message will appear to ask if you want to clear the user information in the security chip. Use the left / right arrow key to select between [OK] and [Cancel], then press <Enter> to confirm your choice.

TPM Enable/Disable Status

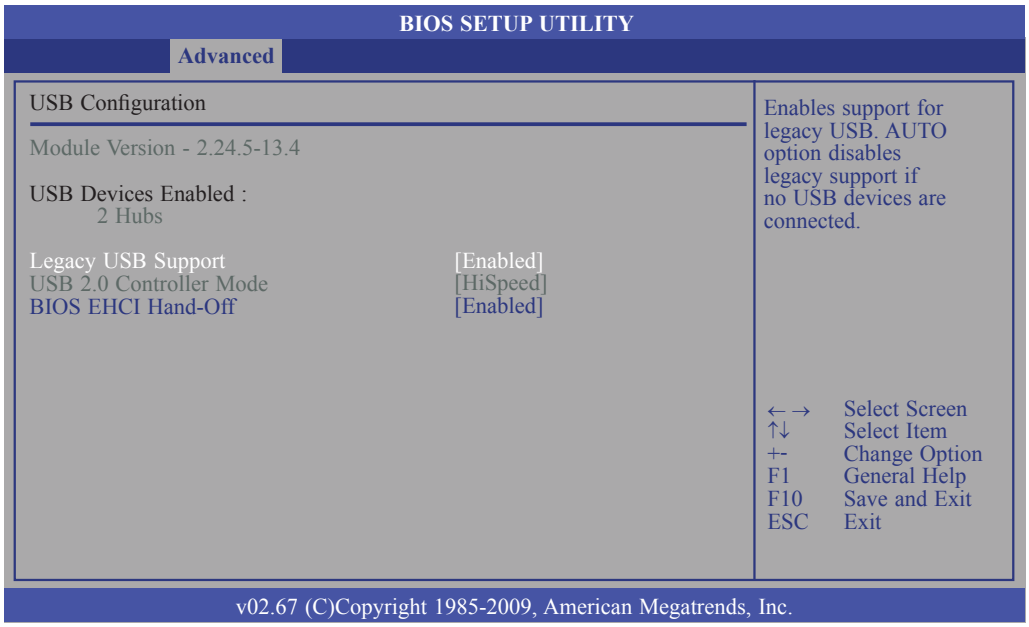
Enables or disables the TPM status.

TPM Owner Status

Enables or disables the TPM owner's status.

USB Configuration

This section is used to configure USB devices.



Legacy USB Support

Enabled
Enables Legacy USB.

Auto
Disables support for Legacy when no USB devices are connected.

Disabled
Keeps USB devices available only for EFI applications.

USB 2.0 Controller Mode

Configures the USB 2.0 controller in HiSpeed (480Mbps) or FullSpeed (12Mbps).

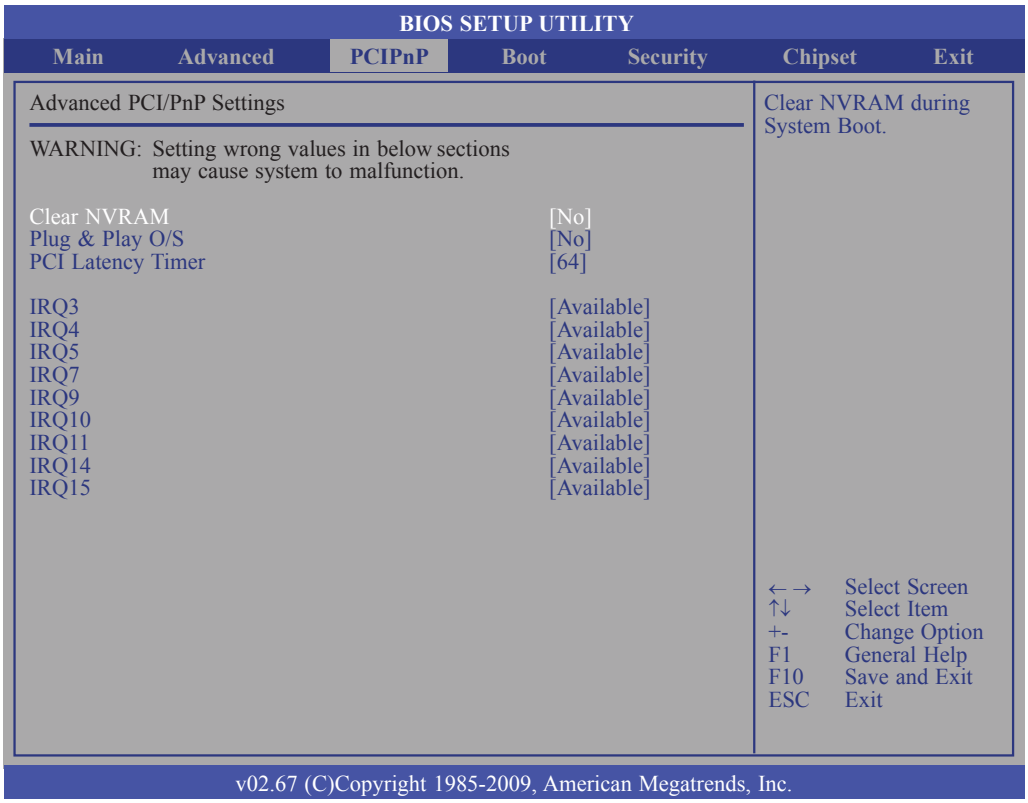
BIOS EHCI Hand-Off

This is a workaround for OSes that does not support EHCI hand-off. The EHCI ownership change should be claimed by the EHCI driver.

PCIPnP

The PCIPnP menu is used to configure PCI Plug and Play devices.

Important:
Setting incorrect field values may cause the system to malfunction.



Clear NVRAM

This field allows clearing the NVRAM during system boot.

Plug & Play O/S

Yes
The operating system configures Plug and Play (PnP) devices that are not required to boot in a Plug and Play supported operating system.

No
The BIOS configures all the devices in the system.

PCI Latency Timer

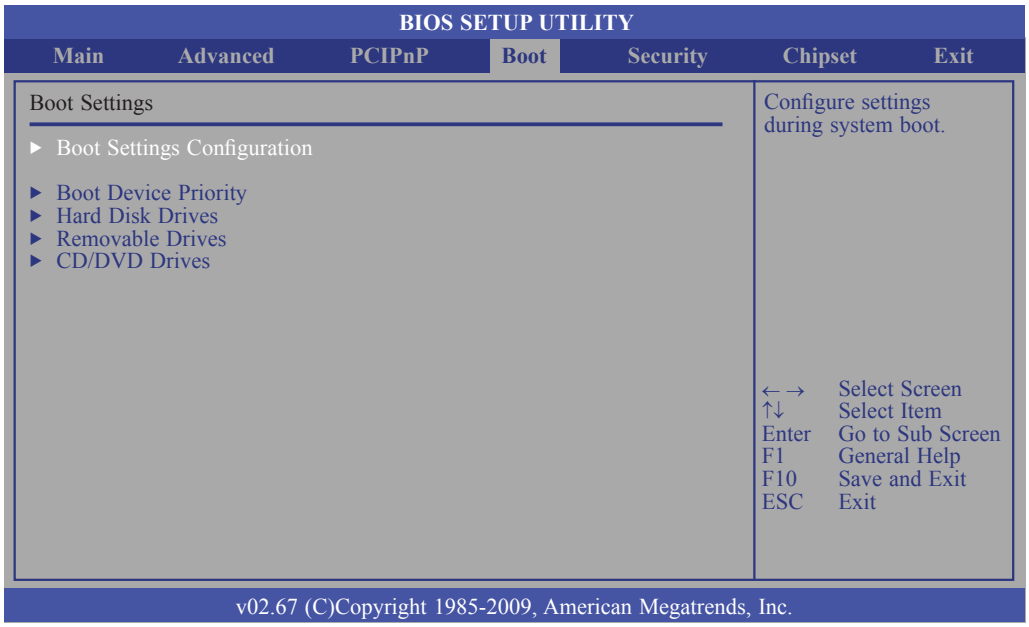
This feature is used to select the length of time each PCI device will control the bus before another takes over. The larger the value, the longer the PCI device can retain control of the bus. Since each access to the bus comes with an initial delay before any transaction can be made, low values for the PCI Latency Timer will reduce the effectiveness of the PCI bandwidth while higher values will improve it.

IRQ3 to IRQ15

Available
The specified IRQ is available for PCI/PnP devices.

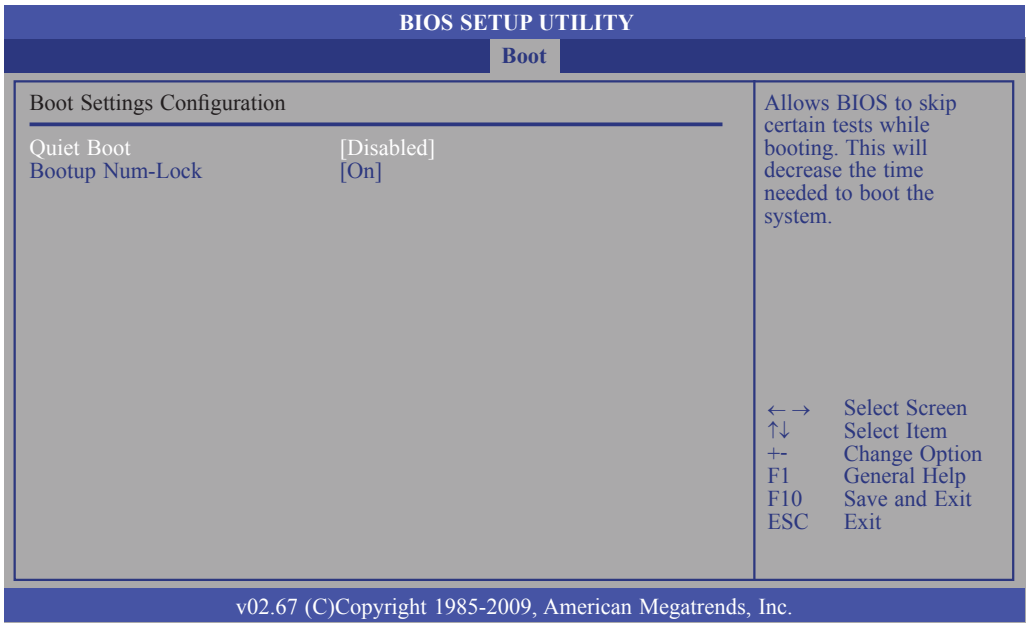
Reserved
The specified IRQ is reserved for Legacy ISA devices.

Boot



Boot Settings Configuration

This section is used to configure settings during system boot.



Quick Boot

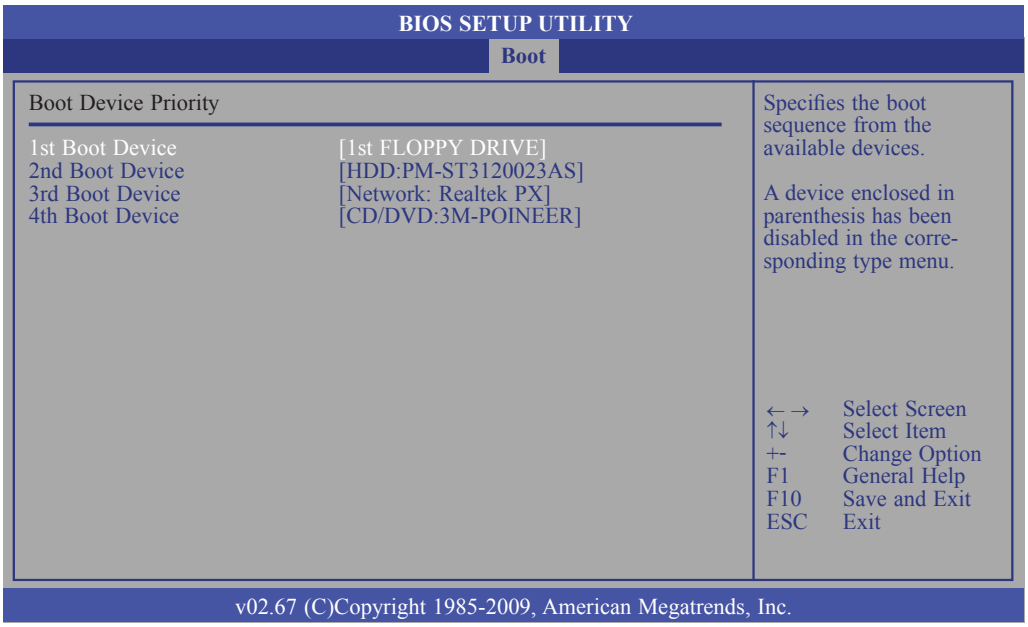
When Enabled, the BIOS will shorten or skip some check items during POST. This will decrease the time needed to boot the system.

Bootup Num-Lock

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

Boot Device Priority

This section is used to select the boot priority sequence of all available devices.

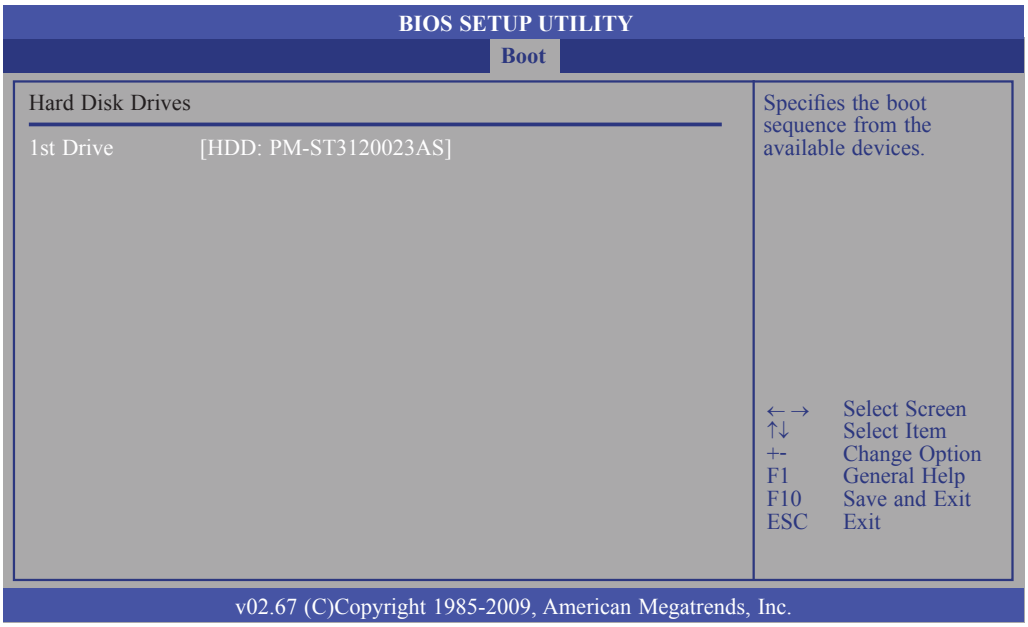


1st Boot Device and 4th Boot Device

Select the drive to boot 1st, 2nd, 3rd and 4th in the "1st Boot Device", "2nd Boot Device" , "3rd Boot Device" and "Fourth Boot Device" fields respectively. The BIOS will boot the operating system according to the sequence of the drive selected.

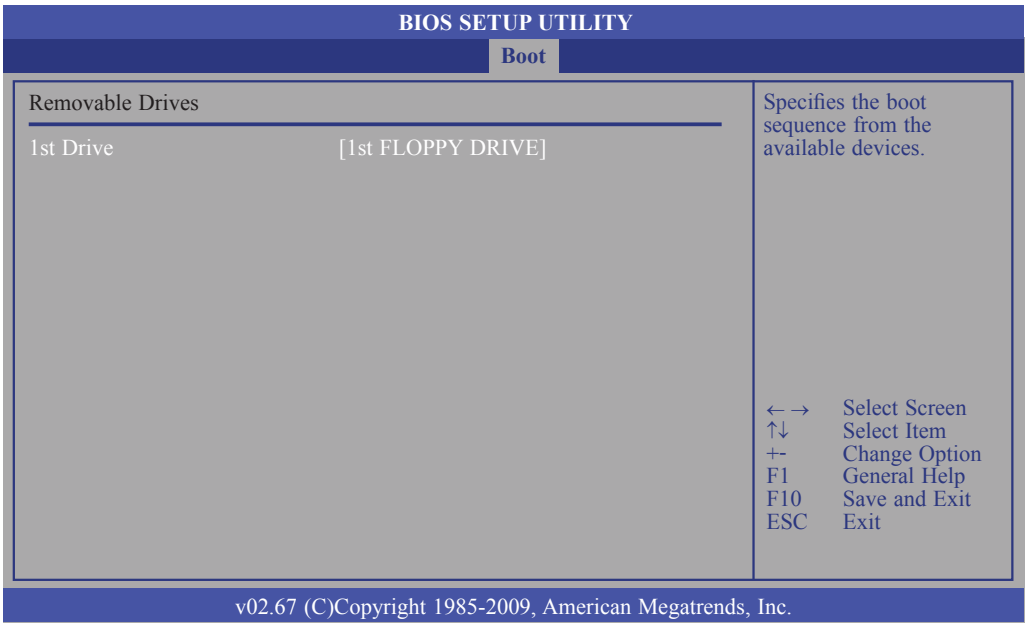
Hard Disk Drives

This section is used to select the boot priority sequence of the hard drives.



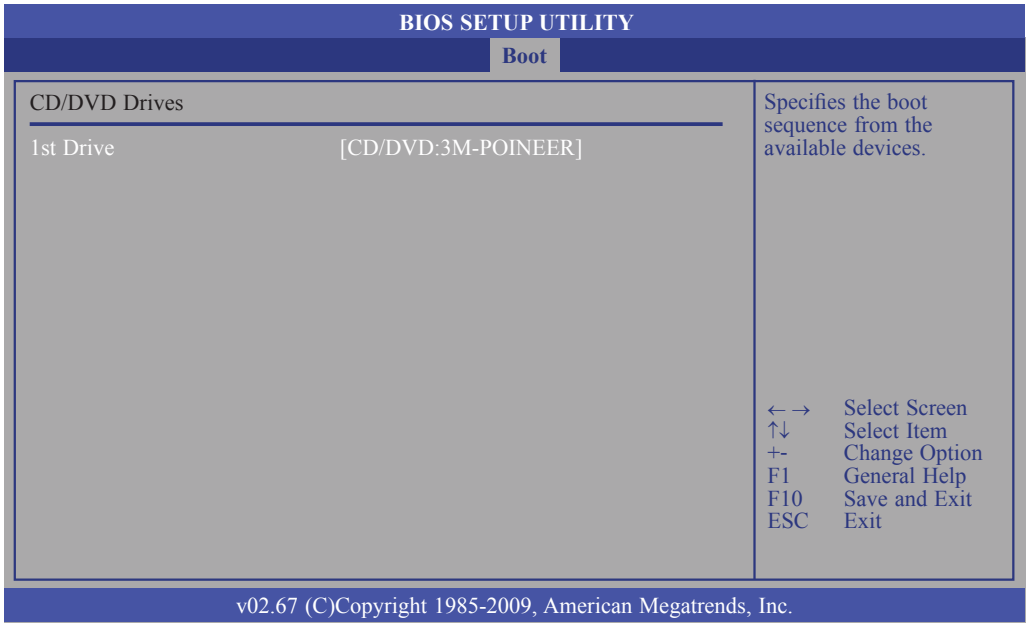
Removable Drives

This section is used to select the boot priority sequence of the removable devices.

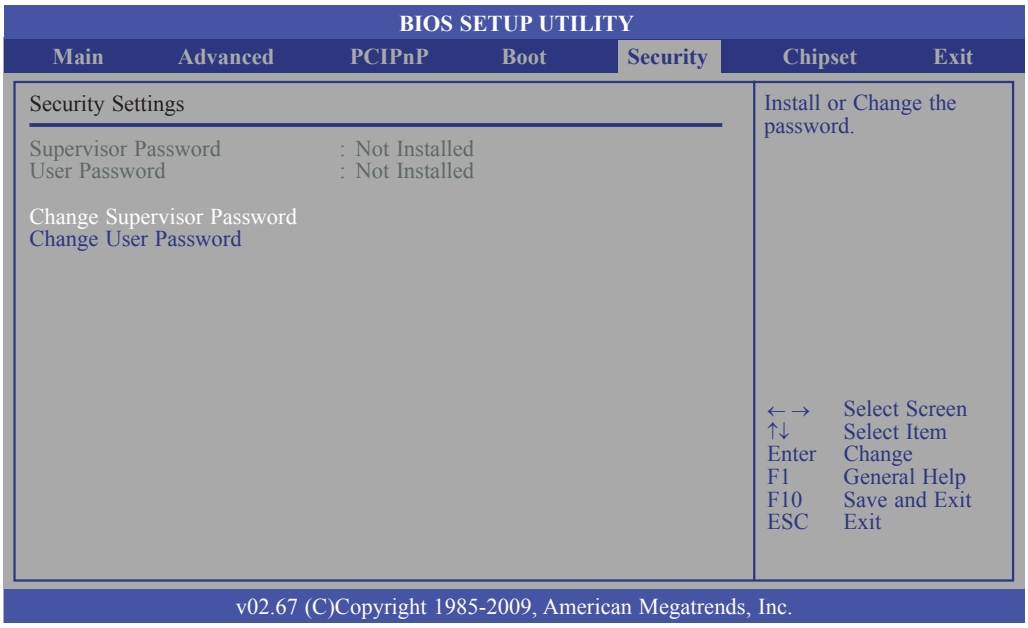


CD/DVD Drives

This section is used to select the boot priority sequence of the optical devices.



Security

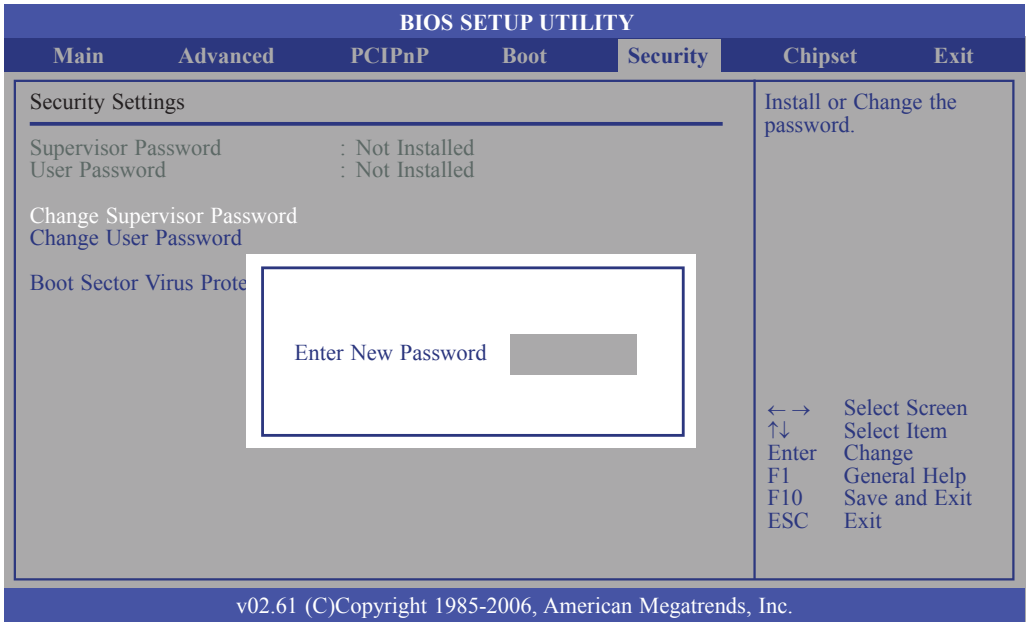


Change Supervisor Password

This field is used to set or change the supervisor password. To set a new password:

1. Select the Change Supervisor Password field then press <Enter>.

2. Type your password in the dialog box then press <Enter>. You are limited to six letters/numbers.



3. Press <Enter> to confirm the new password.

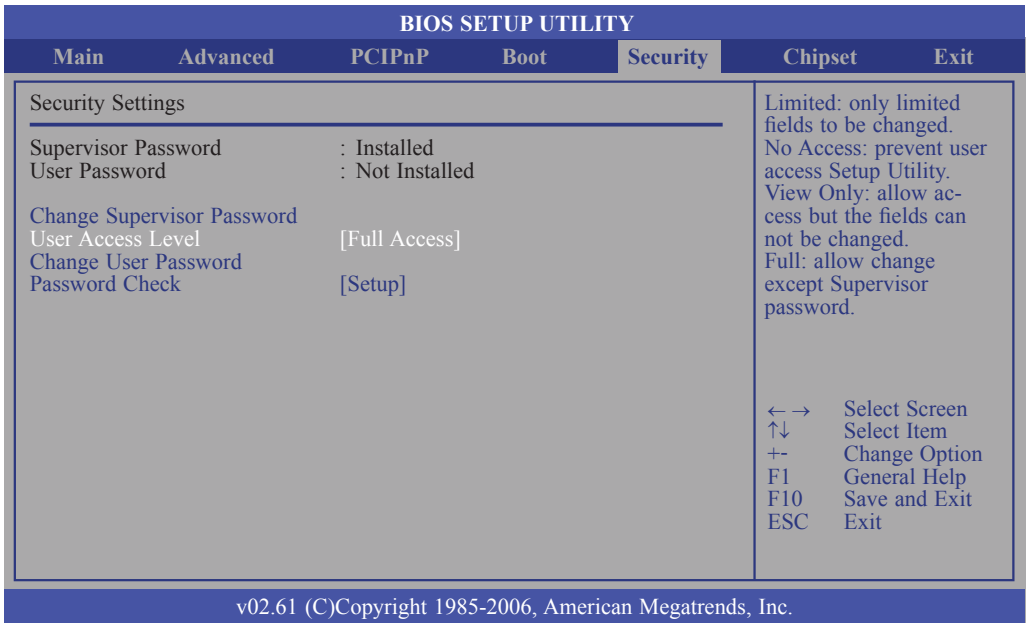
4. When the Password Installed dialog box appears, select OK.

To change the password, repeat the same steps above.

To clear the password, select Change Supervisor Password then press <Enter>. The Password Uninstalled dialog box will appear.

If you forgot the password, you can clear the password by erasing the CMOS RTC (Real Time Clock) RAM using the Clear CMOS jumper. Refer to the Jumper Settings section in chapter 2 for more information.

After you have set the supervisor password, the User Access Level field will appear.



User Access Level

Selects the access level to the fields in the Setup utility.

Limited
Allows you to change settings to some fields such as Date and Time.

No Access
Prevents access to the Setup utility.

View Only
Allows you to view the settings but does not allow you to change the settings.

Full Access
Allows you to change settings to all the fields in the utility.

Change User Password

This field is used to set or change the user password.

To set a new password:

1. Select the Change User Password field then press <Enter>.
2. Type your password in the dialog box then press <Enter>. You are limited to six letters/numbers.
3. Press <Enter> to confirm the new password.
4. When the Password Installed dialog box appears, select OK.

To change the password, repeat the same steps above.

After you have set the user password, the Clear User Password and Password Check fields will appear.

Clear User Password

To clear the password, select Clear User Password then press <Enter>. The Password Uninstalled dialog box will appear.

Password Check

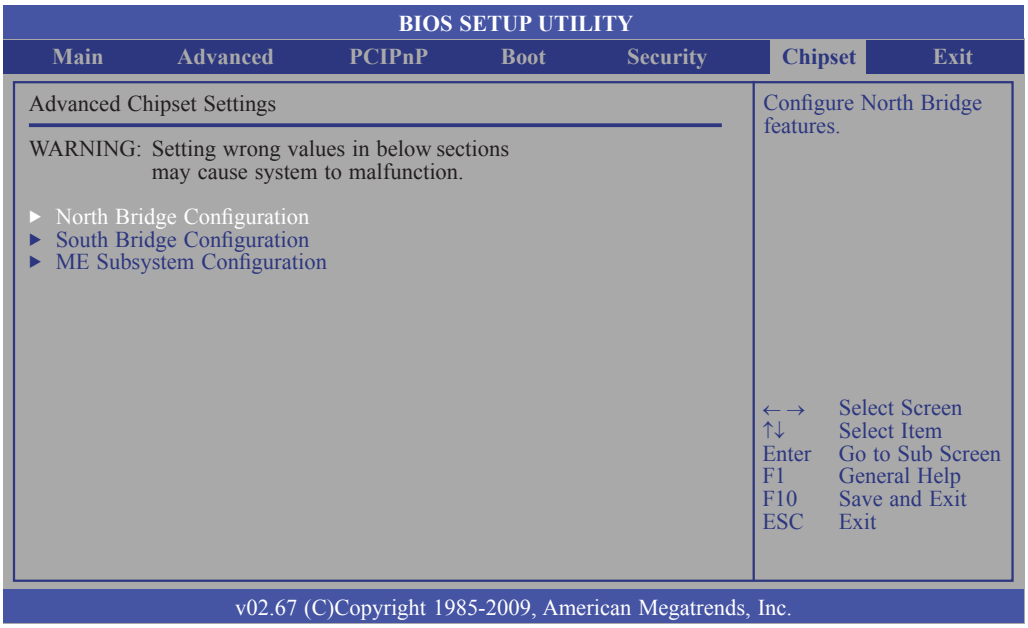
Setup
The BIOS checks for the user password whenever accessing the Setup utility.

Always
The BIOS checks for the user password when accessing the Setup utility and booting the system.

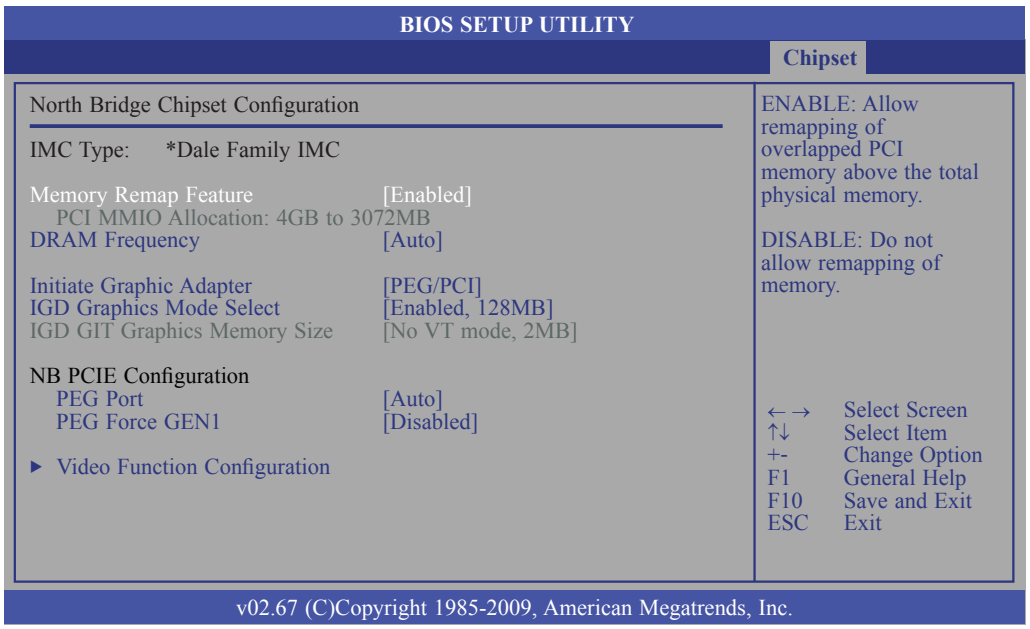
Chipset

This section is used to configure the system based on the specific features of the chipset.

Important:
Setting incorrect field values may cause the system to malfunction.



North Bridge Configuration



Memory Remap Feature

Enabled
Allows remapping of overlapped PCI memory above the total physical memory.

Disabled
Does not allow remapping of memory.

DRAM Frequency

Selects the frequency of the DRAM.

Initiate Graphic Adapter

Selects the graphics controller to use as the primary boot device.

IGD Graphics Mode Select

Selects the amount of system memory used by the internal graphics device.

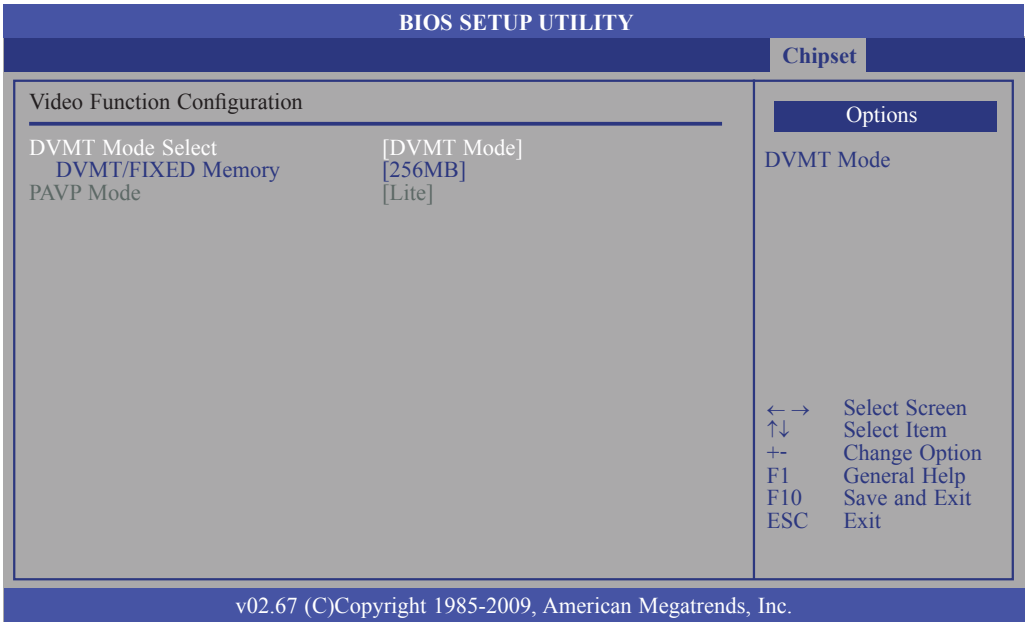
PEG Port

The options are Auto and Disabled.

PEG Force GEN1

Some PCIE graphics devices does not comply to the PCIE specification and may incorrectly report their Gen capability or link width. Select Enabled to force the graphics device in Gen 1 mode.

Video Function Configuration



DVMT Mode Select

DVMT Mode
Memory that is dynamically allocated based on memory requests made by an application and are released back to the system once the requesting application has been terminated.

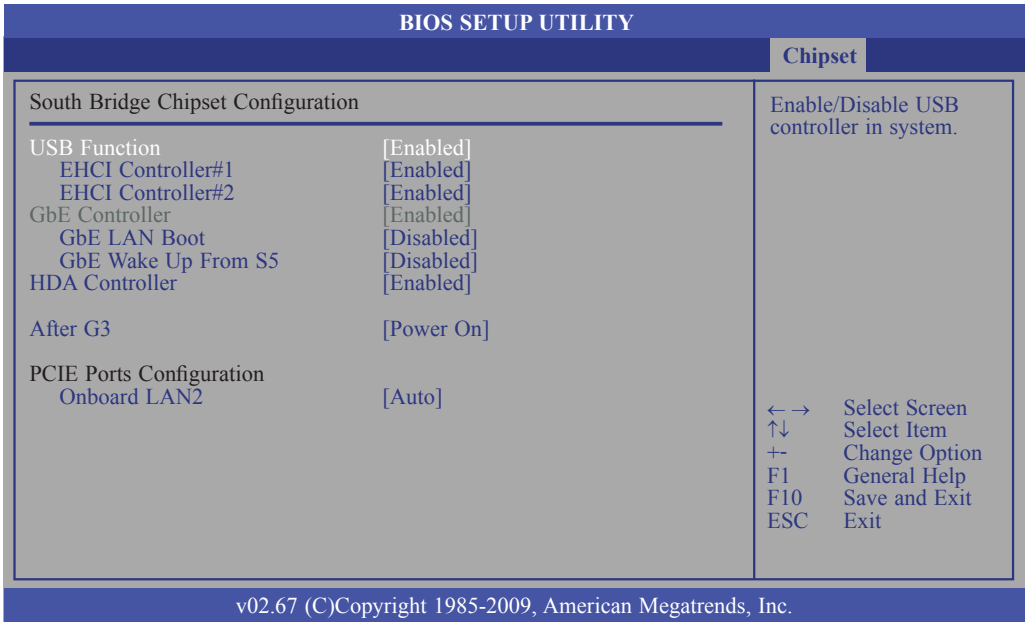
DVMT/FIXED Memory

Selects the graphics memory size used by the DVMT/Fixed mode.

PAVP Mode

The option is Lite.

South Bridge Configuration



USB Functions

Enables or disables the USB controller.

EHCI Controller#1 and EHCI Controller#2

This field is used to enable or disable the Enhanced Host Controller Interface controller.

GbE Controller

Enables or disables the Gigabit LAN controller.

GbE LAN Boot (for onboard Intel)

Enable this field if you want to use the boot ROM (instead of a disk drive) to boot-up the system and access the local area network directly. If you want to change the boot ROM's settings, type the <Ctrl> and <S> keys simultaneously when prompted during boot-up. Take note: you will be able to access the boot ROM's program (by typing <Ctrl> + <S>) only when this field is enabled.

GbE Wake Up From S5

When enabled, it allows the network LAN to wake up the system from S5.

HDA Controller

Enables or disables the High Definition Audio controller.

After G3

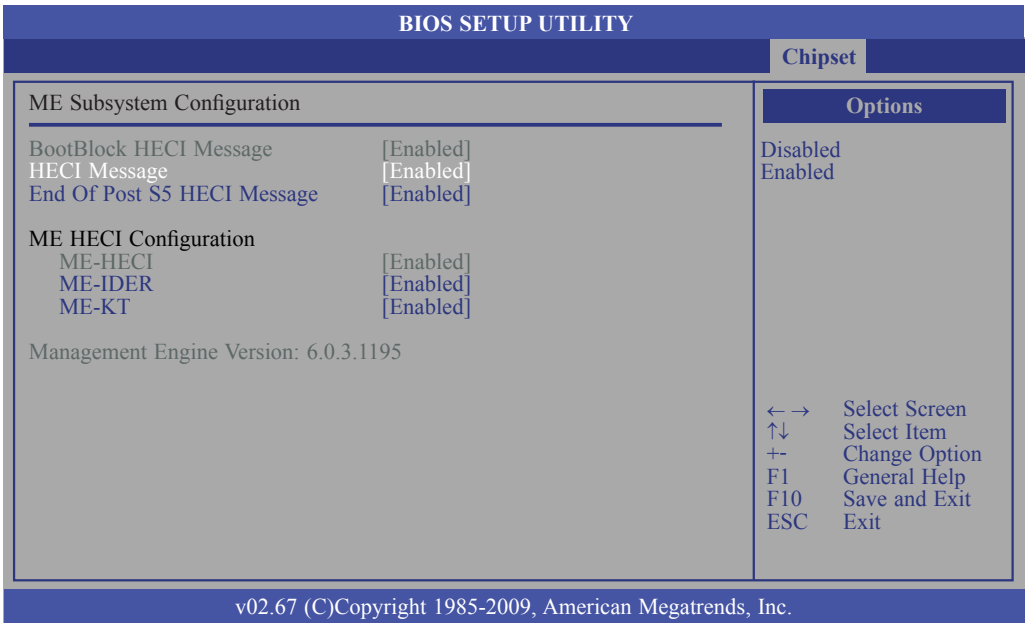
Power Off / WOL
Power-on the system via WOL after G3.

Power On
Power-on the system after G3.

On Board LAN2

Enables or disables the LAN2 controller.

ME Subsystem Configuration



BootBlock HECI Message

Enables or disables the bootblock HECI message.

HECI Message

Enables or disables the HECI message.

End of Post S5 HECI Message

Enables or disables the end of post S5 HECI message.

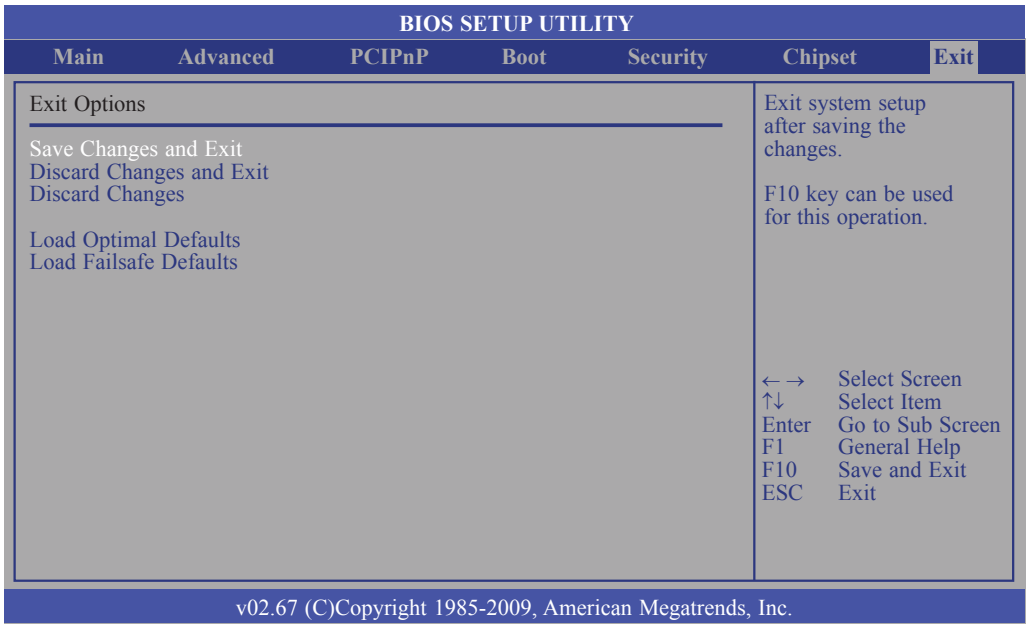
ME HECI Configuration

ME-HECI
When this setting is set to [Enabled], Host Embedded Communication Interface (HECI) provides an interface for the exchange of message between the host software and the ME firmware.

