P5E

Motherboard

E3392

First Edition V1
September 2007

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Appendix: CPU features

Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

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 in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, 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 receiver.
- Connect the equipment to 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.

The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.

- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.

- Seek professional assistance before using an adpater or extension cord. These devices could interrupt the grounding circuit.

- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.

- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.

- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.

- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.

- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.

- Place the product on a stable surface.

- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment, and mercury-containing button cell battery) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

About this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This guide contains the following parts:

*   **Chapter 1: Product introduction**

    This chapter describes the features of the motherboard and the new technology it supports.

*   **Chapter 2: Hardware information**

    This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the switches, jumpers, and connectors on the motherboard.

*   **Chapter 3: Powering up**

    This chapter describes the power up sequence and ways of shutting down the system.

*   **Chapter 4: BIOS setup**

    This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

*   **Chapter 5: Software support**

    This chapter describes the contents of the support DVD that comes with the motherboard package.

*   **Chapter 6: ATI CrossFire™ support**

    This chapter describes the ATI CrossFire™ feature and shows the graphics card installation procedures.

*   **Appendix: CPU features**

    The Appendix describes the CPU features and technologies that the motherboard supports.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. **ASUS websites**

    The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.

2. **Optional documentation**

    Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.

CAUTION: Information to prevent damage to the components when trying to complete a task.

IMPORTANT: Instructions that you MUST follow to complete a task.

NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.
	Example: <Enter> means that you must press the Enter or Return key.
<Key1+Key2+Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).
	Example: <Ctrl+Alt+D>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.
	Example: At the DOS prompt, type the command line:
	`afudos /i[filename]`
	`afudos /iP5E.ROM`

P5E specifications summary

CPU	LGA775 socket for Intel® Core™2 Quad / Core™2 Extreme / Core™2 Duo / Pentium® Extreme / Pentium® D / Pentium® 4 Processors Supports Intel® next-generation 45nm multi-core CPUs Compatible with Intel® 06/05B/05A processors * Refer to www.asus.com for Intel CPU support list
Chipset	Intel® X38 / ICH9R with Intel® Fast Memory Access Technology
System Bus	1333/1066/800 MHz

Memory	Dual-channel memory architecture
	  - 4 x 240-pin DIMM sockets support ECC/non-ECC, unbuffered DDR2 1066*/800/667MHz memory modules
	  - Supports up to 8 GB system memory
	* The chipset officially supports the memory frequency up to DDR2 800MHz. Tuned by the ASUS Super Memspeed Technology, this motherboard natively supports up to DDR2 1066MHz. Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lists).

Expansion Slots	2 x PCIe 2.0 x16 slots (both @ x16 mode) support CrossFire Technology 3 x PCIe x1 (PCIEX1_1 [black] is compatible with the audio slot.) 2 x PCI 2.2 slots

Storage	Southbridge
	  - 6 x SATA 3.0 Gb/s ports
	  - Intel® Matrix Storage Technology supports RAID 0, 1, 5, and 10
	
	JMicron® JMB368 PATA controller
	  - 1 x UltraDMA 133/100 for up to 2 PATA devices

LAN	Marvell 88E8056® PCIe Gigabit LAN controller featuring AI NET 2

High Definition Audio	SupremeFX II Audio Card
	  - ADI 1988B 8-channel High Definition Audio CODEC
	  - Supports Jack-Sensing, Enumeration, Multi-streaming, AI Audio 2, and ASUS Noise Filter
	Coaxial / Optical S/PDIF Out ports at back I/O

IEEE 1394	VIA VT6308P controller supports 2 x IEEE 1394a ports (one at midboard; one at back panel)
USB	12 x USB 2.0 ports (6 ports at midboard, 6 ports at back panel)

(continued on the next page)

P5E specifications summary

ASUS AI Lifestyle Unique features	**ASUS Power Saving Solution:**
	   - ASUS EPU (Energy Processing Unit)
	     - ASUS AI Gear 3 (ASUS EPU Utility)
	   - ASUS AI Nap
	
	ASUS Quiet Thermal Solution:
	   - ASUS New Generation 8-Phase Power Design
	   - ASUS Fanless Design: Heat-pipe solution
	   - ASUS Fanless Design: StackCool 2
	   - ASUS Q-Fan 2
	   - ASUS Optional Fan for Water-cooling or Passive-Cooling only
	
	ASUS EZ DIY:
	   - ASUS AI Direct Llink
	   - ASUS Q-Shield
	   - ASUS Q-Connector
	   - ASUS O.C. Profile
	   - ASUS CrashFree BIOS 3
	   - ASUS EZ Flash 2
	   - ASUS AI Slot Detector

ASUS Stylish Features	ASUS MyLogo3™ Multi-language BIOS

ASUS Exclusive Overclocking Features	**Intelligent overclocking tools:**
	   - ASUS AI Booster utility
	
	Precision Tweaker 2:
	   - vCore: Adjustable CPU voltage at 0.0625V increment
	   - vDIMM: 43-step DRAM voltage control
	   - vChipset (N.B.): 25-step DRAM voltage control
	   - vFSB Termination: 15-step reference voltage control
	   - vCPU PLL: 64-step CPU PLL voltage control
	
	SFS (Stepless Frequency Selection)
	   - FSB tuning from 200MHz up to 800MHz at 1MHz increment
	   - Memory tuning from 667MHz up to 3200MHz
	   - PCI Express frequency tuning from 100MHz up to 150MHz at 1MHz increment
	
	Overclocking Protection:
	   - ASUS C.P.R.(CPU Parameter Recall)

P5E specifications summary

Back Panel I/O Ports	1 x PS/2 Keyboard (purple) 1 x S/PDIF Out (Coaxial + Optical) 1 x IEEE1394a port 1 x LAN (RJ45) port 6 x USB 2.0 ports
Internal I/O Connectors	3 x USB connectors support additional 6 USB ports 1 x Floppy disk drive connector 1 x IDE connector for two devices 6 x SATA connectors 4 x Fan connectors (1 x CPU / 1 x Power / 2 x Chassis) 3 x Thermal sensor connectors 1 x IEEE1394a connector 1 x S/PDIF Out connector 1 x Chassis Intrusion connector 24-pin ATX Power connector 2 x 4-pin ATX 12V Power connector 1 x En/Dis-able Clr CMOS 1 x System panel connector
BIOS Features	16 Mb Flash ROM, AMI BIOS, PnP, DMI2.0, WfM2.0, SM BIOS 2.3, ACPI 2.0a Multi-Language BIOS
Manageability	WOL by PME, WOR by PME, PXE
Software	Support DVD: Drivers ASUS PC Probe II ASUS Update ASUS AI Suite Anti-virus software (OEM version) Image-Editing Suite
Form Factor	ATX Form Factor, 12"x 9.6" (30.5 cm x 24.4 cm)

*Specifications are subject to change without notice.

This chapter describes the motherboard features and the new technologies it supports.

Product introduction

1

Chapter summary

1

1.1   Welcome!

Thank you for buying an ASUS® P5E motherboard!

The motherboard delivers a host of new features and latest technologies, making it another standout in the long line of ASUS quality motherboards!

Before you start installing the motherboard, and hardware devices on it, check the items in your package with the list below.

1.2   Package contents

Check your motherboard package for the following items.

Motherboard	ASUS P5E
I/O modules	1 x Multi-function module (1-port IEEE 1394a module and 2-port USB 2.0 module)
Cables	1 x Serial ATA power cable for 2 devices 6 x Serial ATA signal cable 1 x Ultra DMA 133/100 cable 1 x Floppy disk drive cable
Accessories	ASUS Q-Shield (Advance I/O shield) ASUS Optional Fan SupremeFX II Audio Card 1 x ASUS Q-Connector Kit (USB, 1394, system panel; Retail version only)
Application DVD	ASUS motherboard Support DVD
Documentation	User guide

If any of the above items is damaged or missing, contact your retailer.

1.3 Special features

1.3.1 Product highlights

Green ASUS

This motherboard and its packaging comply with the European Union's Restriction on the use of Hazardous Substances (RoHS). This is in line with the ASUS vision of creating environment-friendly and recyclable products/packaging to safeguard consumers' health while minimizing the impact on the environment.

Intel® Core™ 2 Quad Processor ready

This motherboard supports the latest Intel® Core™ 2 Quad processors in the LGA775 package and Intel's next-generation 45nm multi-core processors. It is excellent for multi-tasking, multi-media and enthusiastic gamers with 1333/1066/800 MHz FSB. Intel® Core™ 2 Quad processor is one of the most powerful CPU in the world. See page 2-9 for details.

Intel® Core™2 Duo/ Intel® Core™2 Extreme CPU support

This motherboard supports the latest Intel® Core™2 processor in the LGA775 package and Intel's next-generation 45nm multi-core processors. With the new Intel® Core™ microarchitecture technology and 1333/1066/800 MHz FSB, the Intel® Core™2 is one of the most powerful and energy efficient CPUs in the world. See page 2-9 for details.

Intel® X38 Chipset

The Intel® X38 Express Chipset is the latest chipset designed to support 8GB of dual-channel DDR2 800/667 MHz memory architecture, 1333/1066/800 FSB (Front Side Bus), dual PCI Express 2.0 x16 graphics and multi-core CPUs. It especially includes Intel® Fast Memory Access technology that significantly optimizes the use of available memory bandwidth and reduces the latency of the memory accesses.

PCIe 2.0

This motherboard supports the latest PCIe 2.0 device for twice the current speed and bandwidth. This enhances system performance while still providing backward compatibility to PCIe 1.0 devices.

Native DDR2 1066 memory support

To attain top performance, ASUS engineers have successfully unleashed the true potential of DDR2 memory. While in DDR2 1066 mode, ASUS's exclusive technology offers a choice of FSB 1333, providing great performance for 3D graphics and other memory demanding applications. See page 2-19 for details.

Dual-channel DDR2 800 memory support

The motherboard supports DDR2 memory that features data transfer rates of 800/667 MHz to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The dual-channel DDR2 architecture doubles the bandwidth of your system memory to boost system performance, eliminating bottlenecks with peak bandwidths of up to 12.8 GB/s. Furthermore, this motherboard does not restrict the memory size across two channels. Users may install different memory size DIMMs into the two channels and enjoy dual-channel and single-channel functions at the same time. This new feature optimizes the use of available memory size. See page 2-19 for details.

ASUS Super Memspeed Technology

To attain top performance, ASUS has managed to break through current FSB and DRAM ratio proportions by utilizing Super Memspeed Technology–the latest technology that provides even more precise overclocking options to unleash the true potential of DDR2 memory. The DDR2 Mode maximizes system performance by eliminating the bottleneck when overclocking both the CPU and memory–providing great performance for 3D graphics and other memory demanding applications. See page 2-19 for details.

Serial ATA 3.0 Gb/s technology

This motherboard supports the next-generation hard drives based on the Serial ATA (SATA) 3Gb/s storage specification, delivering enhanced scalability and doubling the bus bandwidth for high-speed data retrieval and saves. See page 2-29 for details.

IEEE 1394a support

The IEEE 1394a interface provides high speed digital interface for audio/video appliances such as digital television, digital video camcorders, storage peripherals & other PC portable devices. See pages 2-26 and 2-30 for details.

High Definition Audio

Enjoy high-end sound quality on your PC! The onboard 8-channel HD audio (High Definition Audio, previously codenamed Azalia) CODEC enables high-quality 192KHz/24-bit audio output, jack-sensing feature, retasking functions, and multi-streaming technology that simultaneously sends different audio streams to different destinations. You can now talk to your partners on the headphones while playing multi-channel network games. See pages 2-25 and 2-26 for details.

1.3.2 ASUS AI Lifestyle unique features

ASUS Power Saving Solution

ASUS Power Saving solution intelligently and automatically provides balanced computing power and energy consumption.

ASUS EPU

The ASUS EPU utilizes innovative technology to digitally monitor and tune the CPU power supply with improved VR responses in heavy or light loadings. It automatically provides power for higher performance or improve efficiency by 7% when the PC is running low intensity applications. Working together with AI Gear 3, this can help you attain the best possible power efficiency and energy savings up to 58.6% to help save the environment. See page 5-20 for details.

AI Nap

With AI Nap, the system can continue running at minimum power consumption and noise when you are temporarily away. To wake up the system and return to the OS environment, simply click the mouse or press a key. See page 5-21 for details.

ASUS Quiet Thermal Solution

ASUS Quiet Thermal solution makes system more stable and enhances the overclocking capability.

New Generation 8-Phase Power Design

The ASUS 8-Phase Power Design provides highly efficient operation to generate less heat (at least 18°C (32.4°F)) than other conventional power solutions. It reduces input ripple current and output ripple voltage, which keeps CPU and power module from suffering the risk of high power stress. It has the advantages of quick transient response and stability, especially beneficial when CPU requires more current immediately under heavy loading or overclocking mode.

Q-Fan 2

ASUS Q-Fan 2 technology intelligently adjusts both CPU fan and chassis fan speeds according to system loading to ensure quiet, cool and efficient operation. See page 4-28 and 5-23 for details.

Fanless Design - Pure Copper Heat-pipe

The Heat Pipe design effectively directs the heat generated by the chipsets to the heatsink near the back IO ports, where it can be carried away by existing airflow from CPU fan or bundled optional fan. The purpose of the innovative heat pipe design on this motherboard is that the groundbreaking fanless design does not have lifetime problems as a chipset fan does. Furthermore, it provides options for users to install side-flow fan or passive cooler. The Heat Pipe design is the most reliable fanless thermal solution to date.

> DO NOT uninstall the heat-pipe by yourself. Doing so may bend the tubing and affect the heat dissipation performance.

Optional Fan (for Water-Cooling or Passive-Cooling only)

The optional fan is specifically designed to provide sufficient airflow over the CPU power modules and chipset area when water-cooling or passive-cooling is utilized, ensuring effective heat dissipation for the entire system. See page 2-13 for details.

Gaming Level Audio Design: Supreme FX II

Supreme FX II delivers an excellent high definition audio experience to the gamers of ROG. The SupremeFX II features unique audio innovations for gamers to spot enemies in 3D environment during game play. SupremeFX II also provides a special tool to emphasize human voices in games to help make dialogues clearer. See page 2-24 for details.

AI Audio 2

AI Audio 2 creates a virtual center channel that expands the overall sound field without introducing a picket fencing effect. Preserving the dialogue or solo performances with downmixing from multichannels will allow you to experience true-to-life high quality audio.

Noise Filter

This feature detects repetitive and stationary noises (non-voice signals) like computer fans, air conditioners, and other background noises then eliminates it in the incoming audio stream while recording. See page 5-29 for details.

ASUS EZ DIY

ASUS EZ DIY feature collection provides you easy ways to install computer components, update the BIOS or back up your favorite settings.

ASUS AI Direct Link

AI Direct Link can easily and efficiently transfer large amounts of data via the network cable - saving up to 70% of the total time taken. With AI Direct Link, it becomes easy to backup or share large data files like movies or other media content. See page 5-30 for details.

ASUS Q-Shield

The specially designed ASUS Q-Shield does without the usual "fingers" -- making it convenient and easy to install. With better electric conductivity, it ideally protects your motherboard against static electricity and shields it against Electronic Magnetic Interference (EMI).

ASUS Q-Connector

ASUS Q-Connector allows you to easily connect or disconnect the chassis front panel cables to the motherboard. This unique module eliminates the trouble of connecting the system panel cables one at a time and avoiding wrong cable connections. See page 2-35 for details.

ASUS O.C. Profile

The motherboard features the ASUS O.C. Profile that allows users to conveniently store or load multiple BIOS settings. The BIOS settings can be stored in the CMOS or a separate file, giving users freedom to share and distribute their favorite settings. See page 4-35 for details.

ASUS CrashFree BIOS 3

The ASUS CrashFree BIOS 3 allows users to restore corrupted BIOS data from a USB flash disk containing the BIOS file. See page 4-7 for details.

ASUS EZ Flash 2

EZ Flash 2 is a user-friendly BIOS update utility. Simply press the predefined hotkey to launch the utility and update the BIOS without entering the OS. Update your BIOS easily without preparing a bootable diskette or using an OS-based flash utility. See pages 4-4 and 4-34 for details.