ME-IDER
This setting disables/enables the IDE Redirection interface by which the remote management console is able to direct the client PC to boot.

ME-KT
When this setting is set to [Enabled], the KT function help redirect keyboard and POST message to the remote management console and thus facilitates the control of the client machine through the network.

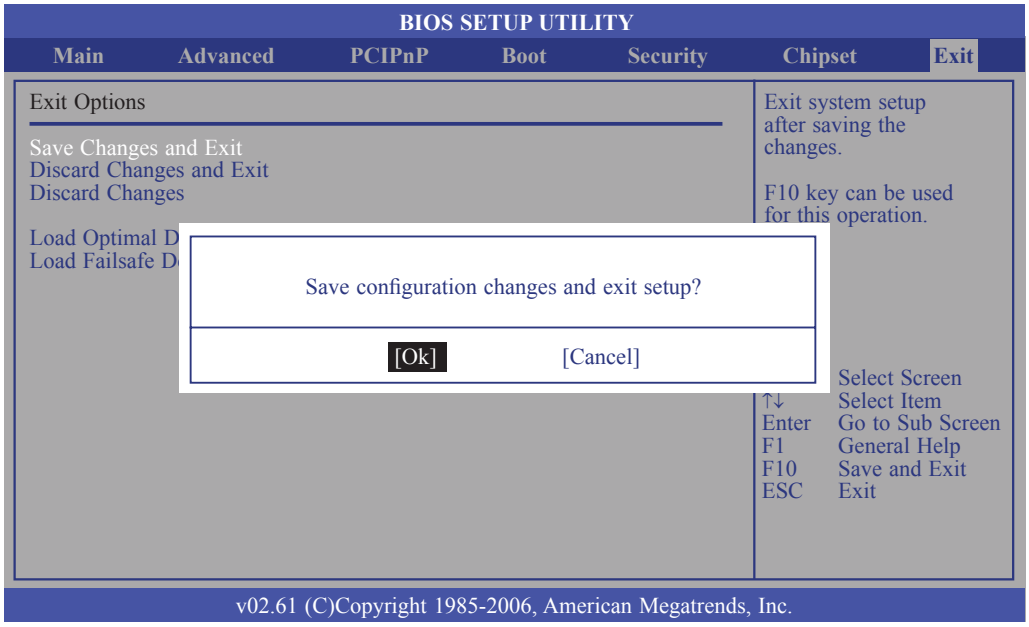
Exit



Save Changes and Exit

To save the changes and exit the Setup utility, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK.

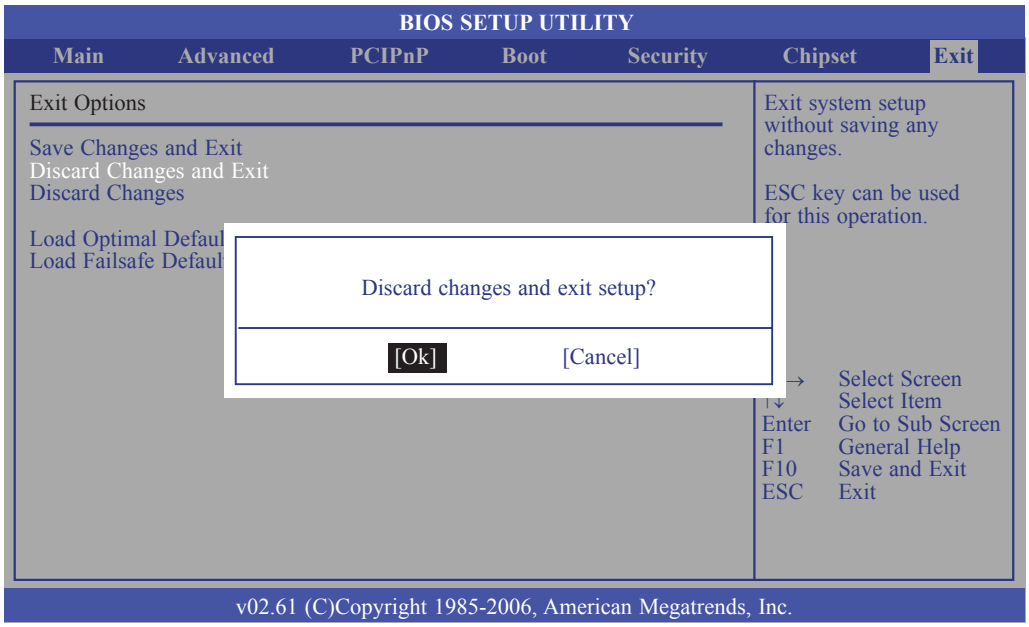
You can also press <F10> to save and exit Setup.



Discard Changes and Exit

To exit the Setup utility without saving the changes, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK.

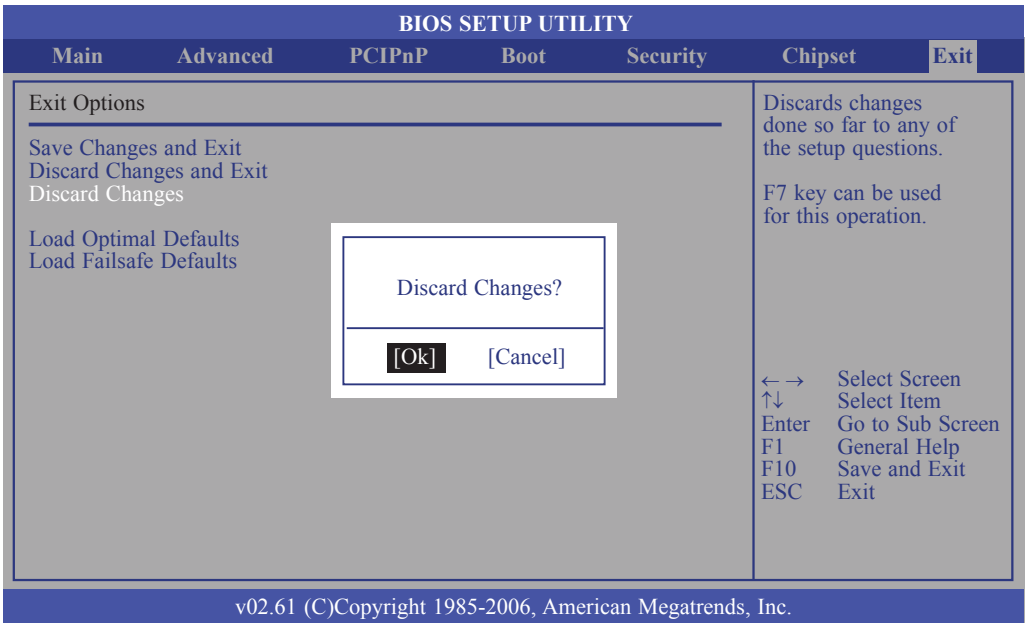
You can also press <ESC> to exit without saving the changes.



Discard Changes

To discard the changes, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK to discard all changes made and restore the previously saved settings.

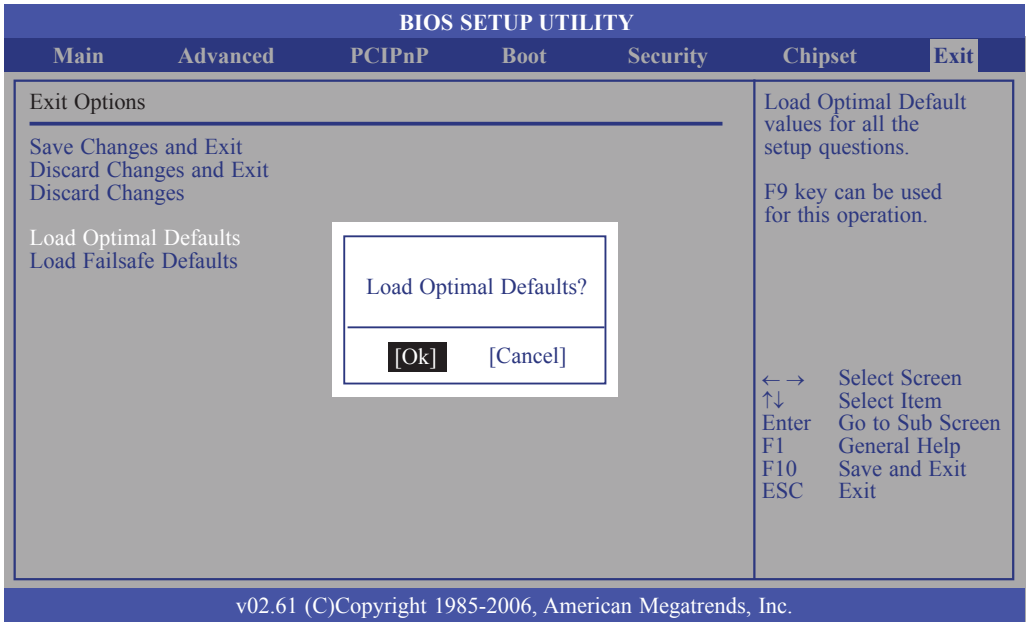
You can also press <F7> to discard the changes.



Load Optimal Defaults

To load optimal default values from the BIOS ROM, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK.

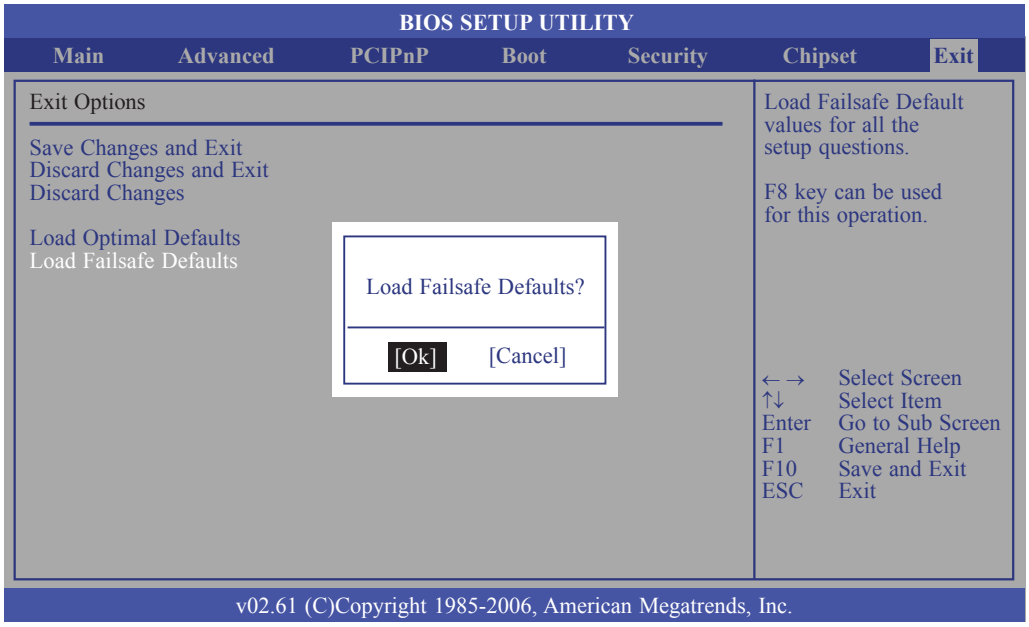
You can also press <F9> to load optimal default values.



Load Failsafe Defaults

To load the fail-safe default values from the BIOS ROM, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK.

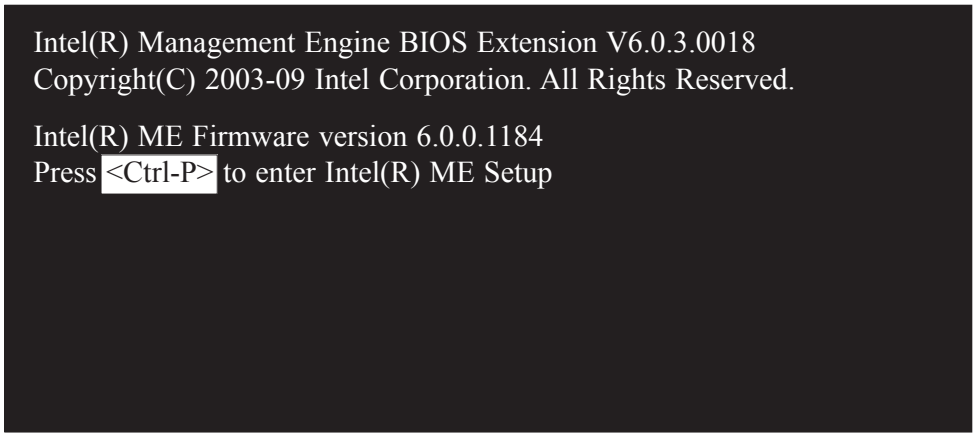
You can also press <F8> to load the fail-safe default values.



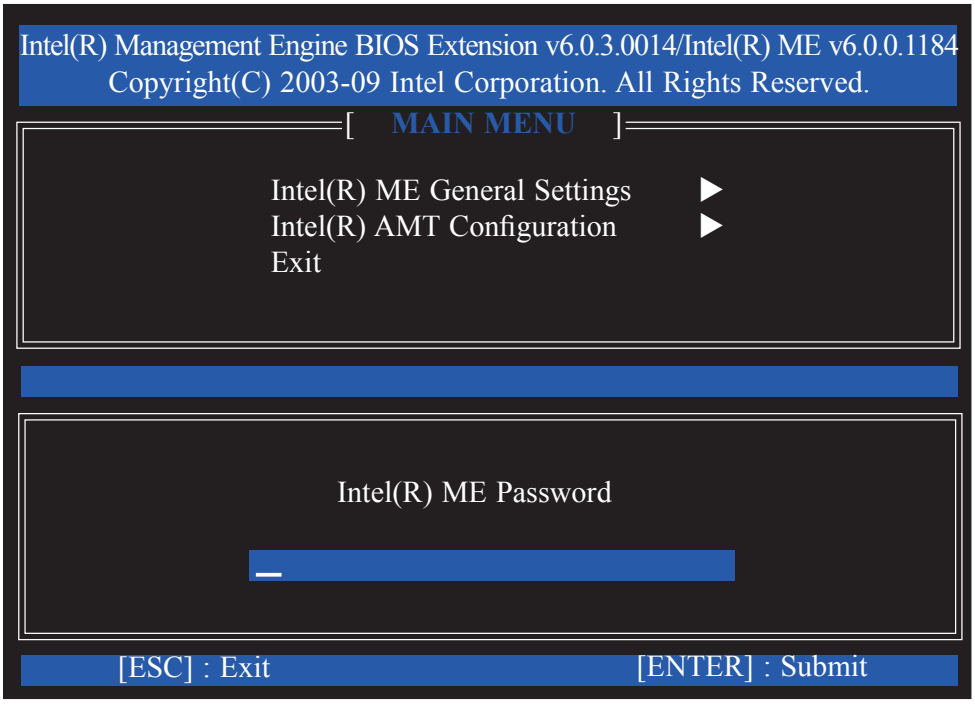
Updating the System BIOS

Prior to updating the AMI BIOS, you must first disable the Intel® ME function.

1. When the system powers-on, the following message will be displayed. Press **<Ctrl-P>** as soon as the message is displayed; as this message will be displayed for only a few seconds.



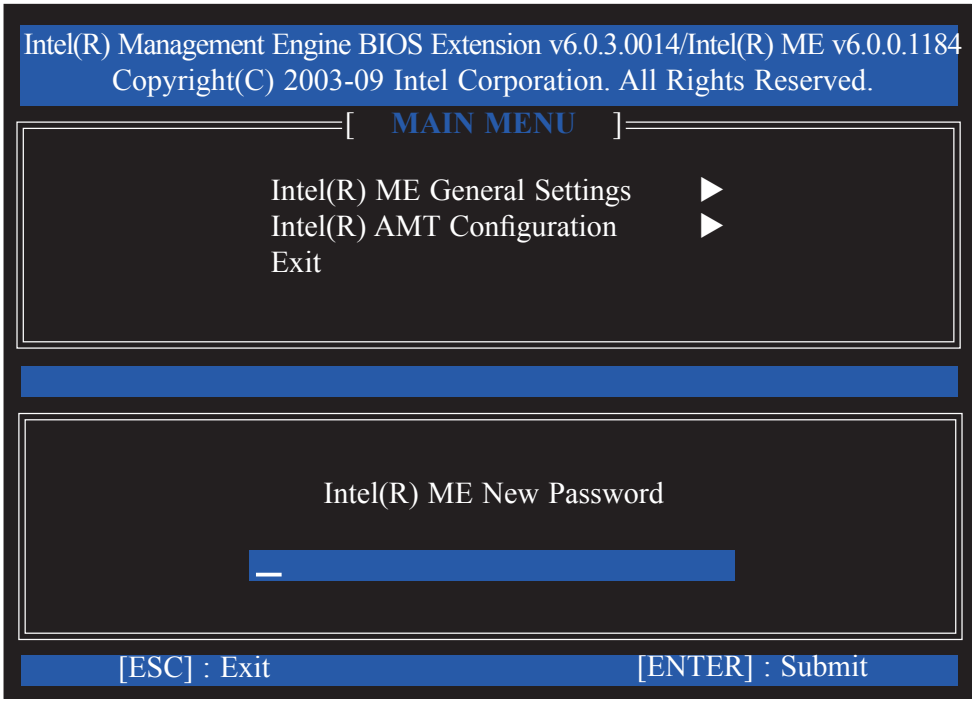
2. You will be prompted for a password. The default password is "**admin**". Enter the default password in the space provided under Intel(R) ME Password then press Enter.



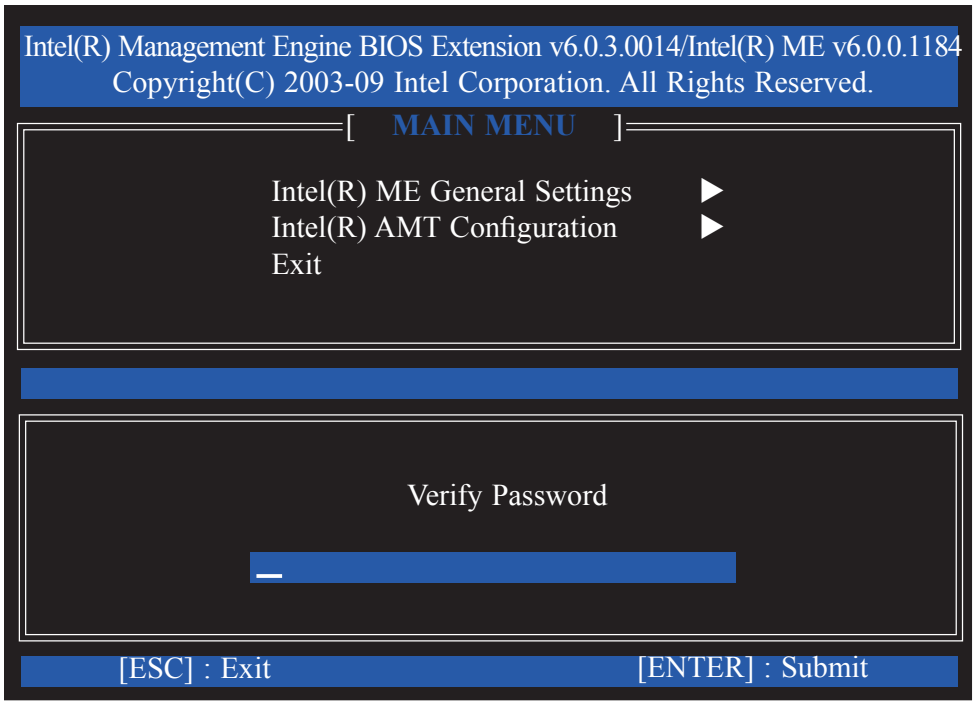
3. Enter a new password in the space provided under Intel(R) ME New Password then press Enter. The password must include:

   - 8-32 characters
   - Strong 7-bit ASCII characters excluding **{: ,** and **"}** characters
   - At least one digit character (0, 1, ...9)
   - At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, $, ;)
   - Both lower case and upper case characters

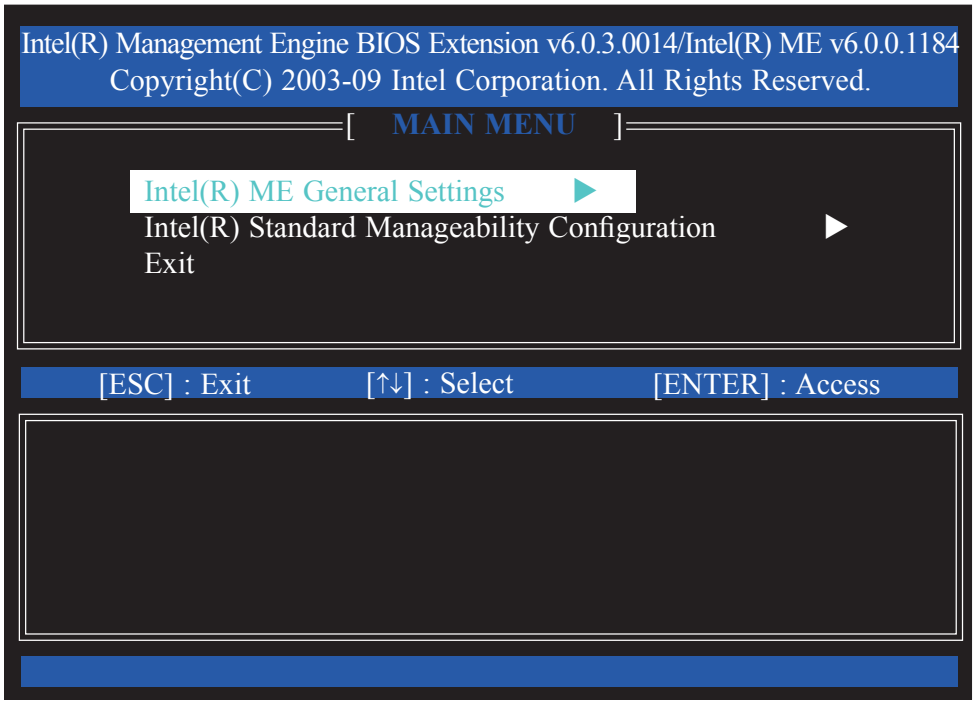
   Note:
   '_' (underscore) and ' ' (space) are valid password characters but are not used in the determination of complexity.



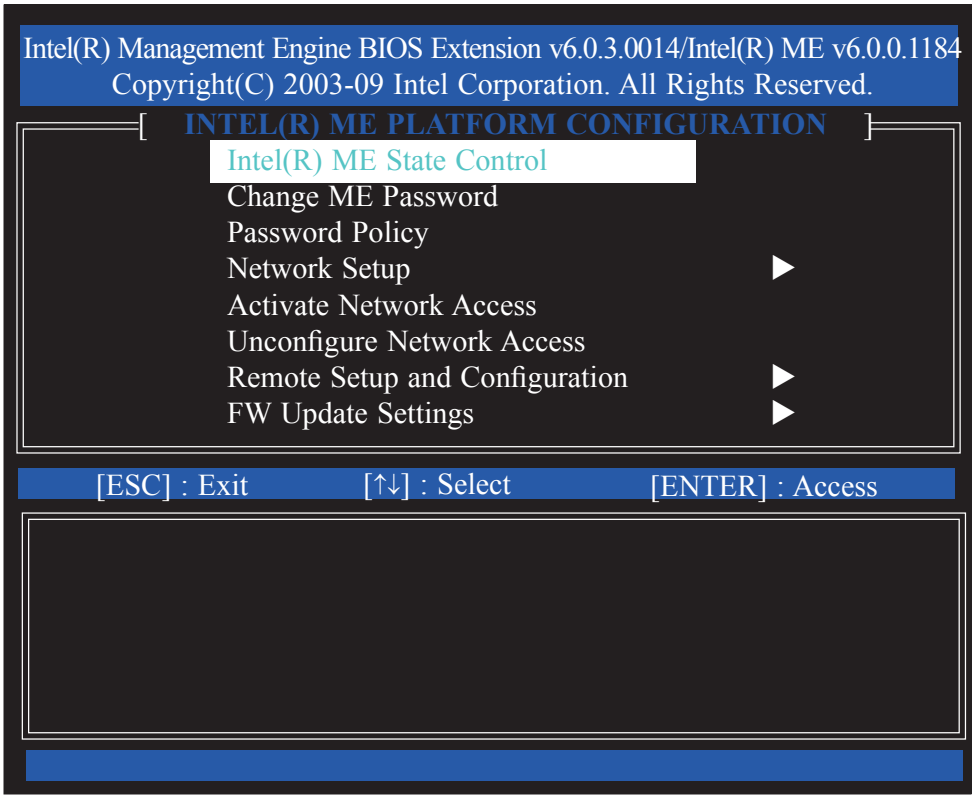
4. You will be asked to verify the password. Enter the same new password in the space provided under Verify Password then press Enter.



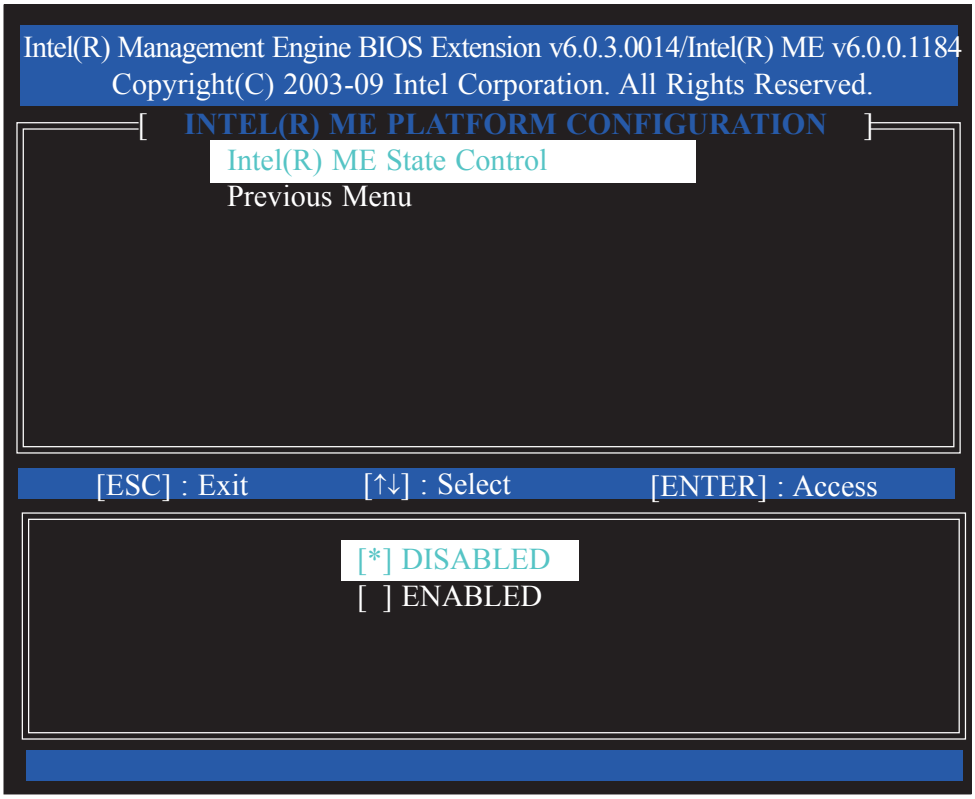
5. Select **Intel(R) ME General Settings** then press Enter.



6. Select **Intel(R) ME State Control** then press Enter.



7. Select **Disabled** and then press Enter.

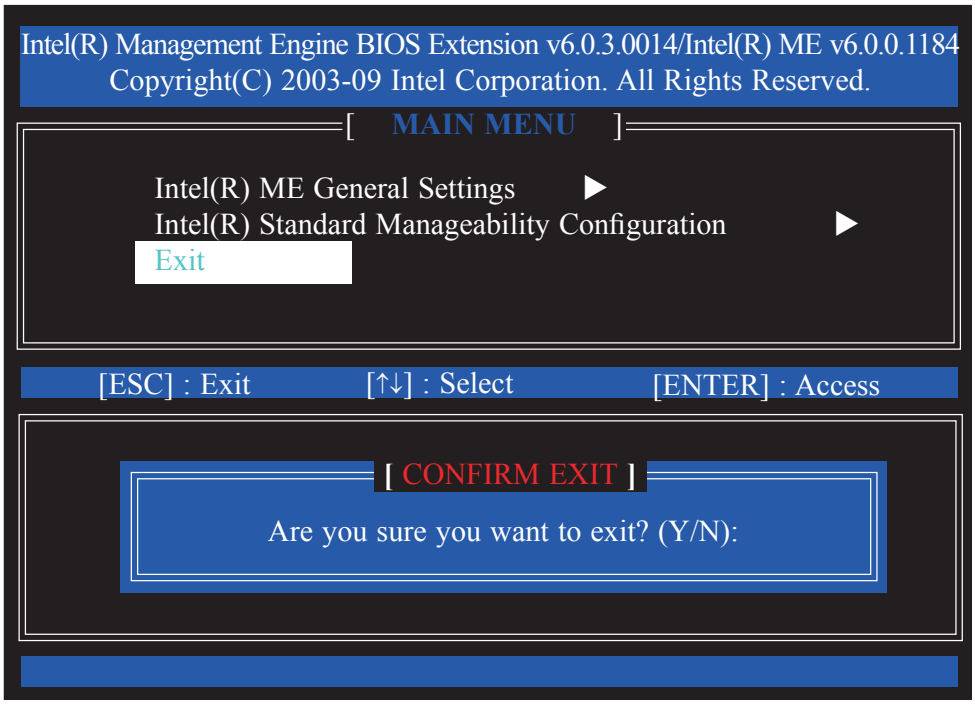


8. Select Previous Menu until you return to the **Main Menu.** Select **Exit** and then press Enter.

9. The following message will be displayed on the screen.

[CONFIRM EXIT]
Are you sure you want to exit? (Y/N):

Press **Y**.



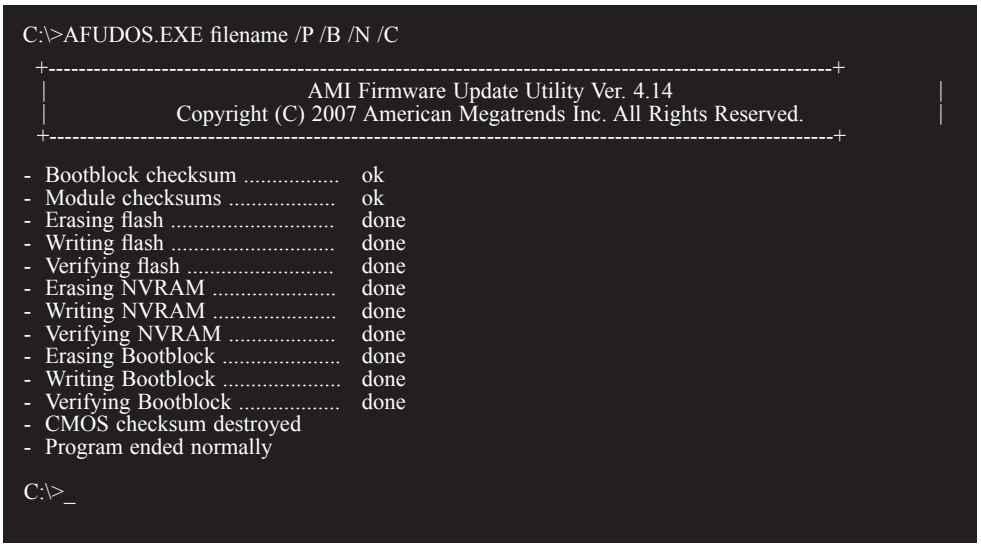
10. The system will restart.

To update the AMI BIOS, you will need the new BIOS file and a flash utility, AFUDOS.EXE. Please contact technical support or your sales representative for the files.

To execute the utility, type:

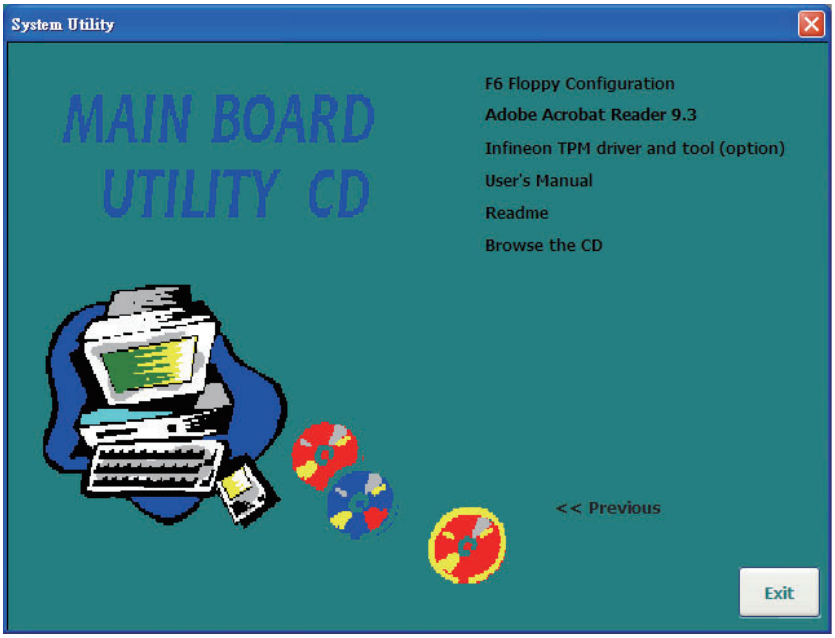
A:> AFUDOS BIOS_File_Name /b /n /c /p

then press <Enter>.



Chapter 4 - Supported Software

Install drivers, utilities and software applications that are required to facilitate and enhance the performance of the system board. You may acquire the software from your sales representatives, from an optional DVD included in the shipment, or from the website download page at https://www.dfi.com/DownloadCenter.



Intel Chipset Software Installation Utility

The Intel Chipset Software Installation Utility is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

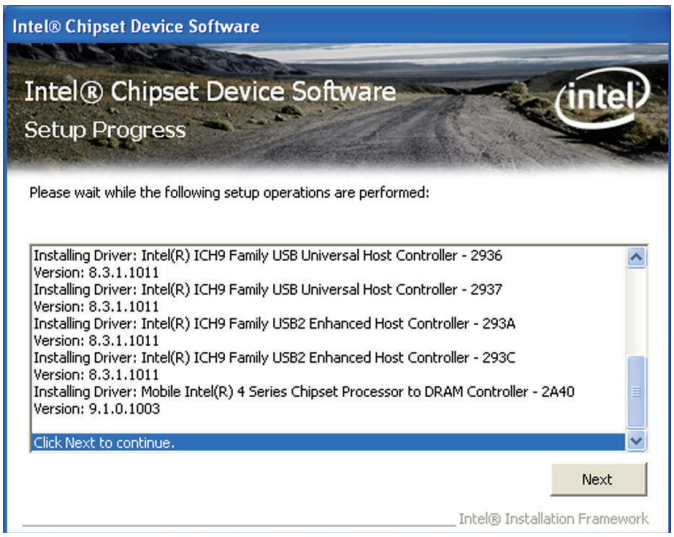
To install the utility, click "Intel Chipset Software Installation Utility" on the main menu.

1. Setup is now ready to install the utility. Click Next.

2. Read the license agreement then click Yes.

3. Go through the readme document for system requirements and installation tips then click Next.

4. Setup is now installing the driver. Click Next to continue.



5. Click "Yes, I want to restart this computer now" then click Finish.

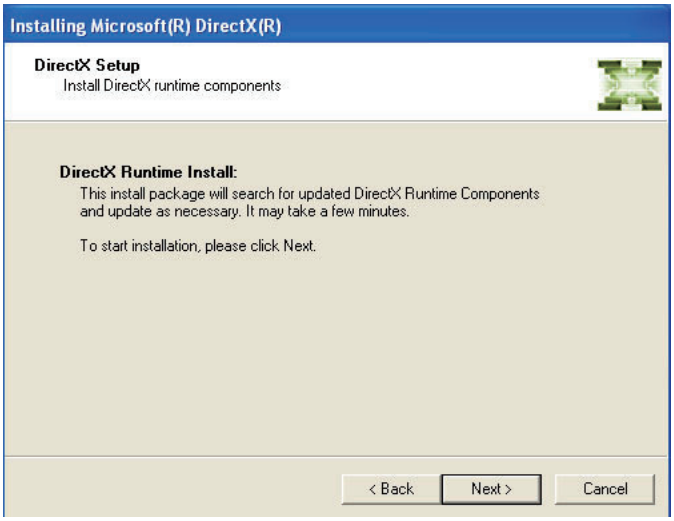
   Restarting the system will allow the new software installation to take effect.

Microsoft DirectX 9.0C Driver

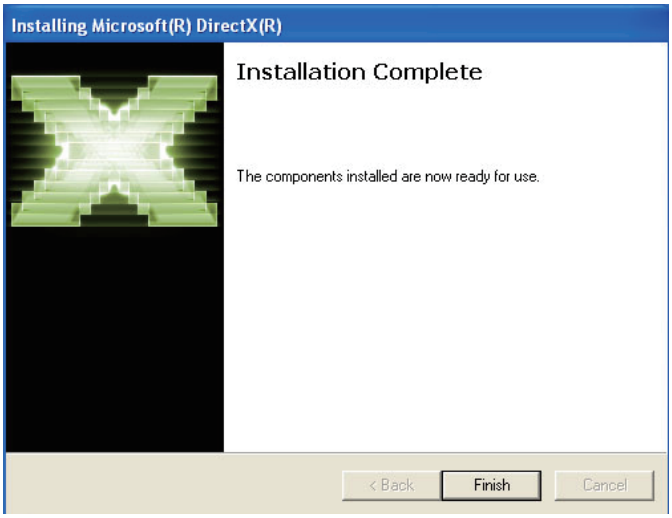
To install the utility, click "Microsoft DirectX 9.0C Driver" on the main menu.

1. Click "I accept the agreement" then click Next.

2. To start installation, click Next.



3. Click Finish. Reboot the system for DirectX to take effect.



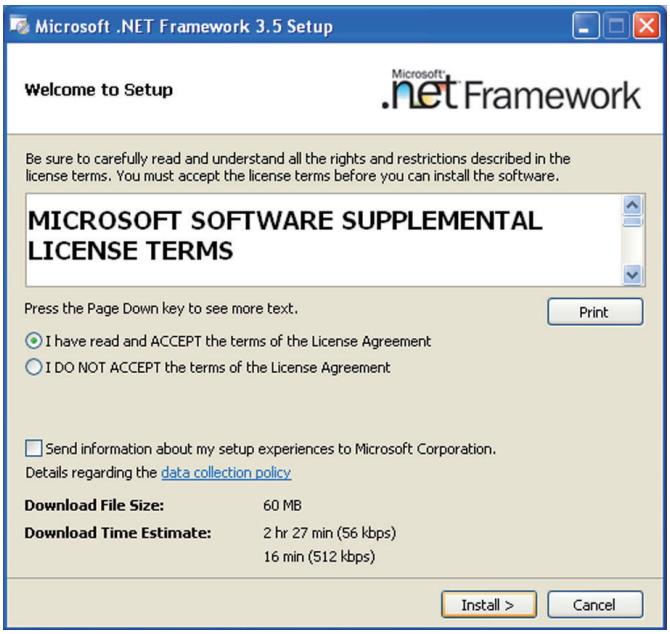
Microsoft .NET Framework 3.5

Note:
Before installing Microsoft .NET Framework 3.5, make sure you have updated your Windows XP operating system to Service Pack 3.

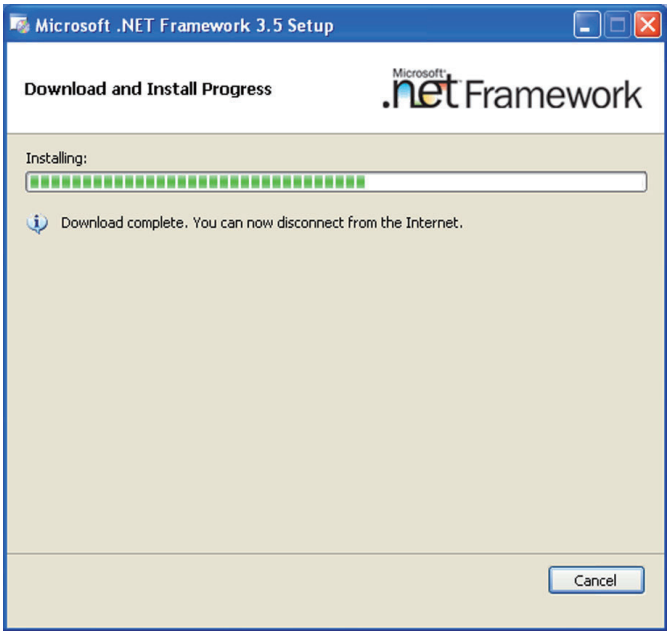
To install the driver, click "Microsoft .NET Framework 3.5" on the main menu.

1. Read the license agreement carefully.

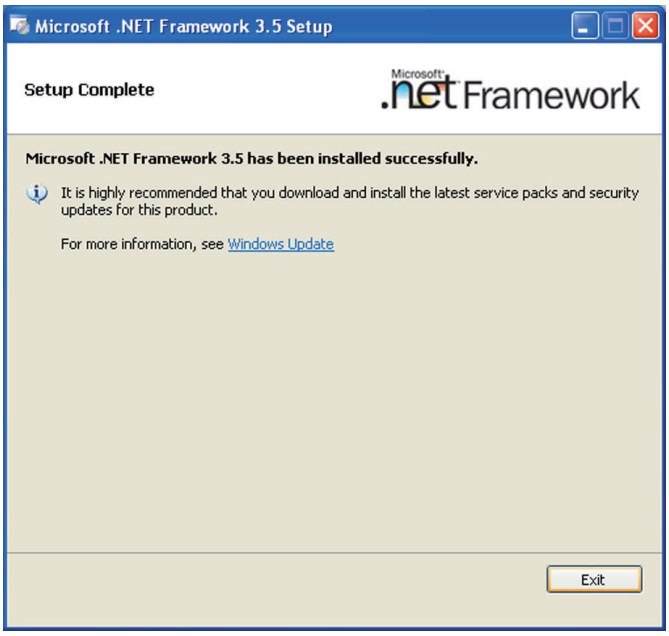
   Click "I have read and accept the terms of the License Agreement" then click Install.



2. Setup is now installing the driver.



3. Click Exit.

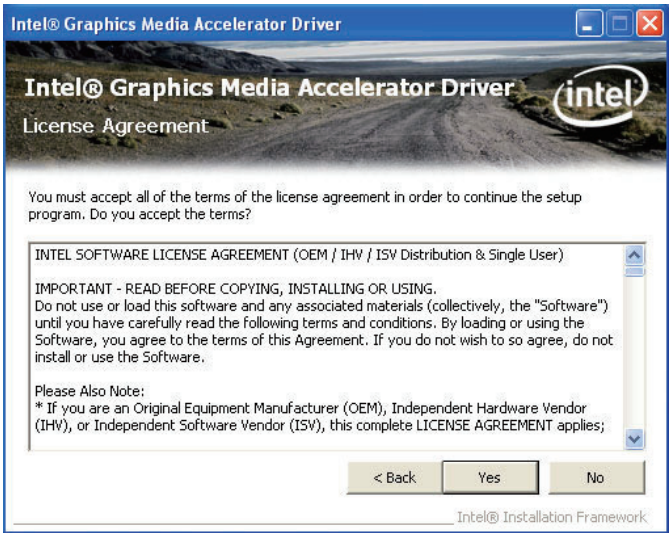

Microsoft .NET Framework 3.5 Setup
Setup Complete
Microsoft .NET Framework
Microsoft .NET Framework 3.5 has been installed successfully.
It is highly recommended that you download and install the latest service packs and security updates for this product.
For more information, see Windows Update
Exit

Intel Graphics Drivers

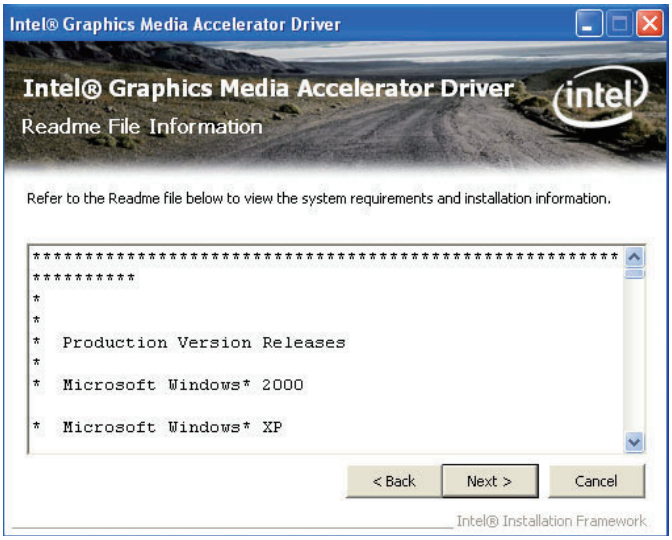
To install the driver, click "Intel Graphics Drivers" on the main menu.

1. To start installation, click Next.

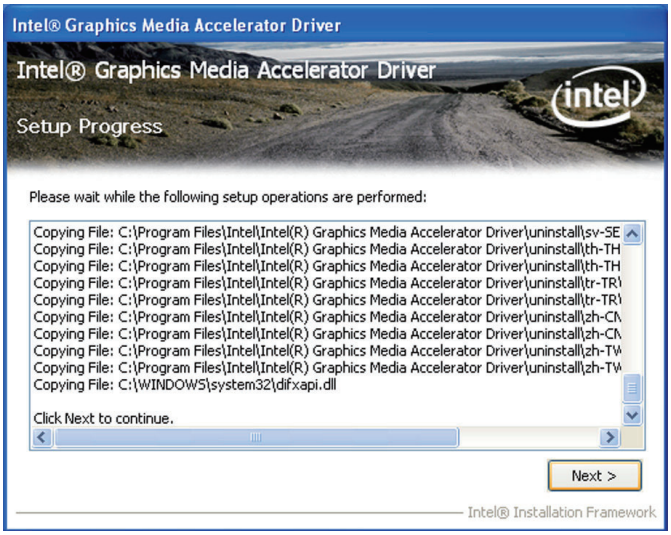
2. Read the license agreement then click Yes.



3. Go through the readme document for system requirements and installation tips then click Next.

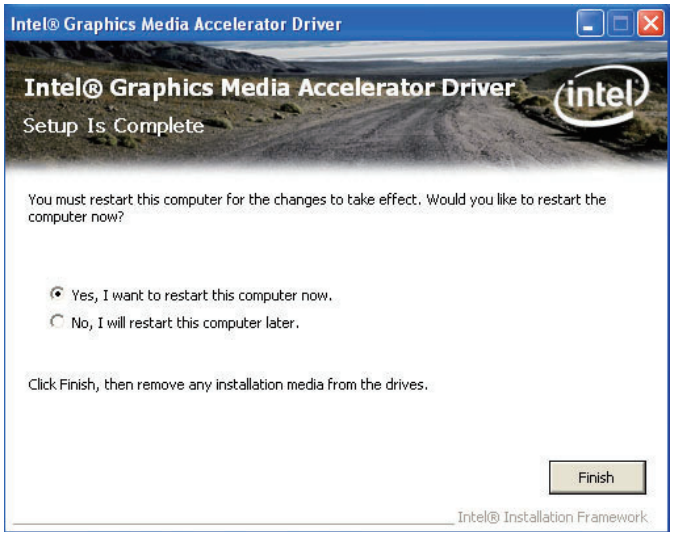


4. Setup is now installing the driver. Click Next to continue.



5. Click "Yes, I want to restart this computer now" then click Finish.

   Restarting the system will allow the new software installation to take effect.

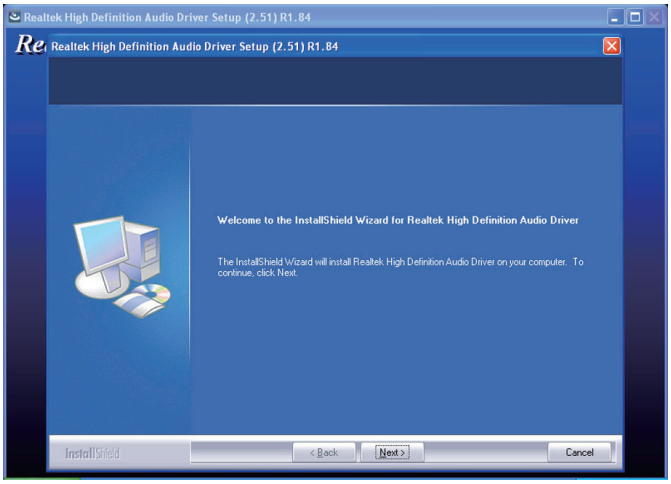


Audio Drivers

To install the driver, click "Audio Drivers" on the main menu.

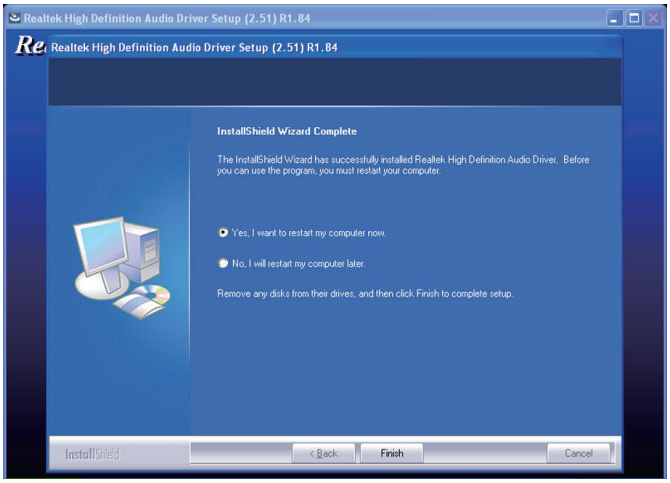
1. Setup is now ready to install the audio driver. Click Next.

2. Follow the remainder of the steps on the screen; clicking "Next" each time you finish a step.



3. Click "Yes, I want to restart my computer now" then click Finish.

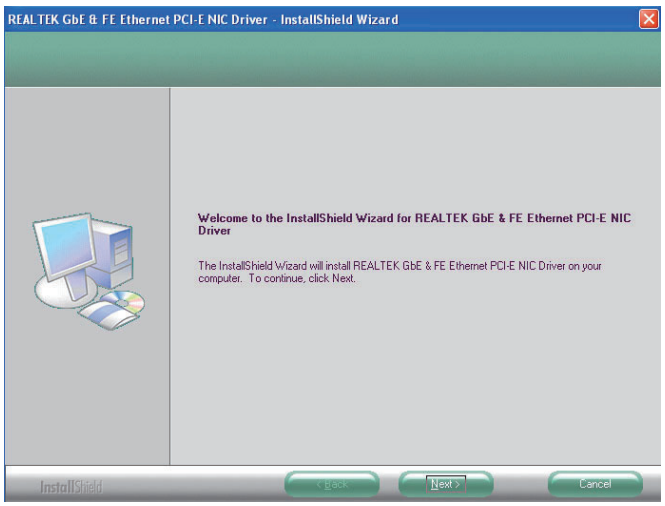
   Restarting the system will allow the new software installation to take effect.



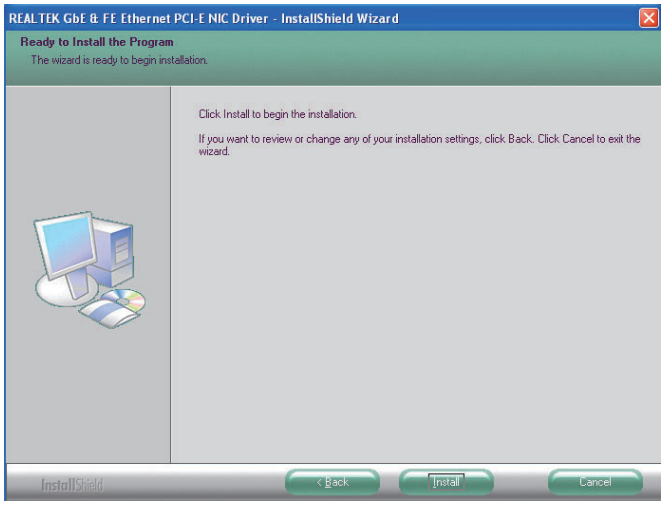
Realtek LAN Drivers

To install the driver, click "Realtek LAN Drivers" on the main menu.

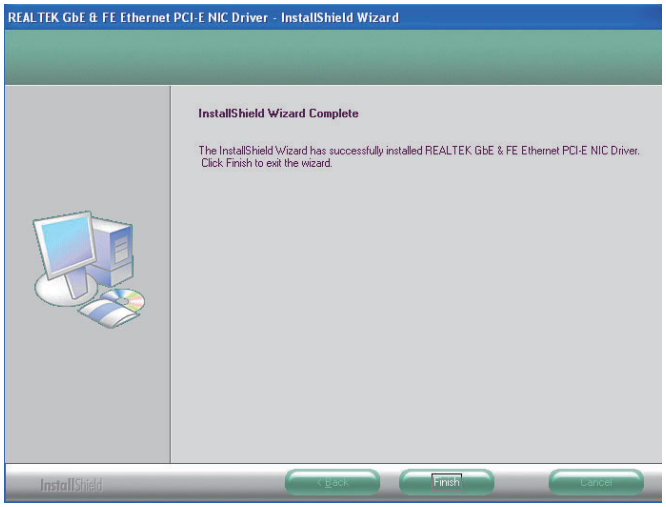
1. Setup is ready to install the driver. Click Next.



2. Click Install to begin the installation.



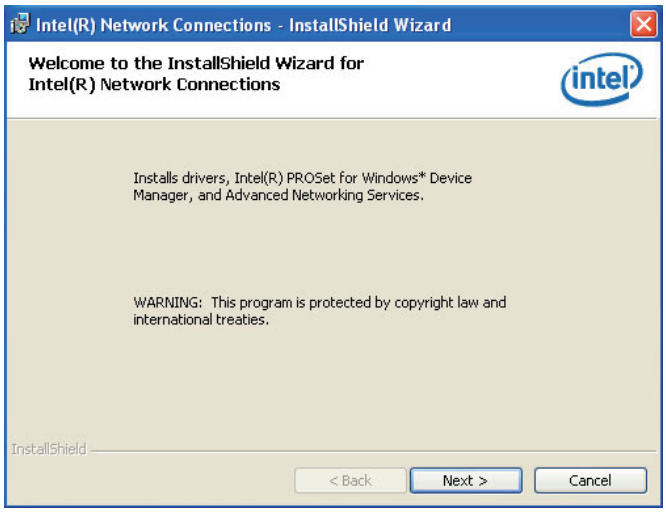
3. After completing installation, click Finish.



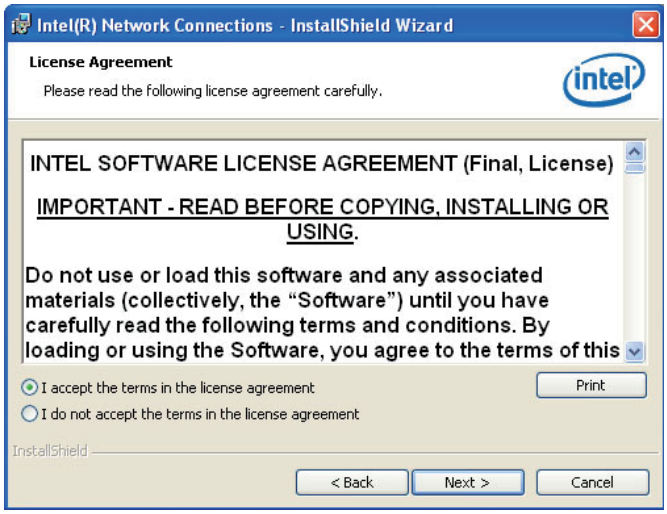
Intel LAN Drivers

To install the driver, click "Intel LAN Drivers" on the main menu.

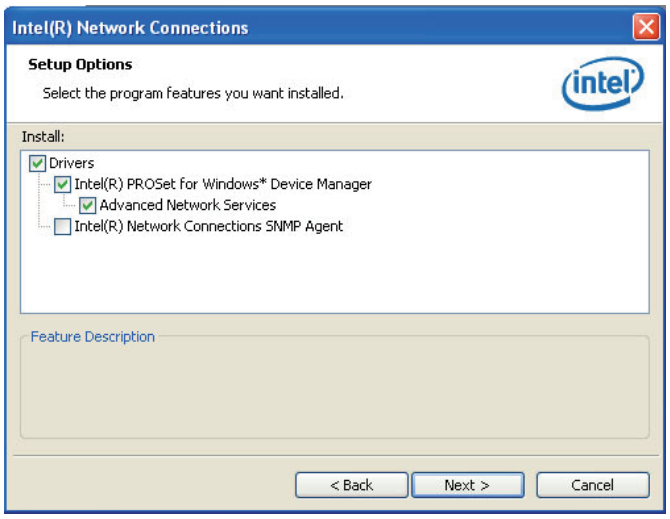
1. Setup is ready to install the driver. Click Next.



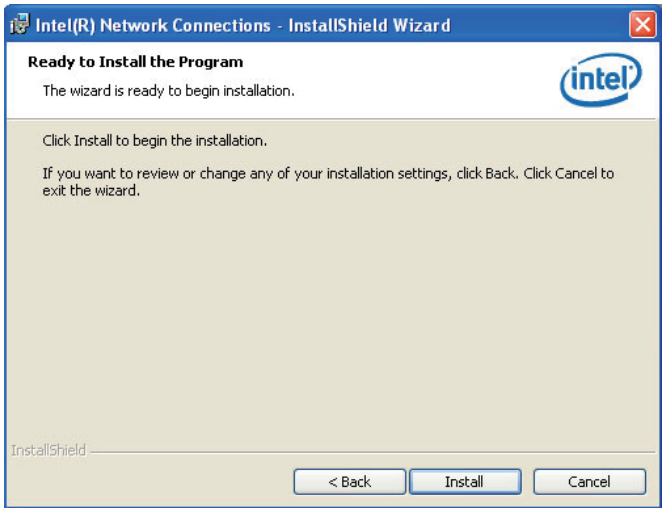
2. Click "I accept the terms in the license agreement" then click "Next".



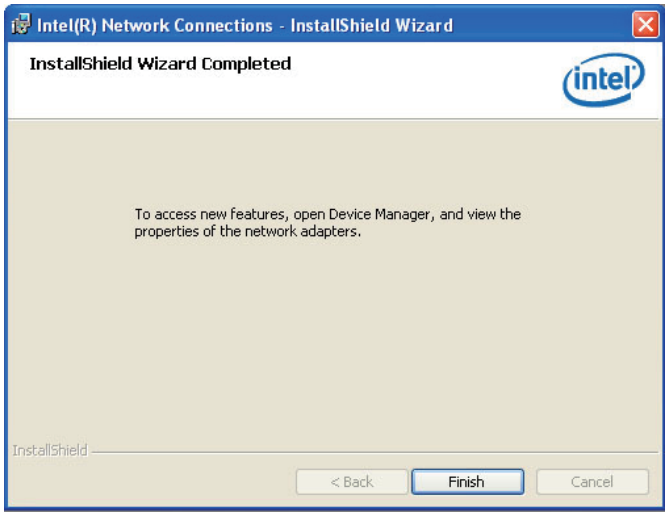
3. Select the program featuers you want installed then click Next.



4. Click Install to begin the installation.



5. After completing installation, click Finish.

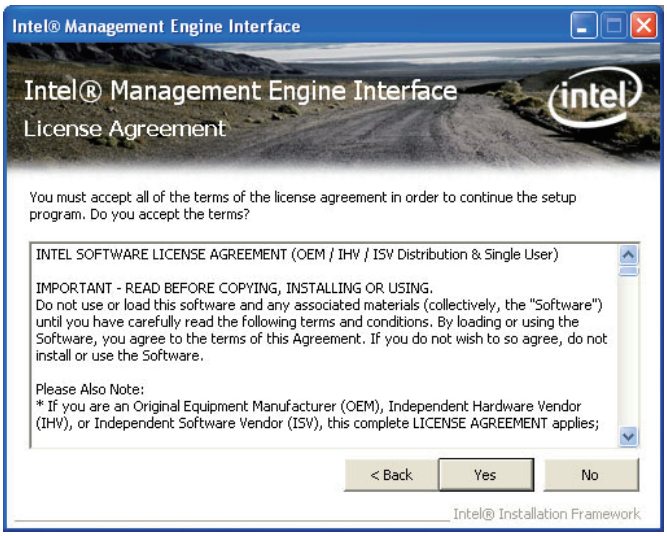


Intel Management Engine Interface

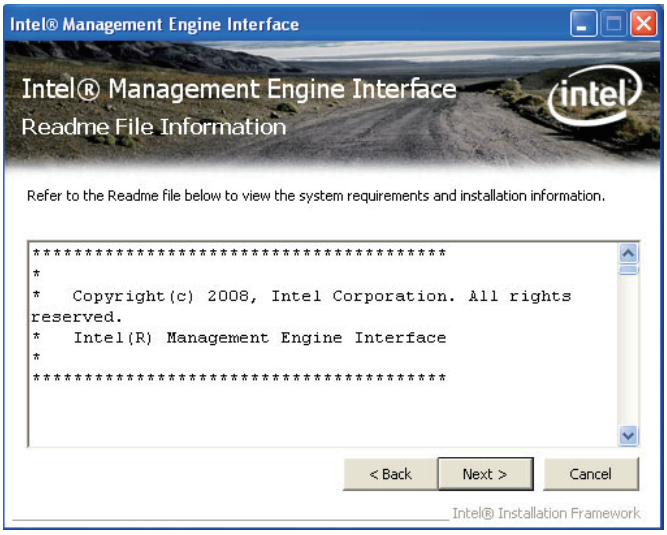
To install the driver, click "Intel Management Engine Interface" on the main menu.

1. Setup is ready to install the driver. Click Next.

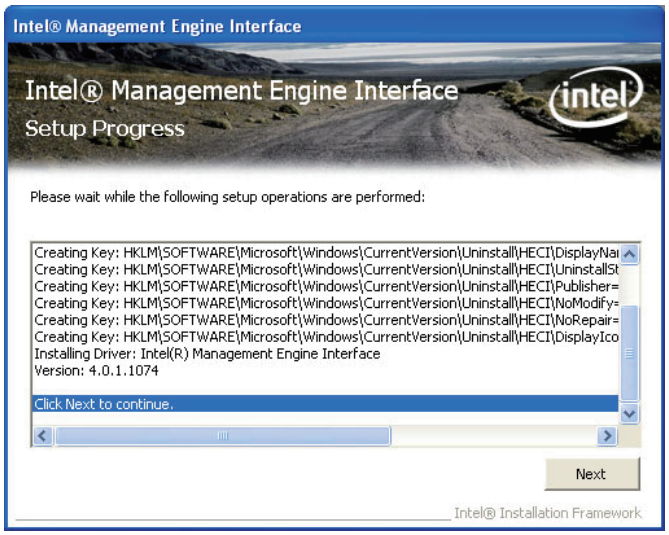
2. Read the license agreement then click Yes.



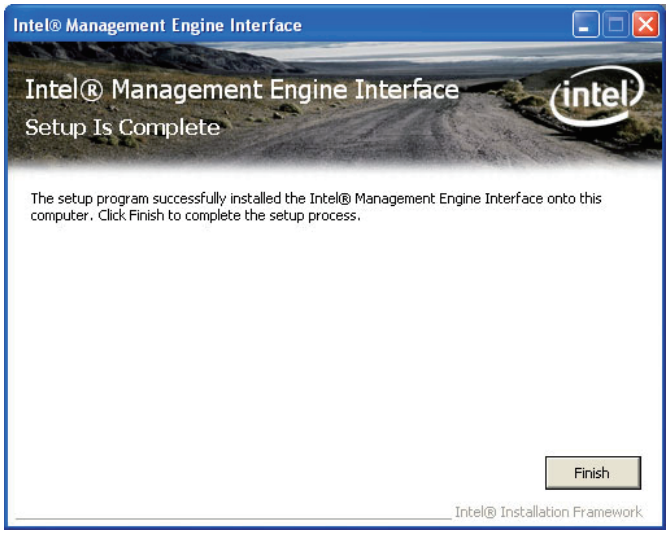
3. Go through the readme document for more installation tips then click Next.



4. Setup is currently installing the driver. After installation has completed, click Next.



5. After completing installation, click Finish.



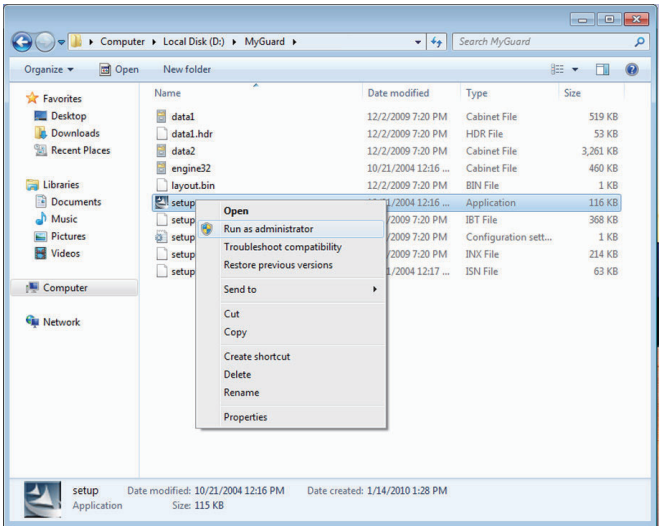
MyGuard Hardware Monitor

1. Locate for the MyGuard folder in the provided disc.

2. In the MyGuard folder, right-click on the "setup" file.

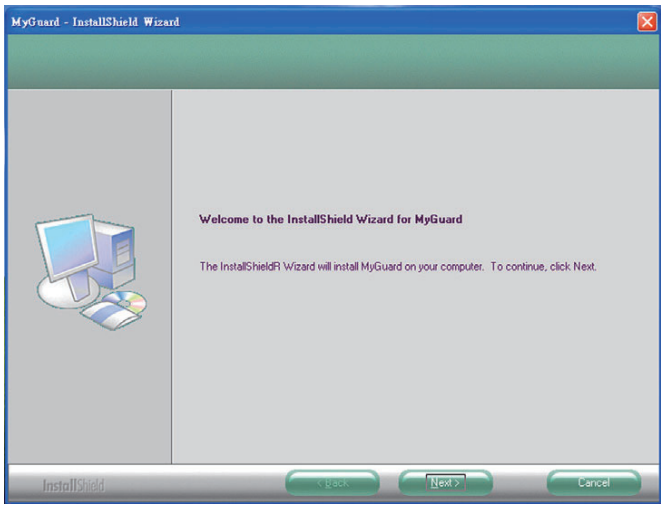
3. Select Run As Administrator.

4. Double-click Setup.

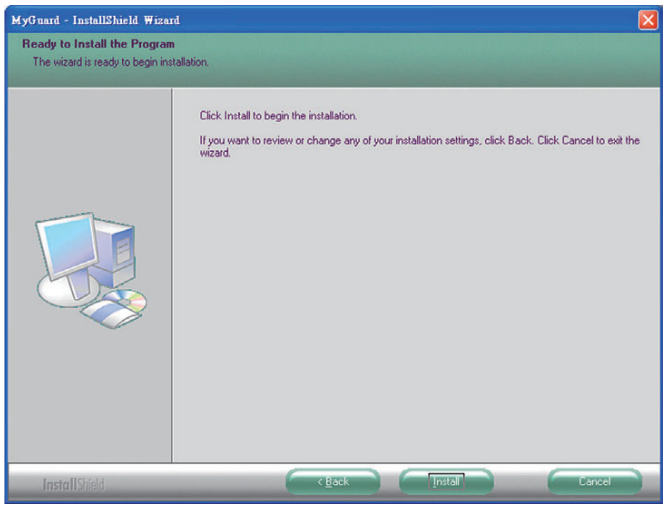


Important:
Perform steps 1-3 only when using Windows 7 or Windows Vista.

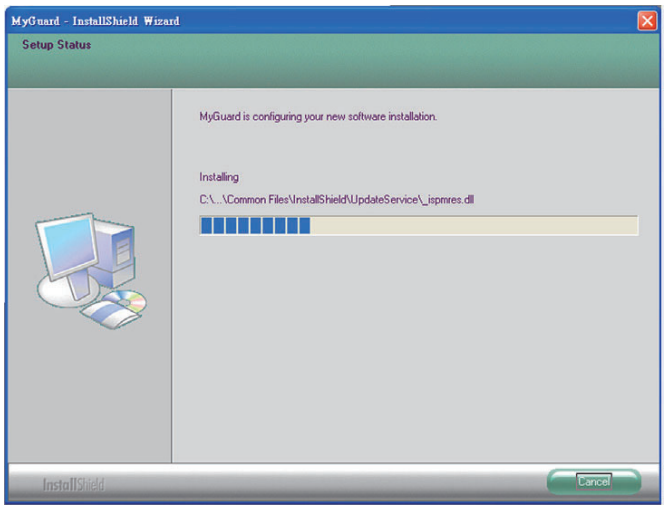
5. Setup is ready to install the utility. Click Next.



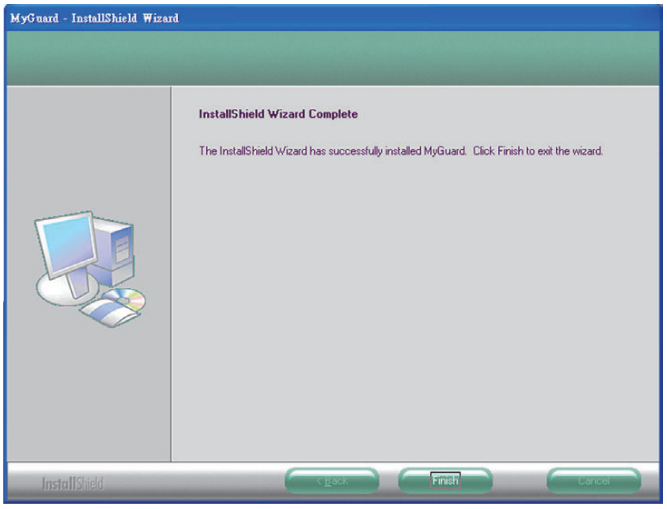
6. Click Install to begin installation.



7. Setup is currently installing the utility.



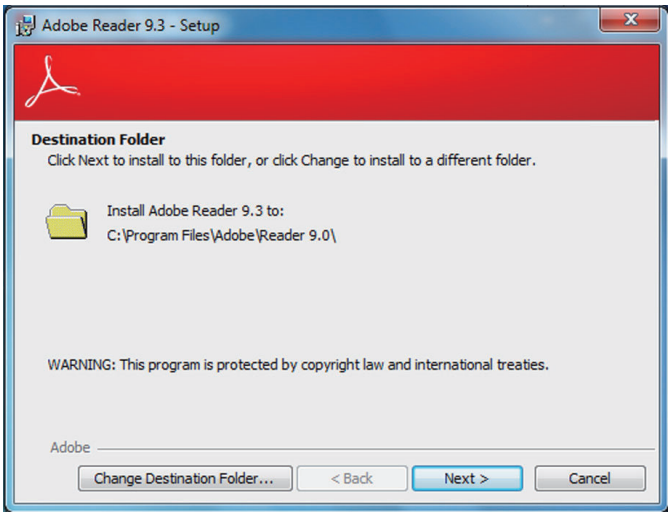
8. After completing installation, click Finish to exit setup.



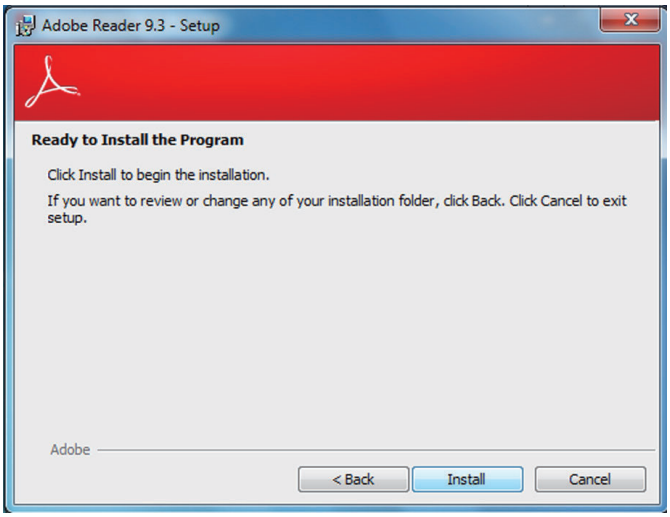
Adobe Acrobat Reader 9.3

To install the reader, click "Adobe Acrobat Reader 9.3" on the main menu.

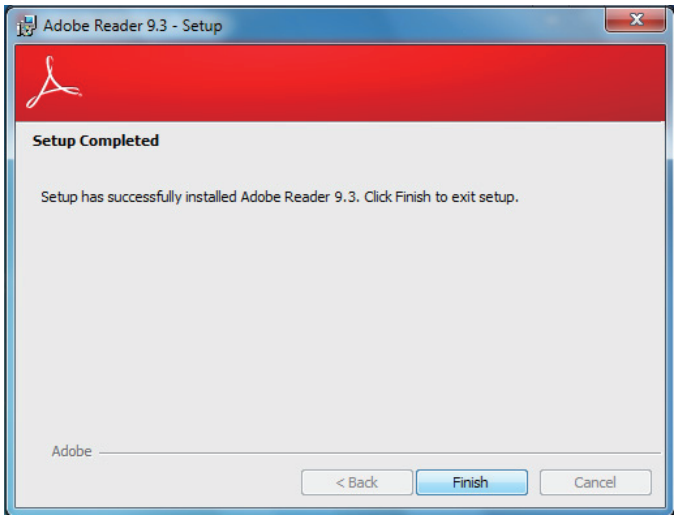
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



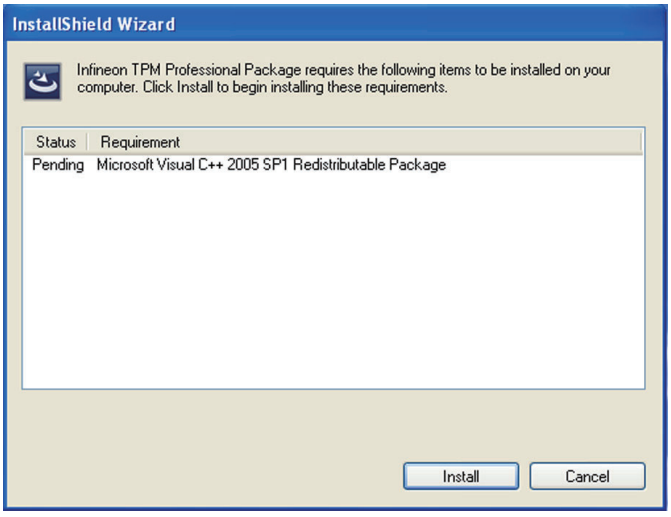
3. Click Finish to exit installation.



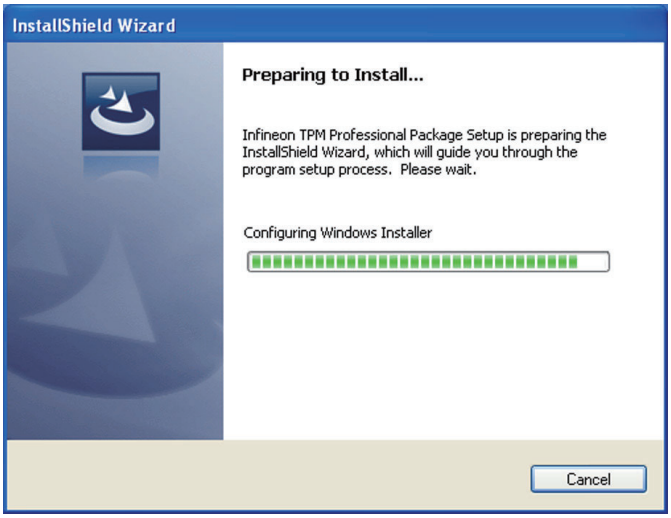
Infineon TPM Driver and Tool (optional)

To install the driver, click "Infineon TPM Driver and Tool" on the main menu.

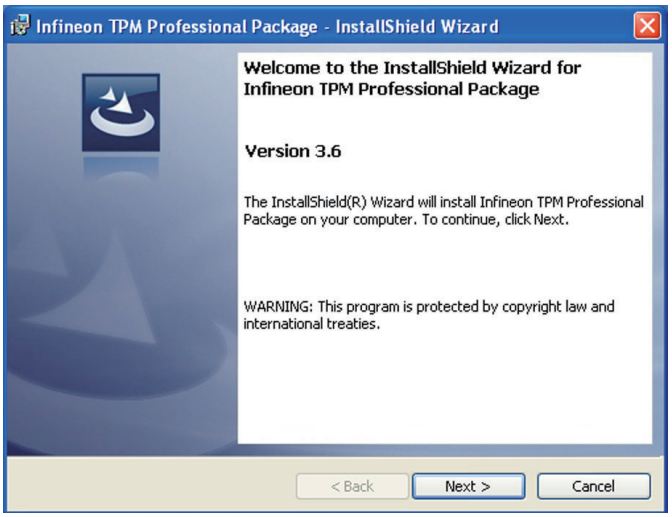
1. TPM requires installing the Microsoft Visual C++ package prior to installing the driver. Click Install.



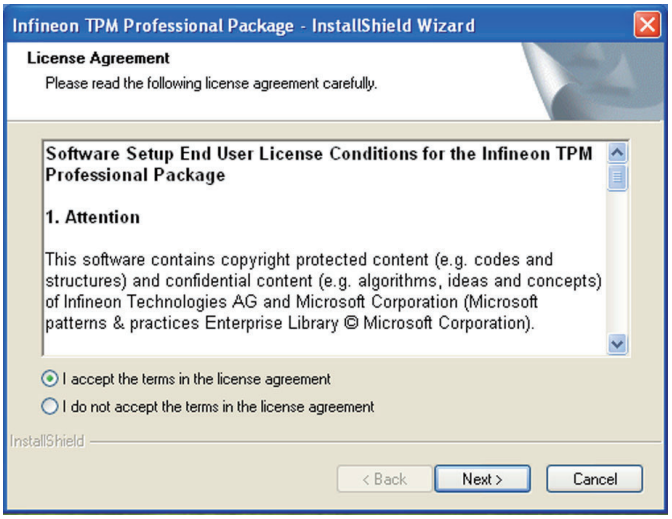
2. The setup program is preparing to install the driver.



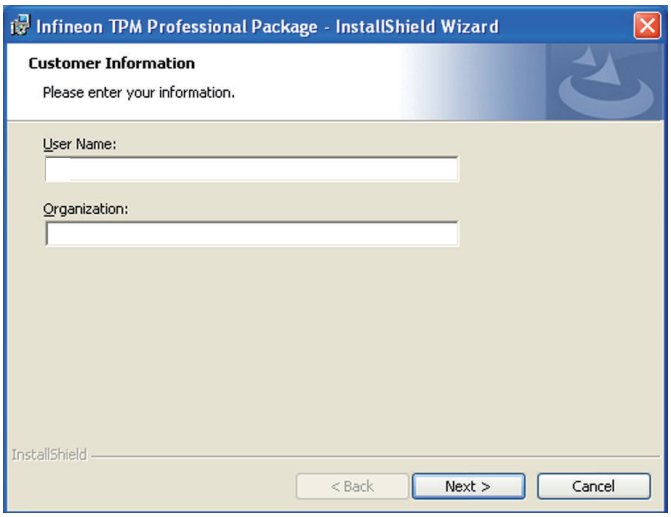
3. The setup program is ready to install the driver. Click Next.



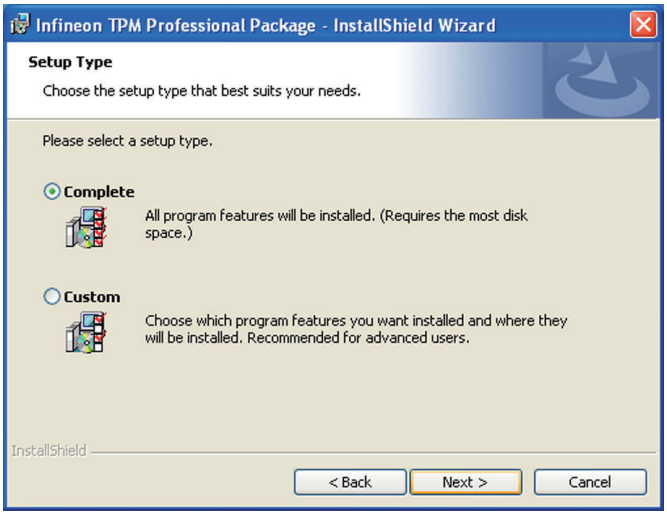
4. Click "I accept the terms in the license agreement" and then click "Next".



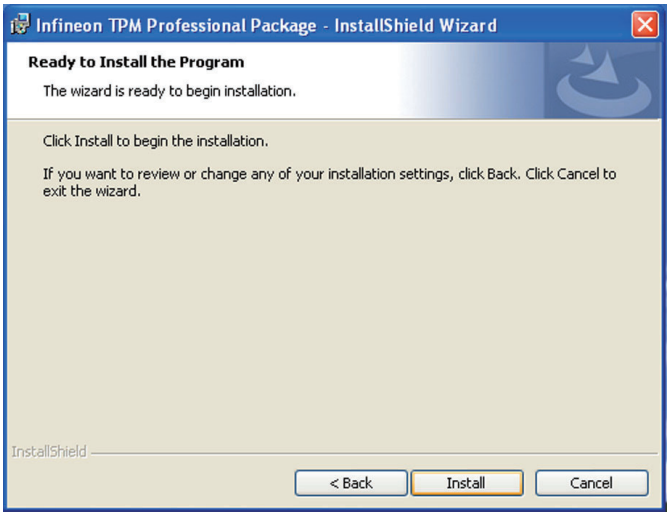
5. Enter the necessary information and then click Next.