Smart Support DVD

It provides a checklist to allow the user to see which drivers are already installed, as well as those that aren't. When using ASUS PC Probe II, you can easily see the critical parts of the computer.

ASUS MyLogo3™

This feature allows you to convert your favorite photo into a 256-color boot logo for a more colorful and vivid image on your screen. See page 4-31 and 5-9 for details.

ASUS Multi-language BIOS

The multi-language BIOS allows you to select the language of your choice from the available options. The localized BIOS setup menu helps you configure your system easier and faster. See page 4-11 for details.

1.3.3   ASUS Exclusive Overclocking Features

AI Booster

The ASUS AI Booster allows you to overclock the CPU speed in Windows environment without the hassle of booting the BIOS.

Precision Tweaker 2

Allows the user to adjust the NB Voltage, FSB termination Voltage, CPU PLL Voltage and the DRAM Voltage in 0.02v steps to finetune voltages to achieve the most precise setting for the ultimate customized overclocking configuration. See page 4-20 for details.

C.P.R. (CPU Parameter Recall)

The C.P.R. feature of the motherboard BIOS allows automatic re-setting to the BIOS default settings in case the system hangs due to overclocking. When the system hangs due to overclocking, C.P.R. eliminates the need to open the system chassis and clear the RTC data. Simply shut down and reboot the system, and the BIOS automatically restores the CPU default setting for each parameter.

This chapter lists the hardware setup
procedures that you have to perform
when installing system components. It
includes description of the jumpers and
connectors on the motherboard.

Hardware information 2

Chapter summary

2

2.1   Before you proceed

Take note of the following precautions before you install motherboard components
or change any motherboard settings.

⚠️

- Unplug the power cord from the wall socket before touching any component.

- Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.

- Hold components by the edges to avoid touching the ICs on them.

- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.

- Before you install or remove any component, ensurethat the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

Onboard LED

The motherboard comes with a standby power LED. The green LED lights up
to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a
reminder that you should shut down the system and unplug the power cable before
removing or plugging in any motherboard component. The illustration below shows
the location of the onboard LED.

SB_PWR

ON
Standby
Power

OFF
Powered
Off

P5E WS Professional Onboard LED
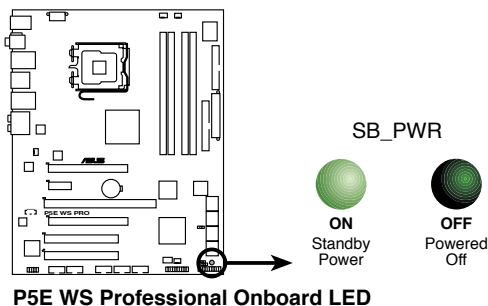
2.2 Motherboard overview

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

⚡ Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.

2.2.1 Placement direction

When installing the motherboard, make sure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.2 Screw holes

Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.

⚠ DO NOT overtighten the screws! Doing so can damage the motherboard.

Place this side towards the rear of the chassis
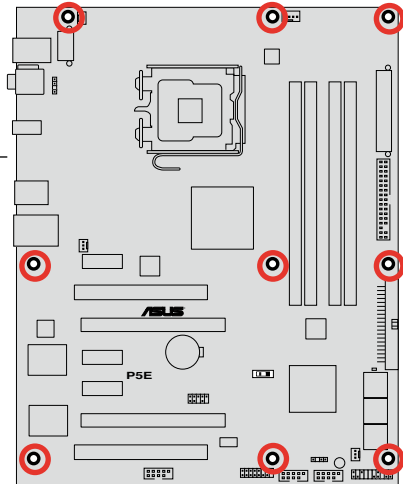
2.2.3   Motherboard layout
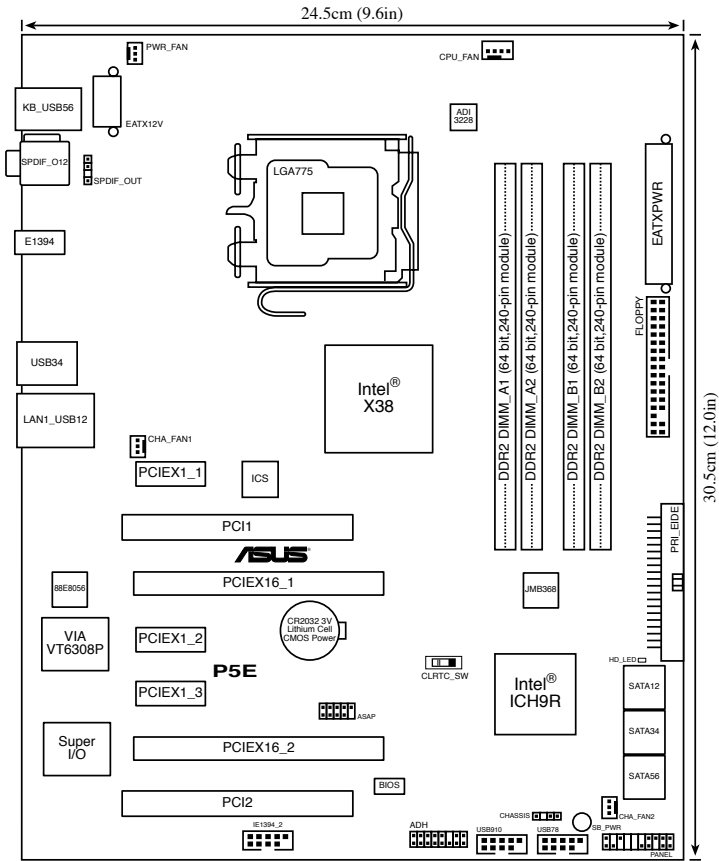
Refer to **2.8 Connectors** for more information about rear panel connectors and internal connectors.

2.2.4   Audio card layout
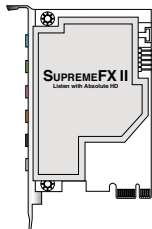
2.2.5   Layout contents

Slots		Page
1.	DDR2 DIMM slots	2-14
2.	PCI slots	2-21
3.	PCI Express x 1 slots	2-21
4.	PCI Express 2.0 x 16 slots	2-21

Onboard switch		Page
1.	Clear RTC RAM (Gaming Level Switch Design)	2-22

Rear panel connectors		Page
1.	PS/2 keyboard port (purple)	2-24
2.	Coaxial S/PDIF Out port	2-24
3.	LAN (RJ-45) port	2-24
4.	Line In port (light blue)	2-25
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6.	Microphone port (pink)	2-25
7.	Center/Subwoofer port (orange)	2-25
8.	Rear Speaker Out port (black)	2-25
9.	Side Speaker Out port (gray)	2-25
10.	USB 2.0 ports 1 and 2	2-25
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12.	IEEE 1394a port	2-25
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14.	USB 2.0 ports 5 and 6	2-25

Internal connectors	Page
1. Floppy disk drive connector (34-1 pin FLOPPY)	2-26
2. IDE connector (40-1 pin PRI_EIDE)	2-27
3. ICH9R Serial ATA connectors (7-pin SATA1~6)	2-28
4. USB connectors (10-1 pin USB78, USB910, USB1112)	2-29
5. IEEE 1394a port connector (10-1 pin IE1394_2)	2-29
6. CPU, chassis, and optional fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN1~2, 3-pin PWR_FAN)	2-30
7. Chassis intrusion connector (4-1 pin CHASSIS)	2-31
8. Digital audio connector (4-1 pin SPDIF_OUT for ASUS HDMI VGA card)	2-31
9. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)	2-32
10. System panel connector (20-8 pin PANEL)	2-33

2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Core™2 Quad / Core™2 Extreme / Core™2 Duo / Pentium® D / Pentium® 4 / Pentium® Extreme processors.

- Make sure that all power cables are unplugged before installing the CPU.

- If installing a dual-core CPU, connect the chassis fan cable to the CHA_FAN1 connector to ensure system stability.

- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.

- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA775 socket.

- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/ incorrect removal of the PnP cap.

2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

P5E CPU Socket 775

![icon]
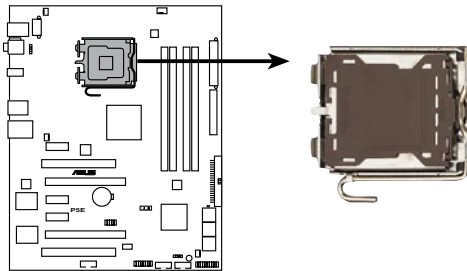
> Before installing the CPU, make sure that the cam box is facing towards you and the load lever is on your left.

2. Press the load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.

Retention tab

Load lever

A

PnP cap

B

This side of the socket box should face you.

![icon]
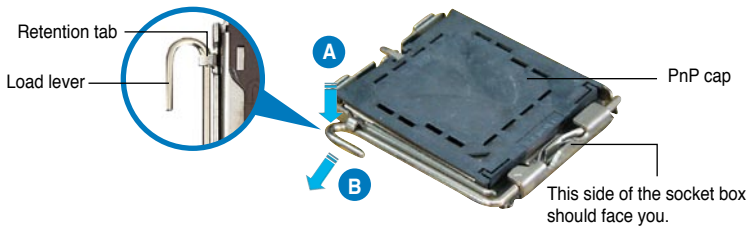
> To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

3. Lift the load lever in the direction of the arrow to a 135º angle.
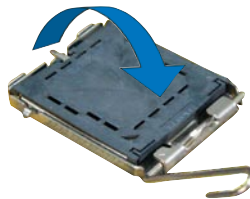
4.	Lift the load plate with your thumb
	and forefinger to a 100º angle (A),
	then push the PnP cap from the load
	plate window to remove (B).

B

A

Load plate
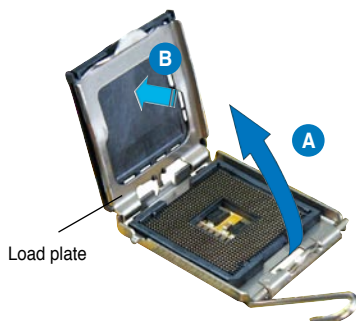
Alignment key

5.	Position the CPU over the
	socket, making sure that
	the gold triangle is on the
	bottom-left corner of the
	socket then fit the socket
	alignment key into the
	CPU notch.

CPU notch

Gold triangle mark
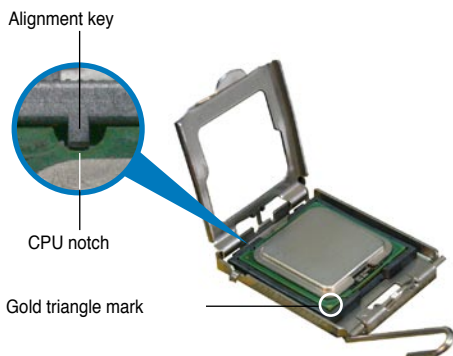
> The CPU fits in only one correct orientation. DO NOT force the CPU into the
> socket to prevent bending the connectors on the socket and damaging the CPU!

6.	Close the load plate (A), then
	push the load lever (B) until it
	snaps into the retention tab.

7.	If installing a dual-core CPU,
	connect the chassis fan cable
	to the CHA_FAN1 connector to
	ensure system stability.

A

B

> The motherboard supports Intel® LGA775 processors with the Intel® Enhanced
> Memory 64 Technology (EM64T), Enhanced Intel SpeedStep® Technology
> (EIST), and Hyper-Threading Technology. Refer to the Appendix for more
> information on these CPU features.

2.3.2   Installing the CPU heatsink and fan

The Intel® LGA775 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

•   When you buy a boxed Intel® processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel®-certified multi-directional heatsink and fan.

•   Your Intel® LGA775 heatsink and fan assembly comes in a push-pin design and requires no tool to install.

•   If you purchased a separate CPU heatsink and fan assembly, make sure that you have properly applied Thermal Interface Material to the CPU heatsink or CPU before you install the heatsink and fan assembly.

Make sure that you have installed the motherboard to the chassis before you install the CPU fan and heatsink assembly.

To install the CPU heatsink and fan:

1.   Place the heatsink on top of the installed CPU, making sure that the four fasteners match the holes on the motherboard.

Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

Motherboard hole
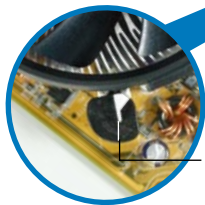
Fastener

Narrow end of the groove

Make sure to orient each fastener with the narrow end of the groove pointing outward. (The photo shows the groove shaded for emphasis.)

---

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.
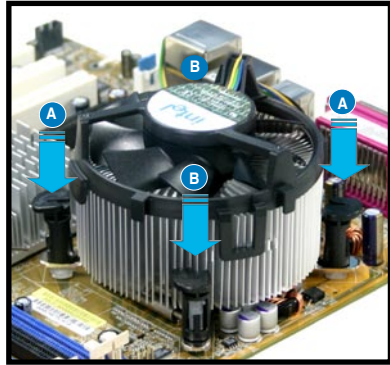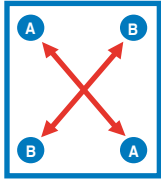
3. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN.
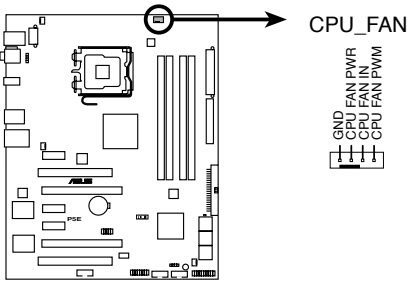
CPU_FAN

P5E CPU fan connector

DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

2.3.3   Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

1.   Disconnect the CPU fan cable from the connector on the motherboard.

2.   Rotate each fastener counterclockwise.
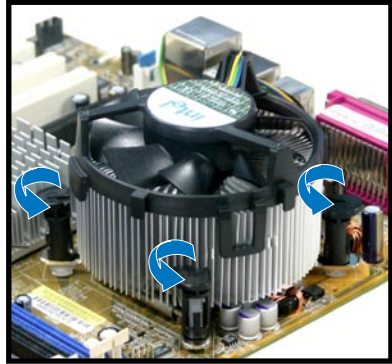
3.   Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.
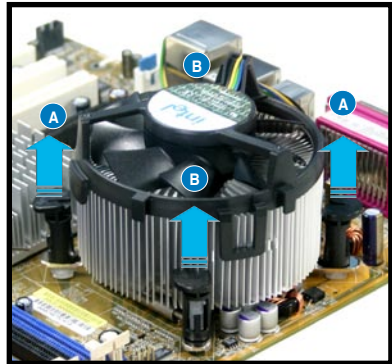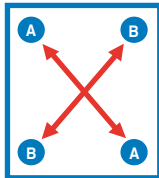
4.   Carefully remove the heatsink and fan assembly from the motherboard.

5. Rotate each fastener clockwise to ensure correct orientation when reinstalling.
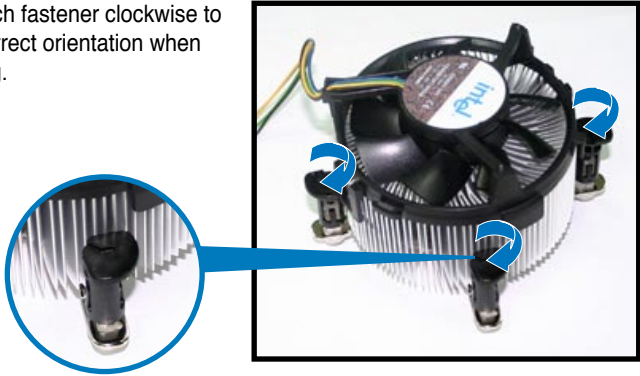
Narrow end of the groove

The narrow end of the groove should point outward after resetting. (The photo shows the groove shaded for emphasis.)
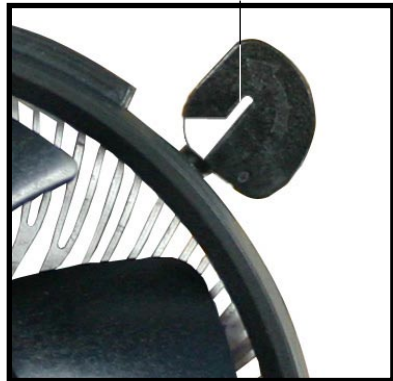
Refer to the documentation in the boxed or stand-alone CPU fan package for detailed information on CPU fan installation.