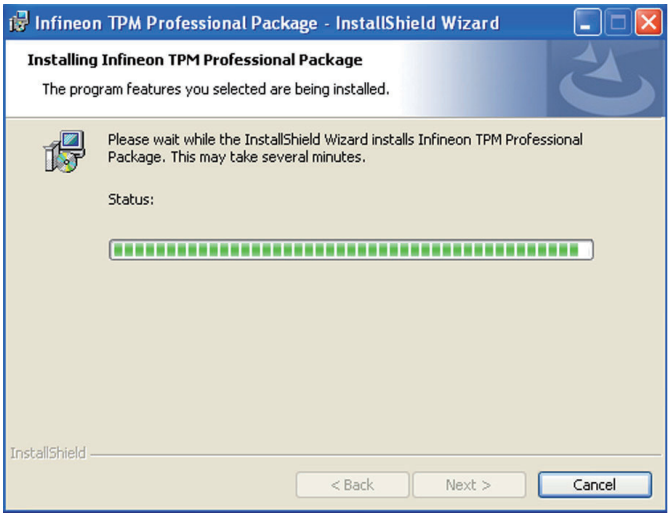
6. Select a setup type and then click Next.



7. Click Install.



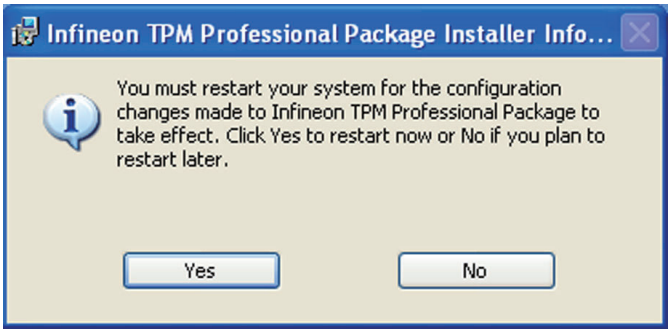
8. The setup program is currently installing the driver.



9. Click Finish.

10. Click Yes to restart the system.

    Restarting the system will allow the new software installation to take effect.



Chapter 5 - RAID

The Intel Q57 chip allows configuring RAID on Serial ATA drives. It supports RAID 0, RAID 1, RAID 5 and RAID 10.

RAID Levels

RAID 0 (Striped Disk Array without Fault Tolerance)

RAID 0 uses two new identical hard disk drives to read and write data in parallel, interleaved stacks. Data is divided into stripes and each stripe is written alternately between two disk drives. This improves the I/O performance of the drives at different channel; however it is not fault tolerant. A failed disk will result in data loss in the disk array.

RAID 1 (Mirroring Disk Array with Fault Tolerance)

RAID 1 copies and maintains an identical image of the data from one drive to the other drive. If a drive fails to function, the disk array management software directs all applications to the other drive since it contains a complete copy of the drive's data. This enhances data protection and increases fault tolerance to the entire system. Use two new drives or an existing drive and a new drive but the size of the new drive must be the same or larger than the existing drive.

RAID 5

RAID 5 stripes data and parity information across hard drives. It is fault tolerant and provides better hard drive performance and more storage capacity.

RAID 10 (Mirroring and Striping)

RAID 10 is a combination of data striping and data mirroring providing the benefits of both RAID 0 and RAID 1. Use four new drives or an existing drive and three new drives for this configuration.

Settings

To enable the RAID function, the following settings are required.

1. Connect the Serial ATA drives.
2. Configure Serial ATA in the AMI BIOS.
3. Configure RAID in the RAID BIOS.
4. Install the RAID driver during OS installation.
5. Install the Intel Rapid Storage Drivers.

Step 1: Connect the Serial ATA Drives

Refer to chapter 2 for details on connecting the Serial ATA drives.

Important:

1. Make sure you have installed the Serial ATA drives and connected the data cables otherwise you won't be able to enter the RAID BIOS utility.
2. Treat the cables with extreme caution especially while creating RAID. A damaged cable will ruin the entire installation process and operating system. The system will not boot and you will lost all data in the hard drives. Please give special attention to this warning because there is no way of recovering back the data.

Step 2: Configure Serial ATA in the AMI BIOS

1. Power-on the system then press <Del> to enter the main menu of the AMI BIOS.
2. Configure Serial ATA in the appropriate fields.
3. Save the changes in the Save & Exit menu.
4. Reboot the system.

Step 3: Configure RAID in the RAID BIOS

When the system powers-up and all drives have been detected, the Intel RAID BIOS status message screen will appear. Press the <Ctrl> and <I> keys simultaneously to enter the utility. The utility allows you to build a RAID system on Serial ATA drives.

Step 4: Install the RAID Driver During OS Installation

The RAID driver must be installed during the Windows® XP or Windows® 2000 installation using the F6 installation method. This is required in order to install the operating system onto a hard drive or RAID volume when in RAID mode or onto a hard drive when in AHCI mode.

1. Start Windows Setup by booting from the installation CD.

2. Press <F6> when prompted in the status line with the 'Press F6 if you need to install a third party SCSI or RAID driver' message.

3. Press <S> to "Specify Additional Device".

4. At this point you will be prompted to insert a floppy disk containing the RAID driver. Insert the RAID driver diskette.

5. Locate for the drive where you inserted the diskette then select RAID or AHCI controller that corresponds to your BIOS setup. Press <Enter> to confirm.

You have successfully installed the driver. However you must continue installing the OS. Leave the floppy disk in the floppy drive until the system reboots itself because Windows setup will need to copy the files again from the floppy disk to the Windows installation folders. After Windows setup has copied these files again, remove the floppy diskette so that Windows setup can reboot as needed.

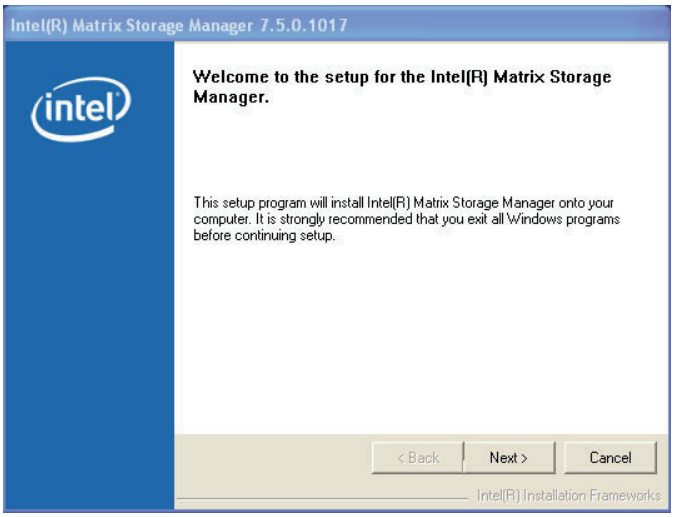
Step 5: Install the Intel Matrix Storage Manager for RAID/AHCI

The Intel Matrix Storage Manager can be installed from within Windows. It allows RAID volume management (create, delete, migrate) from within the operating system. It will also display useful SATA device and RAID volume information. The user interface, tray icon service and monitor service allow you to monitor the current status of the RAID volume and/or SATA drives. It enables enhanced performance and power management for the storage subsystem.

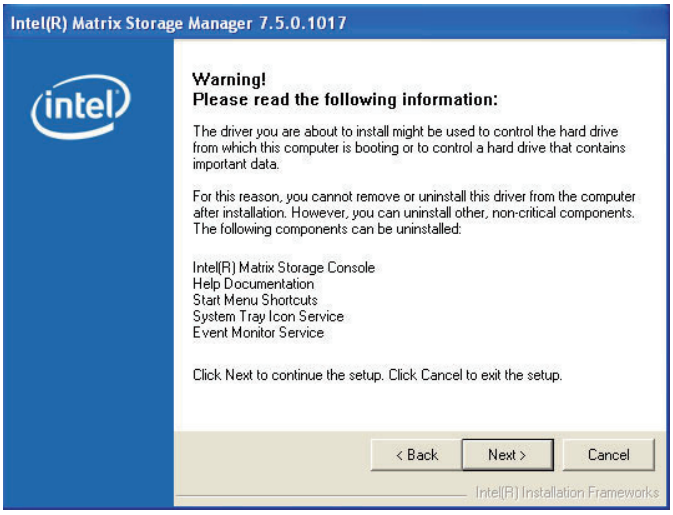
1. Insert the provided CD into an optical drive.

2. Click "Intel Matrix Storage Manager for RAID/AHCI" on the main menu.

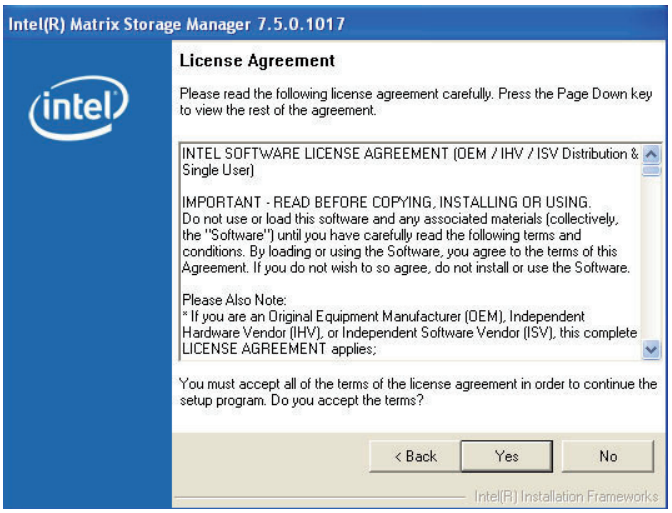
3. Setup is ready to install the utility. Click Next.



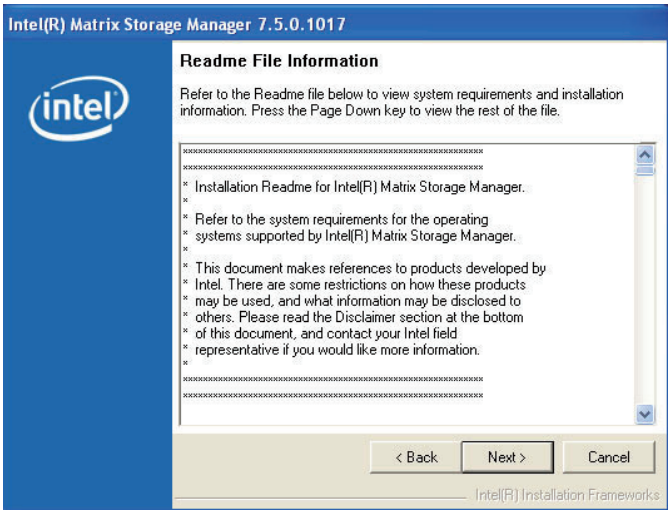
4. Read the warning carefully then click Next.



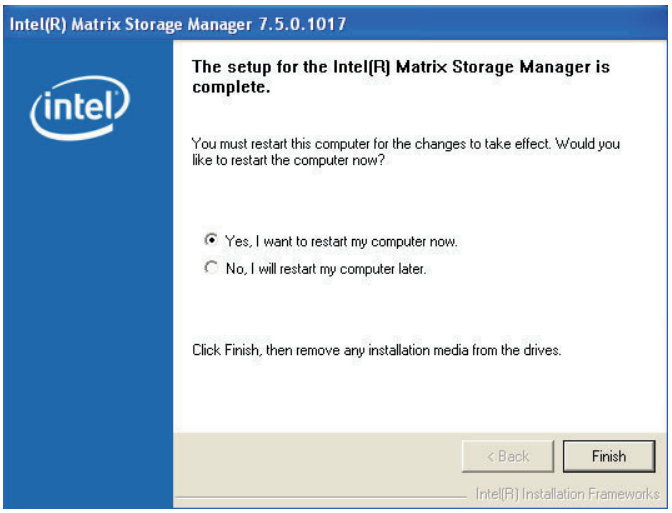
5. Read the license agreement then click Yes.



6. Go through the readme document to view system requirements and installation information then click Next.



7. Click "Yes, I want to restart my computer now" then click Finish.



Chapter 6 - Intel AMT Settings

Overview

Intel Active Management Technology (Intel® AMT) combines hardware and software solution to provide maximum system defense and protection to networked systems.

The hardware and software information are stored in non-volatile memory. With its built-in manageability and latest security applications, Intel® AMT provides the following functions.

- Discover

  Allows remote access and management of networked systems even while PCs are powered off; significantly reducing desk-side visits.

- Repair

  Remotely repair systems after OS failures. Alerting and event logging help detect problems quickly to reduce downtime.

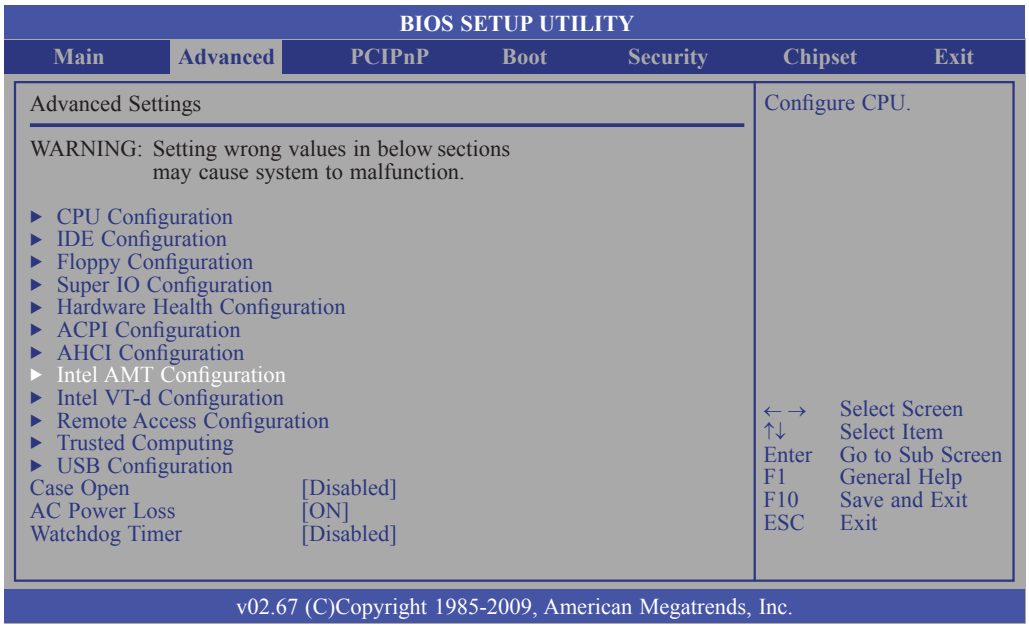
- Protect

  Intel AMT's System Defense capability remotely updates all systems with the latest security software. It protects the network from threats at the source by proactively blocking incoming threats, reactively containing infected clients before they impact the network, and proactively alerting when critical software agents are removed.

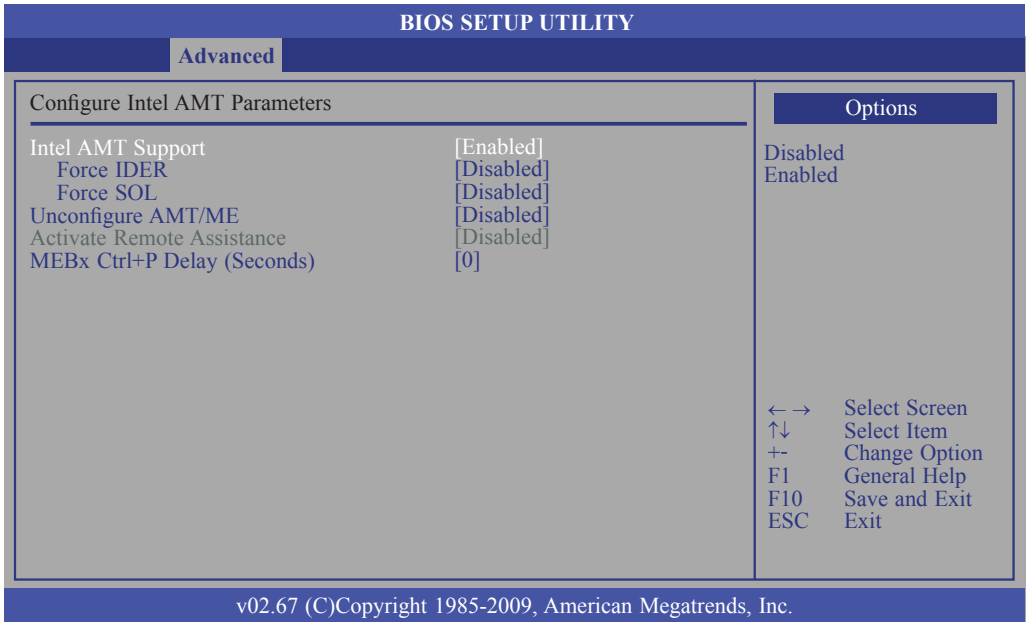
Enable Intel® AMT in the AMI BIOS

1. Power-on the system then press <Del> to enter the main menu of the AMI BIOS.

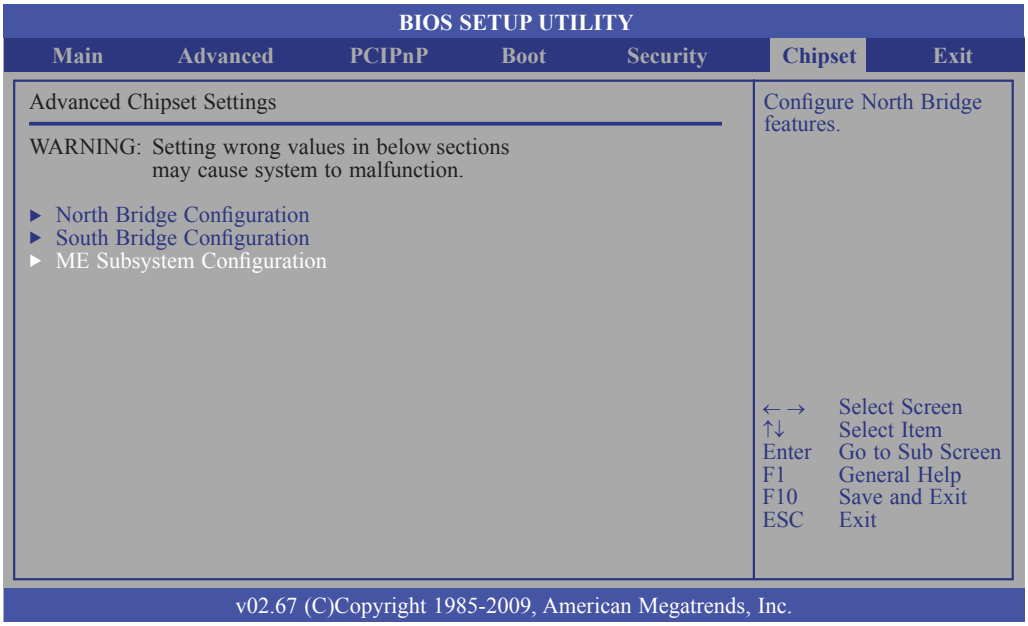
2. In the **Advanced** menu, select **Intel AMT Configuration** then press <Enter>.



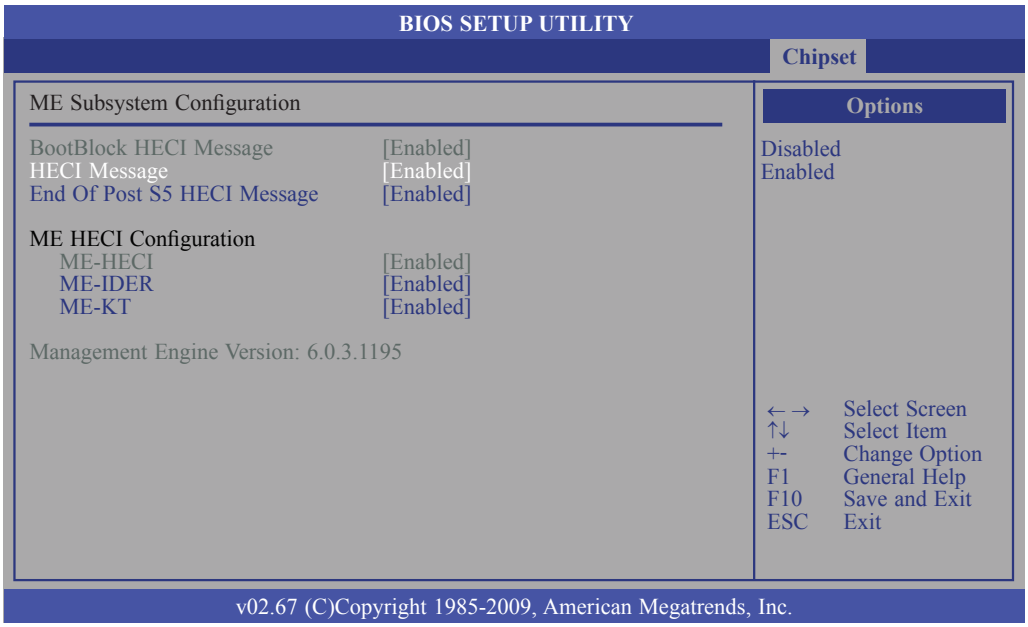
3. In the **Intel AMT Support** field, select **Enabled**.



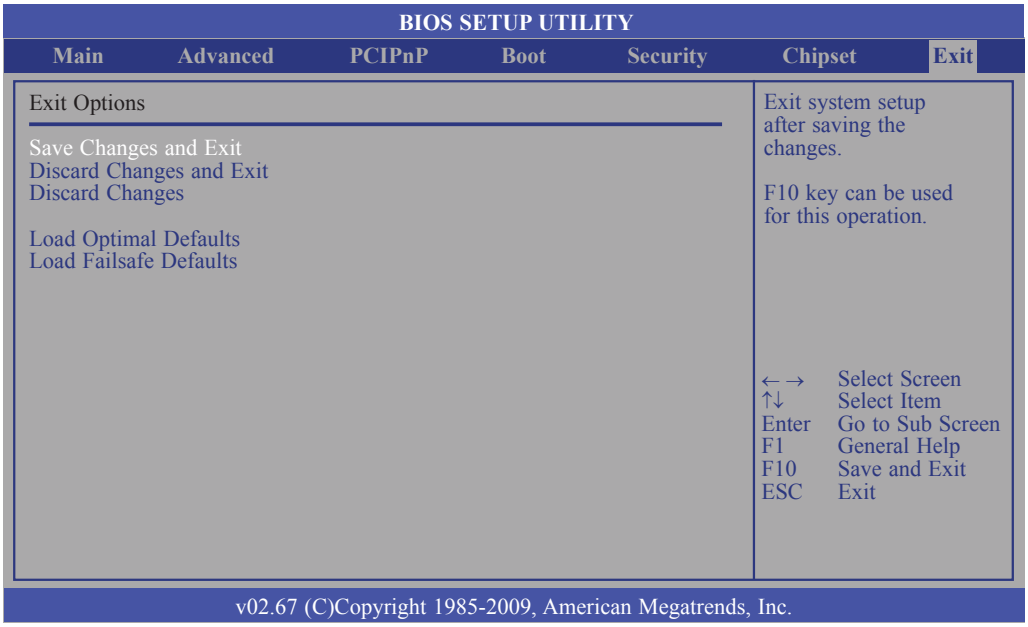
4. In the **Chipset** menu, select **ME Subsystem Configuration** then press <Enter>.



5. Configure the fields in the ME Subsystem Configuration submenu.

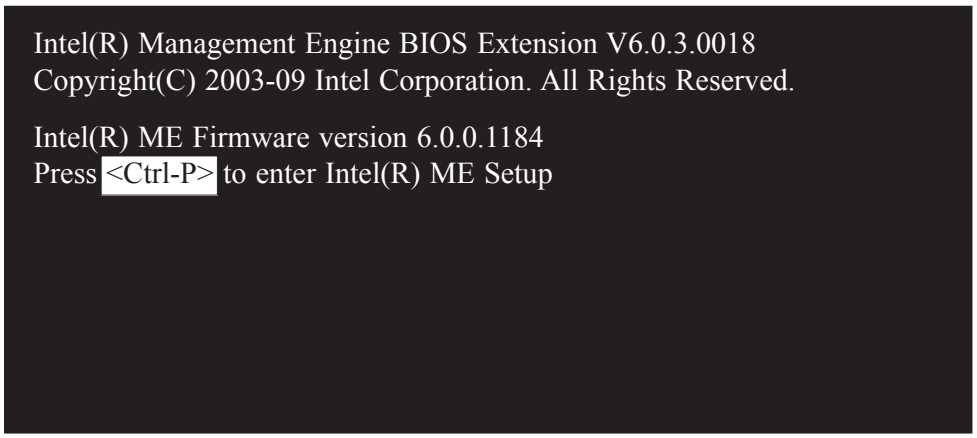


6. In the **Exit** menu, select **Save Changes and Exit** then select **OK**.

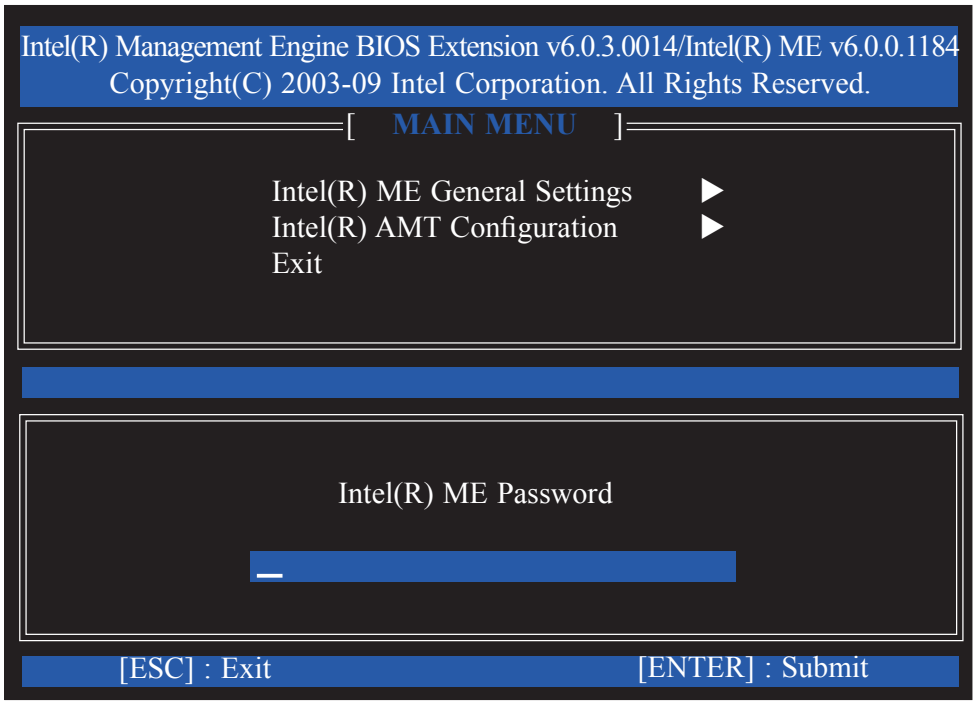


Enable Intel® AMT in the Intel® Management Engine BIOS Extension (MEBX) Screen

1. When the system reboots, the following message will be displayed. Press **<Ctrl-P>** as soon as the message is displayed; as this message will be displayed for only a few seconds.



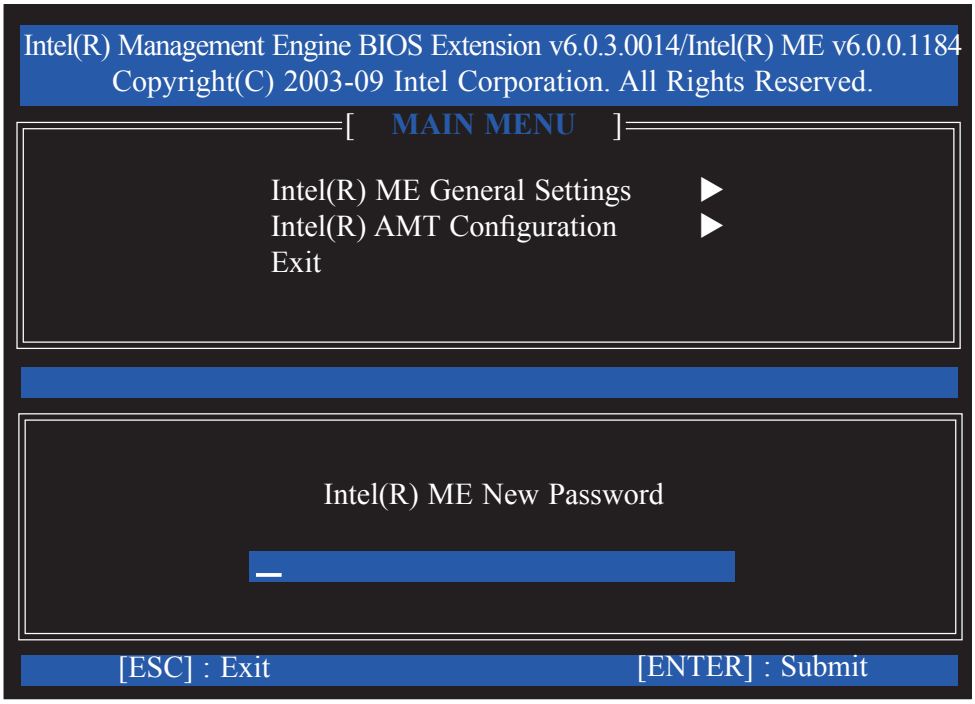
2. You will be prompted for a password. The default password is "**admin**". Enter the default password in the space provided under Intel(R) ME Password then press Enter.



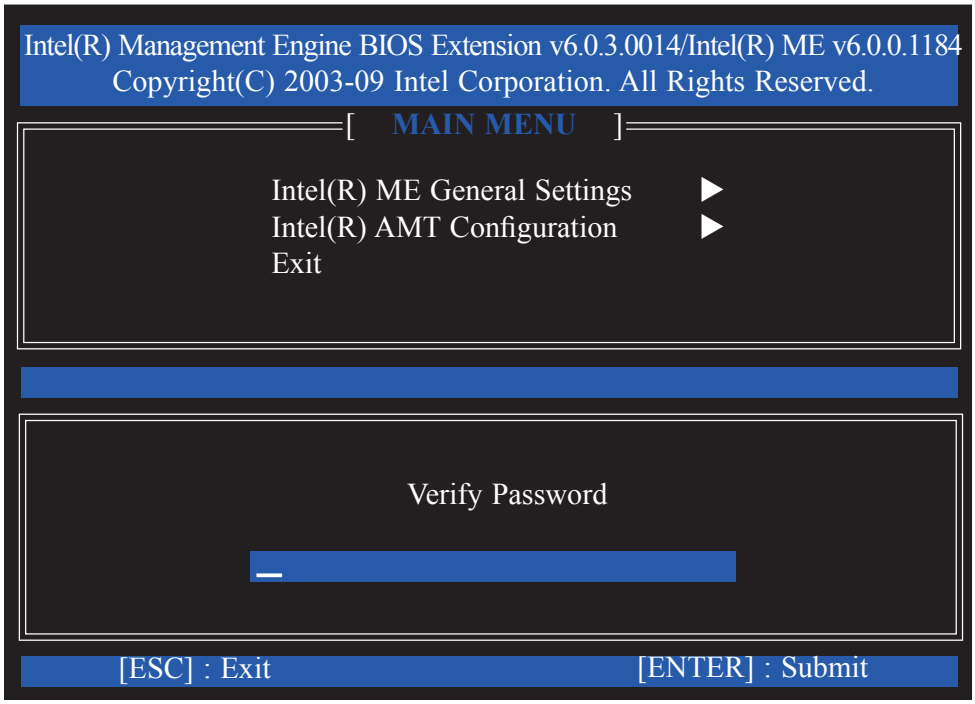
3. Enter a new password in the space provided under Intel(R) ME New Password then press Enter. The password must include:

   - 8-32 characters
   - Strong 7-bit ASCII characters excluding **{: ,** and **”}** characters
   - At least one digit character (0, 1, ...9)
   - At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, $, ;)
   - Both lower case and upper case characters

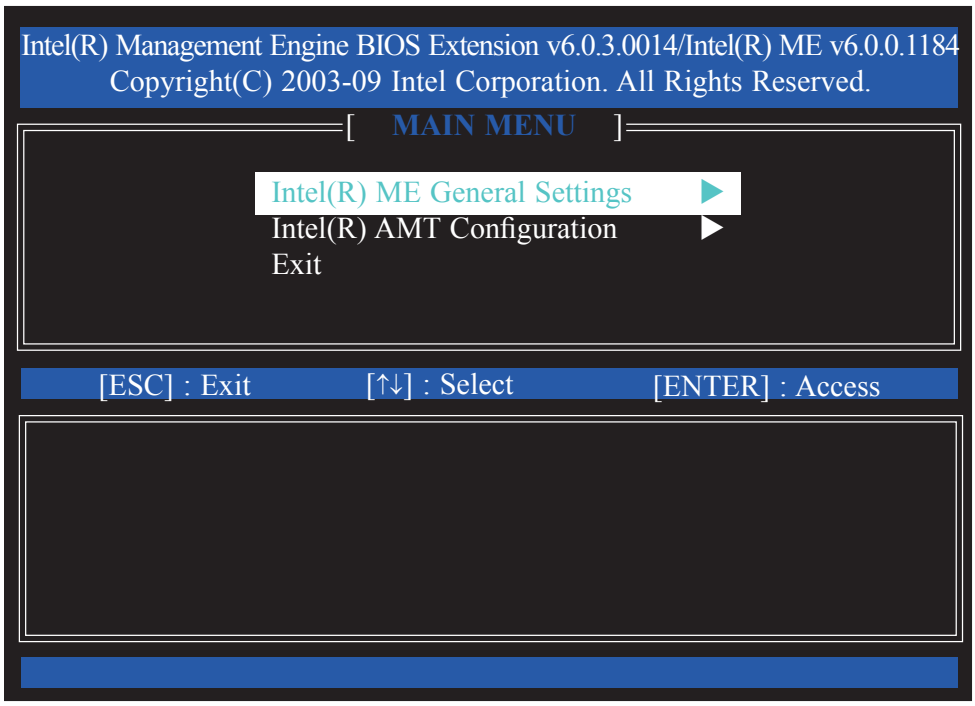
   Note:
   '_' (underscore) and ' ' (space) are valid password characters but are not used in the determination of complexity.



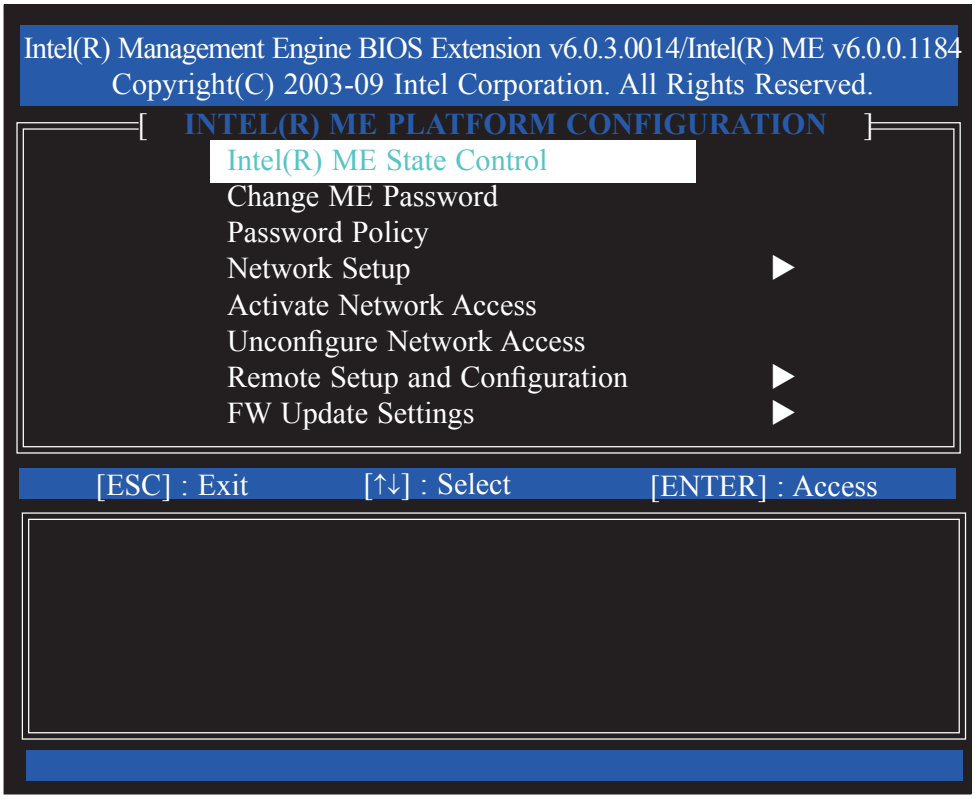
4. You will be asked to verify the password. Enter the same new password in the space provided under Verify Password then press Enter.



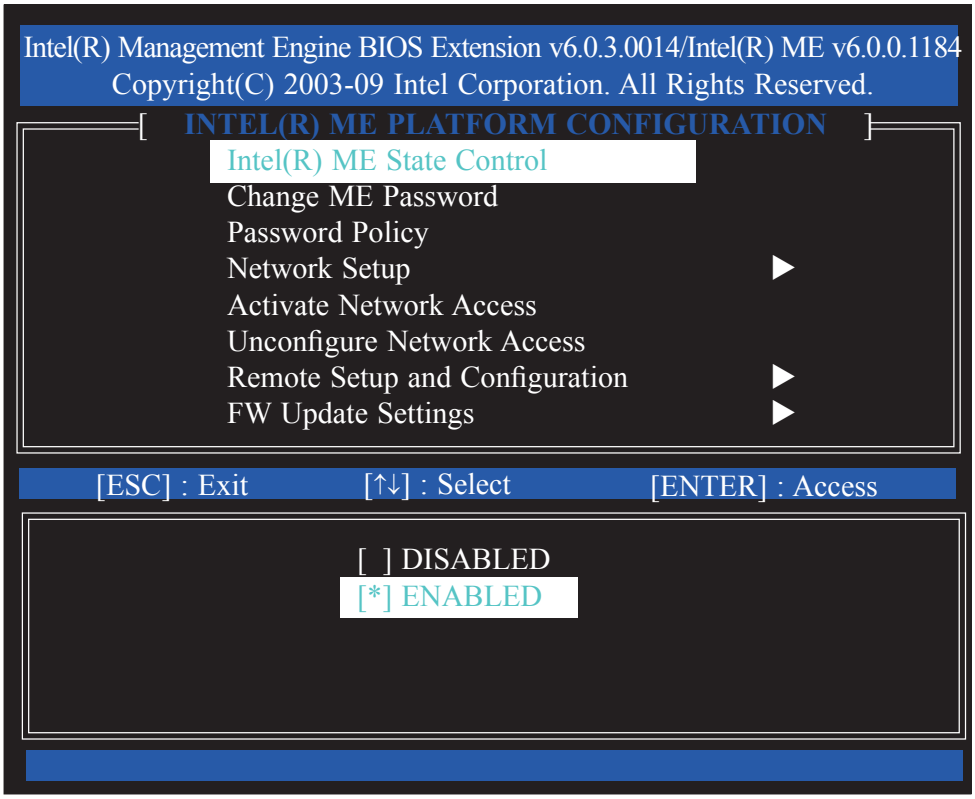
5. Select **Intel(R) ME General Settings** then press Enter.



6. Select **Intel(R) ME State Control** then press Enter.



7. Select **Enabled** then press Enter.

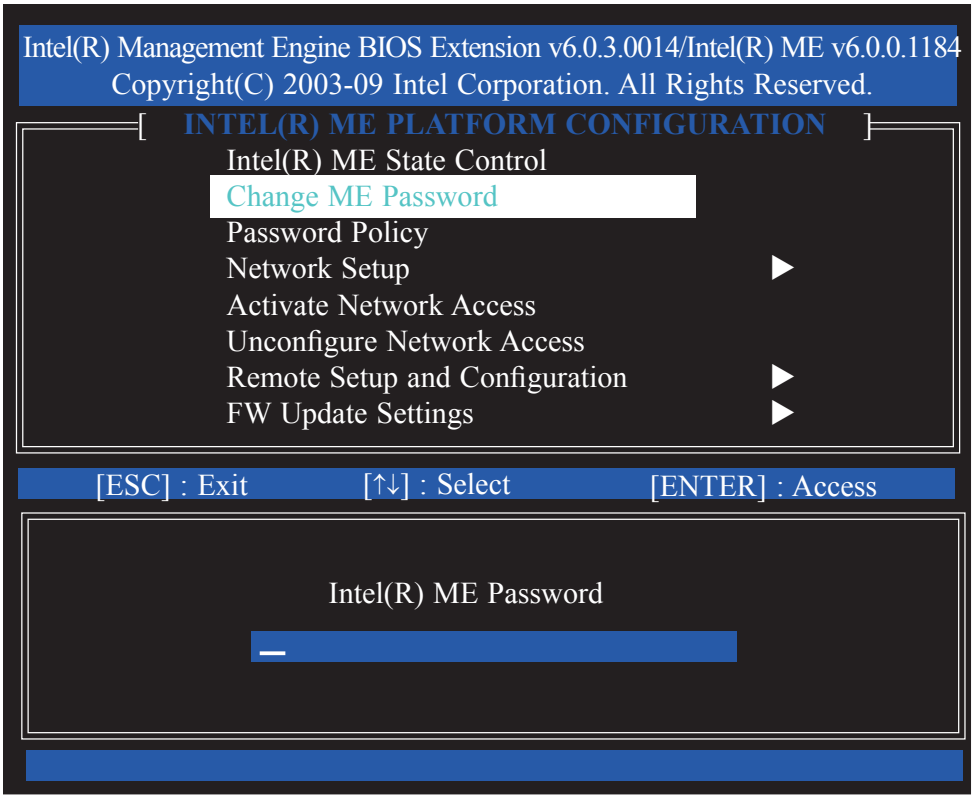


8. Select **Change ME Password** then press Enter.

You will be prompted for a password. The default password is "**admin**". Enter the default password in the space provided under Intel(R) ME Password then press Enter.