2.3.4   Installing the optional fans

Install the optional fan only if you are using a passive cooler or a water cooler. Installing the optional fan with an active CPU cooler will interfere with the airflow and destabilize the system.

Optional fan on one side fins

1.   Position the fan above the pipe and heatsink assembly.

2.   Fit the fan to the grooved edge of the heatsink.
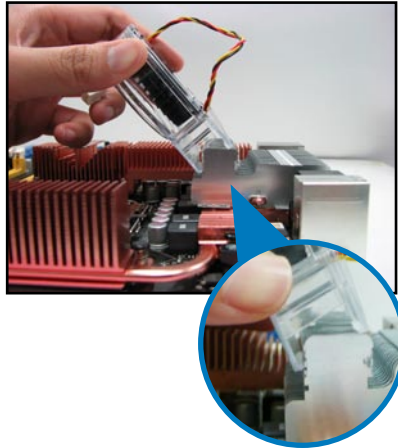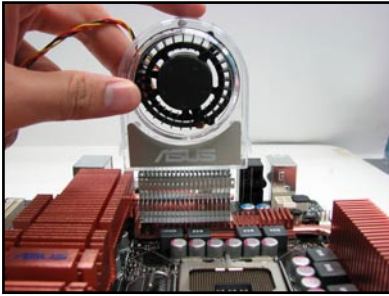
3.   Carefully push down the fan until it snugly fits the heatsink, then connect the fan cable.

4.   The photo shows the fan installed on the motherboard.
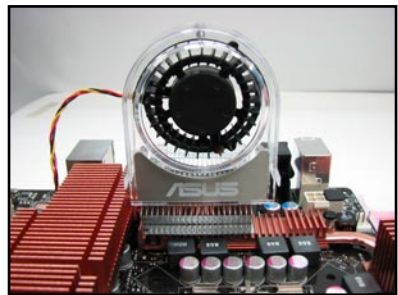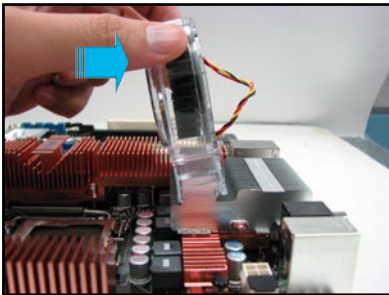
•   Plug the optional fan cables to any of the CHA_FAN1, CHA_FAN3, and PWR_FAN connectors on the motherboard.

•   Make sure the optional fan is installed correctly to prevent damage to the fan and motherboard components.

2.4 System memory

2.4.1 Overview

The motherboard comes with four Double Data Rate 2 (DDR2) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR2 DIMM sockets:
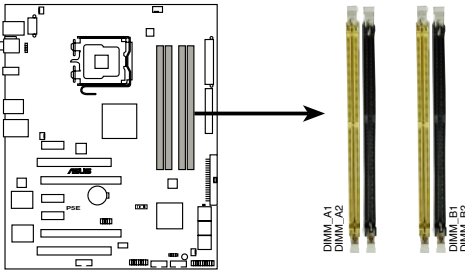
P5E 240-pin DDR2 DIMM sockets

Channel	Sockets
Channel A	DIMM_A1 and DIMM_A2
Channel B	DIMM_B1 and DIMM_B2

• This chipset officially supports DDR2-800 MHz. With the ASUS Super Memspeed Technology, this motherboard natively supports up to DDR2-1066 MHz. See the table below.

FSB	DDR2
1333	1066*
1333	800
1333	667
1066	1066*
1066	800
1066	667

• *If you install a DDR2-1066 memory module, make sure that you set the **DRAM Frequency** item in BIOS to [DDR2-1066MHz]. See section **4.4 Extreme Tweaker menu** for details.

2.4.2   Memory configurations

You may install 256 MB, 512 MB, 1 GB, and 2 GB unbuffered ECC and non-ECC DDR2 DIMMs into the DIMM sockets.

Recommended Memory Configurations

Mode	Sockets			
	DIMM_A1	DIMM_A2	DIMM_B1	DIMM_B2
Single-Channel	Populated	–	–	–
	–	–	Populated	–
Dual-channel (1)	Populated	–	Populated	–
Dual-channel (2)	Populated	Populated	Populated	Populated

- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.

- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

- If you install four 1 GB memory modules, the system may only recognize less than 3GB because the address space is reserved for other critical functions. This limitation appears on Windows® XP/Vista 32-bit operation system which does not support Physical Address Extension (PAE).

- If you install Windows® XP/Vista 32-bit operation system, a total memory of less than 3GB is recommended.

- This motherboard does not support memory modules made up of 128 Mb chips.

Notes on memory limitations

- Due to chipset limitation, this motherboard can only support up to 8 GB on the operating systems listed below. You may install a maximum of 2 GB DIMMs on each slot.

64-bit
Windows® XP Professional x64 Edition
Windows® Vista x64 Edition

- Some old-version DDR2-800 DIMMs may not match Intel®'s On-Die-Termination (ODT) requirement and will automatically downgrade to run at DDR2-667. If this happens, contact your memory vendor to check the ODT value.

- Due to chipset limitation, DDR2-800 with CL=4 will be downgraded to run at DDR2-667 by default setting. If you want to operate with lower latency, adjust the memory timing manually.

P5E Motherboard Qualified Vendors Lists (QVL)
DDR2-800 MHz capability

Size	Vendor	Chip No.	CL	Chip Brand	SS/DS	Part No.	DIMM socket support (Optional)		
							A*	B*	C*
512MB	KINGSTON	K4T51083QC	5	SEC	SS	KVR800D2N5/512	*	*	*
1024MB	KINGSTON	Heat-Sink Package	4-4-4-12	N/A	DS	KHX6400D2LL/1G	*	*	
1024MB	KINGSTON	V59C1512804QBF25	N/A	N/A	DS	KVR800D2N5/1G	*	*	*
1024MB	KINGSTON	Heat-Sink Package	N/A	N/A	SS	KHX6400D2ULK2/1G	*	*	*
2048MB	KINGSTON	Heat-Sink Package	N/A	N/A	DS	KHX6400D2ULK2/2G	*	*	*
512MB	Qimonda	HYB18T512800BF25F	5-5-5	N/A	SS	HYS64T64000HU-25F-B	*	*	*
1024MB	Qimonda	HYB18T512800BF25F	5-5-5	N/A	DS	HYS64T128020HU-25F-B	*	*	*
512MB	Hynix	HY5PS12821CFP-S5	5-5-5	Hynix	SS	HYMP564U64CP8-S5	*	*	*
1024MB	Hynix	HY5PS12821CFP-S5	5-5-5	Hynix	DS	HYMP512U64CP8-S5	*	*	*
512MB	MICRON	D9GKX	N/A	N/A	SS	MT8HTF6464AY-80ED4	*	*	*
1024MB	MICRON	D9GKX	N/A	N/A	DS	MT16HTF12864AY-80ED4	*	*	*
1024MB	CORSAIR	Heat-Sink Package	4	N/A	DS	CM2X1024-6400C4	*	*	*
1024MB	ELPIDA	E1108AB-8E-E(ECC)	5	ELPIDA	SS	EBE10EE8ABFA-8E-E	*	*	*
2048MB	ELPIDA	E1108AB-8E-E(ECC)	5	ELPIDA	DS	EBE21EE8ABFA-8E-E	*	*	*
512MB	Crucial	Heat-Sink Package	4	N/A	SS	BL6464AA804.8FD	*	*	*
1024MB	Crucial	Heat-Sink Package	4	N/A	DS	BL12864AA804.16FD	*	*	*
1024MB	Crucial	Heat-Sink Package	4	N/A	DS	BL12864AL804.16FD3	*	*	*
1024MB	Crucial	Heat-Sink Package	4	N/A	DS	BL12864AA804.16FD3	*	*	*
512MB	Apacer	Heat-Sink Package	5	N/A	DS	AHU512E800C5K1C	*	*	*
1024MB	Apacer	Heat-Sink Package	5	N/A	DS	AHU01GE800C5K1C	*	*	*
512MB	A-DATA	AD29608A8A-25EG	N/A	N/A	SS	M2OAD6G3H3160G1E53	*	*	
512MB	KINGMAX	KKA8FEIBF-HJK-25A	N/A	KINGMAX	SS	KLDC28F-A8KI5	*	*	*
1024MB	KINGMAX	KKA8FEIBF-HJK-25A	N/A	KINGMAX	DS	KLDD48F-ABKI5	*	*	
512MB	Transcend	HY5PS12821CFP-S5	N/A	Hynix	SS	TS64MLQ64V8J	*	*	*
1024MB	Transcend	HY5PS12821CFP-S5	N/A	Hynix	DS	TS128MLQ64V8J	*	*	*
512MB	Super Talent	Heat-Sink Package	N/A	N/A	SS	T800UA12C4	*	*	
1024MB	Super Talent	Heat-Sink Package	N/A	N/A	DS	T800UB1GC4	*	*	*
512MB	NANYA	NT5TU64M8BE-25C	5	NANYA	SS	NT512T64U880BY-25C	*	*	*
1024MB	NANYA	NT5TU64M8BE-25C	5	NANYA	DS	NT1GT64U8HB0BY-25C	*	*	*
512MB	PSC	A3R12E3HEF641B9A05	5	PSC	SS	AL6E8E63B8E1K	*	*	*
1024MB	PSC	A3R12E3HEF641B9A05	5	PSC	DS	AL7E8E63B-8E1K	*	*	
256MB	TwinMOS	E2508AB-GE-E	5	ELPIDA	SS	8G-24IK2-EBT	*	*	*
1024MB	Elixir	N2TU51280BE-25C	N/A	Elixir	DS	M2Y1G64TU8HB0B-25C	*	*	*

P5E Motherboard Qualified Vendors Lists (QVL)
DDR2-667MHz capability

Size	Vendor	Chip No.	CL	Chip Brand	SS/DS	Part No.	DIMM socket support (Optional)		
							A*	B*	C*
512MB	KINGSTON	D6408TEBGGL3U	5	KINGSTON	SS	KVR667D2N5/512	*	*	*
256MB	KINGSTON	HYB18T256800AF3S	5	N/A	SS	KVR667D2N5/256	*	*	
256MB	KINGSTON	6SBI2D9DCG	5	MICRON	SS	KVR667D2N5/256	*	*	*
2048MB	KINGSTON	E1108AB-6E-E	N/A	ELPIDA	DS	KVR667D2N5/2G	*	*	*
1024MB	Qimonda	HYB18T512800BF3S(ECC)	5-5-5	N/A	DS	HYS72T128020HU-3S-B	*	*	*
512MB	Qimonda	HYB18T512800BF3S	5	N/A	SS	HYS64T64000HU-3S-B	*	*	
1024MB	Qimonda	HYB18T512800BF3S	5	N/A	DS	HYS64T128020HU-3S-B	*	*	*
256MB	SAMSUNG	K4T51163QE-ZCE6	5	SAMSUNG	SS	M378T3354EZ3-CE6	*	*	*
512MB	SAMSUNG	K4T51083QE	5	SAMSUNG	DS	M378T6553EZS-CE6	*	*	*
1024MB	SAMSUNG	K4T51083QE	5	SAMSUNG	DS	M378T2953EZ3-CE6	*	*	*
256MB	Hynix	HY5PS121621CFP-Y5	5	Hynix	SS	HYMP532U64CP6-Y5	*	*	*
1024MB	Hynix	HY5PS12821CFP-Y5	5	Hynix	DS	HYMP512U64CP8-Y5	*	*	*
256MB	CORSAIR	MIII00605	N/A	N/A	SS	VS256MB667D2	*	*	*
512MB	CORSAIR	64M8CFEG	N/A	N/A	SS	VS512MB667D2	*	*	*
1024MB	CORSAIR	64M8CFEG	N/A	N/A	DS	VS1GB667D2	*	*	*
256MB	ELPIDA	E2508AB-6E-E	5	ELPIDA	SS	EBE25UC8ABFA-6E-E	*	*	*
512MB	A-DATA	AD29608A8A-3EG	5	A-DATA	SS	M2OAD5G3H3166I1C52	*	*	
1024MB	A-DATA	AD29608A8A-3EG	5	A-DATA	DS	M2OAD5G3I4176I1C52	*	*	
2048MB	A-DATA	NT5TU128M8BJ-3C	N/A	N/A	DS	M2ONY5H3J4170I1C5Z	*	*	*
512MB	crucial	Heat-Sink Package	3	N/A	SS	BL6464AA663.8FD	*		
1024MB	crucial	Heat-Sink Package	3	N/A	DS	BL12864AA663.16FD	*		*
1024MB	crucial	Heat-Sink Package	3	N/A	DS	BL12864AL664.16FD	*	*	*
512MB	Apacer	AM4B5708GQJS7E0628F	5	APACER	SS	AU512E667C5KBGC	*	*	*
1024MB	Apacer	AM4B5708GQJS7E	5	APACER	DS	AU01GE667C5KBGC	*	*	*
512MB	Transcend	K4T51083QE	N/A	SAMSUNG	SS	TS64MLQ64V6J	*	*	*
1024MB	Transcend	K4T51083QE	N/A	SAMSUNG	DS	TS128MLQ64V6J	*	*	*
256MB	Kingmax	N2TU51216AG-3C	5	NANYA	SS	KLCB68F-36KH5	*	*	*
512MB	Kingmax	KKEA88B4LAUG-29DX	5	KINGMAX	SS	KLCC28F-A8KB5	*	*	*
1024MB	Kingmax	KKEA88B4LAUG-29DX	5	KINGMAX	DS	KLCD48F-A8KB5	*	*	
512MB	Super Talent	Heat-Sink Package	5	N/A	SS	T6UA512C5	*	*	*
1024MB	Super Talent	Heat-Sink Package	5	N/A	DS	T6UB1GC5	*	*	*
2048MB	NANYA	NT5TU128M8BJ-3C	5	NANYA	DS	NT2GT64U8HB0JY-3C	*	*	*
512MB	NANYA	NT5TU64M8BE-3C	5	NANYA	SS	NT512T64U88B0BY-3C	*	*	*
512MB	PSC	A3R12E3GEF637BLC5N	5	PSC	SS	AL6E8E63B-6E1K	*	*	*
1024MB	PSC	A3R12E3GEF637BLC5N	5	PSC	DS	AL7E8E63B-6E1K	*	*	*
512MB	TwinMOS	TMM6208G8M30C	5	TwinMOS	SS	8D-23JK5M2ETP	*	*	*

SS - Single-sided   DS - Double-sided
DIMM support:
A -   **Supports one module inserted into either slot, in Single-channel memory configuration.**
B -   **Supports one pair of modules inserted into either Channel A or Channel B as one pair of Dual-channel memory configuration.**
C -   **Supports four modules inserted into the orange and black slots as two pairs of Dual-channel memory configuration.**

Visit the ASUS website for the latest DDR2 QVL.

2.4.3   Installing a DIMM

⚠️ Unplug the power supply before adding or removing DIMMs or other system components. Failure to do so can cause severe damage to both the motherboard and the components.

To install a DIMM:

1. Unlock a DIMM socket by pressing the retaining clips outward.

2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.

3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.
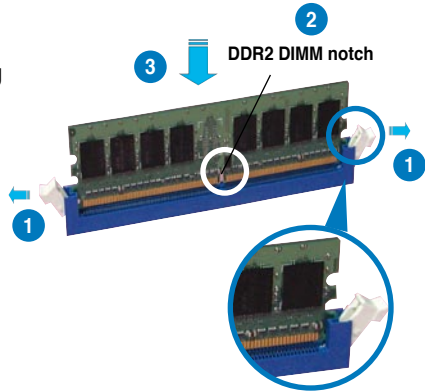
DDR2 DIMM notch

Unlocked retaining clip

✎
- A DDR2 DIMM is keyed with a notch so that it fits in only one direction. Do not force a DIMM into a socket to avoid damaging the DIMM.