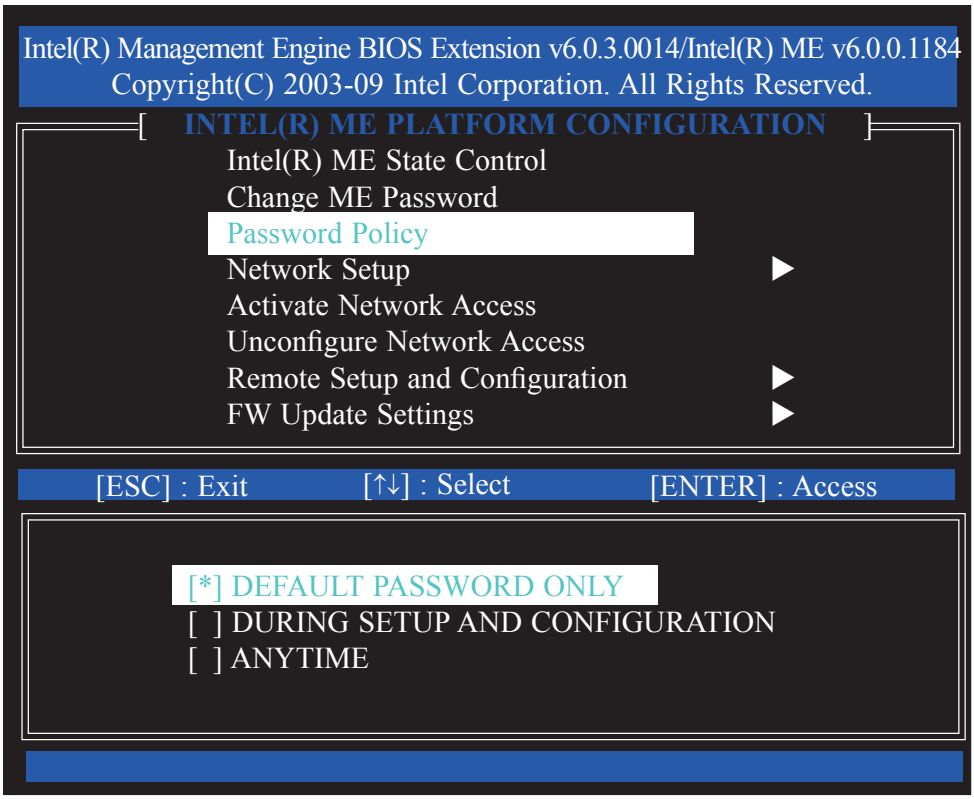
- 8-32 characters
- Strong 7-bit ASCII characters excluding **{: ,** and **"}** characters
- At least one digit character (0, 1, ...9)
- At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, $, ;)
- Both lower case and upper case characters

Note:
'_' (underscore) and ' ' (space) are valid password characters but are not used in the determination of complexity.

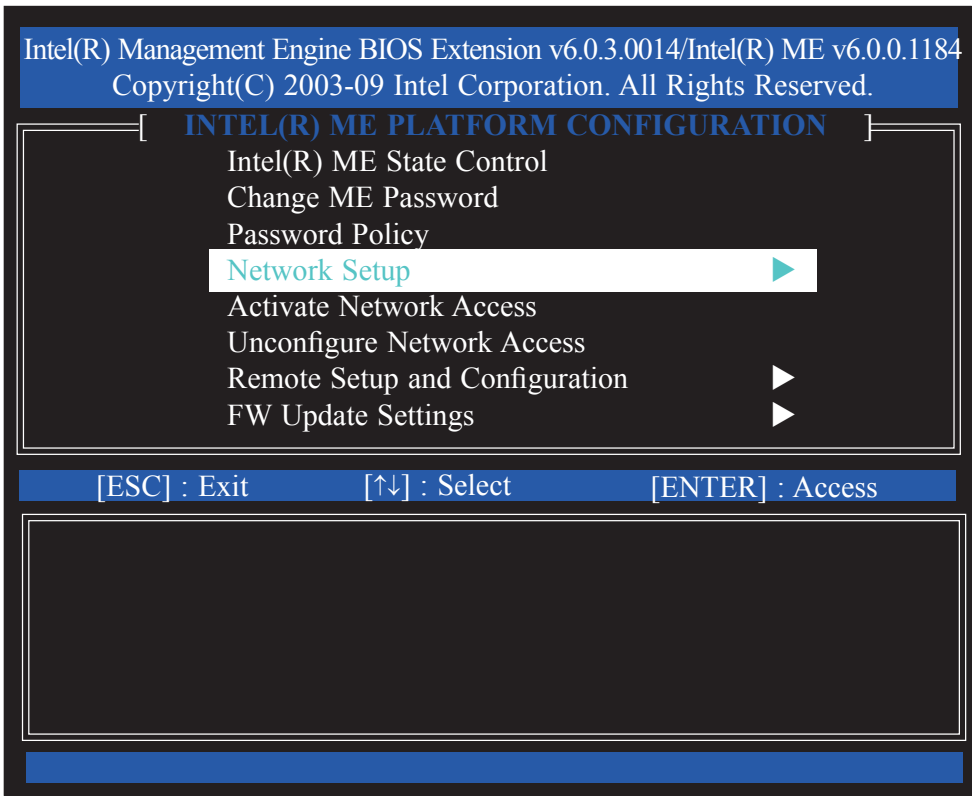


9. Select **Password Policy** then press Enter.

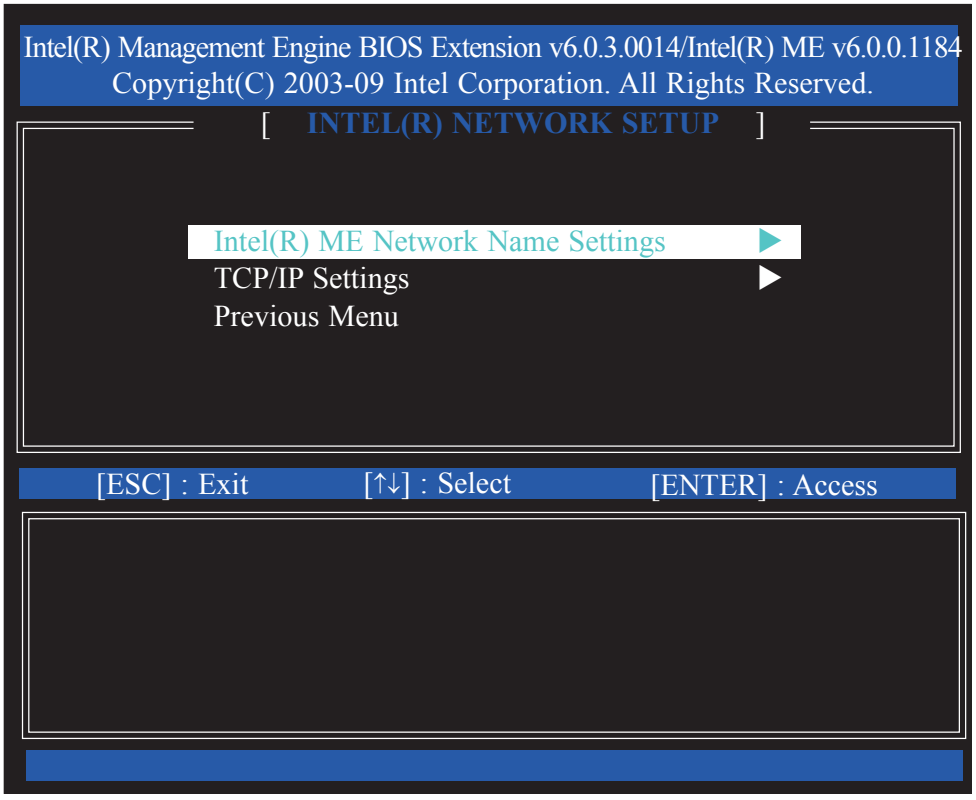
   You may choose to use a password only during setup and configuration or to use a password anytime the system is being accessed.



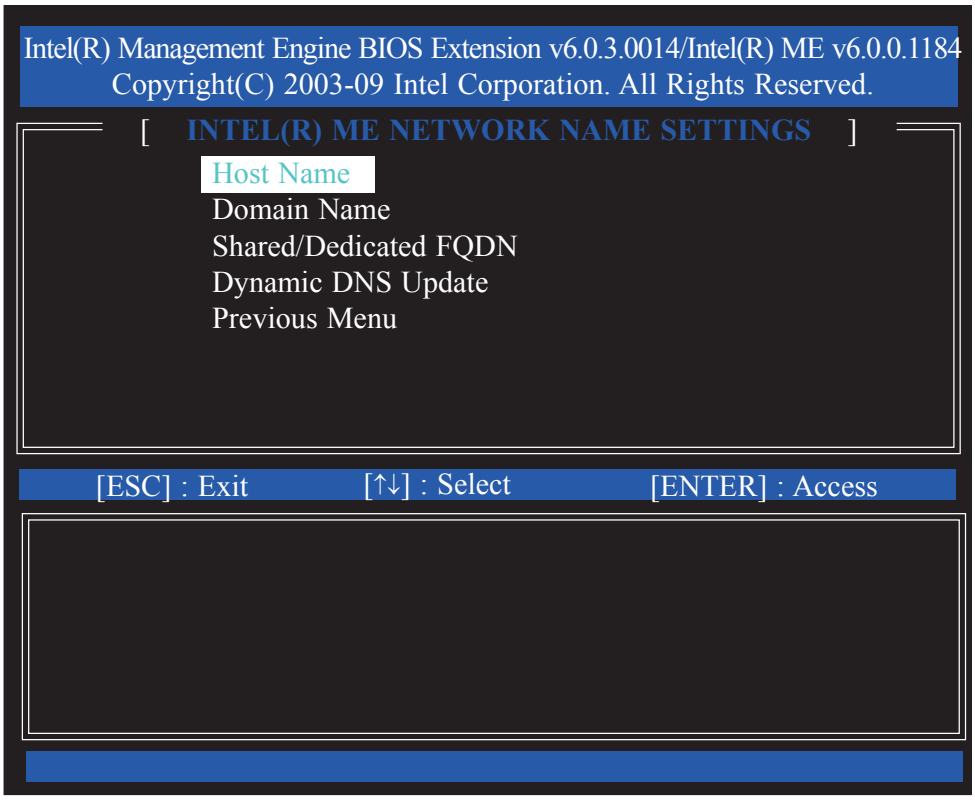
10. Select **Network Setup** then press Enter.



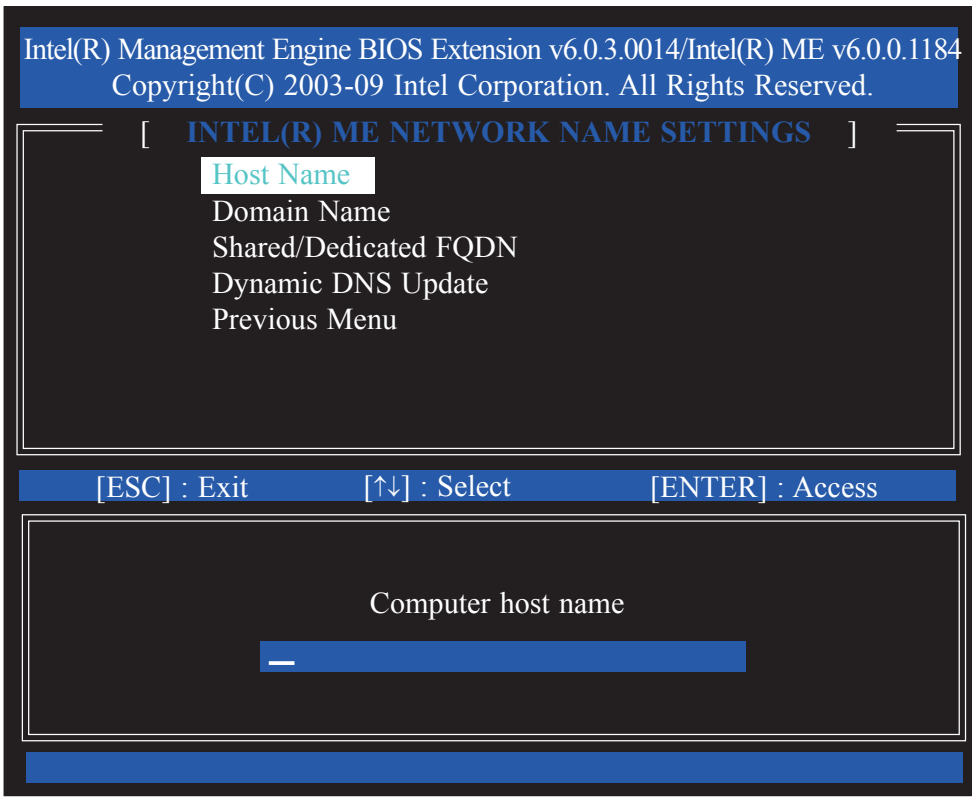
11. In the **Intel(R) Network Setup** menu, select **Intel(R) ME Network Name Settings** then press Enter.



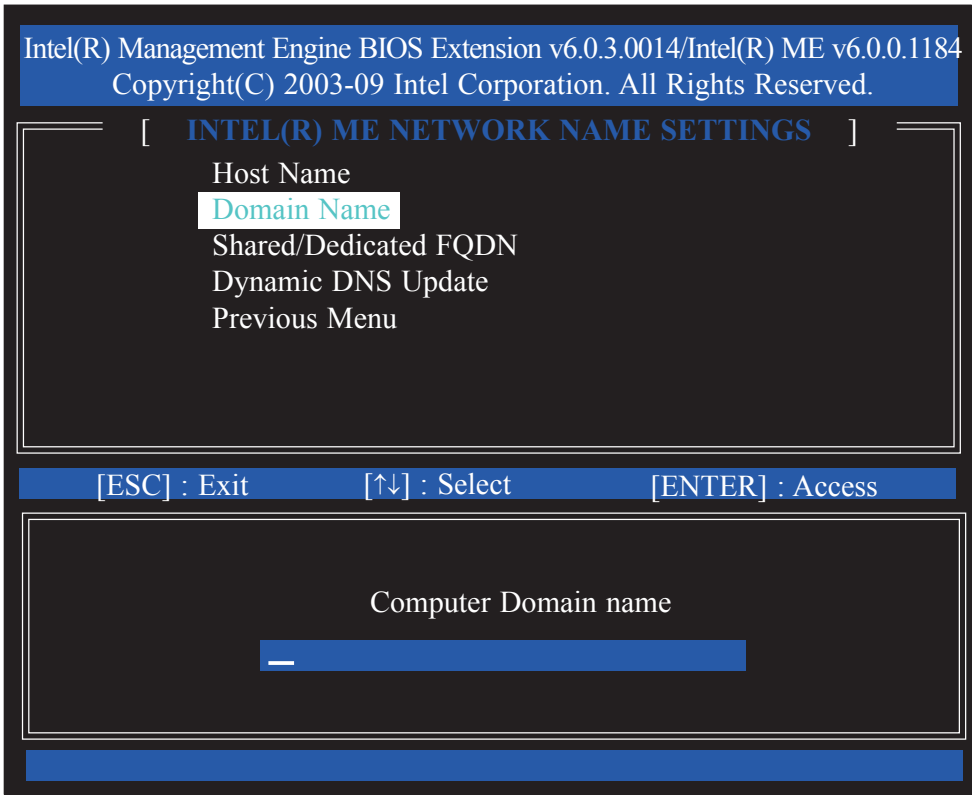
12. In the **Intel(R) ME Network Name Settings** menu, select **Host Name** then press Enter.



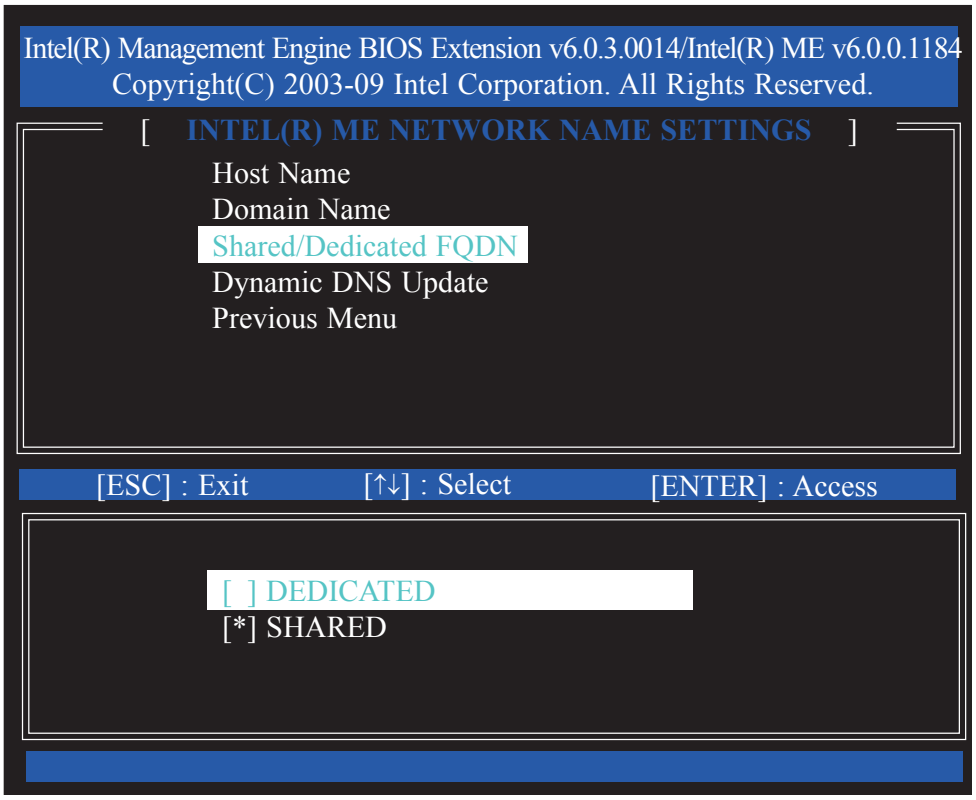
13. Enter the computer's host name then press Enter.



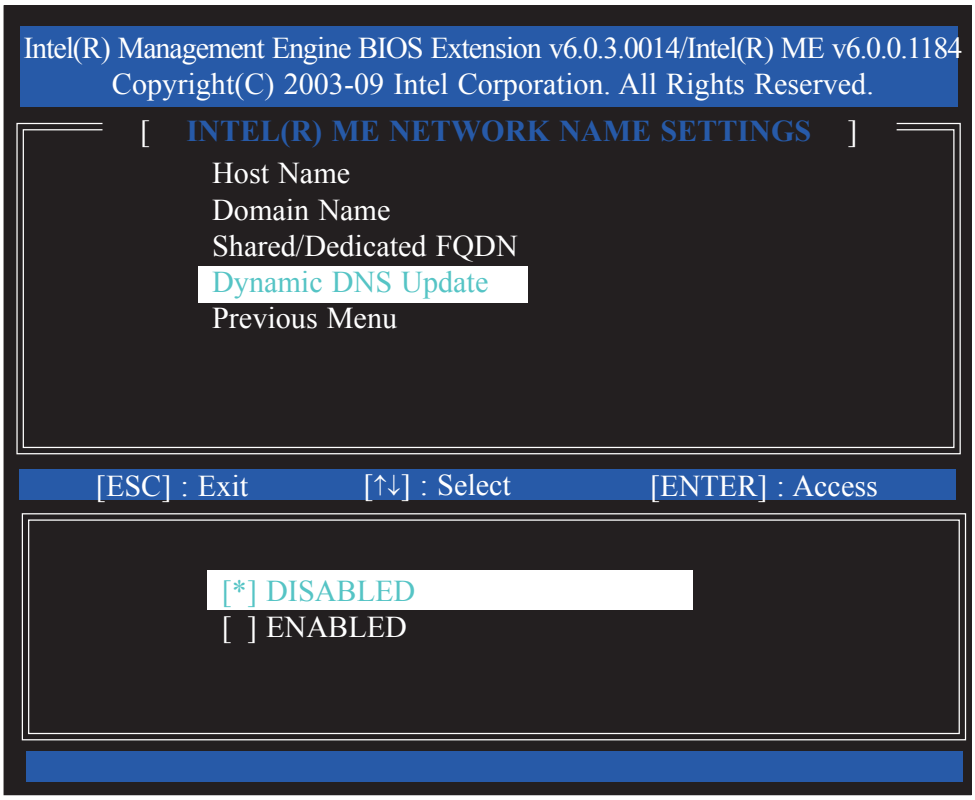
14. Select **Domain Name** then press Enter. Enter the domain name then press Enter.



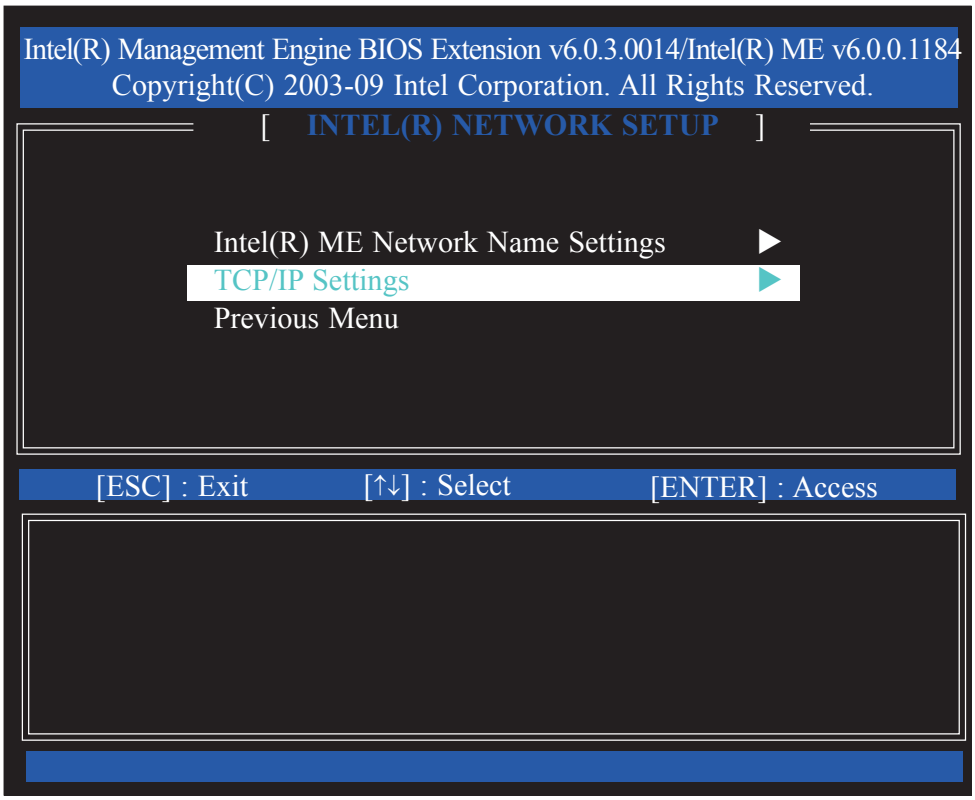
15. Select **Shared/Dedicated FQDN** then press Enter. Select Shared or Dedicated then press Enter.



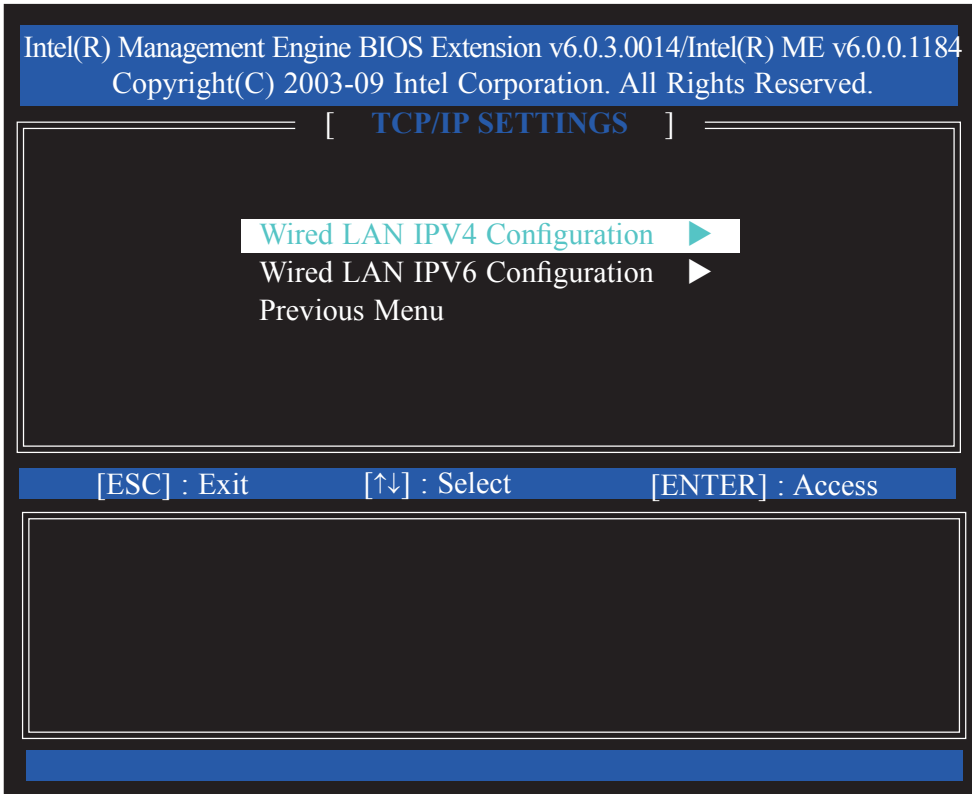
16. Select **Dynamic DNS Update** then press Enter. Select Enabled or Disabled then press Enter.



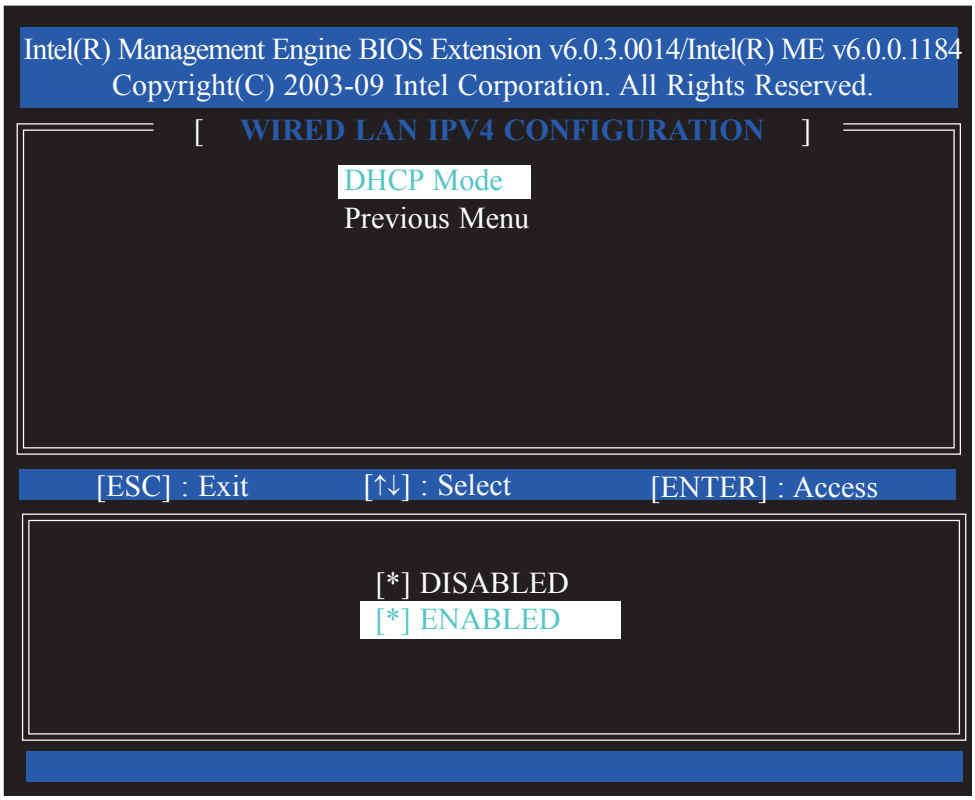
17. Select Previous Menu until you return to the **Network Setup** menu. Select **TCP/IP Settings** then press Enter.



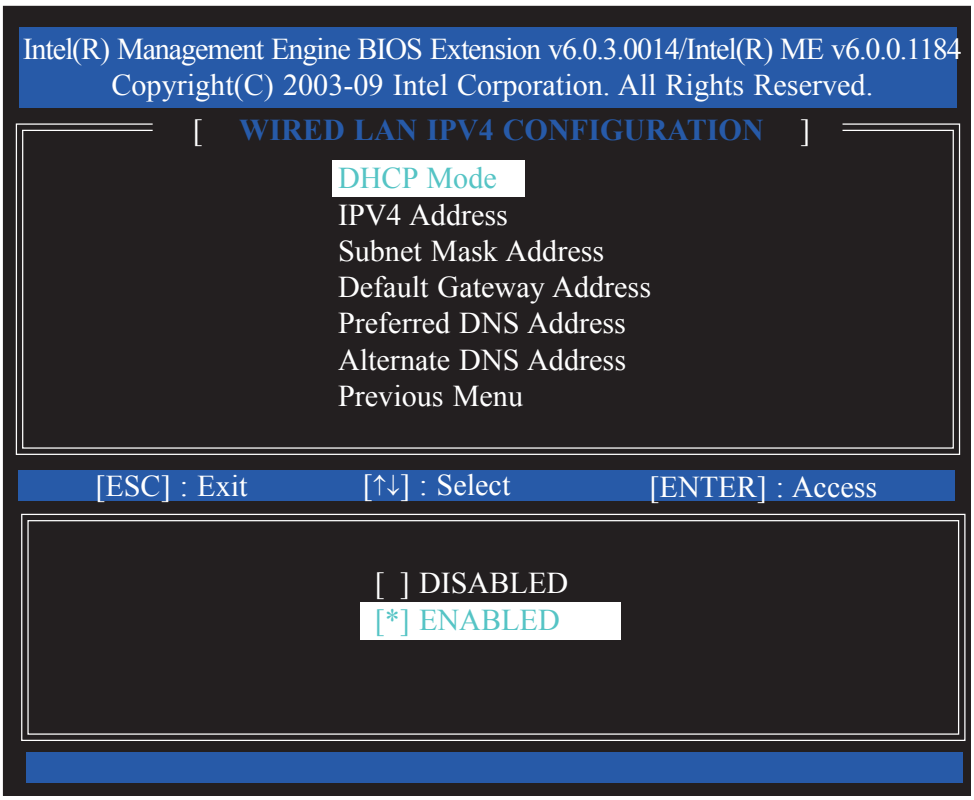
18. In the **TCP/IP Settings** menu, select **Wired LAN IPV4 Configuration** then press Enter.



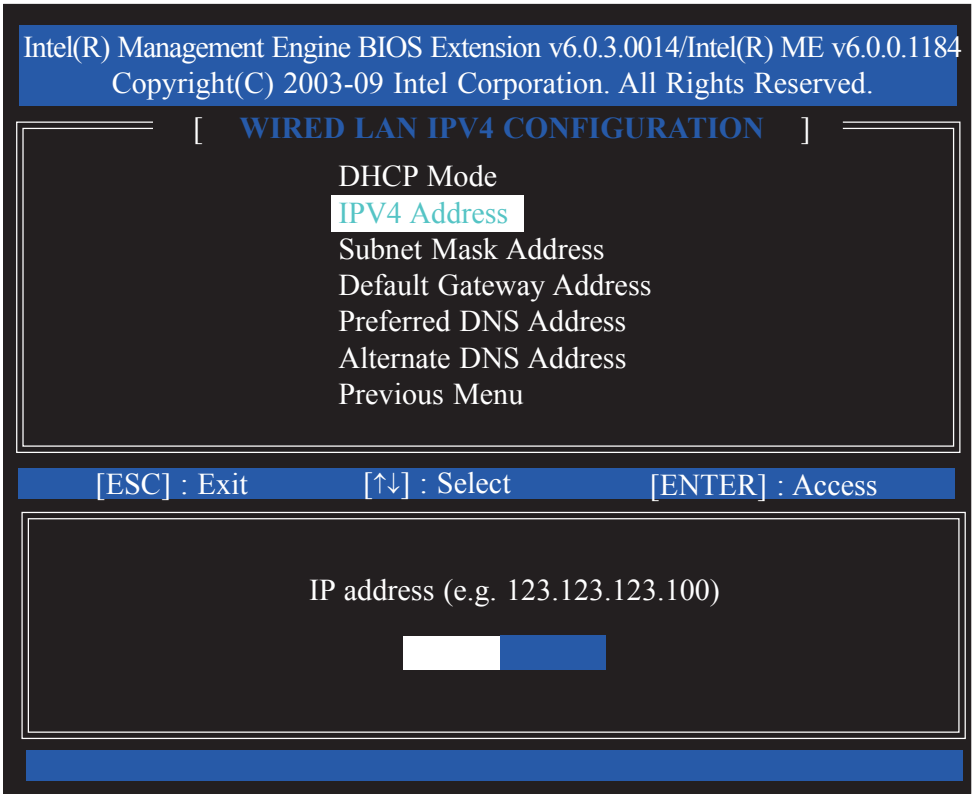
19. In the **Wired LAN IPV4 Configuration** menu, select **DHCP Mode** then press Enter. Select Enabled then press Enter.



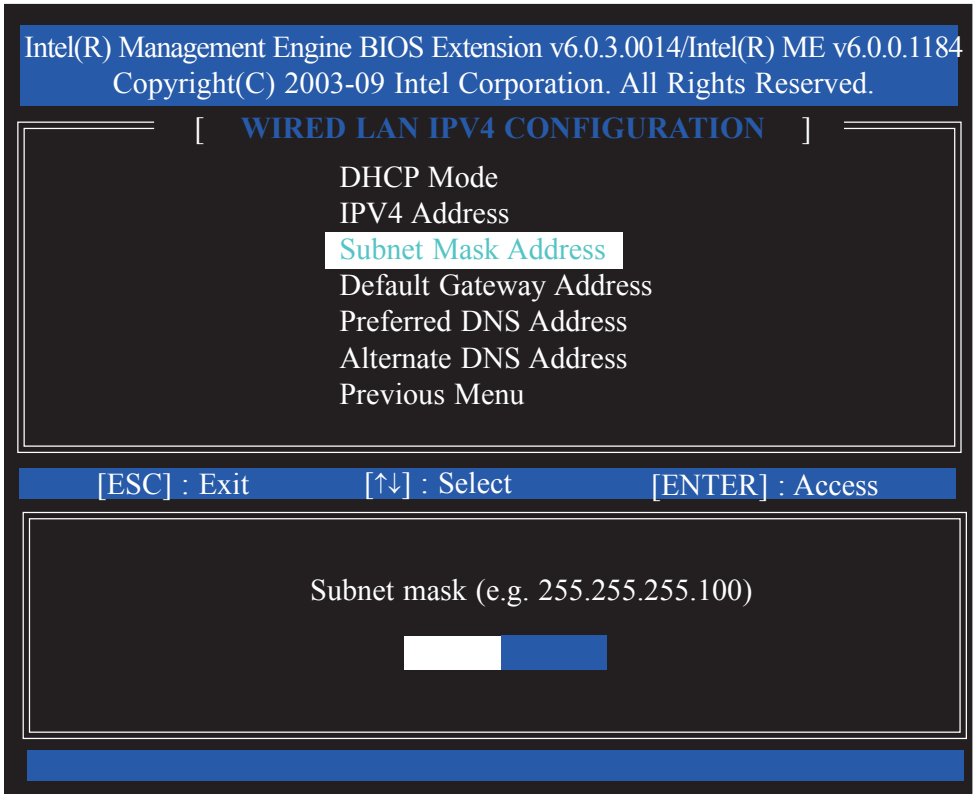
20. A list of options in the **Wired LAN IPV4 Configuration** menu will appear.



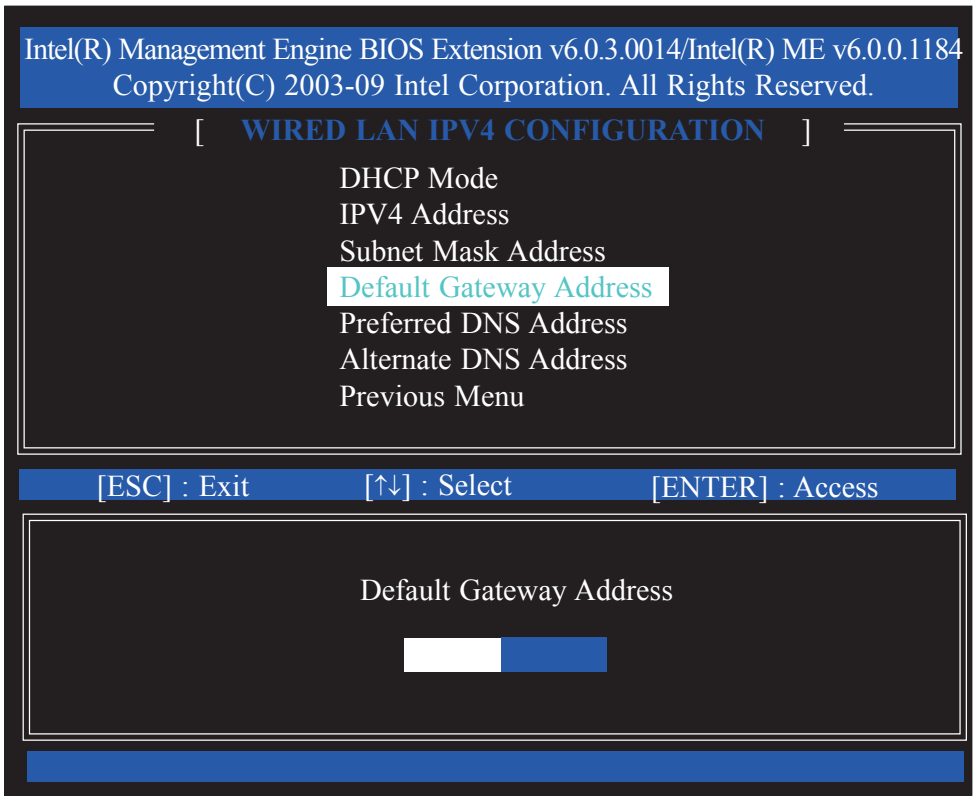
21. Select **IPV4 Address** then press Enter. Enter an IP Address then press Enter.



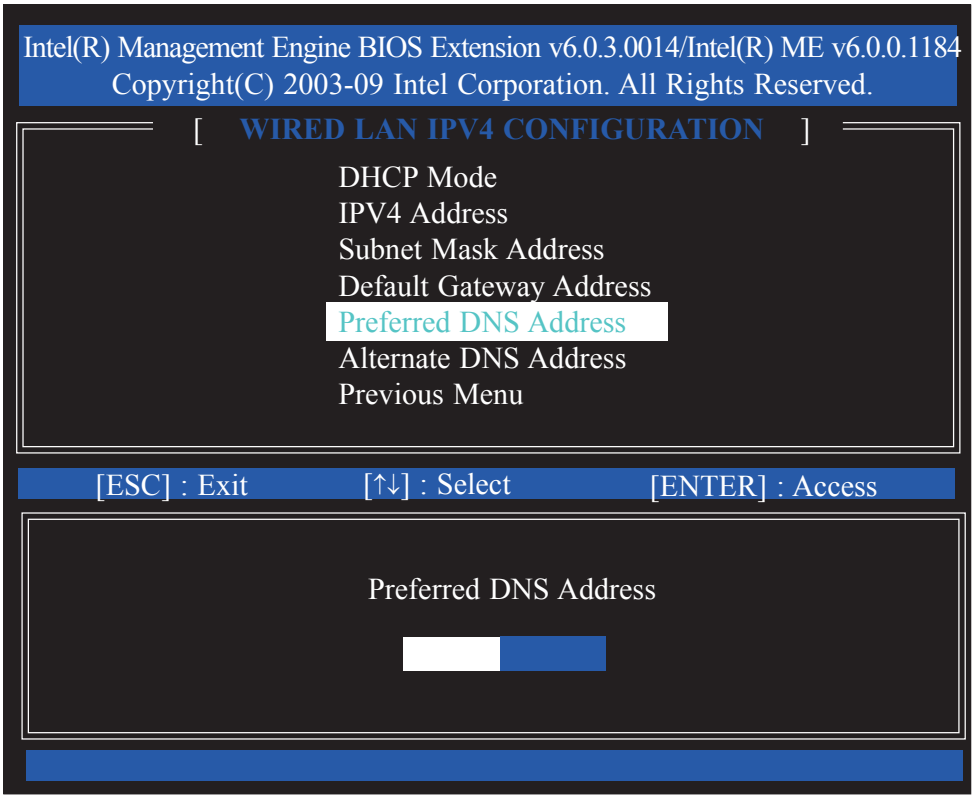
22. Select **Subnet Mask Address** then press Enter. Enter the subnet mask address then press Enter.