- The DDR2 DIMM sockets do not support DDR DIMMs. Do not install DDR DIMMs to the DDR2 DIMM sockets.

2.4.4   Removing a DIMM

To remove a DIMM:

1. Simultaneously press the retaining clips outward to unlock the DIMM.

✎ Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

DDR2 DIMM notch
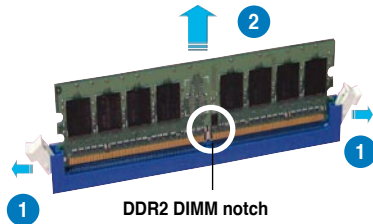
2. Remove the DIMM from the socket.

2.5 Expansion slots

In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support.

⚡ Make sure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

2.5.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

2.5.2 Configuring an expansion card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 4 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the tables on the next page.
3. Install the software drivers for the expansion card.

✎ When using PCI cards on shared slots, ensure that the drivers support "Share IRQ" or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable. Refer to the table on the next page for details.

2.5.3 Interrupt assignments

IRQ	Priority	Standard function
0	1	System timer
1	2	Keyboard controller
2	–	Re-direct to IRQ#9
3	11	IRQ holder for PCI steering*
4	12	Communications port (COM1)*
5	13	IRQ holder for PCI steering*
6	14	Floppy disk controller
7	15	Printer port (LPT1)*
8	3	System CMOS/Real Time Clock
9	4	IRQ holder for PCI steering*
10	5	IRQ holder for PCI steering*
11	6	IRQ holder for PCI steering*
12	7	PS/2 compatible mouse port*
13	8	Numeric data processor
14	9	SATA Primary IDE (legacy mode)
15	10	SATA Secondary IDE (legacy mode)

* These IRQs are usually available for PCI devices.

IRQ assignments for this motherboard

	A	B	C	D	E	F	G	H
PCI slot 1	shared	–	–	–	–	–	–	–
PCI slot 2	–	shared	–	–	–	–	–	–
LAN (8001)	–	–	shared	–	–	–	–	–
SATA (368)	shared	–	–	–	–	–	–	–
PCIe x16_1	shared	–	–	–	–	–	–	–
PCIe x16_2	shared	–	–	–	–	–	–	–
PCIe x1_1	shared	–	–	–	–	–	–	–
PCIe x1_2	–	–	shared	–	–	–	–	–
PCIe x1_3	–	–	–	shared	–	–	–	–
USB controller 1	–	–	–	–	–	–	–	shared
USB controller 2	–	–	–	shared	–	–	–	–
USB controller 3	–	–	shared	–	–	–	–	–
USB controller 4	shared	–	–	–	–	–	–	–
USB controller 5	–	–	–	–	–	shared	–	–
USB controller 6	–	–	shared	–	–	–	–	–
USB 2.0 controller 1	–	–	–	–	–	–	–	shared
USB 2.0 controller 2	–	–	shared	–	–	–	–	–
SATA controller 1	–	–	–	shared	–	–	–	–
SATA controller 2	–	–	–	–	–	–	shared	–

2.5.4   PCI slots

The PCI slots support cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications. Refer to the figure below for the location of the slots.

2.5.5   PCI Express x1 slots

This motherboard supports PCI Express x1 network cards, SCSI cards and other cards that comply with the PCI Express specifications. Refer to the figure below for the location of the slots.

> • Install the audio card prior to other compatible cards to the black PCIe x1 slot.
>
> • Install a PCIe x1 device to a PCIe x1 slot prior to a PCIe x16 slot.

2.5.6   PCI Express 2.0 x16 slots

This motherboard supports two ATI CrossFire™ PCI Express x16 graphics cards that comply with the PCI Express specifications. Refer to the figure below for the location of the slots.
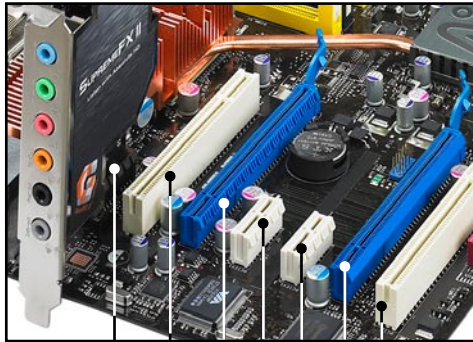
Audio/PCI Express x1 slot 1
PCI slot 1
PCI Express 2.0 x16 slot 1
PCI Express x1 slot 2
PCI slot 2
PCI Express 2.0 x16 slot 2
PCI Express x1 slot 3

> • In CrossFire™ mode, install the ATI CrossFire™ Edition (Master) graphics card on the primary PCI Express slot.
>
> • Install two ATI graphics cards from the same GPU family that support CrossFire™ mode.
>
> • If you install two VGA cards, we recommend that you plug the rear chassis fan cable to the motherboard connector labeled CHA_FAN1/3 for better thermal environment. See page 2-36 for the connector location.

2.6   Switch

1.   **Clear RTC RAM (Gaming Level Switch Design)**

This switch allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

1.   Turn OFF the computer and unplug the power cord.

2.   Remove the onboard battery.

3.   Move the switch from Disable (default) to Enable. Keep the switch on Enable for about 5~10 seconds, then move the switch back to Disable.

4.   Reinstall the battery.

5.   Plug the power cord and turn ON the computer.

6.   Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Except when clearing the RTC RAM, never move the CLRTC switch from its default position, or the system will encounter boot failure!

CLRTC_SW

Enable   Disable (Default)
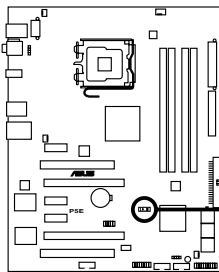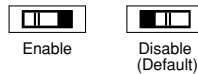
P5E Clear RTC RAM

- You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.

- Due to the chipset limitation, AC power off is required prior using C.P.R. function. You must turn off and on the power supply or unplug and plug the power cord before reboot the system.

2.7 Audio card installation

2.7.1 Audio card Installation

1. Take out the Audio card from the package.

2. Locate the audio slot on the motherboard.
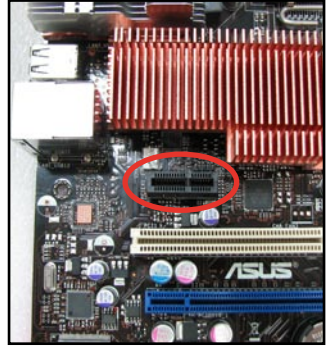
3. Align the card connector with the slot and press firmly until the card sits on the slot completely.

4. The photo below shows the audio card installed on the motherboard.

2.8 Connectors

2.8.1 Rear panel connectors
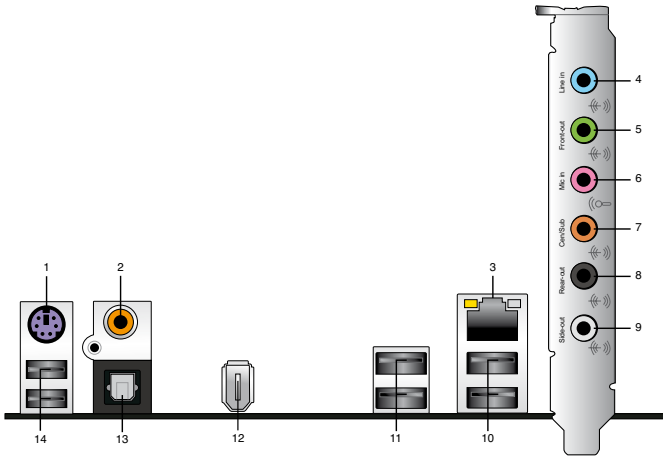
1. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

2. **Coaxial S/PDIF Out port.** This port connects an external audio output device via a coaxial S/PDIF cable.

3. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

32-bit OS LAN port LED indications

Activity/Link	Speed LED	Description
OFF	OFF	Soft-off Mode
YELLOW*	OFF	During Power ON/OFF
YELLOW*	ORANGE	100 Mbps connection

* Blinking
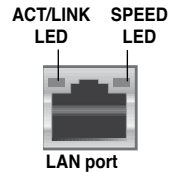
64-bit OS LAN port LED indications

Activity/Link	Speed LED	Description
OFF	OFF	Soft-off Mode
YELLOW*	OFF	During Power ON/OFF
YELLOW*	ORANGE	100 Mbps connection
YELLOW*	GREEN	1 Gbps connection

* Blinking

4. **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.

5. **Line Out port (lime).** This port connects a headphone or a speaker. In 4-channel, 6-channel, and 8-channel configuration, the function of this port becomes Front Speaker Out.

6. **Microphone port (pink).** This port connects a microphone.

7. **Center/Subwoofer port (orange).** This port connects the center/subwoofer speakers.

8. **Rear Speaker Out port (black).** This port connects the rear speakers on a 4-channel, 6-channel, or 8-channel audio configuration.

9. **Side Speaker Out port (gray).** This port connects the side speakers in an 8-channel audio configuration.

> Refer to the audio configuration table on the next page for the function of the audio ports in 2, 4, 6, or 8-channel configuration.

Audio 2, 4, 6, or 8-channel configuration

Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Line In
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	–	–	Center/Subwoofer	Center/Subwoofer
Black	–	Rear Speaker Out	Rear Speaker Ou	Rear Speaker Out
Gray	–	–	–	Side Speaker Out

10. **USB 2.0 ports 1 and 2 .** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

11. **USB 2.0 ports 3 and 4.** These 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

12. **IEEE 1394a port.** This 6-pin IEEE 1394a port provides high-speed connectivity for audio/video devices, storage peripherals, PCs, or portable devices.

13. **Optical S/PDIF Out port.** This port connects an external audio output device via an optical S/PDIF cable.

14. **USB 2.0 ports 5 and 6.** These 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

2.8.2   Internal connectors

1.   Floppy disk drive connector (34-1 pin FLOPPY)

This connector is for the provided floppy disk drive (FDD) signal cable. Insert one end of the cable to this connector, then connect the other end to the signal connector at the back of the floppy disk drive.

Pin 5 on the connector is removed to prevent incorrect cable connection when using a FDD cable with a covered Pin 5.
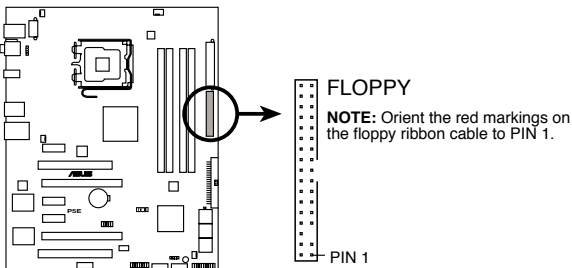
P5E Floppy disk drive connector

2.   IDE connector (40-1 pin PRI_EIDE)

The onboard IDE connector is for the Ultra DMA 133/100 signal cable. There are three connectors on each Ultra DMA 133/100 signal cable: blue, black, and gray. Connect the blue connector to the motherboard's IDE connector, then select one of the following modes to configure your device.

PRI_EIDE
NOTE: Orient the red markings (usually zigzag) on the IDE cable to PIN 1.
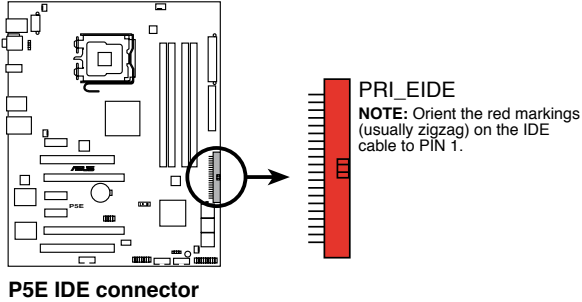
P5E IDE connector

	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
	Slave	Slave	

•   Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.

•   Use the 80-conductor IDE cable for Ultra DMA 133/100 IDE devices.

If any device jumper is set as "Cable-Select," make sure all other device jumpers have the same setting.

3. ICH9R Serial ATA connectors (7-pin SATA1~6)

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives.

If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 5, RAID 10 configuration with the Intel® Matrix Storage Technology through the onboard Intel® ICH9R RAID controller.

SATA1	SATA2
SATA3	SATA4
SATA5	SATA6

P5E SATA connectors
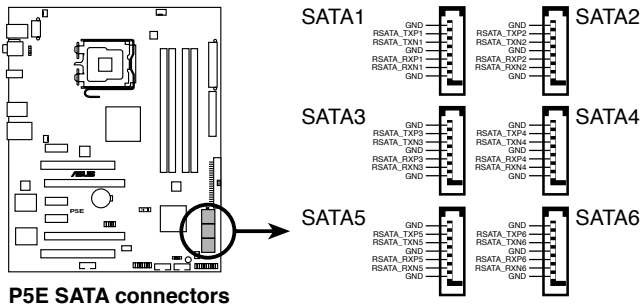
- You must install the Windows® XP Service Pack 1 before using Serial ATA hard disk drives. The Serial ATA RAID feature (RAID 0/RAID 1/RAID 5/RAID 10) is available only if you are using Windows® XP or later version.

- These connectors are set to Standard IDE mode by default. In Standard IDE mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the [Configure SATA as] item in the BIOS to [RAID]. See section **4.3.6 SATA Configuration** for details.

- For RAID 5, use at least three hard disk drives. For RAID 10, use at least four hard disk drives. Use two to four Serial ATA hard disk drives for each RAID 0 or RAID 1 set.

- Before creating a RAID set, refer to **5.4.3 Intel® RAID configurations** or the manual bundled in the motherboard support DVD.

Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

right angle side
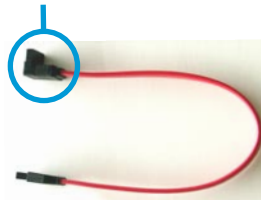
4. USB connectors (10-1 pin USB 78, USB 910, USB 1112)

These connectors are for USB 2.0 ports. Connect the USB module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.

P5E
USB 2.0 connectors

USB910   USB78

USB+5V	USB+5V
USB_P10-	USB_P8-
USB_P10+	USB_P8+
GND	GND
NC	NC

USB+5V	USB+5V
USB_P9-	USB_P7-
USB_P9+	USB_P7+
GND	GND
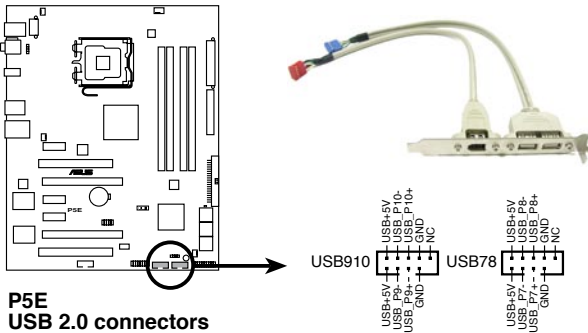
> ⚠ Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

> ✎ You can connect the USB cable to ASUS Q-Connector (USB, blue) first, and then install the Q-Connector (USB) to the USB connector onboard.

5. IEEE 1394a port connector (10-1 pin IE1394_2)

This connector is for a IEEE 1394a port. Connect the IEEE 1394a module cable to this connector, then install the module to a slot opening at the back of the system chassis.

IE1394_2

PIN 1

TPA1-
TPA1+
GND
GND
TPB1-
TPB1+
+12V
+12V
GND
GND

P5E IEEE 1394a connector
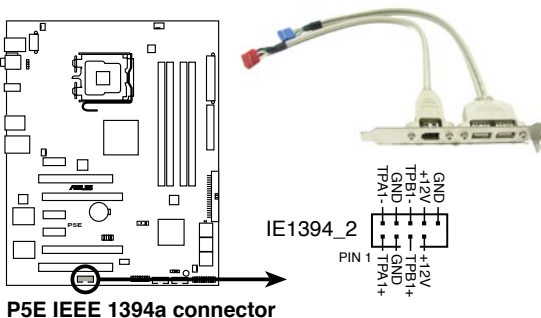
> ⚠ Never connect a USB cable to the IEEE 1394a connector. Doing so will damage the motherboard!

> ✎ You can connect the 1394 cable to ASUS Q-Connector (1394, red) first, and then install the Q-Connector (1394) to the 1394 connector onboard.

6. CPU, chassis, and optional fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN1~2, 3-pin PWR_FAN)

The fan connectors support cooling fans of 350 mA~1000 mA (24 W max.) or a total of 1 A~3.48 A (41.76 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.

> ⚠ DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors!
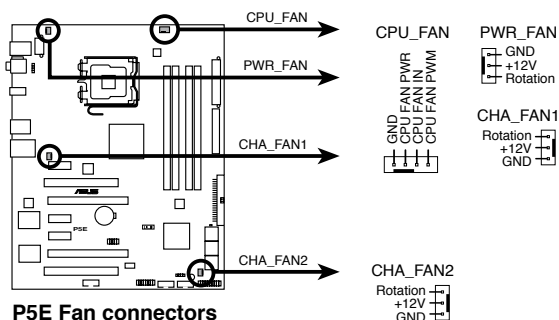
P5E Fan connectors

> 🖊
> • Only the CPU_FAN, CHA_FAN1~3, and OPT_FAN1~3 connectors support the ASUS Q-Fan 2 feature.
> • If you install two VGA cards, we recommend that you plug the chassis fan cable to the motherboard connector labled CHA_FAN1 or CHA_FAN3 for better themal environment.

7. **Chassis intrusion connector (4-1 pin CHASSIS)**

This connector is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.

By default , the pin labeled "Chassis Signal" and "Ground" are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.
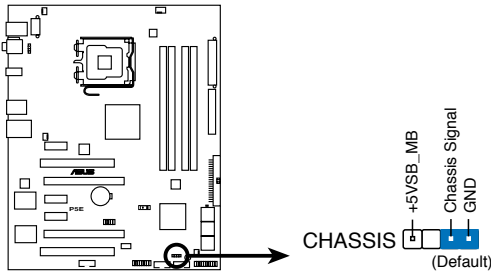
P5E Chassis intrusion connector

CHASSIS

+5VSB_MB
Chassis Signal
GND
(Default)

8. **Digital audio connector (4-1 pin SPDIF_OUT for ASUS HDMI VGA card)**

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port(s). If you are using an ASUS HDMI-equipped graphics card, connect the HDMI card to this connector with a S/PDIF Out cable.

SPDIF_OUT

GND
SPDIFOUT
+5V
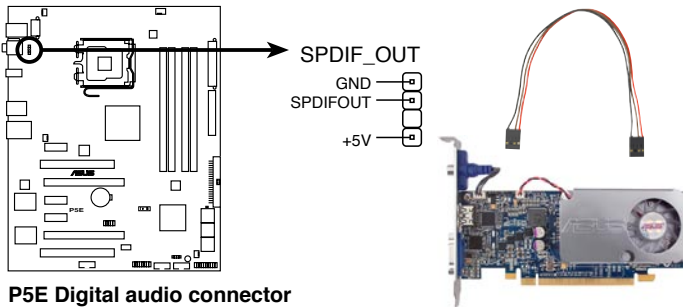
P5E Digital audio connector

The ASUS HDMI-equipped graphics card and the S/PDIF Out cable are purchased separately.

9. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)

These connectors are for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

EATXPWR

+3 Volts — Ground
+12 Volts — +5 Volts
+12 Volts — +5 Volts
+5V Standby — +5 Volts
Power OK — -5 Volts
Ground — Ground
+5 Volts — Ground
Ground — Ground
+5 Volts — PSON#
Ground — Ground
+3 Volts — -12 Volts
+3 Volts — +3 Volts

EATX12V

GND — +12V DC
GND — +12V DC
GND — +12V DC
GND — +12V DC

P5E ATX power connectors
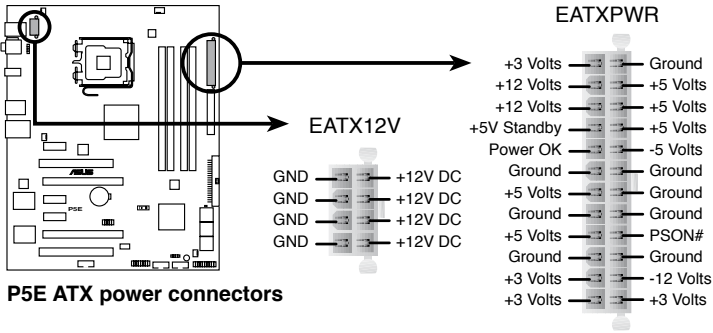
• Make sure to remove the cap on the EATX12V connector before connecting an 8-pin EPS +12V power plug.

• Use only an 8-pin EPS +12V power plug for the EATX12V connector.

• For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 400 W.

• Do not forget to connect the 4-pin/8pin EATX12V power plug; otherwise, the system will not boot.

• Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.

• If you are uncertain about the minimum power supply requirement for your system, refer to the **Recommended Power Supply Wattage Calculator** at http://support.asus.com/PowerSupplyCalculator/PSCalculator. aspx?SLanguage=en-us for details.

• The ATX 12 V Specification 2.0-compliant (400W) PSU has been tested to support the motherboard power requirements with the following configuration:
CPU: Intel® Pentium® Extreme 3.73GHz
Memory: 512 MB DDR2 (x4)
Graphics card: ASUS EAX1900XT
Parallel ATA device: IDE hard disk drive
Serial ATA device: SATA hard disk drive (x2)
Optical drive: DVD-RW

• If you want to use two high-end PCI Express x16 cards, use a PSU with 500W to 600W power or above to ensure the system stability.

10. System panel connector (20-8 pin PANEL)

This connector supports several chassis-mounted functions.

P5E System panel connector

PLED SPEAKER

PANEL

IDE_LED RESET

PWRSW

* Requires an ATX power supply.
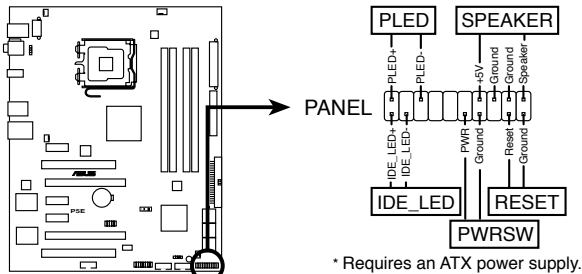
- **System power LED (2-pin PLED)**

  This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Hard disk drive activity LED (2-pin IDE_LED)**

  This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

- **System warning speaker (4-pin SPEAKER)**

  This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **ATX power button/soft-off button (2-pin PWRSW)**

  This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **Reset button (2-pin RESET)**

  This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

ASUS Q-Connector (system panel)

You can use the ASUS Q-Connector to connect/disconnect chassis front panel cables in a few steps. Refer to the instructions below to install the ASUS Q-Connector.

1. Connect the front panel cables to the ASUS Q-Connector.

    Refer to the labels on the Q-Connector to know the detailed pin definitions, then match them to the respective front panel cable labels.
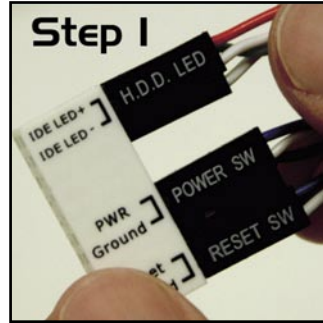
2. Install the ASUS Q-Connector to the system panel connector, making sure the orientation matches the labels on the motherboard.
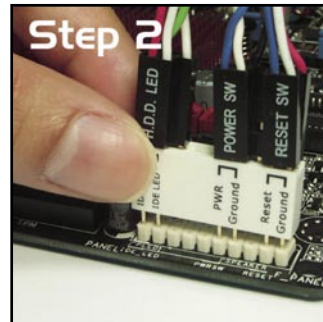
3. The front panel functions are now enabled. The figure shows the Q-Connector properly installed on the motherboard.
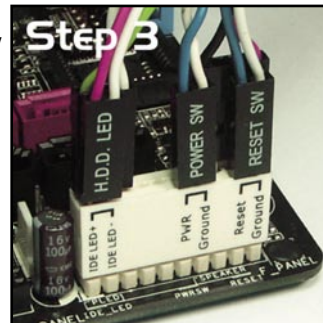
This chapter describes the power up
sequence, the vocal POST messages,
and ways of shutting down the system.

Powering up 3

Chapter summary

3

3.1 Starting up for the first time

1. After making all the connections, replace the system case cover.

2. Be sure that all switches are off.

3. Connect the power cord to the power connector at the back of the system chassis.

4. Connect the power cord to a power outlet that is equipped with a surge protector.

5. Turn on the devices in the following order:

    a. Monitor

    b. External SCSI devices (starting with the last device on the chain)

    c. System power

6. After applying power, the system power LED on the system front panel case lights up. For systems with ATX power supplies, the system LED lights up when you press the ATX power button. If your monitor complies with "green" standards or if it has a "power standby" feature, the monitor LED may light up or switch between orange and green after the system LED turns on.

    The system then runs the power-on self tests or POST. While the tests are running, the BIOS beeps (see BIOS beep codes table below) or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

BIOS Beep	Description
One short beep	VGA detected Quick boot set to disabled No keyboard detected
One continuous beep followed by two short beeps then a pause (repeated)	No memory detected
One continuous beep followed by three short beeps	No VGA detected
One continuous beep followed by four short beeps	Hardware component failure

7. At power on, hold down the <Delete> key to enter the BIOS Setup. Follow the instructions in Chapter 4.

3.2 Turning off the computer

3.2.1 Using the OS shut down function

If you are using Windows® XP:

1. Click the **Start** button then select **Turn Off Computer**.
2. Click the **Turn Off** button to shut down the computer.
3. The power supply should turn off after Windows® shuts down.

If you are using Windows® Vista™:

1. Click the **Start** button then select **ShutDown**.
2. The power supply should turn off after Windows® shuts down.

3.2.2 Using the dual function power switch

While the system is ON, pressing the power switch for less than four seconds puts the system to sleep mode or to soft-off mode, depending on the BIOS setting. Pressing the power switch for more than four seconds lets the system enter the soft-off mode regardless of the BIOS setting. Refer to section **4.6 Power Menu** in Chapter 4 for details.

This chapter tells how to change
the system settings through the BIOS
Setup menus. Detailed descriptions
of the BIOS parameters are also
provided.

BIOS setup

4

Chapter summary

4

4.1 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup.

1. **ASUS Update** (Updates the BIOS in Windows® environment.)
2. **ASUS EZ Flash 2** (Updates the BIOS using a floppy disk or USB flash disk.)
3. **ASUS AFUDOS** (Updates the BIOS using a bootable floppy disk)
4. **ASUS CrashFree BIOS 3** (Updates the BIOS using a USB flash disk or the motherboard support DVD when the BIOS file fails or gets corrupted.)

Refer to the corresponding sections for details on these utilities.

> Save a copy of the original motherboard BIOS file to a bootable floppy disk or USB flash disk in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the ASUS Update or AFUDOS utilities.

4.1.1 ASUS Update utility

The ASUS Update is a utility that allows you to manage, save, and update the motherboard BIOS in Windows® environment. The ASUS Update utility allows you to:

- Save the current BIOS file
- Download the latest BIOS file from the Internet
- Update the BIOS from an updated BIOS file
- Update the BIOS directly from the Internet, and
- View the BIOS version information.

This utility is available in the support DVD that comes with the motherboard package.

> ASUS Update requires an Internet connection either through a network or an Internet Service Provider (ISP).

Installing ASUS Update

To install ASUS Update:

1. Place the support DVD in the optical drive. The Drivers menu appears.
2. Click the Utilities tab, then click Install ASUS Update VX.XX.XX.
3. The ASUS Update utility is copied to your system.

Quit all Windows® applications before you update the BIOS using this utility.

Updating the BIOS through the Internet

To update the BIOS through the Internet:

1.   Launch the ASUS Update utility from the Windows® desktop by clicking **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate**. The ASUS Update main window appears.
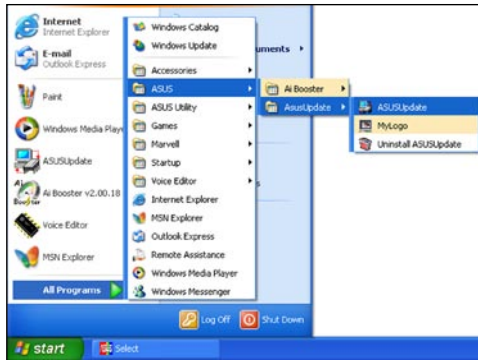
2.   Select **Update BIOS** from the Internet option from the drop-down menu, then click **Next**.

3.   Select the ASUS FTP site nearest you to avoid network traffic, or click **Auto Select**. Click **Next**.

4. From the FTP site, select the BIOS version that you wish to download. Click **Next**.

5. Follow the screen instructions to complete the update process.

✏️ The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.

Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

1. Launch the ASUS Update utility from the Windows® desktop by clicking **Start** > **Programs** > **ASUS** > **ASUSUpdate** > **ASUSUpdate**. The ASUS Update main window appears.

2. Select **Update BIOS** from a file option from the drop-down menu, then click **Next**.

3. Locate the BIOS file from the Open window, then click **Open**.

4. Follow the screen instructions to complete the update process.
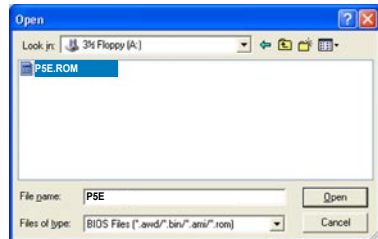
4.1.2   Creating a bootable floppy disk

1.   Do either one of the following to create a bootable floppy disk.

    DOS environment

    a.   Insert a 1.44MB floppy disk into the drive.

    b.   At the DOS prompt, type *format* **A:/S** then press <Enter>.

    Windows® XP environment

    a.   Insert a 1.44 MB floppy disk to the floppy disk drive.

    b.   Click **Start** from the Windows® desktop, then select **My Computer**.

    c.   Select the 3 1/2 Floppy Drive icon.

    d.   Click File from the menu, then select **Format**. A **Format 3 1/2 Floppy Disk** window appears.

    e.   Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.

2.   Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

4.1.3   ASUS EZ Flash 2 utility

The ASUS EZ Flash 2 feature allows you to update the BIOS without having to go through the long process of booting from a floppy disk and using a DOS-based utility. The EZ Flash 2 utility is built-in the BIOS chip so it is accessible by pressing <Alt> + <F2> during the Power-On Self Tests (POST).

To update the BIOS using EZ Flash 2:

1.   Visit the ASUS website (www.asus.com) to download the latest BIOS file for the motherboard.

2.   Save the BIOS file to a floppy disk or a USB flash disk, then restart the system.

3.   You can launch the EZ Flash 2 by two methods.

    (1)   Insert the floppy disk / USB flash disk that contains the BIOS file to the floppy disk drive or the USB port.

        Press <Alt> + <F2> during POST to display the following.

```
              ASUSTek EZ Flash 2 BIOS ROM Utility V3.06
  FLASH TYPE: MXIC 25L1605A
  ┌─── Current ROM ───┐        ┌─── Update ROM ───┐
  │ BOARD: P5E        │        │ BOARD: Unknown   │
  │ VER:   0102       │        │ VER:   Unknown   │
  │ DATE:  08/24/07   │        │ DATE:  Unknown   │
  └───────────────────┘        └──────────────────┘
  PATH: A:\
  ┌─────────┐ ┌──────────────────────────────────────┐
  │ A:      │ │                                      │
  │         │ │                                      │
  │         │ │                                      │
  │         │ │                                      │
  │         │ │                                      │
  ┌─ Note ──┴─┴──────────────────────────────────────┐
  │    [Enter] Select or Load    [B] Backup    [ESC] Exit │
  │    [Tab] Switch              [Up/Down/Home/End] Move  │
  └──────────────────────────────────────────────────┘
```
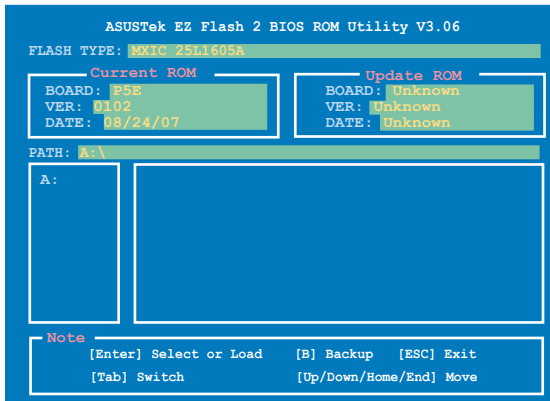
    (2)   Enter BIOS setup program. Go to the **Tools** menu to select **EZ Flash2** and press <Enter> to enable it.