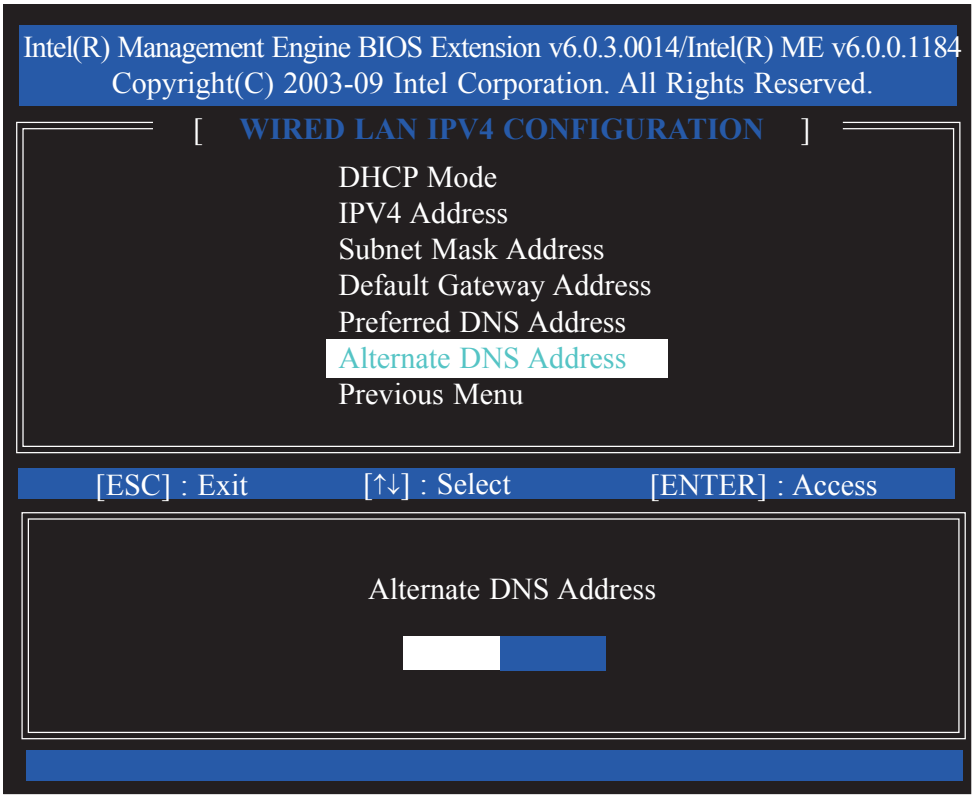
23. Select **Default Gateway Address** then press Enter. Enter the default gateway address then press Enter.



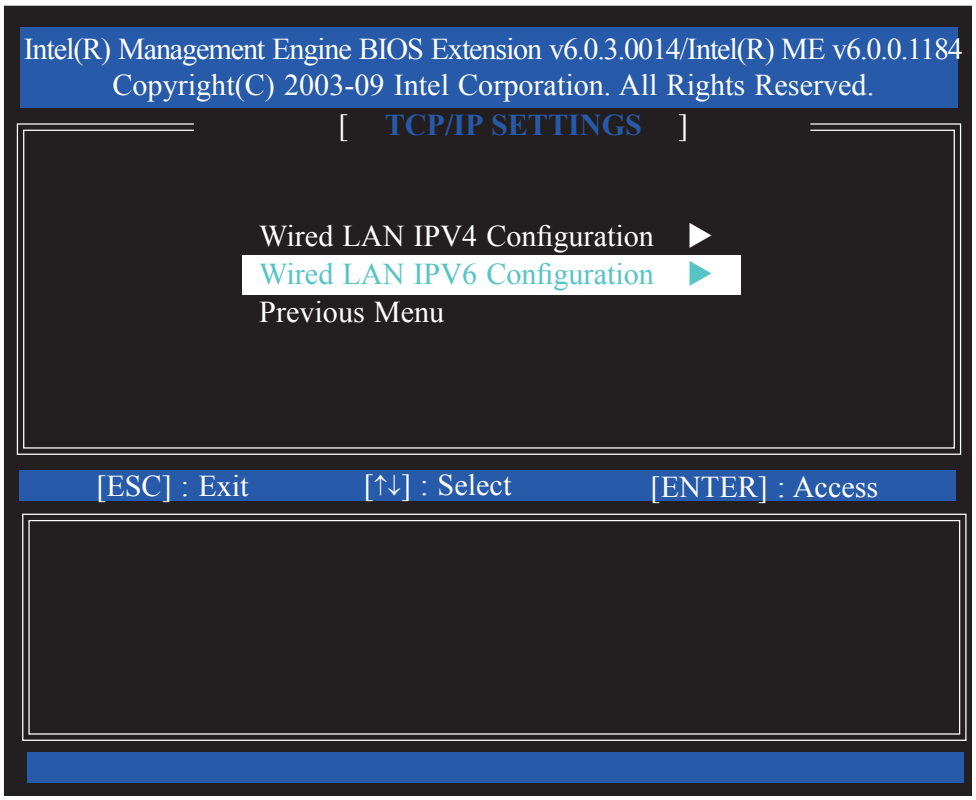
24. Select **Preferred DNS Address** then press Enter. Enter the preferred DNS address then press Enter.



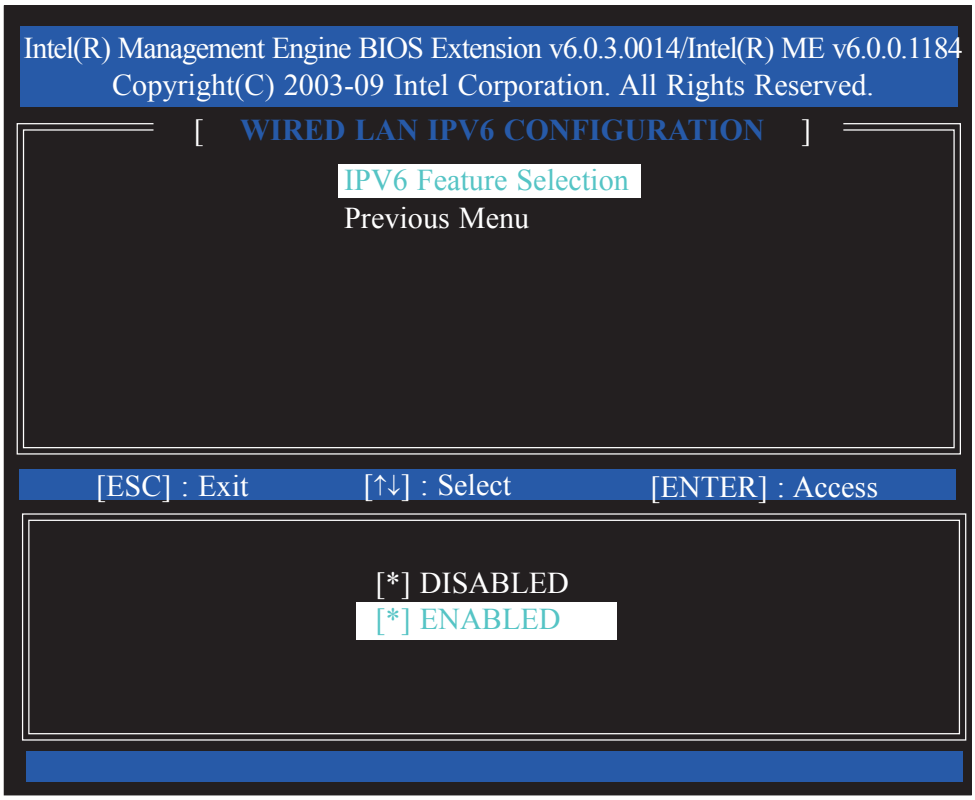
25. Select **Alternate DNS Address** then press Enter. Enter the alternate DNS address then press Enter.



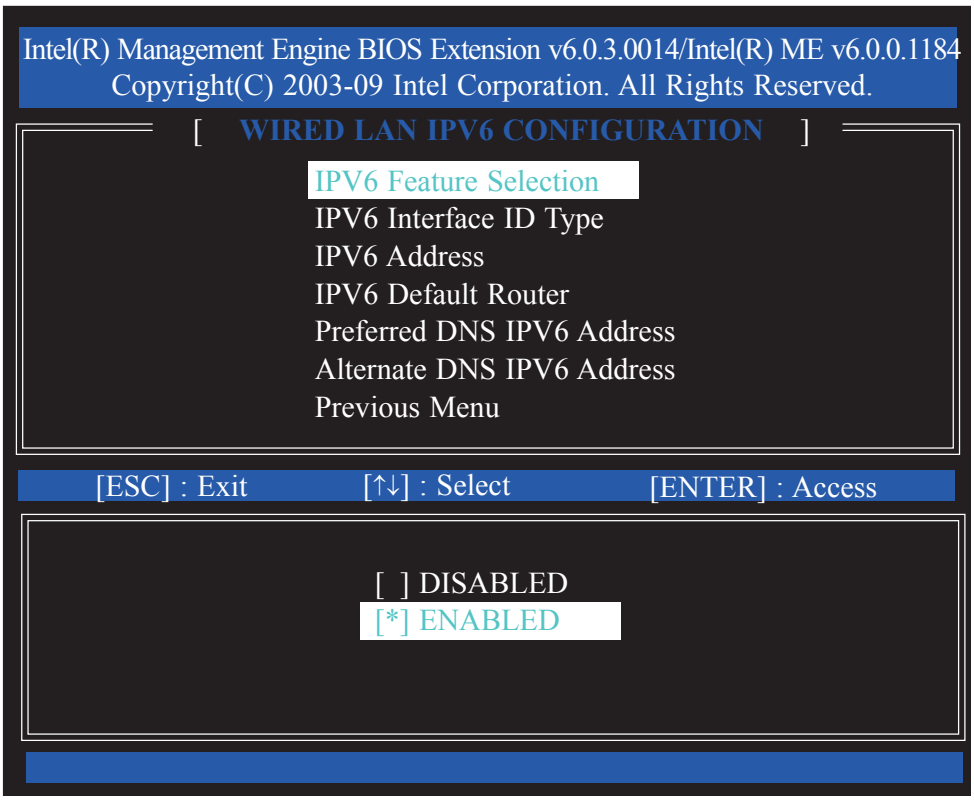
26. Select Previous Menu until you return to the **TCP/IP Settings** menu. Select **Wired LAN IPV6 Configuration** then press Enter.



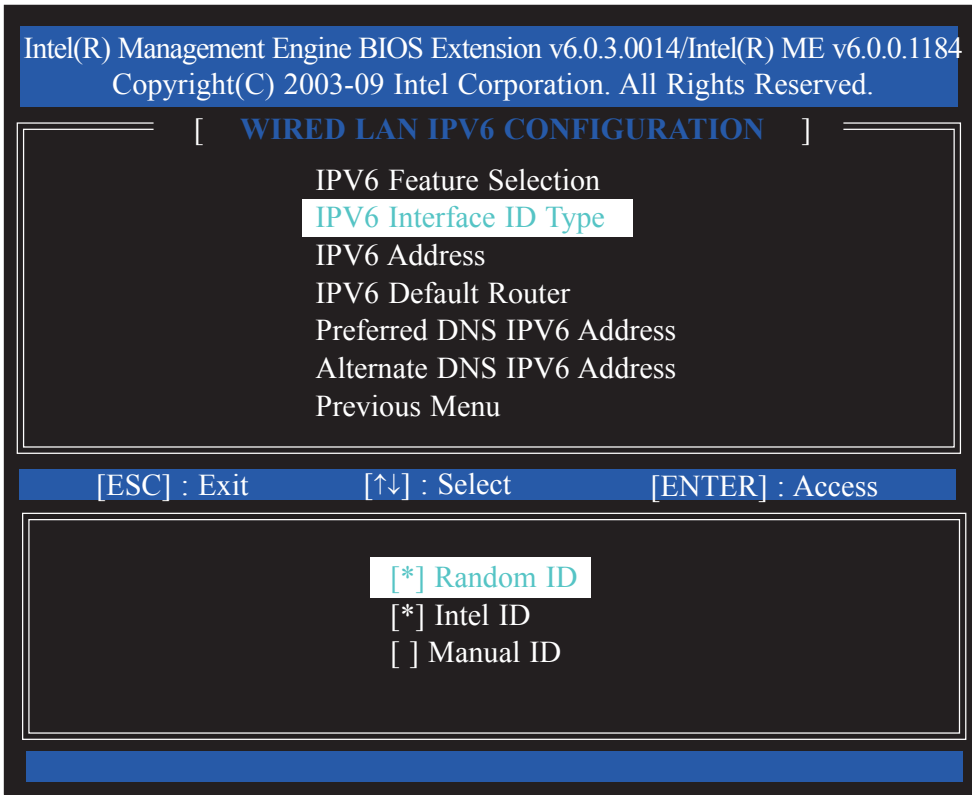
27. In the **Wired LAN IPV6 Configuration** menu, select **IPV6 Feature Selection** then press Enter. Select Enabled then press Enter.



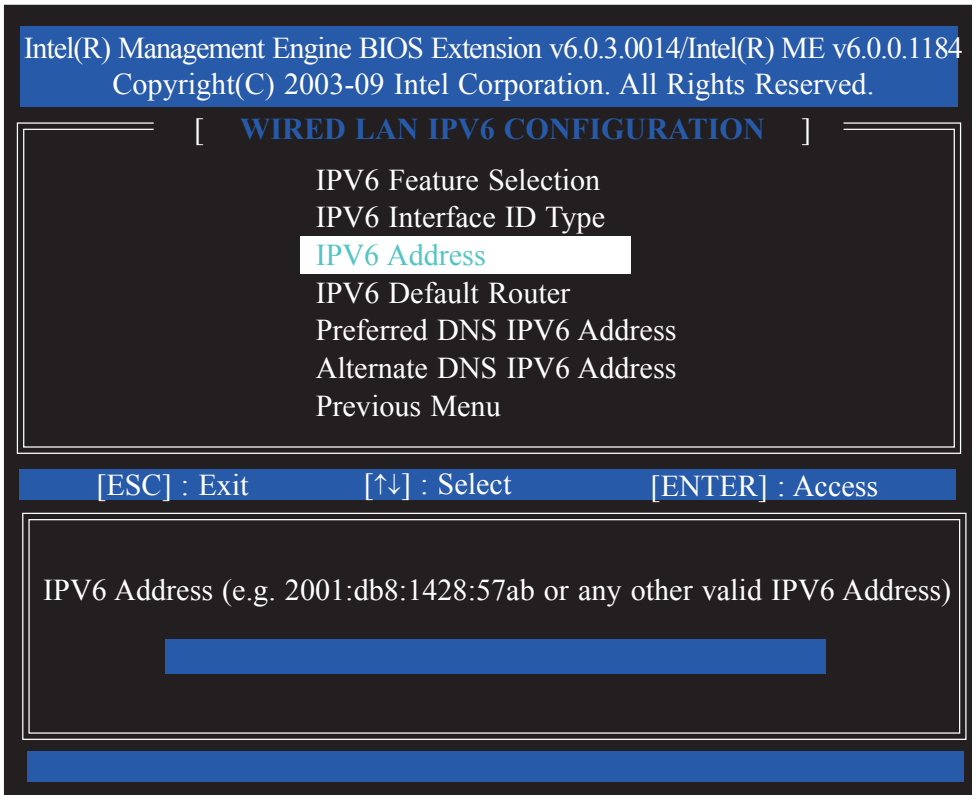
28. A list of options in the **Wired LAN IPV6 Configuration** menu will appear.



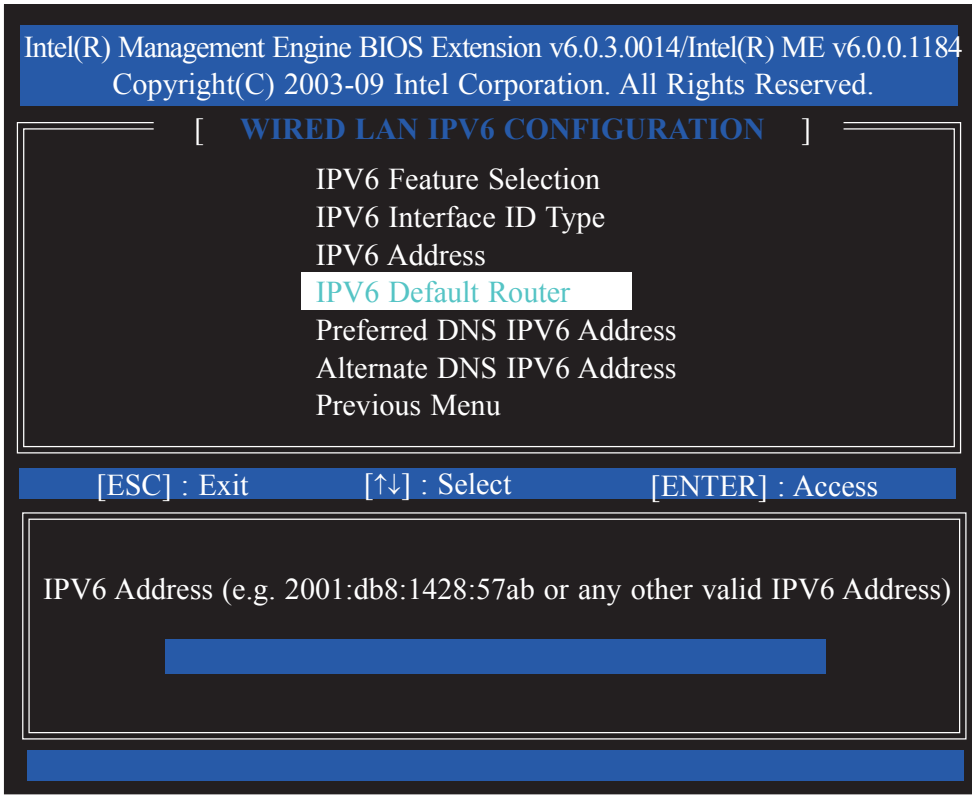
29. Select **IPV6 Interface ID Type** then press Enter. Select the ID type then press Enter.



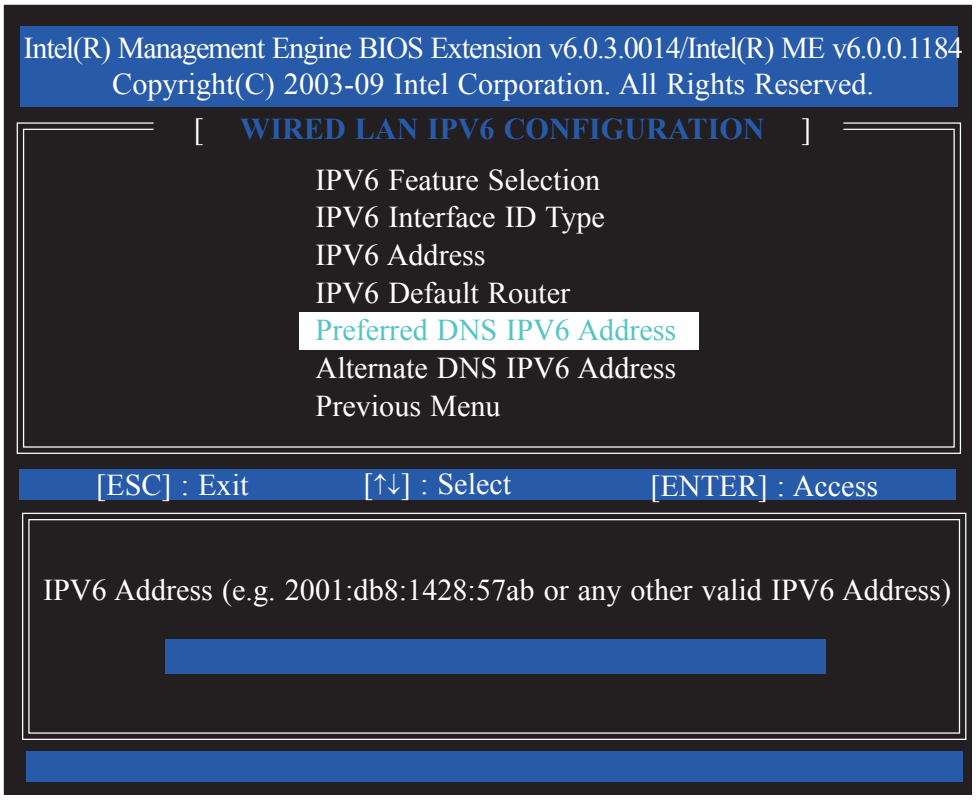
30. Select **IPV6 Address** then press Enter. Enter the IPV6 address then press Enter.



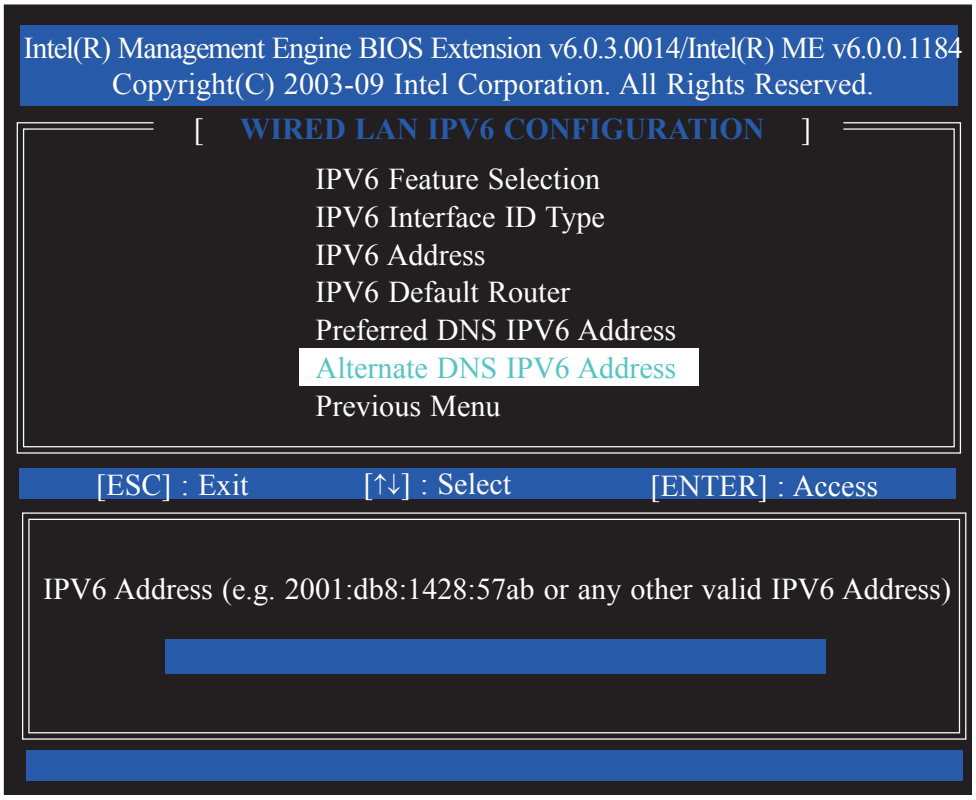
31. Select **IPV6 Default Router** then press Enter. Enter the IPV6 default router address then press Enter.



32. Select **Preferred DNS IPV6 Address** then press Enter. Enter the preferred DNS IPV6 address then press Enter.



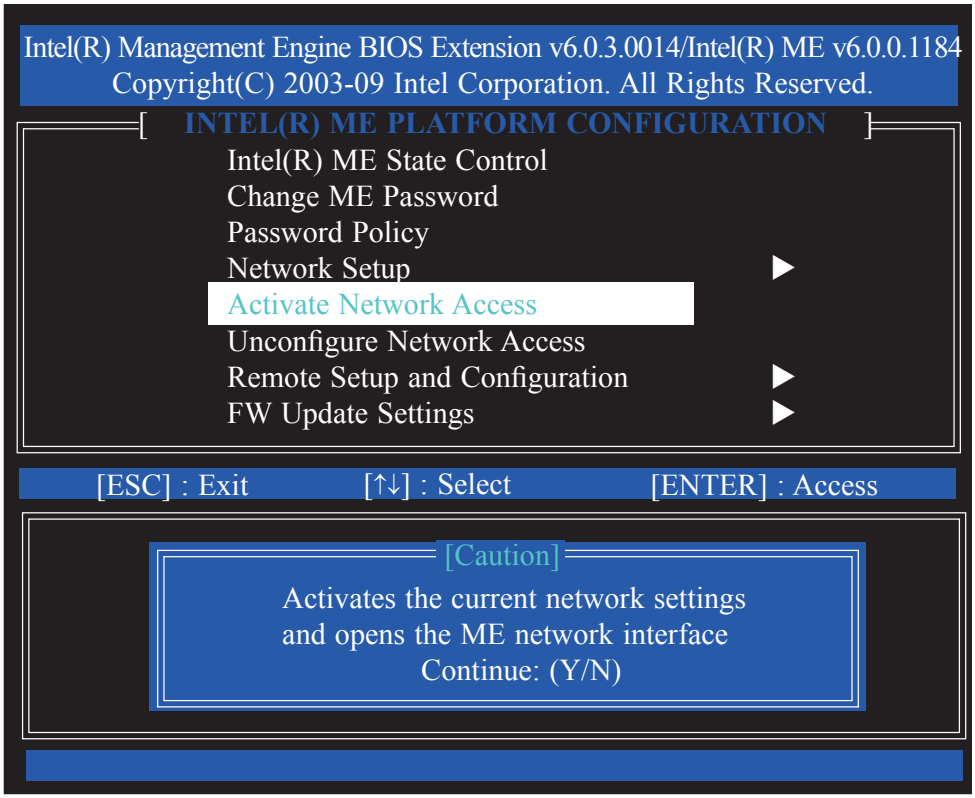
33. Select **Alternate DNS IPV6 Address** then press Enter. Enter the alternate DNS IPV6 address then press Enter.



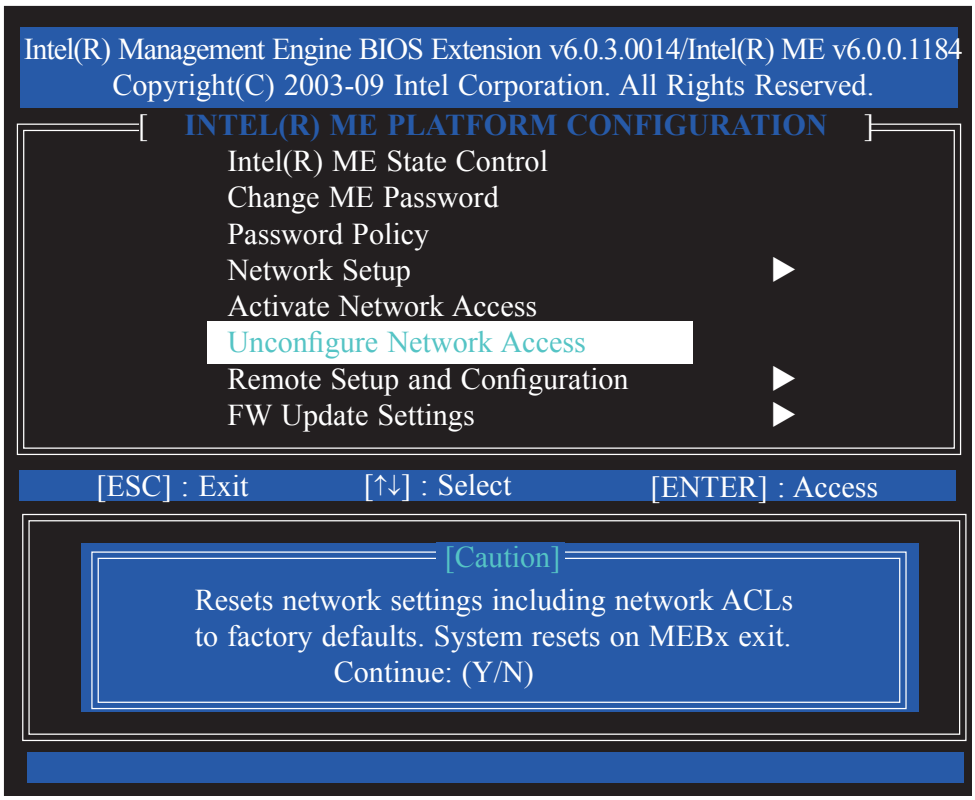
34. Select Previous Menu until you return to the **Intel(R) ME Platform Configuration** menu.

Select **Activate Network Access** then press Enter.

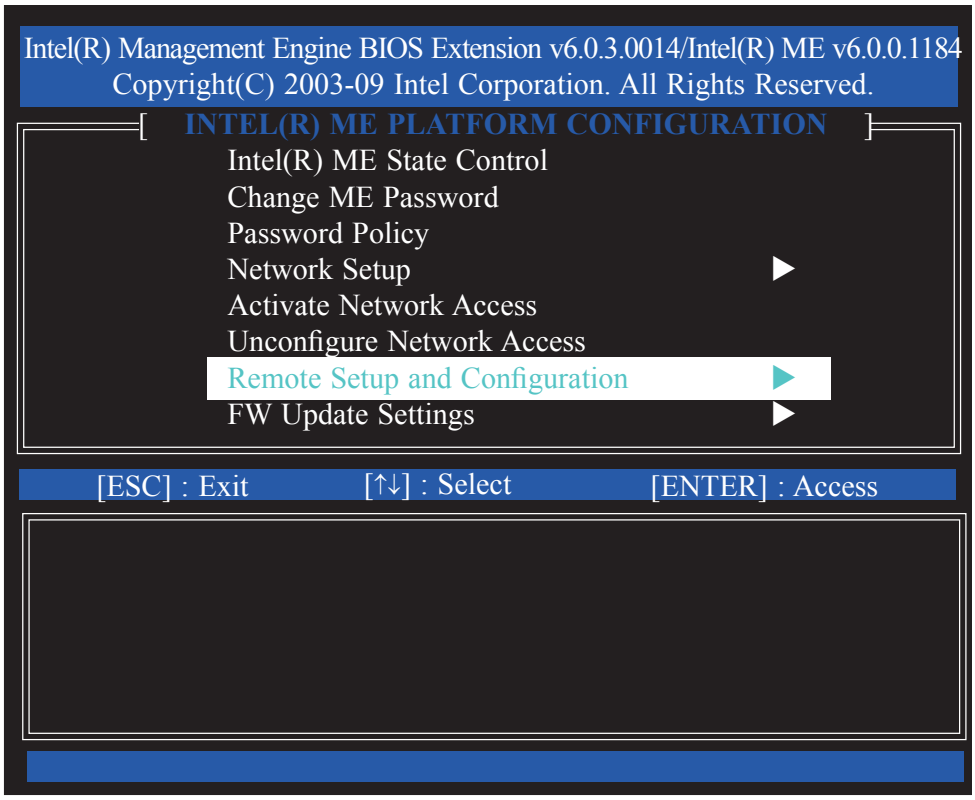
Type **Y** then press Enter.



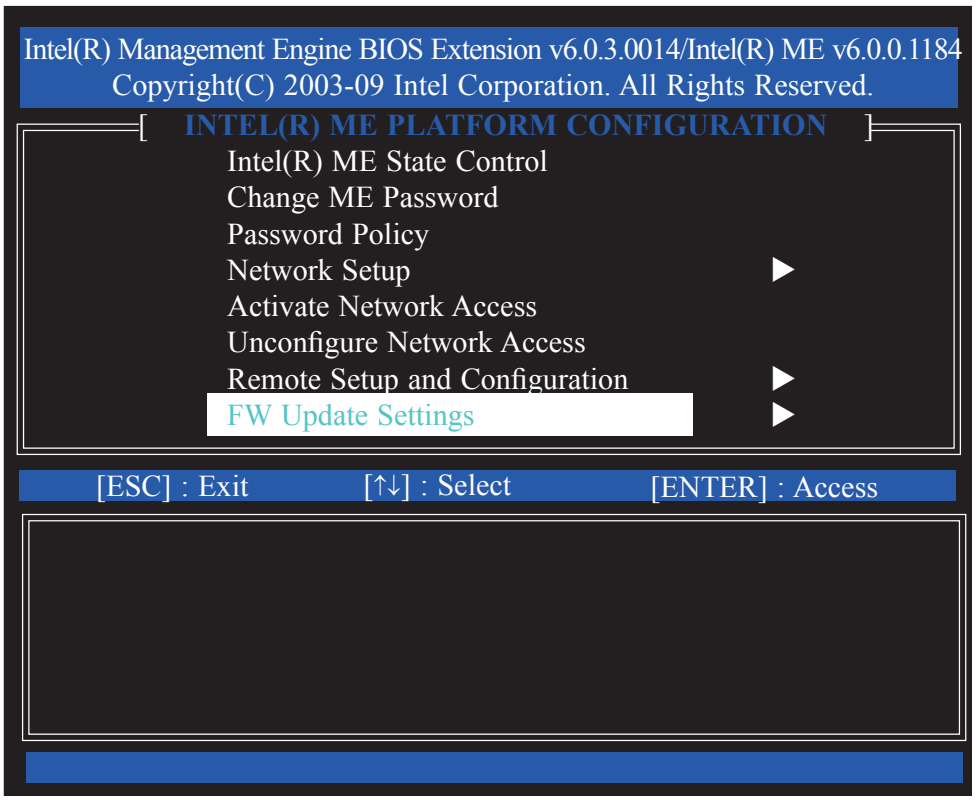
35. In the **Intel(R) ME Platform Configuration** menu, select **Unconfigure Network Access** then press Enter. Type **Y** then press Enter.



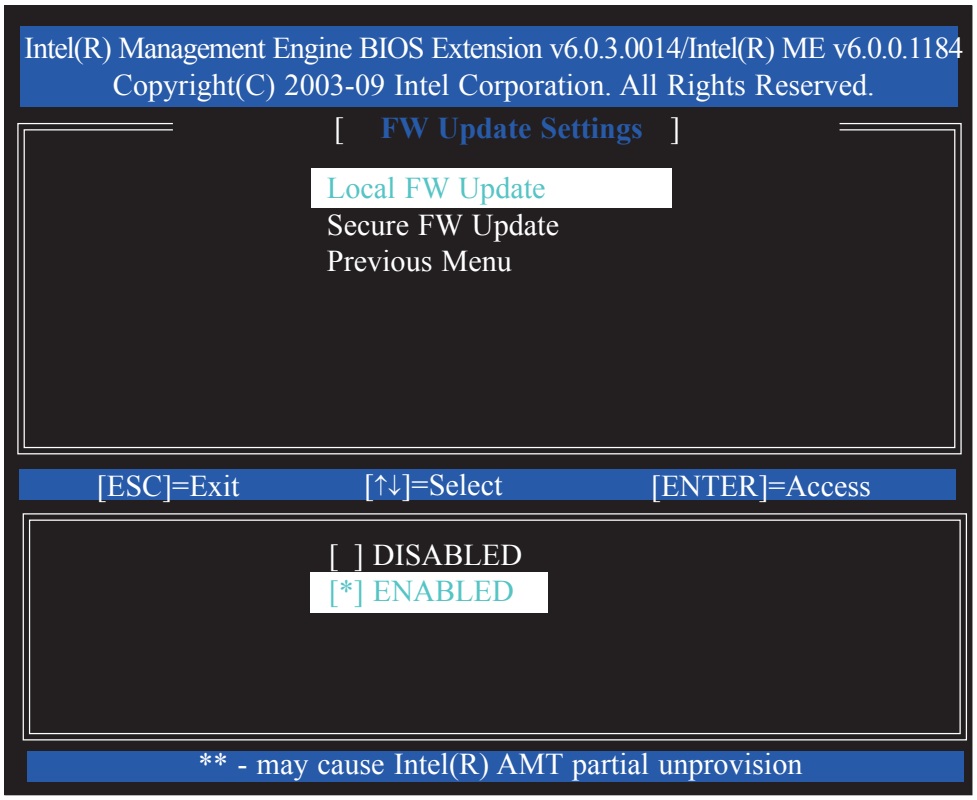
36. In the **Intel(R) ME Platform Configuration** menu, select **Remote Setup and Configuration** then press Enter.



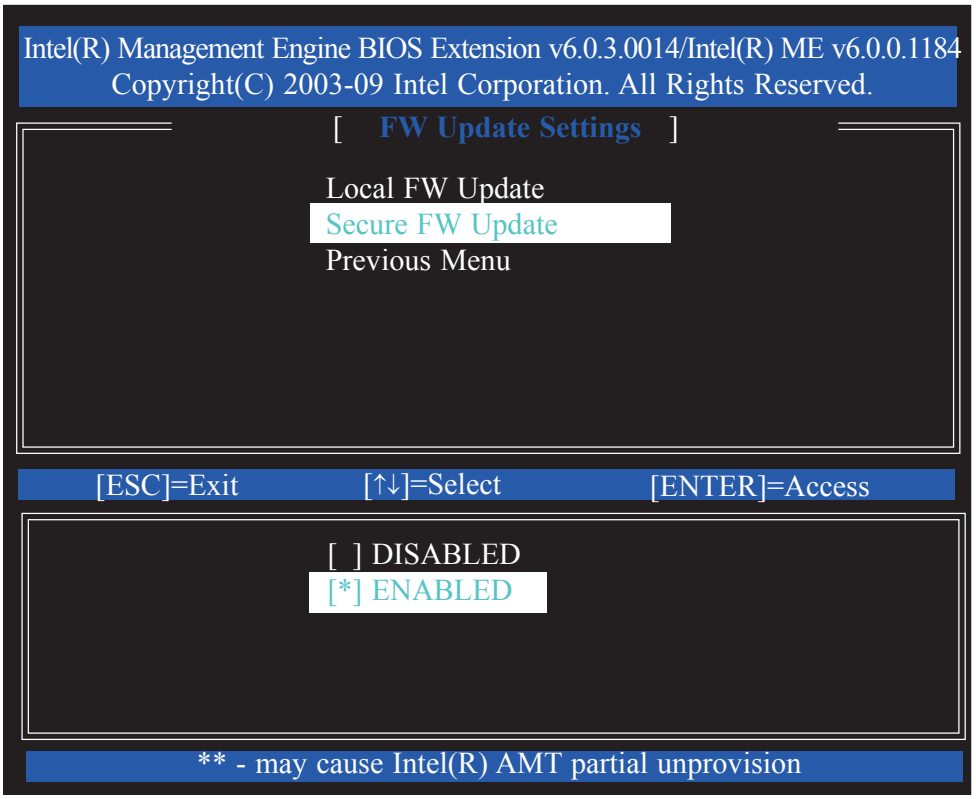
37. Select Previous Menu until you return to the **Intel(R) ME Platform Configuration** menu. Select **FW Update Settings** then press Enter.



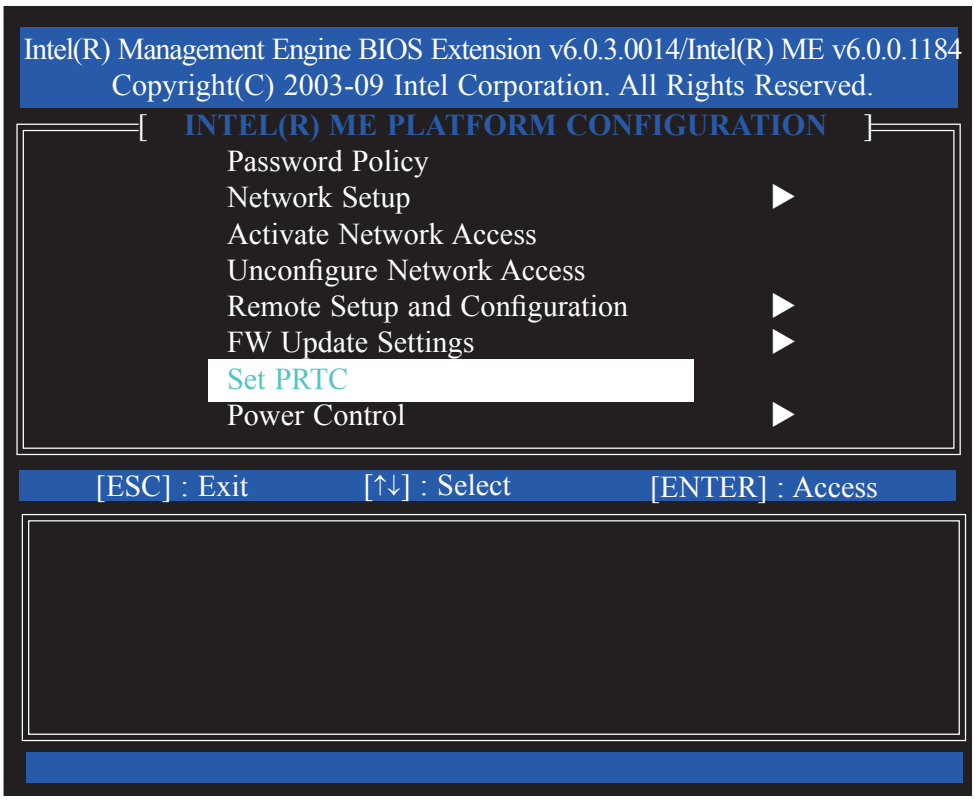
38. In the **FW Update Settings** menu, select **Local FW Update** then press Enter. Select **Enabled** then press Enter.



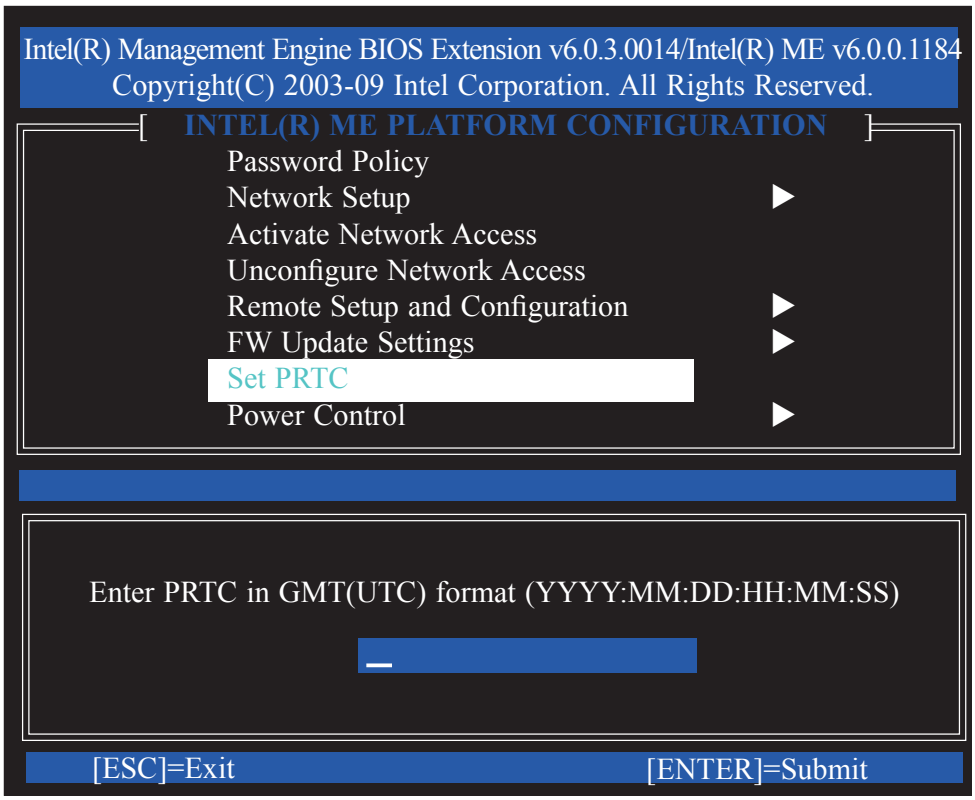
39. In the **FW Update Settings** menu, select **Secure FW Update** then press Enter. Select **Enabled** then press Enter.



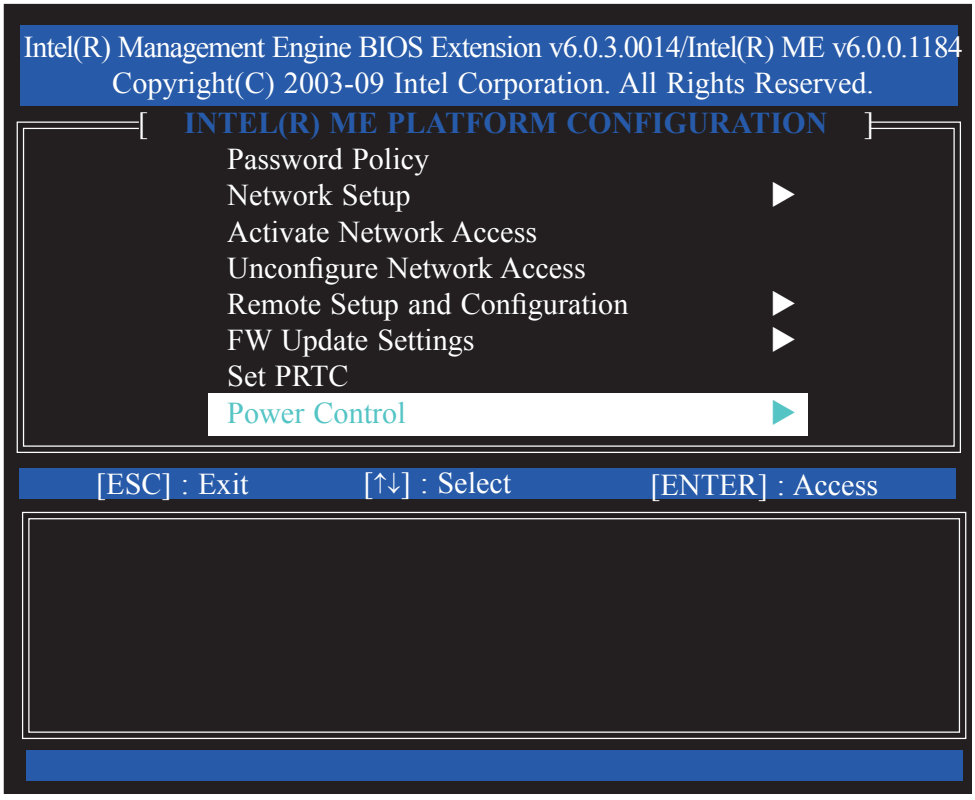
40. Select Previous Menu until you return to the **Intel(R) ME Platform Configuration** menu. Select **Set PRTC** then press Enter.



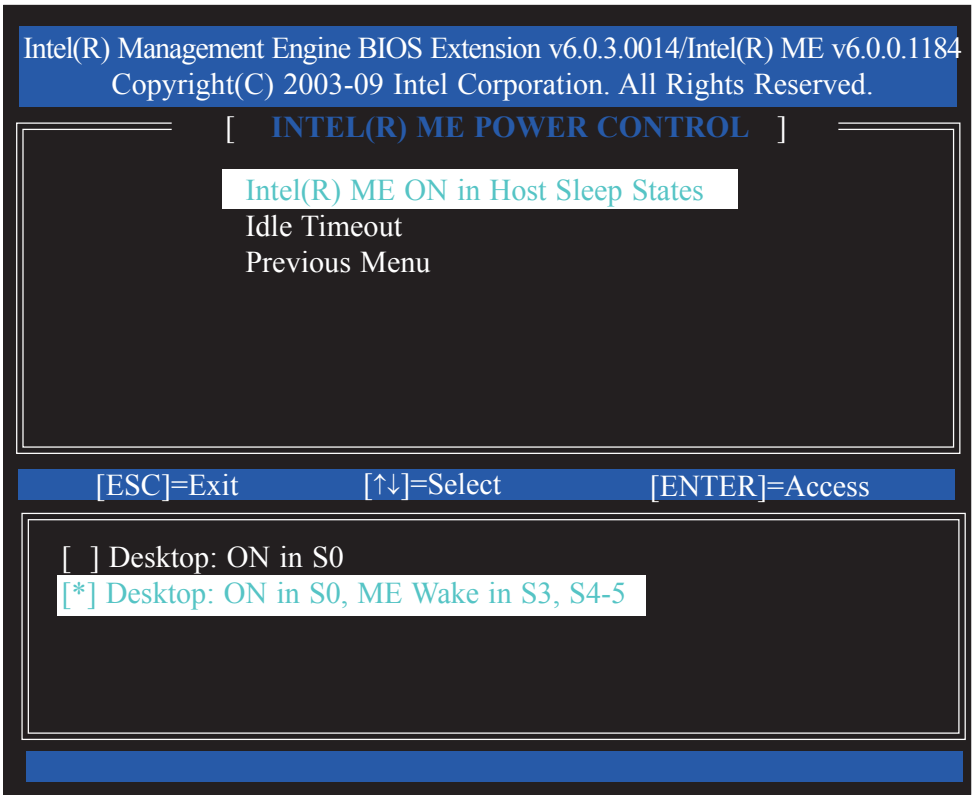
41. Enter the PRTC in GMT(UTC) format.



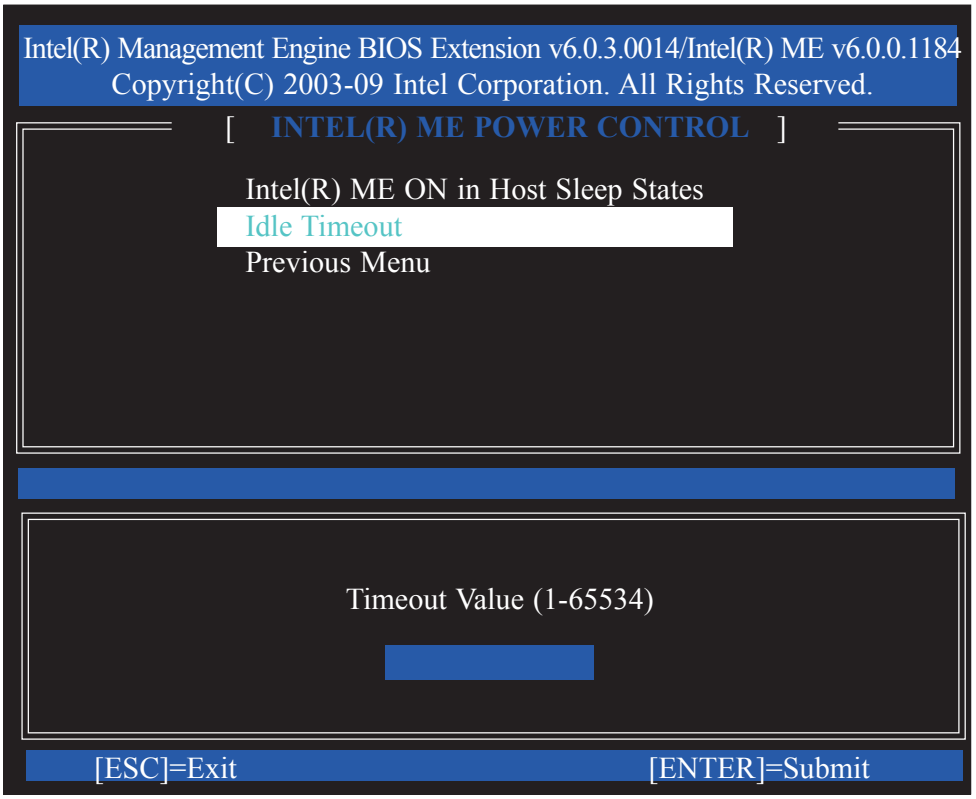
42. In the **Intel(R) ME Platform Configuration** menu, select **Power Control** then press Enter.



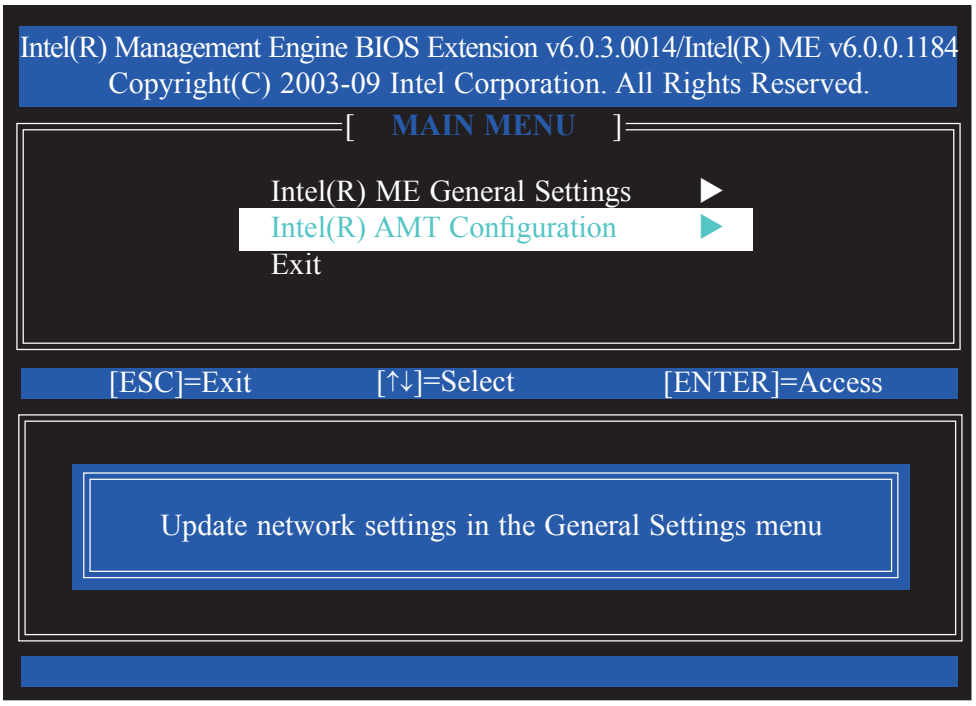
43. In the **Intel(R) ME Power Control** menu, select **Intel(R) ME ON in Host Sleep States** then press Enter. Select an option then press Enter.



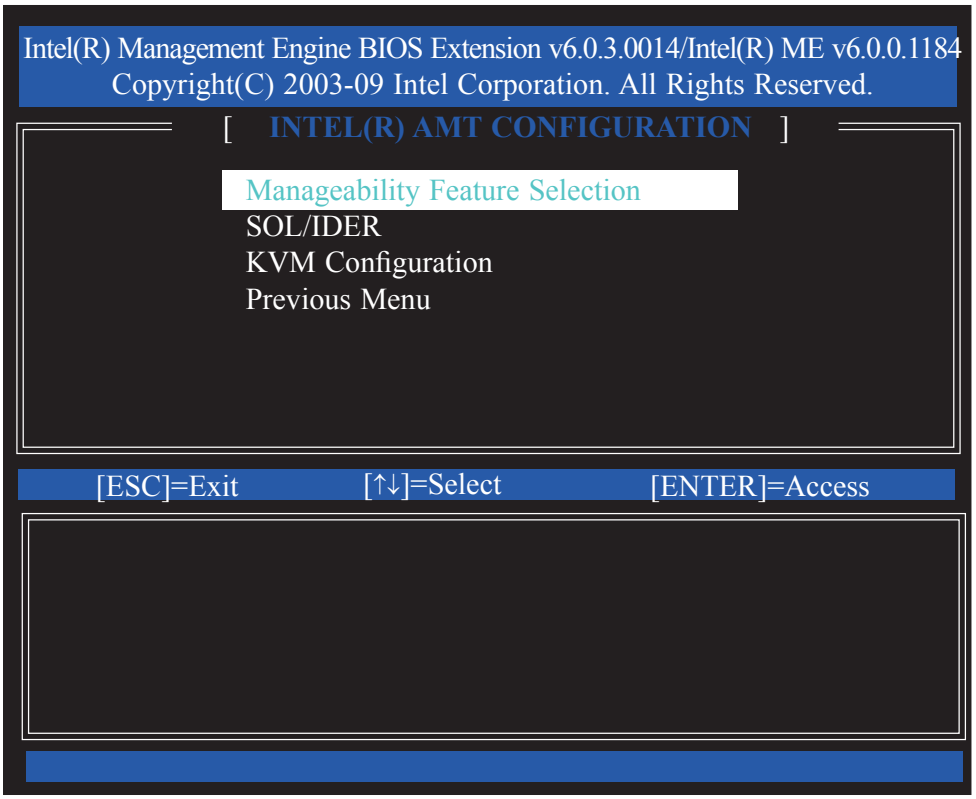
44. In the **Intel(R) ME Power Control** menu, select **Idle Timeout** then press Enter. Enter the timeout value.



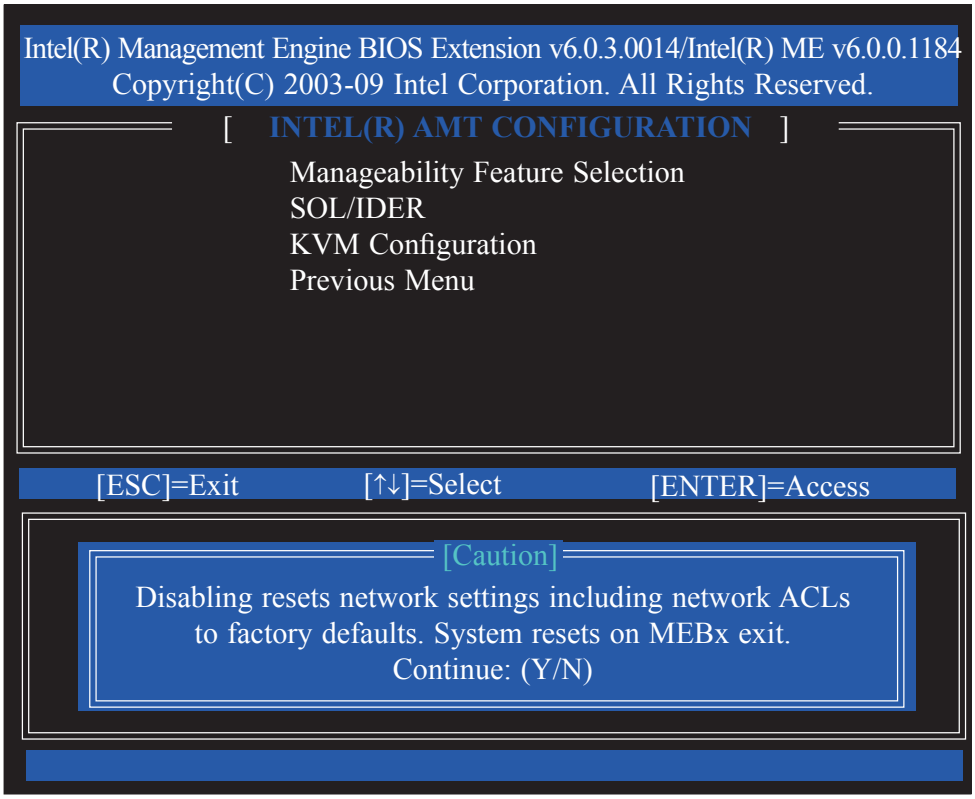
45. Select Previous Menu until you return to the **Main Menu**. Select **Intel(R) AMT Configuration**.



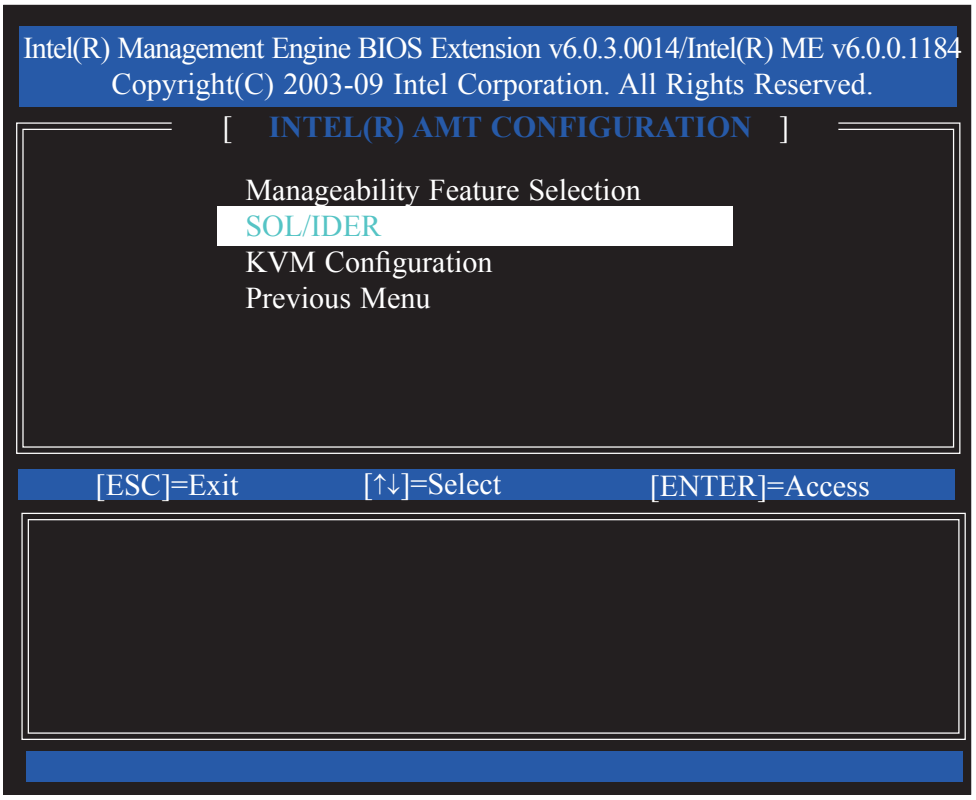
46. In the **Intel(R) AMT Configuration** menu**,** select **Manageability Feature Selection** then press Enter.



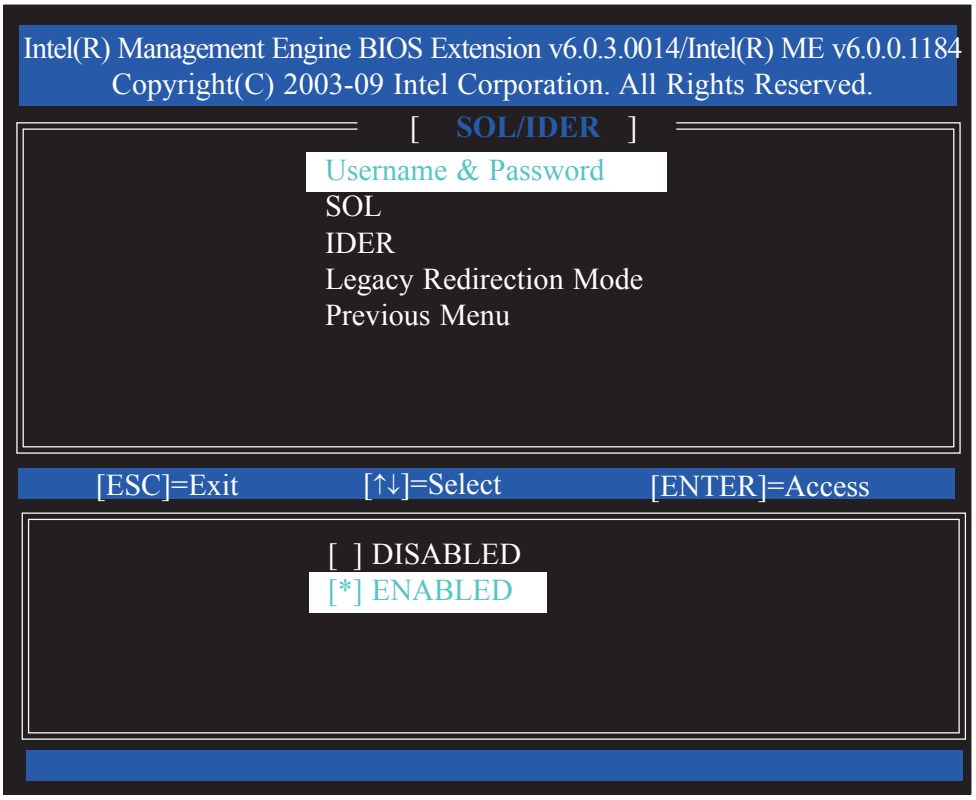
47. Type **Y** then press Enter.



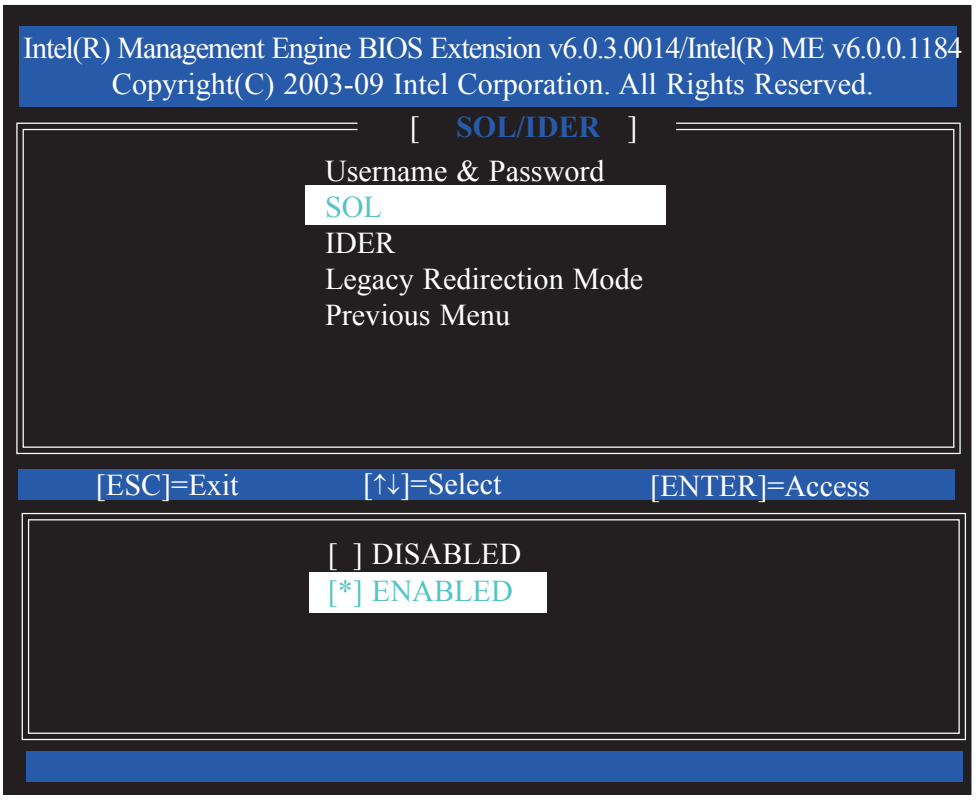
48. In the **Intel(R) AMT Configuration** menu, select **SOL/IDER** then press Enter.



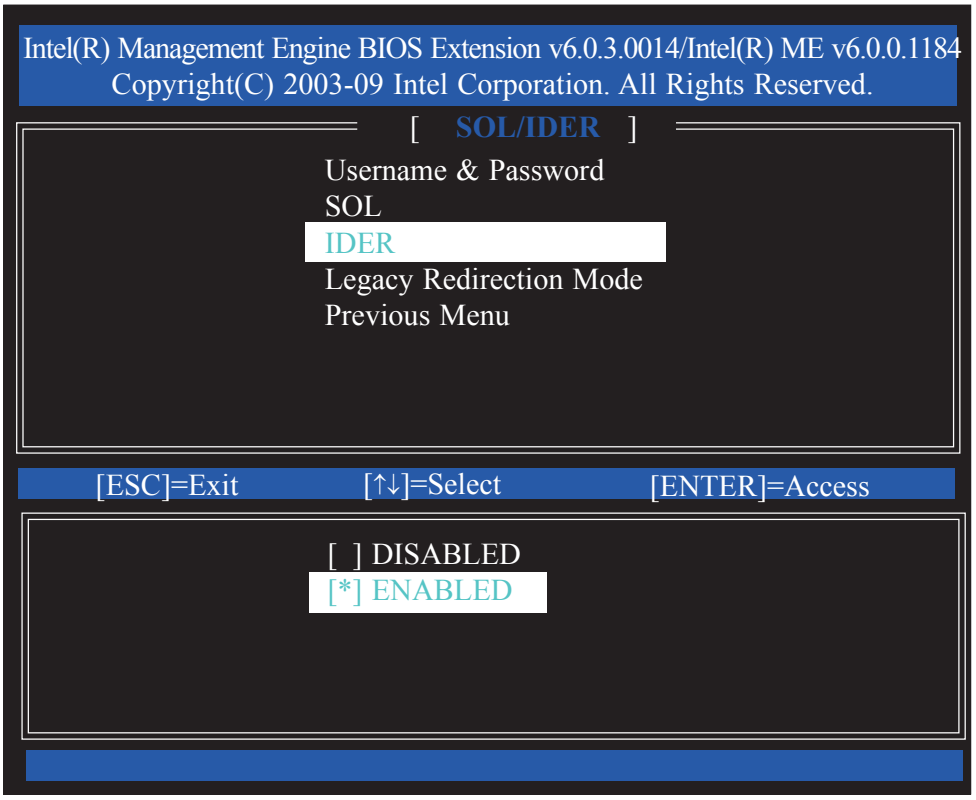
49. In the **SOL/IDER** menu, select **Username & Password** then press Enter. Select Enabled then press Enter.



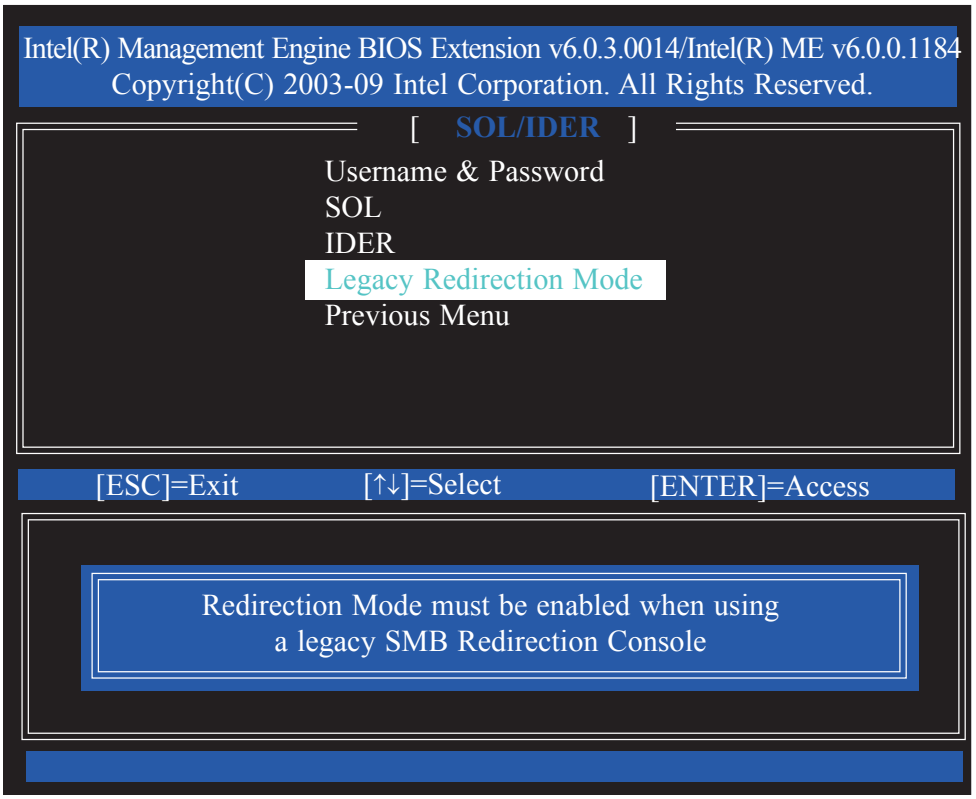
50. In the **SOL/IDER** menu, select **SOL** then press Enter. Select Enabled then press Enter.



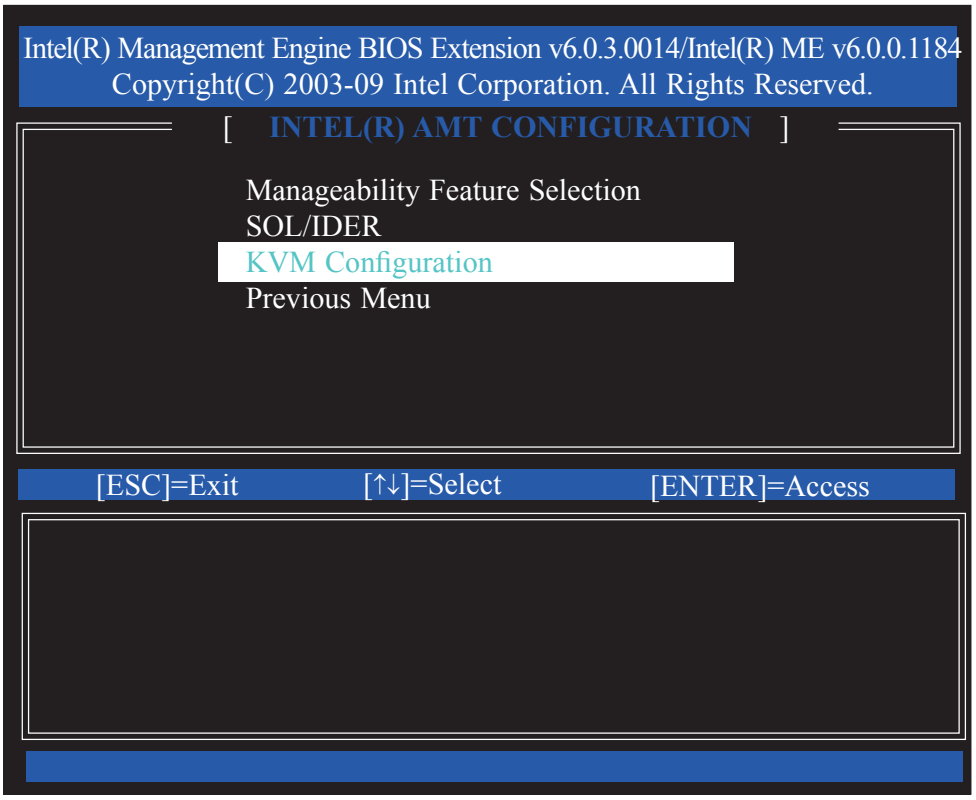
51. In the **SOL/IDER** menu, select **IDER** then press Enter. Select Enabled then press Enter.



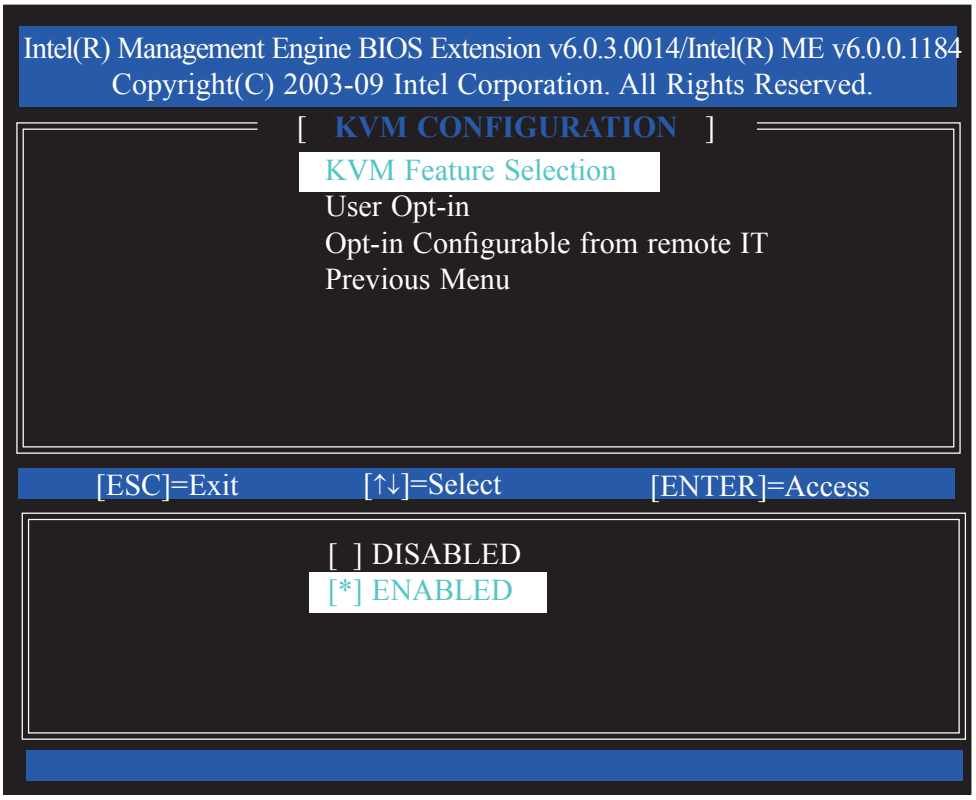
52. In the **SOL/IDER** menu, select **Legacy Redirection Mode** then press Enter.



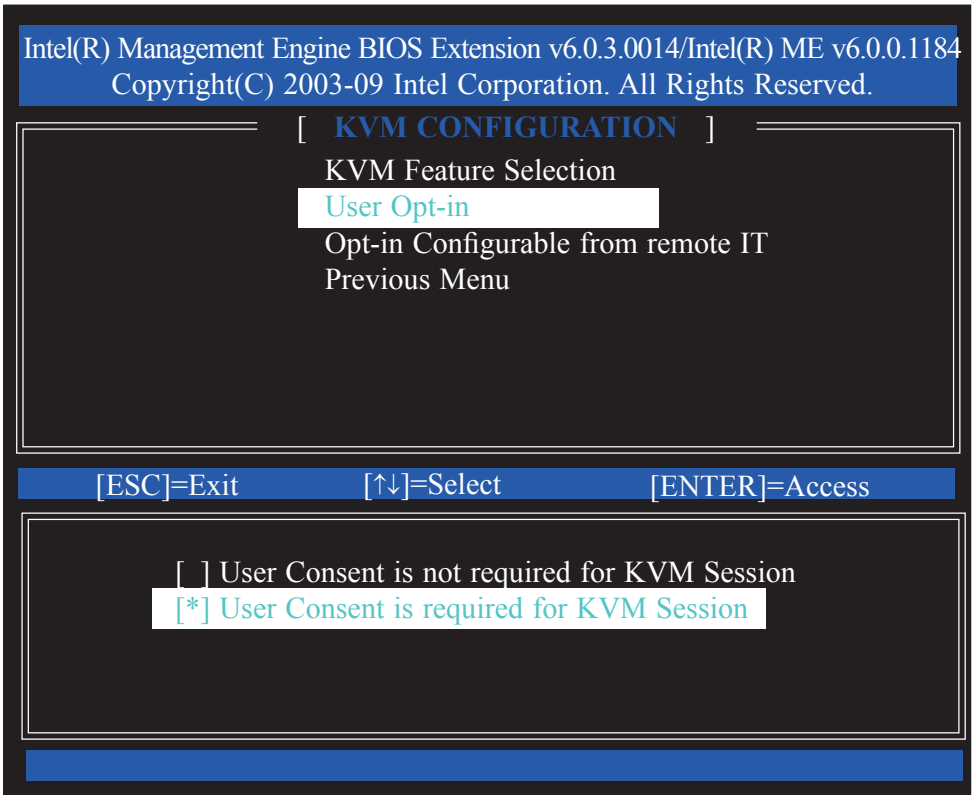
53. Select Previous Menu until you return to the **Intel(R) AMT Configuration** menu**.** Select **KVM Configuration** then press Enter.



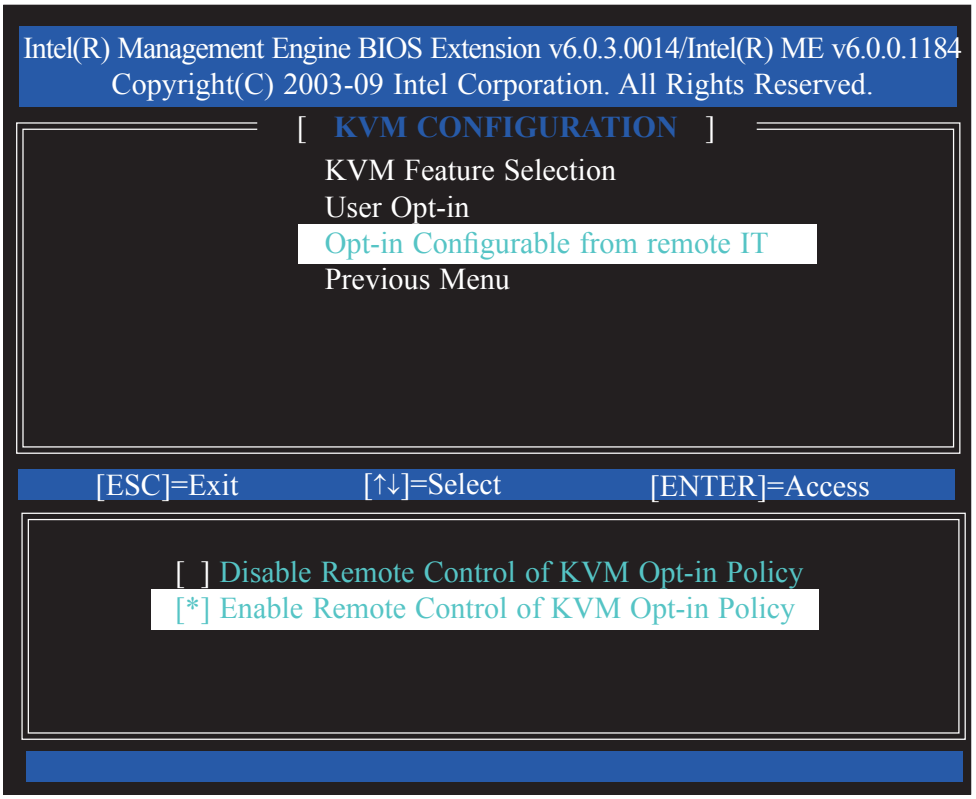
54. In the **KVM Configuration** menu**,** select **KVM Feature Selection** then press Enter. Select Enabled then press Enter.



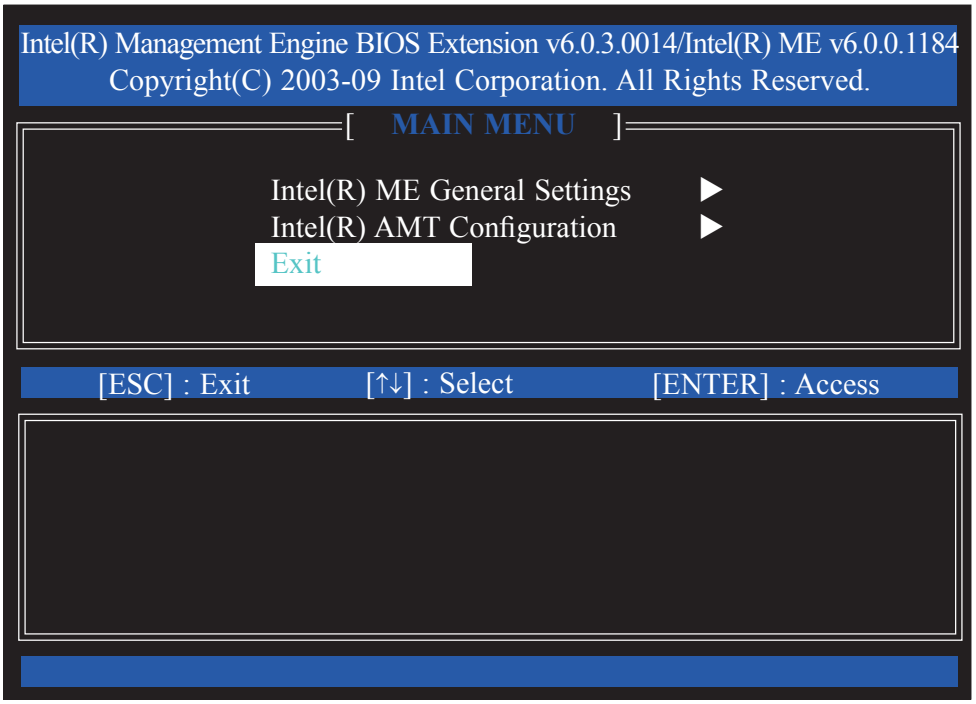
55. In the **KVM Configuration** menu**,** select **User Opt-in** then press Enter. Select **User Consent is required for KVM Session** then press Enter.