        You can switch between drives by pressing <Tab> before the correct file is found. Then press <Enter>.

4.   When the correct BIOS file is found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.

⚠️   •   This function can support devices such as USB flash disk, or floppy disk with **FAT 32/16** format and single partition only.

    •   DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

4.1.4 AFUDOS utility

The AFUDOS utility allows you to update the BIOS file in DOS environment using a bootable floppy disk with the updated BIOS file. This utility also allows you to copy the current BIOS file that you can use as backup when the BIOS fails or gets corrupted during the updating process.

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:

> • Make sure that the floppy disk is not write-protected and has at least 1024KB free space to save the file.
>
> • The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be same as shown.

1. Copy the AFUDOS utility (afudos.exe) from the motherboard support DVD to the bootable floppy disk you created earlier.

2. Boot the system in DOS mode, then at the prompt type:

   afudos /o[filename]

   where the [filename] is any user-assigned filename not more than eight alphanumeric characters for the main filename and three alphanumeric characters for the extension name.

   ```
   A:\>afudos /oOLDBIOS1.rom
   ```

   Main filename   Extension name

3. Press <Enter>. The utility copies the current BIOS file to the floppy disk.

   ```
   A:\>afudos /oOLDBIOS1.rom
   AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
   Copyright (C) 2002 American Megatrends, Inc. All rights reserved.
      Reading flash ..... done
      Write to file...... ok
   A:\>
   ```

   The utility returns to the DOS prompt after copying the current BIOS file.

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

1. Visit the ASUS website (www.asus.com) and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable floppy disk.

> Write the BIOS filename on a piece of paper. You need to type the exact BIOS filename at the DOS prompt.

2. Copy the AFUDOS utility (afudos.exe) from the motherboard support DVD to the bootable floppy disk you created earlier.

3. Boot the system in DOS mode, then at the prompt type:

    afudos /i[filename]

    where [filename] is the latest or the original BIOS file on the bootable floppy disk.

    ```
    A:\>afudos /iP5E.ROM
    ```

4. The utility verifies the file and starts updating the BIOS.

    ```
    A:\>afudos /iP5E.ROM
    AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
    Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

        WARNING!! Do not turn off power during flash BIOS
        Reading file ....... done
        Reading flash ...... done

        Advance Check ......
        Erasing flash ...... done
        Writing flash ...... 0x0008CC00 (9%)
    ```

> DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

5. The utility returns to the DOS prompt after the BIOS update process is completed. Reboot the system from the hard disk drive.

    ```
    A:\>afudos /iP5E.ROM
    AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
    Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

        WARNING!! Do not turn off power during flash BIOS
        Reading file ....... done
        Reading flash ...... done

        Advance Check ......
        Erasing flash ...... done
        Writing flash ...... done
        Verifying flash .... done

        Please restart your computer

    A:\>
    ```

4.1.5   ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using the motherboard support DVD or the USB flash disk that contains the updated BIOS file.

> • Prepare the motherboard support DVD, the floppy disk or the USB flash disk containing the updated motherboard BIOS before using this utility.
>
> • If you use a SATA optical drive, always connect the SATA cable to the SATA1/SATA 2/SATA3/SATA4 connector; otherwise, the utility will not function.

Recovering the BIOS from the support DVD

To recover the BIOS from the support DVD:

1.   Turn on the system.
2.   Insert the motherboard support DVD to the optical drive.
3.   The utility displays the following message and automatically checks the DVD for the BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
```

When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
Floppy found!
Reading file "P5E.ROM". Completed.
Start flashing...
```

4.   Restart the system after the utility completes the updating process.

Recovering the BIOS from the USB flash disk

To recover the BIOS from the USB flash disk:

1.   Insert the USB flash disk that contains BIOS file to the USB port.
2.   Turn on the system.
3.   The utility will automatically checks the devices for the BIOS file When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.
4.   Restart the system after the utility completes the updating process.

> • Only the USB flash disk with FAT 32/16 format and single partition can support ASUS CrashFree BIOS 3. The device size should be smaller than 8GB.
>
> • DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

4.2   BIOS setup program

This motherboard supports a programmable Serial Peripheral Interface (SPI) chip that you can update using the provided utility described in section **4.1 Managing and updating your BIOS**.

Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to "Run Setup." This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the SPI chip.

The SPI chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section **4.9 Exit Menu**.

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

4.2.1 BIOS menu screen

Menu items   Menu bar   Configuration fields   General help

```
                          BIOS SETUP UTILITY
  Main     Ai Tweaker    Advanced    Power    Boot    Tools    Exit

   System Time              [10:55:25]            Use [ENTER], [TAB]
   System Date              [Mon 07/23/2007]      or [SHIFT-TAB] to
   Legacy Diskette A        [1.44M, 3.5 in.]      select a field.
   Language                 [English]
                                                  Use [+] or [-] to
 ▶ SATA1                    [Not Detected]        configure the System
 ▶ SATA2                    [Not Detected]        Time.
 ▶ SATA3                    [Not Detected]
 ▶ SATA4                    [Not Detected]
 ▶ SATA5                    [Not Detected]
 ▶ SATA6                    [Not Detected]        ←→    Select Screen
                                                  ↑↓    Select Item
 ▶ SATA Configuration                             +-    Change Field
 ▶ System Information                             Tab   Select Field
                                                  F1    General Help
                                                  F10   Save and Exit
                                                  ESC   Exit

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```

Sub-menu items   Navigation keys

4.2.2 Menu bar

The menu bar on top of the screen has the following main items:

Main	For changing the basic system configuration
Ai Tweaker	For changing the overclocking settings
Advanced	For changing the advanced system settings
Power	For changing the advanced power management (APM) configuration
Boot	For changing the system boot configuration
Tools	For configuring options for special functions
Exit	For selecting the exit options and loading default settings

To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

4.2.3 Navigation keys

At the bottom right corner of a menu screen are the navigation keys for that particular menu. Use the navigation keys to select items in the menu and change the settings.

The navigation keys may differ from one screen to another.

4.2.4   Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting Main shows the Main menu items.

The other items (Advanced, Power, Boot, and Exit) on the menu bar have their respective menu items.
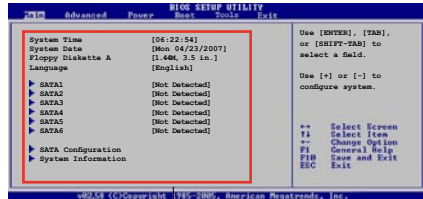
Main menu items

4.2.5   Sub-menu items

A solid triangle before each item on any menu screen means that the iteam has a sub-menu. To display the sub-menu, select the item and press <Enter>.

4.2.6   Configuration fields

These fields show the values for the menu items. If an item is user- configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to **4.2.7 Pop-up window**.

4.2.7   Pop-up window

Select a menu item then press <Enter> to display a pop-up window with the configuration options for that item.

4.2.8   Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> /<Page Down> keys to display the other items on the screen.
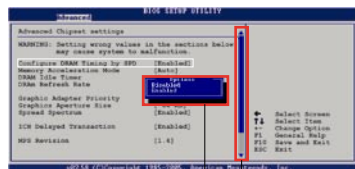
Pop-up window

Scroll bar

4.2.9   General help

At the top right corner of the menu screen is a brief description of the selected item.

4.3 Main menu

When you enter the BIOS Setup program, the Main menu screen appears, giving you an overview of the basic system information.

Refer to section **4.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.

```
                            BIOS SETUP UTILITY
   Main     Ai Tweaker    Advanced    Power    Boot     Tools    Exit

  System Time                [10:55:25]           Use [ENTER], [TAB]
  System Date                [Mon 04/23/2007]     or [SHIFT-TAB] to
  Legacy Diskette A          [1.44M, 3.5 in.]     select a field.
  Language                   [English]
                                                  Use [+] or [-] to
 ▶ SATA1                     [Not Detected]       configure the System
 ▶ SATA2                     [Not Detected]       Time.
 ▶ SATA3                     [Not Detected]
 ▶ SATA4                     [Not Detected]
 ▶ SATA5                     [Not Detected]
 ▶ SATA6                     [Not Detected]
                                                  ←→    Select Screen
 ▶ SATA Configuration                             ↑↓    Select Item
 ▶ System Information                             +-    Change Field
                                                  Tab   Select Field
                                                  F1    General Help
                                                  F10   Save and Exit
                                                  ESC   Exit

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```

4.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

4.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

4.3.3 Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed.
Configuration options: [Disabled] [720K , 3.5 in.] [1.44M, 3.5 in.]

4.3.4 Language [English]

Allows you to select the display language for the BIOS setup screen.
Configuration options: [Chinese(BIG5)] [Chinese(GB)] [Japanese] [Français] [German] [English]

4.3.5   SATA 1-6

While entering Setup, the BIOS automatically detects the presence of Serial ATA devices. There is a separate sub-menu for each SATA device. Select a device item then press <Enter> to display the SATA device information.

```
                            BIOS SETUP UTILITY
 Main

 SATA 1                                         Select  the  type  of
 Device       : Hard Disk                       device connected to
 Vendor       : WDC WD800JD-00LSA0              the system.
 Size         : 80.0GB
 LBA Mode     : Supported
 Block Mode   : 16Sectors
 PIO Mode     : 4
 Async DMA    : MultiWord DMA-2
 Ultra DMA    : Ultra DMA-5
 SMART Monitoring: Supported

 Type                          [Auto]
 LBA/Large Mode                [Auto]           ←→   Select Screen
 Block(Multi-Sector Transfer)  [Auto]           ↑↓   Select Item
 PIO Mode                      [Auto]           +-   Change Option
 DMA Mode                      [Auto]           F1   General Help
 SMART Monitoring              [Auto]           F10  Save and Exit
 32Bit Data Transfer           [Enabled]        ESC  Exit

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```

The BIOS automatically detects the values opposite the dimmed items (Device, Vendor, Size, LBA Mode, Block Mode, PIO Mode, Async DMA, Ultra DMA, and SMART monitoring). These values are not user-configurable. These items show N/A if no IDE device is installed in the system.

Type [Auto]

Selects the type of IDE drive. Setting to [Auto] allows automatic selection of the appropriate IDE device type. Select [DVDROM] if you are specifically configuring a DVD-ROM drive. Select [ARMD] (ATAPI Removable Media Device) if your device is either a ZIP, LS-120, or MO drive.
Configuration options: [Not Installed] [Auto] [DVDROM] [ARMD]

LBA/Large Mode [Auto]

Enables or disables the LBA mode. Setting to [Auto] enables the LBA mode if the device supports this mode, and if the device was not previously formatted with LBA mode disabled. Configuration options: [Disabled] [Auto]

Block (Multi-Sector Transfer) [Auto]

Enables or disables data multi-sectors transfers. When set to [Auto], the data transfer from and to the device occurs multiple sectors at a time if the device supports multi-sector transfer feature. When set to [Disabled], the data transfer from and to the device occurs one sector at a time.
Configuration options: [Disabled] [Auto]

PIO Mode [Auto]

Allows you to select the data transfer mode.
Configuration options: [Auto] [0] [1] [2] [3] [4]

DMA Mode [Auto]

Selects the DMA mode.
Configuration options: [Auto] [SWDMA0] [SWDMA1] [SWDMA2] [MWDMA0]
[MWDMA1] [MWDMA2] [UDMA0] [UDMA1] [UDMA2] [UDMA3] [UDMA4] [UDMA5]

SMART Monitoring [Auto]

Sets the Smart Monitoring, Analysis, and Reporting Technology.
Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

Enables or disables 32-bit data transfer.
Configuration options: [Disabled] [Enabled]

4.3.6 SATA Configuration

The items in this menu allow you to set or change the configurations for the SATA
devices installed in the system. Select an item then press <Enter> if you want to
configure the item.

```
                        BIOS SETUP UTILITY
 Main

  SATA Configuration                                      Options

  SATA Configuraton            [Enhanced]
   Configure SATA as           [IDE]              Disabled
                                                  Compatible
  Hard Disk Write Protect      [Disabled]         Enhanced
  SATA Detect Time Out (Sec)   [35]
```
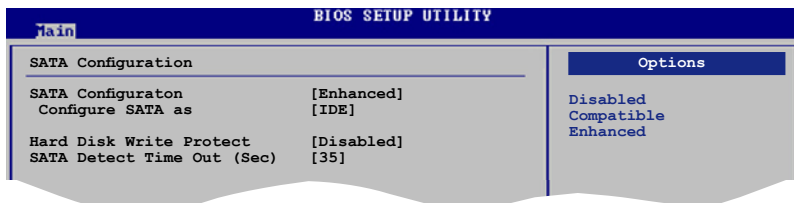
SATA Configuration [Enhanced]

Configuration options: [Disabled] [Compatible] [Enhanced]

> *Configure SATA as [IDE]*
> Sets the configuration for the Serial ATA connectors supported by the
> Southbridge chip. Configuration options: [IDE] [RAID] [AHCI]
>
> The AHCI allows the onboard storage driver to enable advanced Serial
> ATA features that increases storage performance on random workloads by
> allowing the drive to internally optimize the order of commands.
>
> If you want to create a RAID 0, RAID 1, RAID 5, RAID 10, or the Intel® Matrix
> Storage Technology configuration from the Serial ATA hard disk drives, set
> this item to [RAID].
>
> If you want to use the Serial ATA hard disk drives as Parallel ATA physical
> storage devices, keep the default setting [IDE].
>
> If you want the Serial ATA hard disk drives to use the Advanced Host Controller
> Interface (AHCI), set this item to [AHCI].

Hard Disk Write Protect [Disabled]

Disables or enables device write protection. This will be effective only if the device is accessed through BIOS. Configuration option: [Disabled] [Enabled]

SATA Detect Time Out (Sec) [35]

Selects the time out value for detecting ATA/ATAPI devices.
Configuration options: [0] [5] [10] [15] [20] [25] [30] [35]

4.3.7   AHCI Configuration

This menu is the section for AHCI configuration. It appears only when you set the item **Configure SATA as** from the sub-menu of **SATA Configuration** to [AHCI].

```
                          BIOS SETUP UTILITY
   Main

   AHCI Settings

   AHCI DVD/DVD Boot Time out          [15]          Some SATA DVD/DVD in
                                                     AHCI mode need to
 ▶ AHCI Port1 [Not Detected]                         wait ready longer.
 ▶ AHCI Port2 [Not Detected]
 ▶ AHCI Port3 [Not Detected]
 ▶ AHCI Port4 [Not Detected]
 ▶ AHCI Port5 [Not Detected]
 ▶ AHCI Port6 [Not Detected]
```
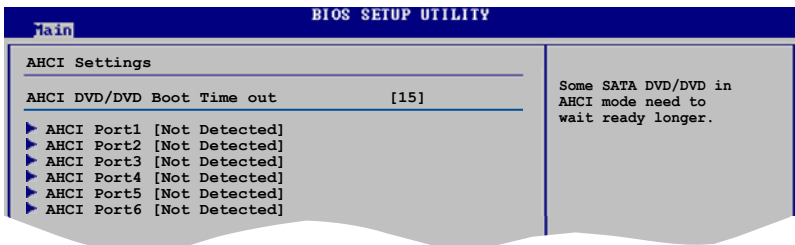
AHCI DVD/DVD Boot Time out [15]

Selects the boot time out value for ACHI DVD/DVD devices.
Congifuration options: [0] [5] [10] [15] [20] [25] [30] [35]

AHCI Port1~6 [XXXX]

Displays the status of auto-detection of SATA devices.

```
                          BIOS SETUP UTILITY
   Main

   AHCI Port1

   Device    :Not Detected                           Select the type of
                                                      devices connected to
   SATA Port1                [Auto]                   the system.
   SMART Monitoring          [Enabled]
```
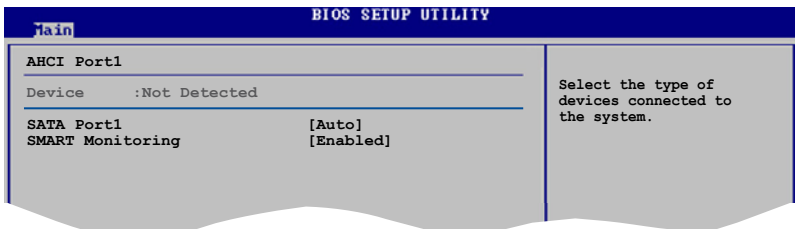
SATA Port1 [Auto]
Allows you to select the type of device connected to the system.
Configuration options: [Auto] [Not Installed]

SMART Monitoring [Enabled]
Allows you to set the Self-Monitoring, Analysis and Reporting Technology.
Configuration options: [Disabled] [Enabled]

4.3.8 System Information

This menu gives you an overview of the general system specifications. The BIOS automatically detects the items in this menu.

```
                         BIOS SETUP UTILITY
  Main

   ASUS BIOS
   Version    : 0102
   Build Date : 08/24/07


   Processor
   Type       : Intel(R) Core(TM)2 Duo @ CPU 3.00GHz
   Speed      :3000 MHz
   Count      : 2

   System Memory
   Available    : 512 MB
                                              ←→   Select Screen
                                              ↑↓   Select Item
                                              F1   General Help
                                              F10  Save and Exit
                                              ESC  Exit


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```
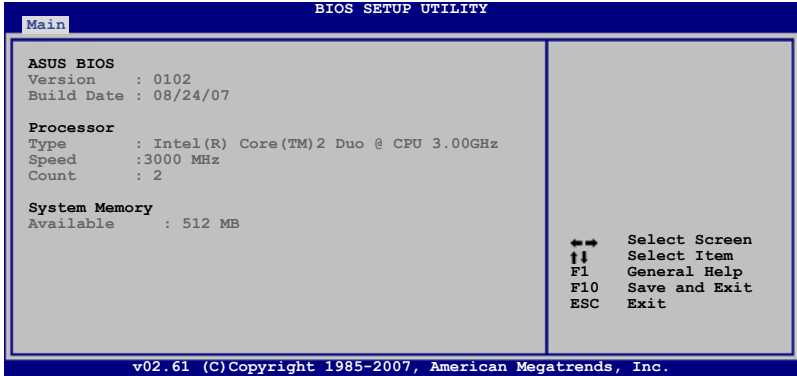
ASUS BIOS

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

Displays the auto-detected system memory.

4.4   Ai Tweaker menu

The Ai Tweaker menu items allow you to configure overclocking-related items.

⚠️   Take caution when changing the settings of the Ai Tweaker menu items.
Incorrect field values can cause the system to malfunction.

```
                         BIOS SETUP UTILITY
    Main     Ai Tweaker              Power    Boot   Tools    Exit
 ┌────────────────────────────────────────────┬──────────────────────────┐
 │ Ai Overclock Tuner Tuner        [Auto]      │ Select the target CPU    │
 │ CPU Ratio Control               [Auto]      │ frequency, and the       │
 │ FSB Strap to North Bridge       [Auto]      │ relevant parameters      │
 │                                             │ will be auto-adjusted.   │
 │ DRAM Frequency                  [Auto]      │ Frequencies higher       │
 │ DRAM Timing Control             [Auto]      │ than CPU manufacturer    │
 │ DRAM Command Rate               [Auto]      │ recommends are not       │
 │ DRAM Static Read Control        [Auto]      │ guaranteed to be         │
 │ Transaction Booster             [Auto]      │ stable. If the system    │
 │                                             │ becomes unstable,        │
 │ CPU Spread Spectrum             [Auto]      │ return to the default.   │
 │ PCIE Spread Spectrum            [Auto]      │                          │
 │                                             │ ←→    Select Screen      │
 │                                             │ ↑↓    Select Item        │
 │                                             │ Enter Go to Sub Screen   │
 │                                             │ +-    Change Option      │
 │                                             │ F1    General Help       │
 │                                             │ F10   Save and Exit      │
 │                                             │ ESC   Exit               │
 └────────────────────────────────────────────┴──────────────────────────┘
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```

4.4.1   Ai Overclock Tuner [Auto]

Allows selection of CPU overclocking options to achieve desired CPU internal
frequency. Select either one of the preset overclocking configuration options:

Manual	Allows you to individually set overclocking parameters.
Auto	Loads the optimal settings for the system.
X.M.P.	If you install memory module(s) supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to set the profile(s) supported by your memory module(s) for optimizing the system performance.

📝   The configuration options for the following sub-item vary depending on the
DIMMs you install on the motherboard.

eXtreme Memory Profile [Disabled]
This item appears only when you set the **Ai Overclock Tuner** item to
[X.M.P.]. Allows you to select the X.M.P. mode supported by your Memory
module.
Configuration options: [Disabled] [Profile #1] [Profile #2]

4.4.2   CPU Ratio Control [Auto]

Configuration options: [Auto] [Manual].

Ratio CMOS Setting [9]
This sub-item appears only when you set the **CPU Ratio Control** item to [Manual]. Allows you to set the ratio between CPU Core Clock and FSB Frequency. Use the <+> and <-> keys to adjust the ratio. If an invalid ratio is set in CMOS, then actual and setpoint values may differ.

4.4.3   FSB Strap to North Bridge [Auto]

When set to [Auto], the FSB Strap will be adjusted automatically by FSB Frequency and DRAM Frequency.
Congifuration options: [Auto] [200MHz] [266MHz] [333MHz]

> The following item appears only when you set the **Ai Overclock Tuner** item to

FSB Frequency [XXX]
Displays the frequency sent by the clock generator to the system bus and PCI bus. The value of this item is auto-detected by the BIOS. Use the <+> and <-> keys to adjust the FSB frequency. You can also type the desired CPU frequency using the numeric keypad. The values range from 200 to 800. Refer to the table below for the correct Front Side Bus and CPU External Frequency settings.

FSB/CPU External Frequency Synchronization

Front Side Bus	CPU External Frequency
FSB 1333	333 MHz
FSB 1066	266 MHz
FSB 800	200 MHz

> The following item appears only when you set the **Ai Overclock Tuner** item to

PCIE Frequency [Auto]
Allows you to set the PCI Express frequency. Use the <+> and <-> keys to adjust the PCIE frequency. The values range from 100 to 150.

4.4.4 DRAM Frequency [Auto]

Allows you to set the DDR2 operating frequency.
Configuration options: [Auto] [DDR2-667 MHz] [DDR2-800MHz] [DDR2-835MHz]
[DDR2-1002MHz] [DDR2-1066] [DDR2-1111] [DDR2-1333]

> The **DRAM Frequency** configuration options vary with the **FSB Frequency** settings.

> Selecting a very high DRAM frequency may cause the system to become unstable! If this happens, revert to the default setting.

4.4.5 DRAM Timing Control [Auto]

Configuration options: [Auto] [Manual]

> • The following sub-items apprear only when you set the DRAM Timing Control item to [Manual].
>
> • The configuration options for some of the following items vary depending on the DIMMs you install on the motherboard.

CAS# Latency [5 DRAM Clocks]
Configuration options: [3 DRAM Clocks] [4 DRAM Clocks] [5 DRAM Clocks]
[6 DRAM Clocks].....[17 DRAM Clocks] [18 DRAM Clocks]

RAS# to CAS# Delay [5 DRAM Clocks]
Configuration options: [3 DRAM Clocks] [4 DRAM Clocks] [5 DRAM Clocks]
[6 DRAM Clocks].....[17 DRAM Clocks] [18 DRAM Clocks]

RAS# Precharge [5 DRAM Clocks]
Configuration options: [3 DRAM Clocks] [4 DRAM Clocks] [5 DRAM Clocks]
[6 DRAM Clocks].....[17 DRAM Clocks] [18 DRAM Clocks]

RAS# Active Time [15 DRAM Clocks]
Configuration options: [3 DRAM Clocks] [4 DRAM Clocks] [5 DRAM Clocks]
[6 DRAM Clocks].....[33 DRAM Clocks] [34 DRAM Clocks]

RAS# to RAS# Delay [Auto]
Configuration options: [Auto] [1 DRAM Clocks]~[15 DRAM Clocks]

Row Refresh Cycle Time [Auto]
Configuration options: [Auto] [20 DRAM Clocks] [25 DRAM Clocks]
[30 DRAM Clocks] [35 DRAM Clocks] [42 DRAM Clocks]

Write Recovery Time [Auto]
Configuration options: [Auto] [1 DRAM Clocks]~[15 DRAM Clocks]

Write to Read Delay [Auto]
Configuration options: [Auto] [1 DRAM Clocks]~[15 DRAM Clocks]

Read to Precharge Time [Auto]
Configuration options: [Auto] [1 DRAM Clocks]~[15 DRAM Clocks]

4.4.6 DRAM Command Rate [Auto]

Configuration options: [Auto] [1T] [2T]

4.4.7 DRAM Static Read Control [Auto]

Configuration options: [Auto] [Disabled] [Enabled]

4.4.8 Transaction Booster [Auto]

Configuration options: [Auto] [Disabled] [Enabled]

Boost Level [0]
This sub-item appears only when you set the **Transaction Booster** item to [Enabled]. Set this item to a higher level to get better performance. Use the <+> and <-> keys to adjust the value. The values range from 0 to 3.

Relax Level [0]
This sub-item appears only when you set the **Transaction Booster** item to [Disabled]. Set this item to a higher level to get better compatibility. Use the <+> and <-> keys to adjust the value. The values range from 0 to 3.

> The following seven items appear only when you set the **Ai Overclock Tuner** item to [Manual] and [X.M.P.] and are adjusted by typing the desired values using the numeric keypad and press the <Enter> key. Use the <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

VCORE Voltage [Auto]

Allows you to set the CPU VCore voltage. The values range from 1.10000V to 2.40000V with a 0.00625V interval.

> Refer to the CPU documentation before setting the CPU Vcore voltage. Setting a high VCore voltage may damage the CPU permanently, and setting a low VCore voltage may make the system unstable.

CPU PLL Voltage [Auto]

Allows you to set the CPU PLL voltage. The values range from 1.50V to 2.78V with a 0.02V interval.

FSB Termination Voltage [Auto]

Allows you to set the front side bus termination voltage. The values range from 1.20V to 1.50V with a 0.02V interval.

DRAM Voltage [Auto]

Allows you to set the DRAM voltage. The values range from 1.80V to 2.66V with a 0.02V interval.

North Bridge Voltage [Auto]

Allows you to set the North Bridge voltage. The values range from 1.25V to 1.75V with a 0.02V interval.

- Setting the CPU PLL Voltage, FSB Termination Voltage, DRAM Voltage and North Bridge Voltage to a high level may damage the chipset, memory module, and CPU permanently. Proceed with caution.

- Some values of the CPU PLL Voltage, FSB Termination Voltage, DRAM Voltage and North Bridge Voltage items are labeled in different color, indicating the risk levels of high voltage settings. Refer to the table below for details.

- The system may need better cooling system to work stably under high voltage settings.

	Blue	Yellow	Purple	Red
CPU PLL Voltage	1.50V~1.78V	1.80V~2.00V	2.02V~2.20V	2.22V~2.78V
FSB Termination Voltage	1.20V~1.38V	1.40V~1.50V	N/A	N/A
DRAM Voltage	1.80V~1.98V	2.00V~2.20V	2.22V~2.40V	2.42V~2.66V
North Bridge Voltage	N/A	1.25V~1.41V	1.43V~1.55V	1.57V~1.75V

South Bridge Voltage [Auto]

Allows you to set the South Bridge voltage. The values range from 1.050V to 1.225V with a 0.15V interval.

Clock Over-Charging Voltage [Auto]

Allows you to set the Clock Over-Charging voltage. The values range from 0.70V to 1.00V with a 0.10V interval.

The following three items appear when you set the **Ai Overclock Tuner** item to [Manual] and [X.M.P.].

CPU Voltage Damper [Auto]

Allows you to enable or disable the CPU voltage damper.
Configuration options: [Auto] [Disabled] [Enabled]

CPU Voltage Reference [Auto]

Configuration options: [Auto] [0.63x] [0.61x] [0.59x] [0.57x]

North Bridge Voltage Reference [Auto]

Configuration options: [Auto] [0.67x] [0.63x] [0.60x] [0.57x] [0.56x] [0.53x] [0.51x] [0.49x]

SB 1.5V Voltage [Auto]

Configuration options: [Auto] [1.50V] [1.55V] [1.60V] [1.65V] [1.70V] [1.75V] [1.80V]

VCC EXT PLL OV [Auto]

Configuration options: [Auto] [Disabled] [Enabled]

4.4.9 CPU Spread Spectrum [Auto]

Allows you to disable or set to auto the CPU clock spread spectrum.
Configuration options: [Auto] [Disabled]

4.4.10 PCIE Spread Spectrum [Auto]

Allows you to disable or set to auto the PCI Express clock spread spectrum.
Configuration options: [Auto] [Disabled]

4.5 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.

⚠️ Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

```
                          BIOS SETUP UTILITY
  Main      Ai Tweaker           Power    Boot    Tools    Exit

  ►  CPU Configuration
  ►  Chipset
  ►  Onboard Devices Configuration
  ►  USB Configuration
  ►  PCIPnP



                                          ←→    Select Screen
                                          ↑↓    Select Item
                                          Enter Go to Sub Screen
                                          F1    General Help
                                          F10   Save and Exit
                                          ESC   Exit

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```
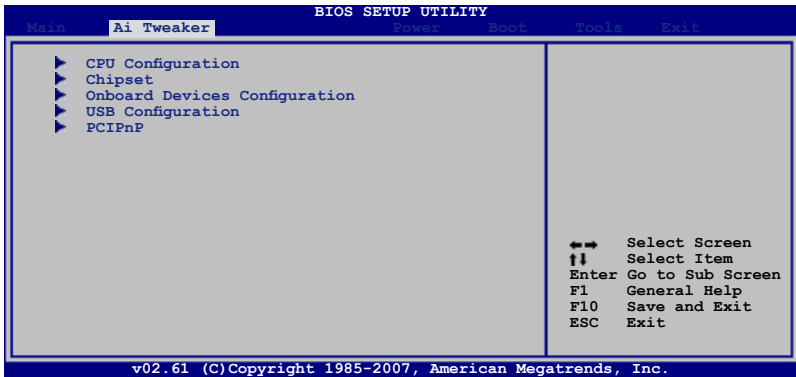
4.5.1 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects.

```
                          BIOS SETUP UTILITY
              Advanced

  Configure advanced CPU settings                    Options

  Manufacturer: Intel                          Auto
  Brand String: Intel(R) Core(TM)2 Duo CPU @ 3.00GHz   Manual
  Frequency   : 3.00GHz
  FSB Speed   : 1333 MHz
  Cache L1    : 64 KB
  Cache L2    : 4096 KB
  CPUID       : 6F9
  Ratio Status: Unlocked (Max:09, Min:06)
  Ratio Actual Value : 9

  CPU Ratio Control          [Auto]
  C1E Support                [Enabled]
  CPU TM function            [Enabled]          ←→    Select Screen
  Vanderpool Technology      [Enabled]          ↑↓    Select Item
  Execute Disable Bit        [Enabled]          +-    Change Option
  Max CPUID Value Limit      [Disabled]         F1    General Help
  Intel(R) SpeedStep(TM) Tech.  [Enabled]       F10   Save and Exit
                                                ESC   Exit

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```

CPU Ratio Control [Auto]

Configuration options: [Auto] [Manual]

📝 The following item appears when the item **CPU Ratio Control** is set to [Manual].

Ratio CMOS Setting: [9]
Allows you to set the ratio between the CPU Core Clock and the FSB
Frequency. Use <+> and <-> to adjust the value.
Configuration options: [6] [7] [8] [9]

The options vary depending on the CPU you install.

C1E Support [Enabled]

Allows you to enable or disable C1E Support.
Configuration options: [Disabled] [Enabled]

CPU TM function [Enabled]

Configuration options: [Disabled] [Enabled]

Vanderpool Technology [Enabled]

Configuration options: [Disabled] [Enabled]

Execute Disable Bit [Enabled]
Allows you to enable or disable the No-Execution Page Protection Technology.
Setting this item to [Disabled] forces the XD feature flag to always return to zero
(0). Configuration options: [Disabled] [Enabled]

Max CPUID Value Limit [Disabled]

Setting this item to [Enabled] allows legacy operating systems to boot even without
support for CPUs with extended CPUID functions.
Configuration options: [Disabled] [Enabled]

The following item appears only when you set the **CPU Ratio Control** item to
[Auto].

Intel(R) SpeedStep (TM) Tech. [Enabled]

Configuration options: [Disabled] [Enabled]

4.5.2   Chipset

The Chipset menu allows you to change the advanced chipset settings. Select an item then press <Enter> to display the sub-menu.