56. In the **KVM Configuration** menu**,** select **Opt-in Configurable from Remote IT** then press Enter. Select **Enable Remote Control of KVM Opt-in Policy** then press Enter.



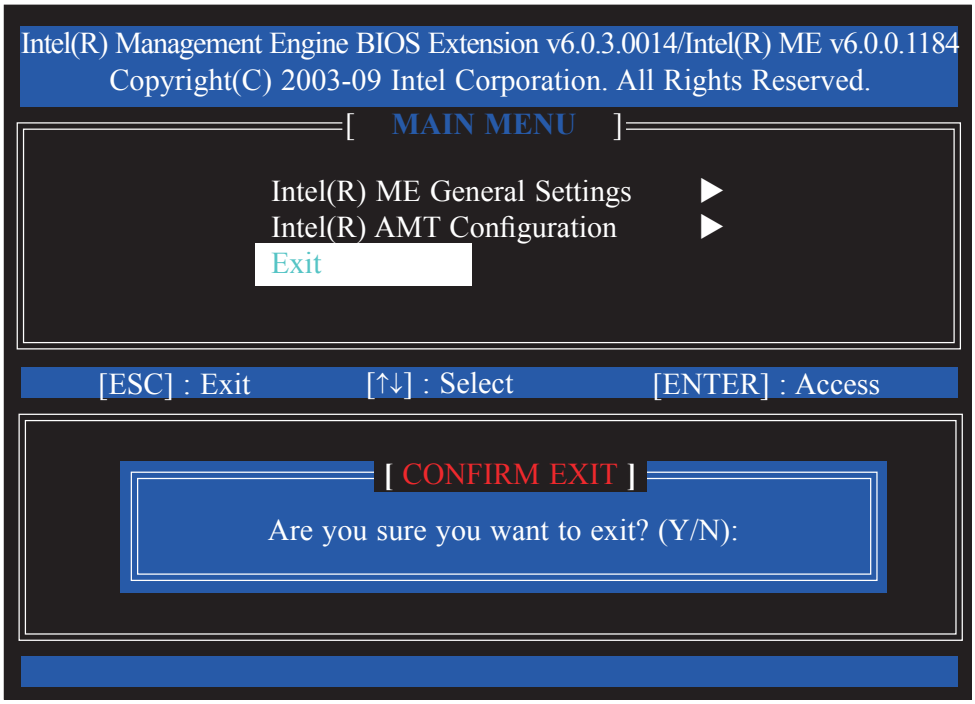
57. Select Previous Menu until you return to the **Main Menu.** Select Exit then press Enter.



58. The following message will be displayed on the screen.

[CONFIRM EXIT]
Are you sure you want to exit? (Y/N):

Press **Y**.



Appendix A - NLITE and AHCI Installation Guide

nLite

nLite is an application program that allows you to customize your XP installation disc by integrating the RAID/AHCI drivers into the disc. By using nLite, the F6 function key usually required during installation is no longer needed.

Note:
The installation steps below are based on nLite version 1.4.9. Installation procedures may slightly vary if you're using another version of the program.

1. Download the program from nLite's offical website.

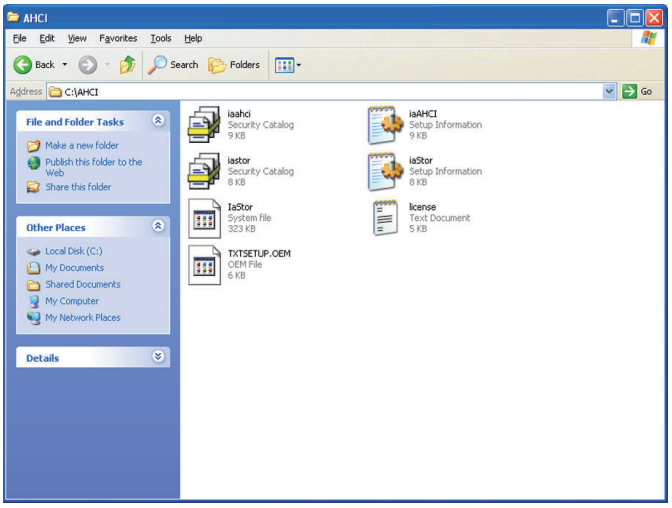
   http://www.nliteos.com/download.html

2. Install nLite.

   Important:
   Due to it's coding with Visual.Net, you may need to first install .NET Framework prior to installing nLite.

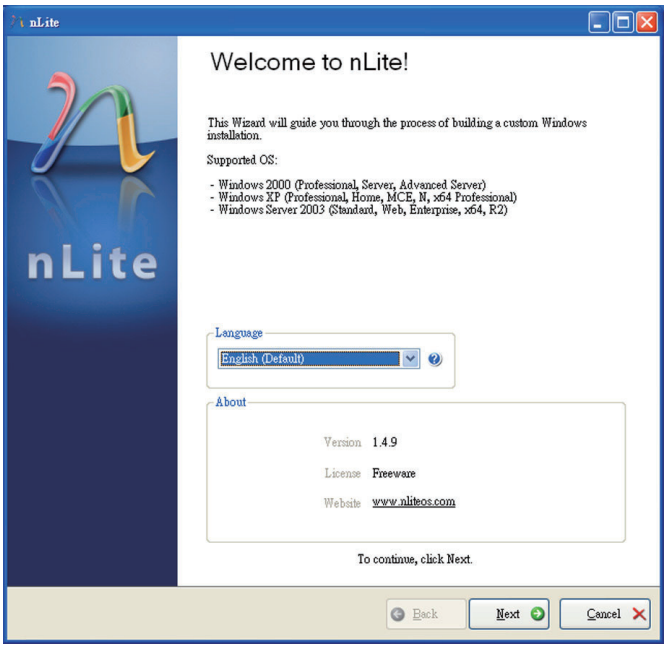
3. Download relevant RAID/AHCI driver files from Intel's website. The drivers you choose will depend on the operating system and chipset used by your computer.

   The downloaded driver files should include iaahci.cat, iaAHCI.inf, iastor.cat, iaStor.inf, IaStor.sys, license.txt and TXTSETUP.OEM.



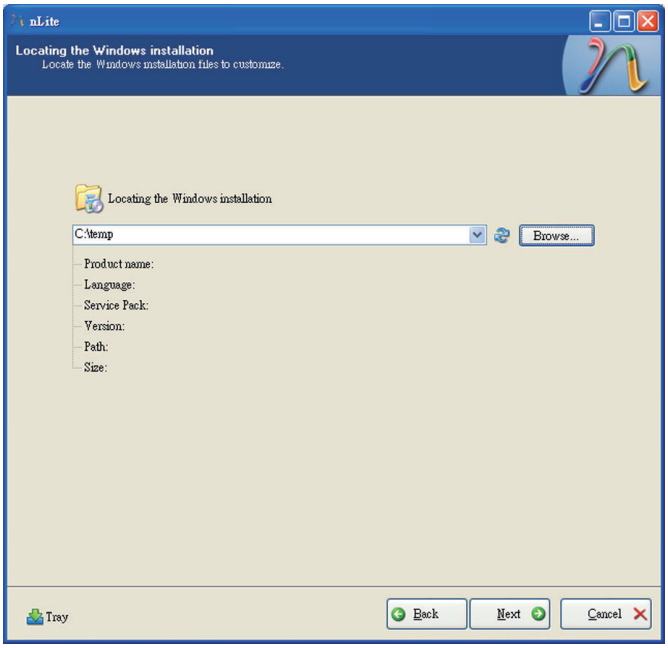
4. Insert the XP installation disc into an optical drive.

5. Launch nLite. The Welcome screen will appear. Click **Next**.

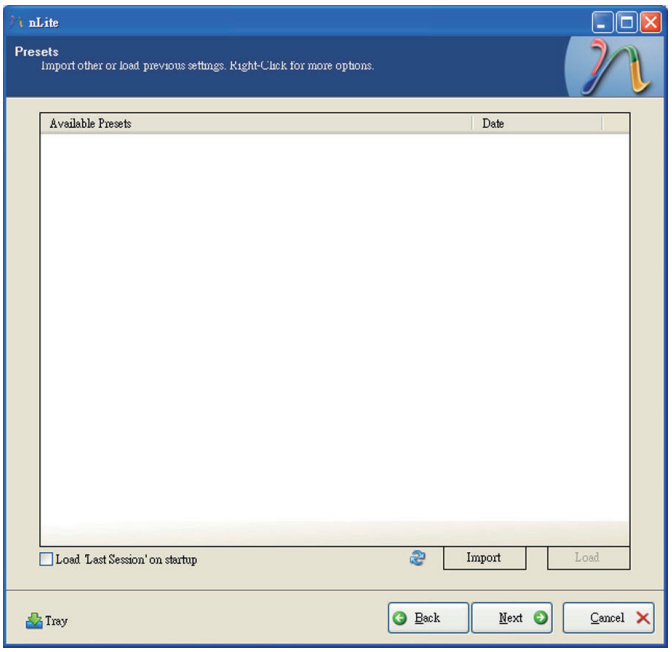


6. Click **Next** to temporarily save the Windows installation files to the designated default folder.

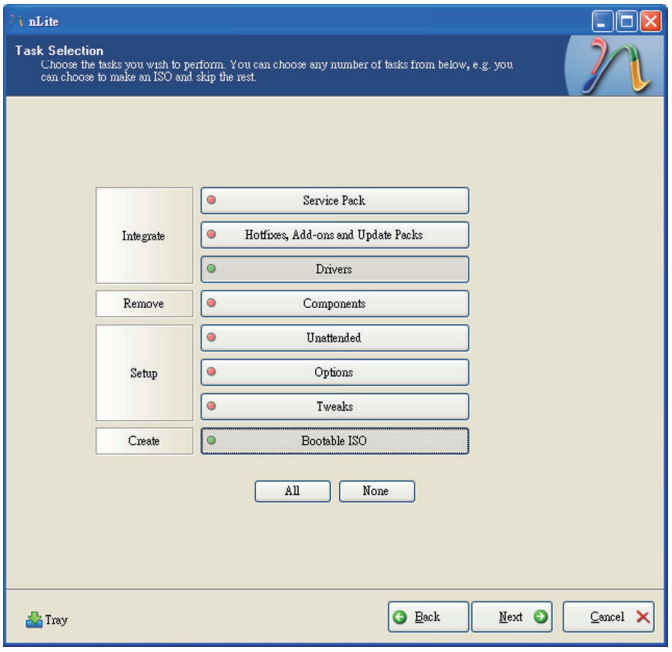
   If you want to save them in another folder, click **Browse**, select the folder and then click **Next**.



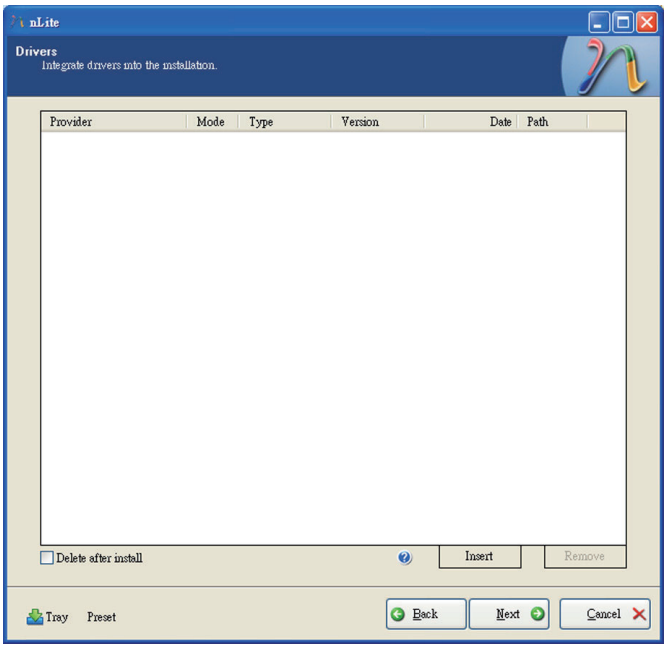
7. Click **Next**.



8. In the Task Selection dialog box, click **Drivers** and **Bootable ISO**. Click **Next**.

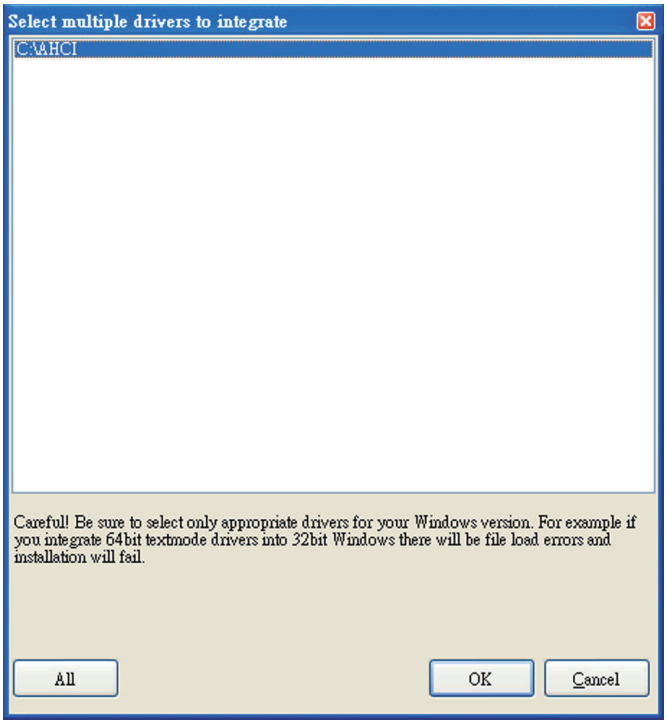


9. Click **Insert** and then select **Multiple driver folder** to select the drivers you will integrate. Click **Next**.



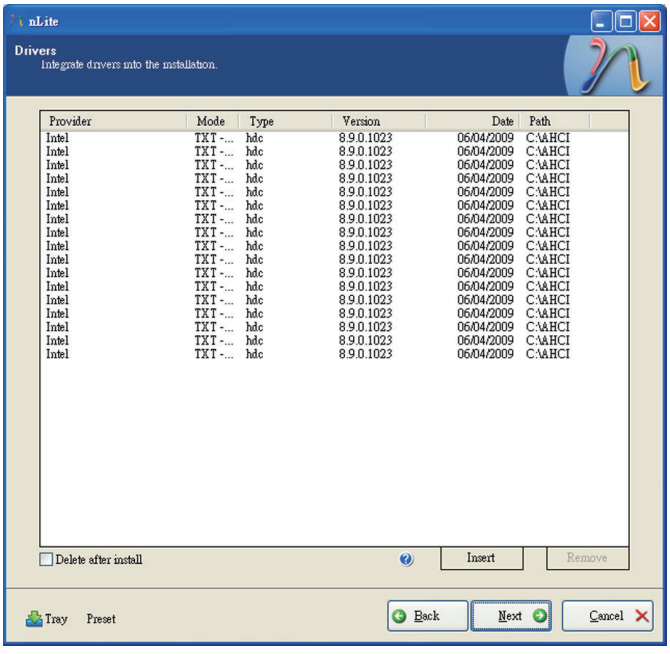
10. Select only the drivers appropriate for the Windows version that you are using and then click **OK**.

    Integrating 64-bit drivers into 32-bit Windows or vice versa will cause file load errors and failed installation.

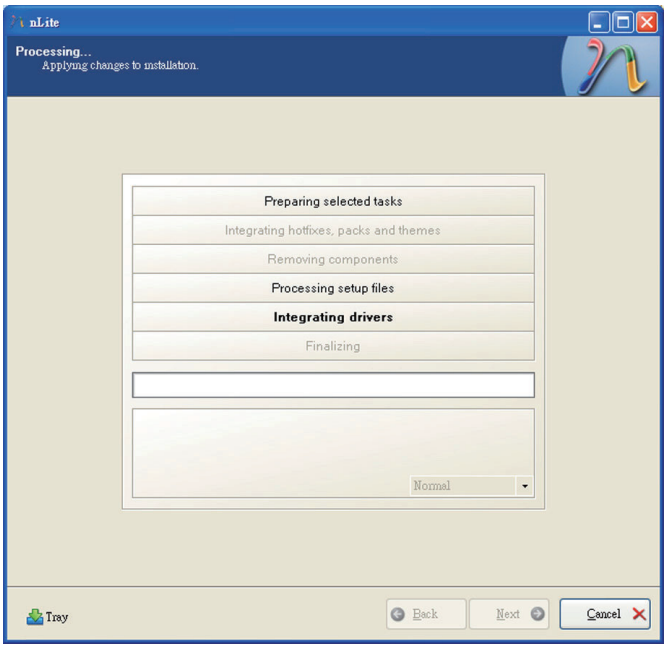


11. If you are uncertain of the southbridge chip used on your motherboard, select all RAID/AHCI controllers and then click **OK**.

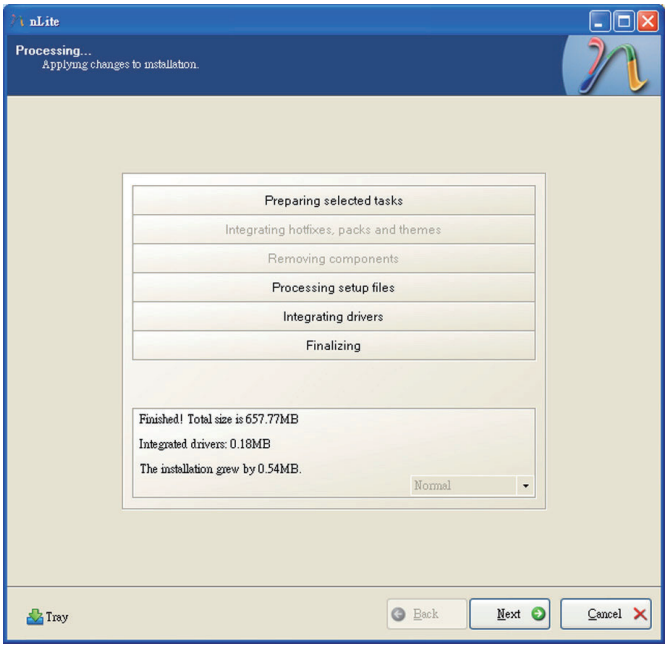
12. Click **Next**.



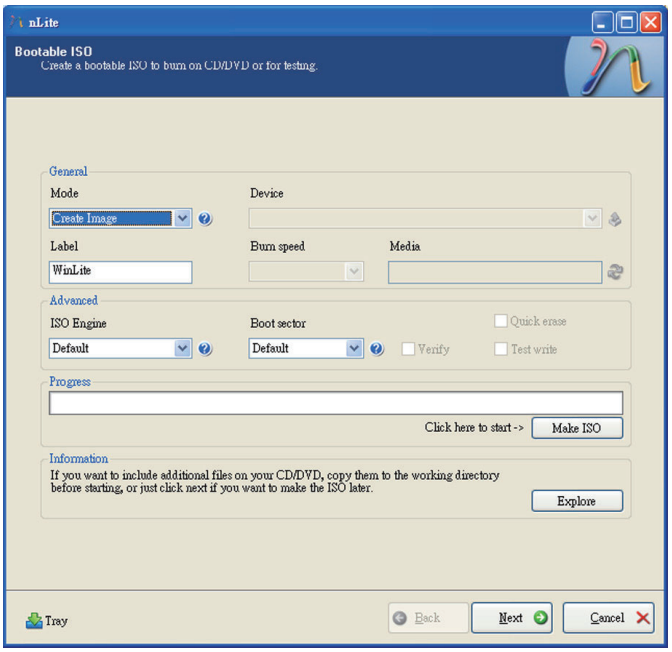
13. The program is currently integrating the drivers and applying changes to the installation.



14. When the program is finished applying the changes, click **Next**.

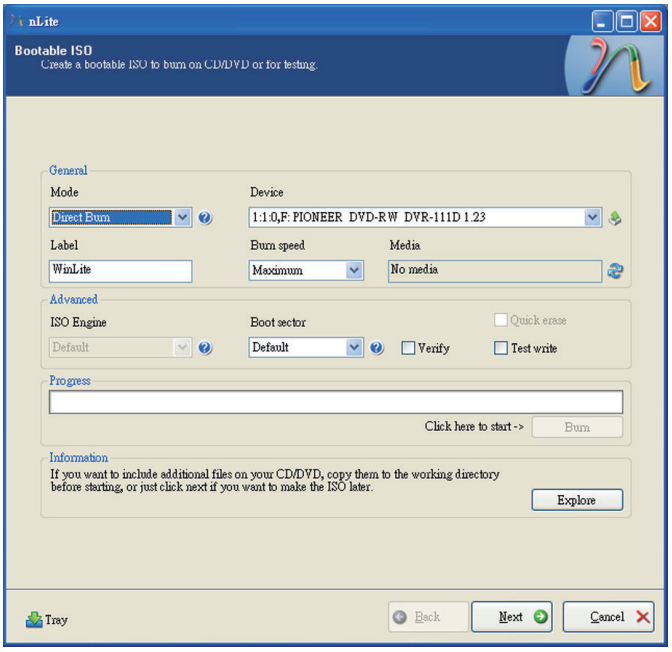


15. To create an image, select the **Create Image** mode under the General section and then click **Next**.



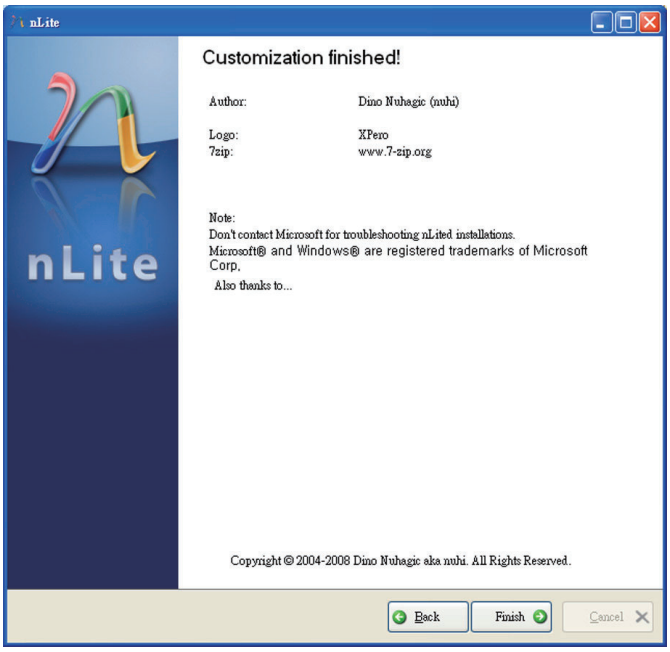
16. Or you can choose to burn it directly to a disc by selecting the **Direct Burn** mode under the General section.

    Select the optical device and all other necessary settings and then click



17. You have finished customizing the Windows XP installation disc. Click **Finish**.

    Enter the BIOS utility to configure the SATA controller to RAID/AHCI. You can now install Windows XP.



AHCI

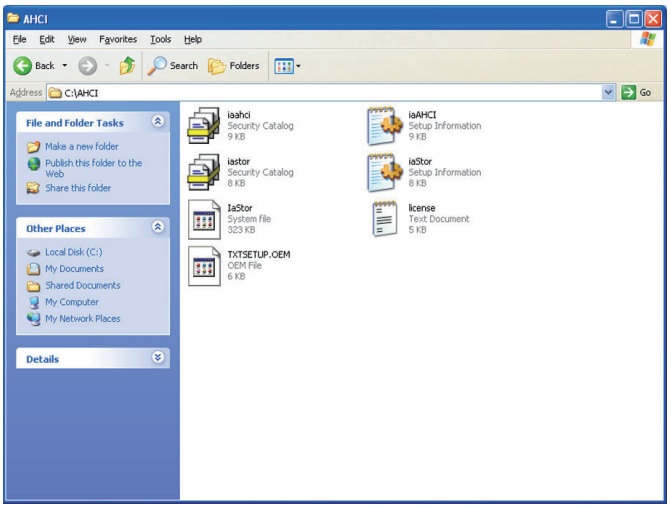
The installation steps below will guide you in configuring your SATA drive to AHCI mode.

1. Enter the BIOS utility and configure the SATA controller to IDE mode.

2. Install Windows XP but do not press F6.

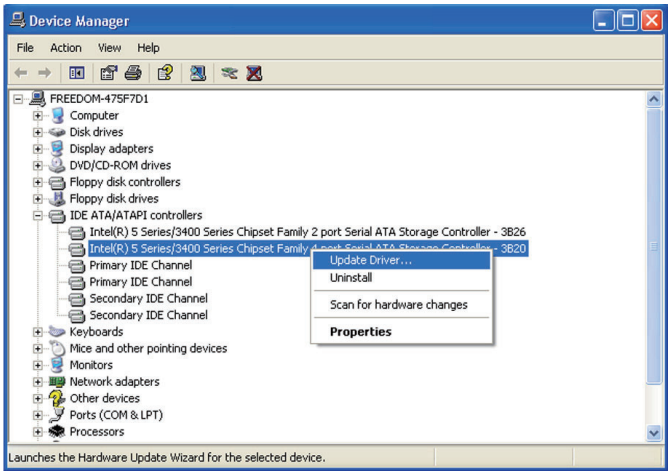
3. Download relevant RAID/AHCI driver files supported by the motherboard chipset from Intel's website.

   Transfer the downloaded driver files to C:\AHCI.

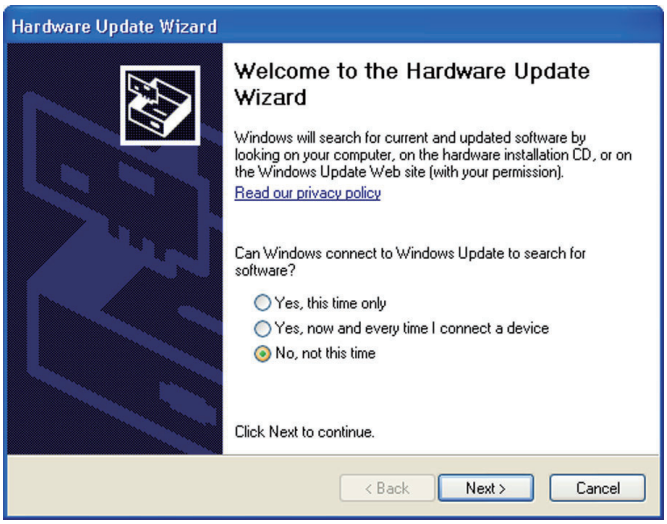


4. Open Device Manager and right click on one of the Intel Serial ATA Storage Controllers, then select **Update Driver**.

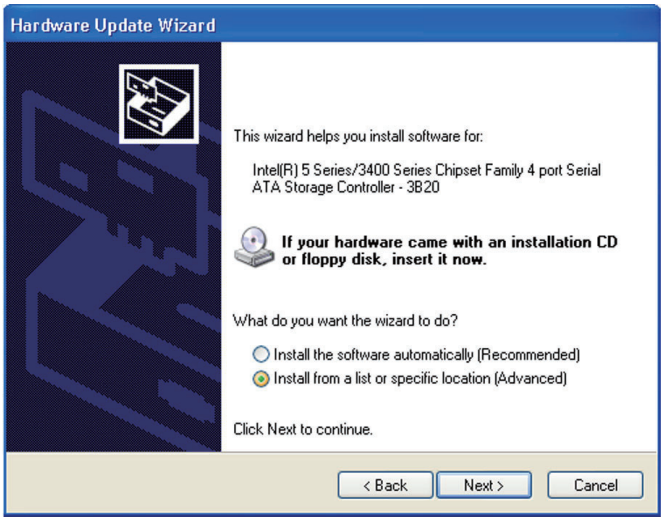
   If the controller you selected did not work, try selecting another one.



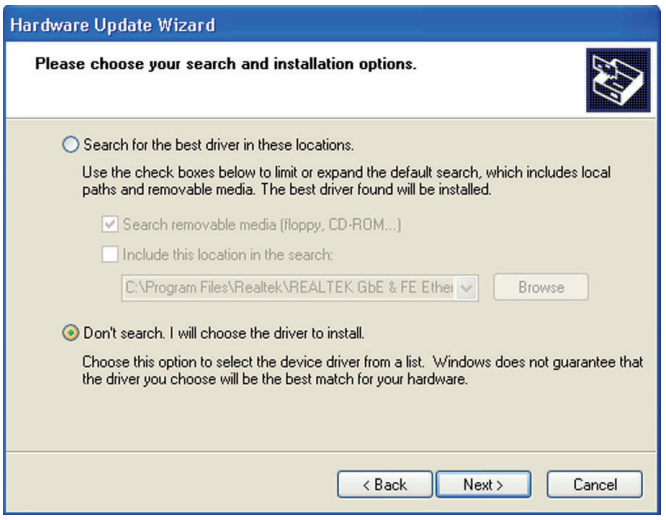
5. In the Hardware Update Wizard dialog box, select **"No, not this time"** then click **Next**.



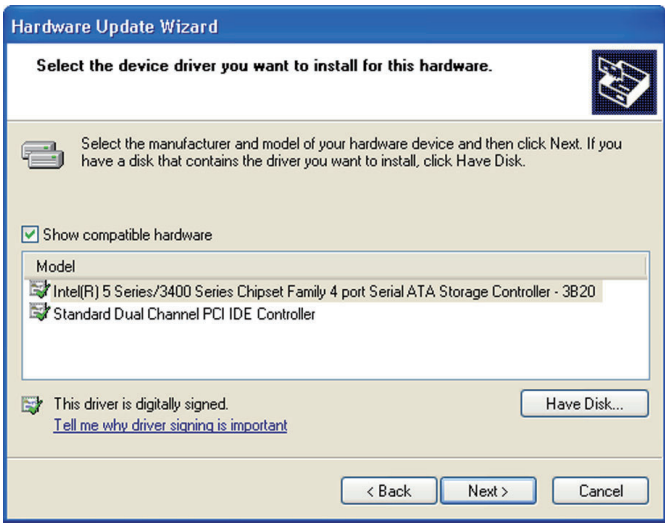
6. Select **"Install from a list or specific location (Advanced)"** and then click **Next**.



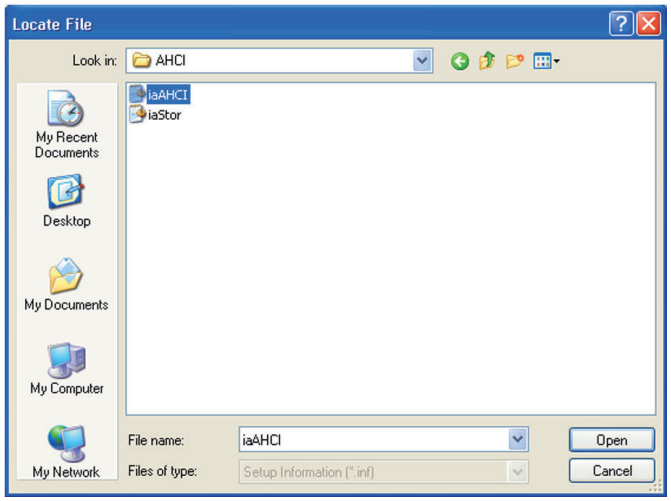
7. Select **"Don't search. I will choose the driver to install"** and then click **Next**.



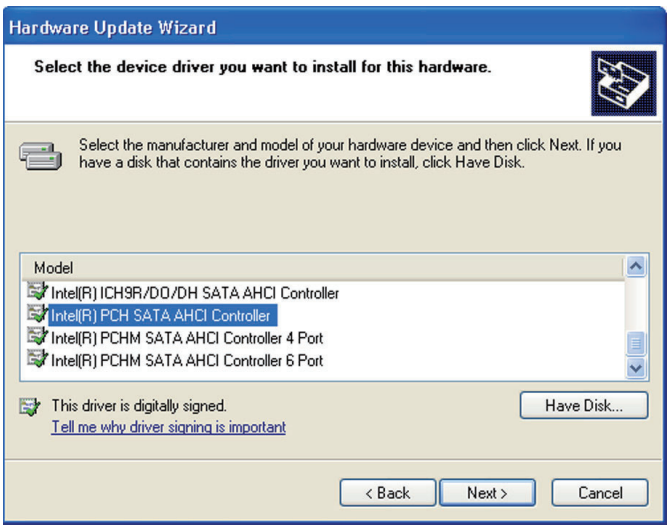
8. Click **"Have Disk"**.



9. Select C:\AHCI\iaAHCI.inf and then click **Open**.

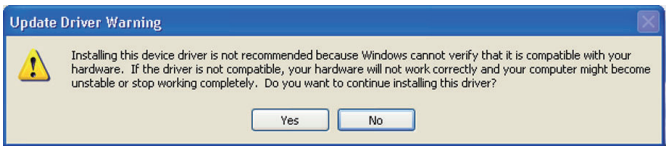


10. Select the appropriate AHCI Controller of your hardware device and then click **Next**.

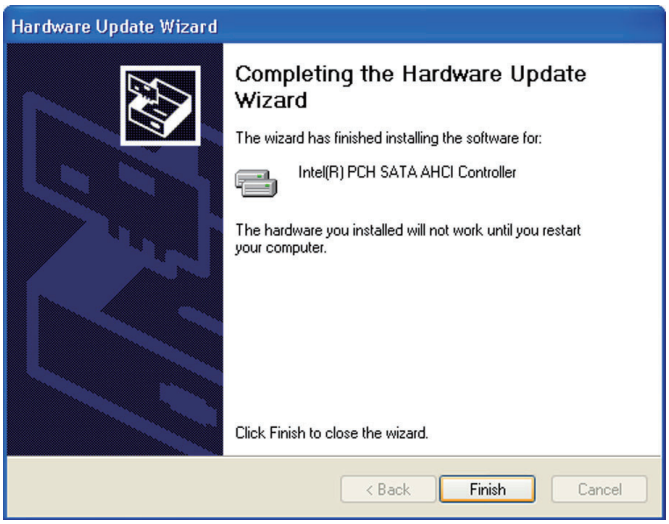


11. A warning message appeared because the selected SATA controller did not match your hardware device.

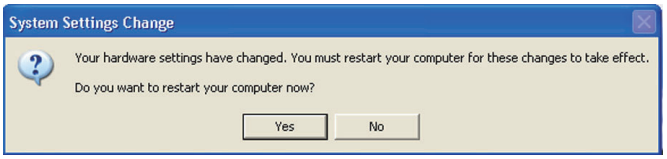
    Ignore the warning and click **Yes** to proceed.



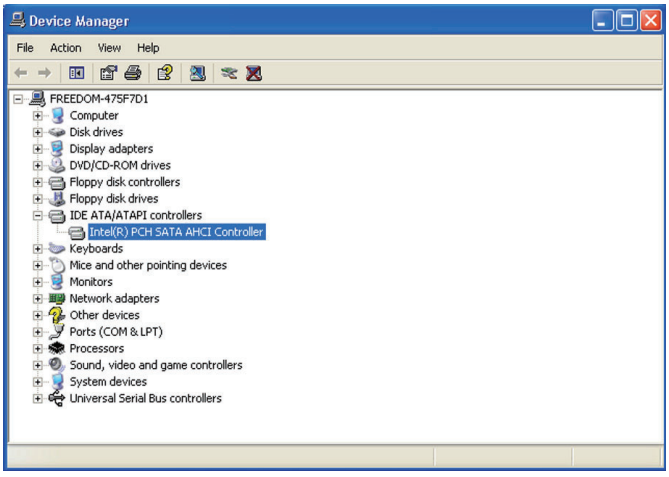
12. Click **Finish**.



13. The system's settings have been changed. Windows XP requires that you restart the computer. Click **Yes**.



14. Enter the BIOS utility and modify the SATA controller from IDE to AHCI. By doing so, Windows will work normally with the SATA controller that is in AHCI mode.



Appendix B - Watchdog Sample Code

```
;Software programming example:

;--------------------------------------------
;(1) Enter Super IO Configuration mode
;--------------------------------------------
MOV         DX,2EH
MOV         AL,87H
OUT         DX,AL
OUT         DX,AL

;-----------------------------------------------------------------------------------------
;(2) Configuration Logical Device 7, register CRF5/CRF6 (WDT Control /WDT timer)
;-----------------------------------------------------------------------------------------
MOV         DX,2EH
MOV         AL,07H              ;Ready to Program Logical Device
OUT         DX,AL

MOV         DX,2FH
MOV         AL,07H              ;Select Logical Device 7
OUT         DX,AL

MOV         DX,2EH
MOV         AL, F6H             ;Select watchdog timer register
OUT         DX,AL

MOV         DX,2FH
MOV         AL,10H              ;Set watchdog timer value
OUT         DX,AL

MOV         DX,2EH
MOV         AL, F5H             ;Select watchdog Control Register
OUT         DX,AL

MOV         DX,2FH
MOV         AL,61H              ;Set Watchdog Control Value
OUT         DX,AL

;-------------------------------------------------------------
;(1) Exit extended function mode
;-------------------------------------------------------------
MOV          DX,2EH
MOV          AL,AAH
OUT           DX,AL
```

Appendix C - Troubleshooting

Troubleshooting Checklist

This chapter of the manual is designed to help you with problems that you may encounter with your personal computer. To efficiently troubleshoot your system, treat each problem individually. This is to ensure an accurate diagnosis of the problem in case a problem has multiple causes.

Some of the most common things to check when you encounter problems while using your system are listed below.

1. The power switch of each peripheral device is turned on.

2. All cables and power cords are tightly connected.

3. The electrical outlet to which your peripheral devices are connected is working. Test the outlet by plugging in a lamp or other electrical device.

4. The monitor is turned on.

5. The display's brightness and contrast controls are adjusted properly.

6. All add-in boards in the expansion slots are seated securely.

7. Any add-in board you have installed is designed for your system and is set up correctly.

Monitor/Display

If the display screen remains dark after the system is turned on:

1. Make sure that the monitor's power switch is on.

2. Check that one end of the monitor's power cord is properly attached to the monitor and the other end is plugged into a working AC outlet. If necessary, try another outlet.

3. Check that the video input cable is properly attached to the monitor and the system's display adapter.

4. Adjust the brightness of the display by turning the monitor's brightness control knob.

The picture seems to be constantly moving.

1. The monitor has lost its vertical sync. Adjust the monitor's vertical sync.

2. Move away any objects, such as another monitor or fan, that may be creating a magnetic field around the display.

3. Make sure your video card's output frequencies are supported by this monitor.

The screen seems to be constantly wavering.

1. If the monitor is close to another monitor, the adjacent monitor may need to be turned off. Fluorescent lights adjacent to the monitor may also cause screen wavering.

Power Supply

When the computer is turned on, nothing happens.

1. Check that one end of the AC power cord is plugged into a live outlet and the other end properly plugged into the back of the system.

2. Make sure that the voltage selection switch on the back panel is set for the correct type of voltage you are using.

3. The power cord may have a "short" or "open". Inspect the cord and install a new one if necessary.

Floppy Drive

The computer cannot access the floppy drive.

1. The floppy diskette may not be formatted. Format the diskette and try again.

2. The diskette may be write-protected. Use a diskette that is not write-protected.

3. You may be writing to the wrong drive. Check the path statement to make sure you are writing to the targeted drive.

4. There is not enough space left on the diskette. Use another diskette with adequate storage space.

Hard Drive

Hard disk failure.

1. Make sure the correct drive type for the hard disk drive has been entered in the BIOS.

2. If the system is configured with two hard drives, make sure the bootable (first) hard drive is configured as Master and the second hard drive is configured as Slave. The master hard drive must have an active/bootable partition.

Excessively long formatting period.

If your hard drive takes an excessively long period of time to format, it is likely a cable connection problem. However, if your hard drive has a large capacity, it will take a longer time to format.

Serial Port

The serial device (modem, printer) doesn't output anything or is outputting garbled characters.

1. Make sure that the serial device's power is turned on and that the device is on-line.

2. Verify that the device is plugged into the correct serial port on the rear of the computer.

3. Verify that the attached serial device works by attaching it to a serial port that is working and configured correctly. If the serial device does not work, either the cable or the serial device has a problem. If the serial device works, the problem may be due to the onboard I/O or the address setting.

4. Make sure the COM settings and I/O address are configured correctly.

Keyboard

Nothing happens when a key on the keyboard was pressed.

1. Make sure the keyboard is properly connected.

2. Make sure there are no objects resting on the keyboard and that no keys are pressed during the booting process.

System Board

1. Make sure the add-in card is seated securely in the expansion slot. If the add-in card is loose, power off the system, re-install the card and power up the system.

2. Check the jumper settings to ensure that the jumpers are properly set.

3. Verify that all memory modules are seated securely into the memory sockets.

4. Make sure the memory modules are in the correct locations.

5. If the board fails to function, place the board on a flat surface and seat all socketed components. Gently press each component into the socket.

6. If you made changes to the BIOS settings, re-enter setup and load the BIOS defaults.