```
                         BIOS SETUP UTILITY
          Advanced

Advanced Chipset Settings                          Configure North Bridge
                                                   features.
WARNING: Setting wrong values in below sections
         may cause system to malfunction.


▶  North Bridge Configuration
```

North Bridge Chipset Configuration

```
                         BIOS SETUP UTILITY
          Advanced

North Bridge Chipset Configuration                       Options

Memory Remap Feature            [Enabled]         Disabled
Initiate Graphic Adapter        [PEG/PCI]         Enabled
PEG Port Control                [Auto]
  PEG Port Force x1             [Disabled]
```
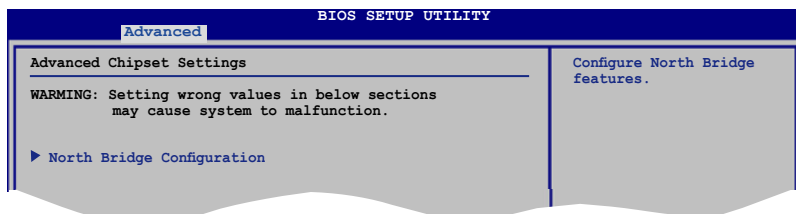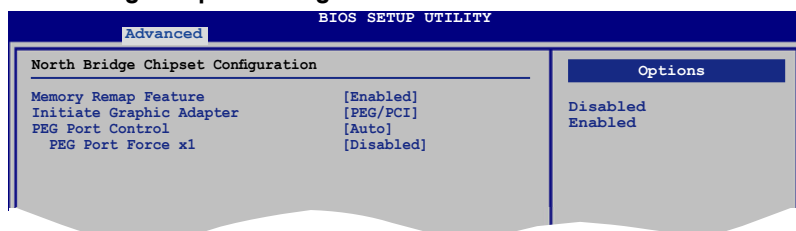
Memory Remap Feature [Disabled]
Allows you to enable or disable the remapping of the overlapped PCI memory above the total physical memory. Enable this option only when you install 64-bit operating system. Configuration options: [Disabled] [Enabled]

Initiate Graphic Adapter [PEG/PCI]
Allows you to decide which graphics controller to use as the primary boot device. Configuration options: [PCI/PEG] [PEG/PCI]

PEG Port Control [Auto]
Configuration options: [Auto] [Disabled]

The following item appears only when you set **PEG Port Control** to [Auto]

PEG Port Force x1 [Disabled]
Configuration options: [Enabled] [Disabled]

4.5.3   Onboard Device Configuration

```
                            BIOS SETUP UTILITY
          Advanced

   Onboard Device Configuration
 ┌──────────────────────────────────────────────────┬─────────────────────────┐
   High Definition Audio           [Enabled]           Enable or Disable
     Front Panel Type              [HD Audio]           High Definition Audio
   J-Micron PATA Controller        [Enabled]            Controller
   Marvell GigaBit LAN             [Enabled]
     LAN Boot ROM                  [Disabled]
   VIA 1394                        [Enabled]


                                                     ←→   Select Screen
                                                     ↑↓   Select Item
                                                     +-   Change Option
                                                     F1   General Help
                                                     F10  Save and Exit
                                                     ESC  Exit

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```

High Definition Audio [Enabled]

Allows you to enable or disable the High Definition Audio Controller.
Configuration options: [Enabled] [Disabled]

> *Front Panel Support Type [HD Audio]*
> Allows you to set the front panel audio connector (AAFP) mode to legacy
> AC'97 or high-definition audio depending on the audio standard that the front
> panel audio module supports. Configuration options: [AC97] [HD Audio]

J-Micron PATA Controller [Enabled]

Configuration options: [Enabled] [Disabled]

Marvell GigaBit LAN [Enabled]

Configuration options: [Enabled] [Disabled]

> *LAN Boot ROM [Disabled]*
> Configuration options: [Disabled] [Enabled]

VIA 1394 [Enabled]

Configuration options: [Enabled] [Disabled]

4.5.4 USB Configuration

The items in this menu allows you to change the USB-related features. Select an item then press <Enter> to display the configuration options.

```
                              BIOS SETUP UTILITY
     Advanced
┌────────────────────────────────────────────────┬──────────────────────────┐
│ USB Configuration                               │        Options           │
│                                                 │                          │
│ USB Devices Enabled:                            │ Disabled                 │
│         None                                    │ Enabled                  │
│                                                 │                          │
│ USB Functions         [Enabled]                 │                          │
│ USB 2.0 Controller    [Enabled]                 │                          │
│ USB 2.0 Controller Mode  [HiSpeed]              │                          │
│ BIOS EHCI Hand-off    [Enabled]                 │                          │
│ Port 64/60 Emulation  [Disabled]                │                          │
│ Legacy USB Support    [Auto]                    │                          │
│                                                 │  ←→   Select Screen      │
│                                                 │  ↑↓   Select Item        │
│                                                 │  +-   Change Option      │
│                                                 │  F1   General Help       │
│                                                 │  F10  Save and Exit      │
│                                                 │  ESC  Exit               │
└────────────────────────────────────────────────┴──────────────────────────┘
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```
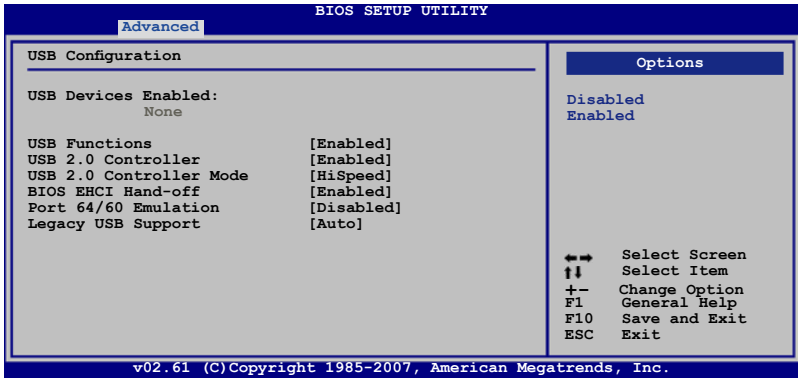
> The **USB Devices Enabled** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

USB Functions [Enabled]

Allows you to enable or disable the USB Host Controllers.
Configuration options: [Disabled] [Enabled]

> The following items appear only when you set **USB Functions** to [Enabled].

USB 2.0 Controller [Enabled]

Allows you to enable or disable the USB 2.0 controller.
Configuration options: [Enabled] [Disabled]

USB 2.0 Controller Mode [HiSpeed]

Allows you to set the USB 2.0 controller mode to HiSpeed (480 Mbps) or FullSpeed (12 Mbps). Configuration options: [FullSpeed] [HiSpeed]

> The **USB 2.0 Controller Mode** item appears only when you enable the **USB 2.0 Controller**.

BIOS EHCI Hand-off [Enabled]

Allows you to enable the support for operating systems without an EHCI hand-off feature. Configuration options: [Disabled] [Enabled]

Port 64/60 Emulation [Disabled]

Allows you to enable or disable the I/O port 60h/64h emulation support. This item should be enabled for the complete USB keyboard legacy support for non-USB aware OSes. Configuration options: [Disabled] [Enabled]

Legacy USB Support [Auto]

Allows you to enable or disable the support for legacy USB devices. Setting to [Auto] allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled.
Configuration options: [Disabled] [Enabled] [Auto]

4.5.5   PCIPnP

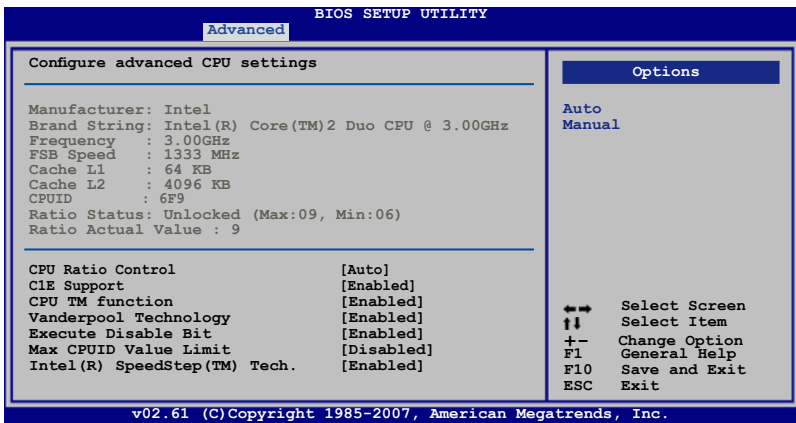The PCIPnP menu items allow you to change the advanced settings for PCI/PnP devices.

Take caution when changing the settings of the PCIPnP menu items. Incorrect field values can cause the system to malfunction.

```
                        BIOS SETUP UTILITY
    Advanced
  Advanced PCI/PnP Settings                      NO: lets the BIOS
                                                 configure all the
                                                 devices in the system.
  WARNING: Setting wrong values in below sections
           may cause system to malfunction.      YES: lets the operating
                                                 system configure Plug
  Plug And Play O/S             [NO]             and Play (PnP) devices
                                                 not required for boot
                                                 if your system has a
                                                 Plug and Play operating
                                                 system.

                                                    Select Screen
                                                    Select Item
                                                 +-  Change Option
                                                 F1   General Help
                                                 F10  Save and Exit
                                                 ESC  Exit

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```

Plug And Play O/S [NO]

When set to [NO], BIOS configures all the devices in the system. When set to [YES] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot.
Configuration options: [NO] [YES]

4.6   Power menu

The Power menu items allow you to change the settings for the Advanced Power Management (APM). Select an item then press <Enter> to display the configuration options.

```
                            BIOS SETUP UTILITY
    Main     Ai Tweaker    Advanced    Power    Boot    Tools    Exit
  ┌─────────────────────────────────────────────┬──────────────────────────┐
  │                                              │  Select the ACPI state   │
  │  Suspend Mode                 [Auto]         │  used for System         │
  │  Repost Video on S3 Resume    [Disabled]     │  Suspend.                │
  │  ACPI 2.0 Support             [Disabled]     │                          │
  │  ACPI APIC Support            [Enabled]      │                          │
  │                                              │                          │
  │  ▶  APM Configuration                        │                          │
  │  ▶  Hardware Monitor                         │                          │
  │                                              │                          │
  │                                              │                          │
  │                                              │  ←→    Select Screen     │
  │                                              │  ↑↓    Select Item       │
  │                                              │  +-    Change Option     │
  │                                              │  F1    General Help      │
  │                                              │  F10   Save and Exit     │
  │                                              │  ESC   Exit              │
  │                                              │                          │
  └─────────────────────────────────────────────┴──────────────────────────┘
        v02.61 (C)Copyright 1985-2007, American Megatrends, Inc.
```
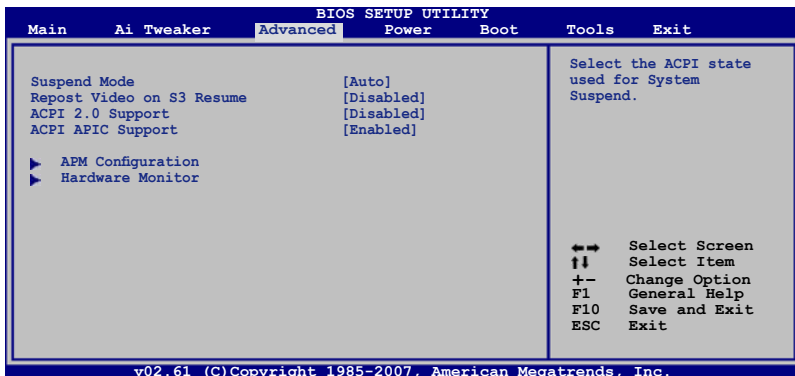
4.6.1   Suspend Mode [Auto]

Allows you to select the Advanced Configuration and Power Interface (ACPI) state to be used for system suspend.
Configuration options: [S1 (POS) only] [S3 only] [Auto]

4.6.2   Repost Video on S3 Resume [Disabled]

Determines whether to invoke VGA BIOS POST on S3/STR resume.
Configuration options: [Disabled] [Enabled]

4.6.3   ACPI 2.0 Support [Disabled]

Add additional tables as per ACPI 2.0 specifications.
Configuration options: [Disabled] [Enabled]

4.6.4   ACPI APIC Support [Enabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC). When set to [Enabled], the ACPI APIC table pointer is included in the RSDT pointer list.
Configuration options: [Disabled] [Enabled]

4.6.5   APM Configuration

```
                          BIOS SETUP UTILITY
                         Power

  APM Configuration                                    <Enter> to select
                                                       whether or not to
  Restore on AC Power Loss          [Power Off]        restart the system
  Power On By RTC Alarm             [Disabled]         after AC power loss.
  Power On By PCI Devices           [Disabled]
  Power On By PCIE Devices          [Disabled]
  Power On By PS/2 Keyboard         [Disabled]




                                                        ←→   Select Screen
                                                        ↑↓   Select Item
                                                        +-   Change Option
                                                        F1   General Help
                                                        F10  Save and Exit
                                                        ESC  Exit

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```

Restore On AC Power Loss [Power Off]

When set to [Power Off], the system goes into off state after an AC power loss. When set to [Power On], the system goes on after an AC power loss. When set to [Last State], the system goes into either off or on state, whatever the system state was before the AC power loss.
Configuration options: [Power Off] [Power On] [Last State]

Power On By RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake event. When this item is set to [Enabled], the items **RTC Alarm Date/ RTC Alarm Hour/ RTC Alarm Minute/ RTC Alarm Second** will become user-configurable with set values.
Configuration options: [Disabled] [Enabled]

Power On By PCI Devices [Disabled]

Allows you to enable or disable the PME to wake up from S5 by PCI devices.
Configuration options: [Disabled] [Enabled]

Power On By PCIE Devices [Disabled]

Allows you to enable or disable the PCIE devices to generate a wake event.
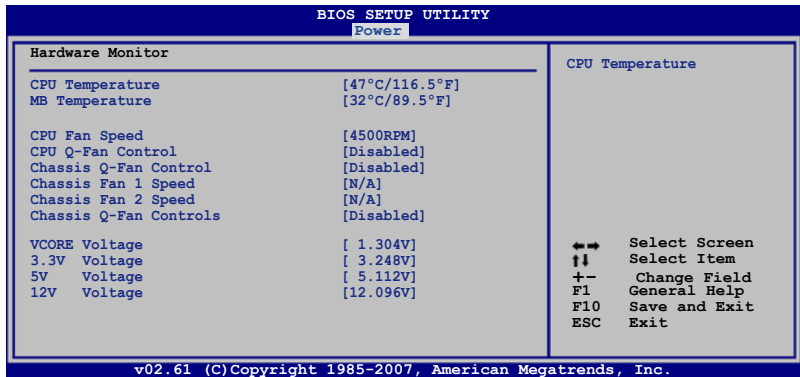Configuration options: [Disabled] [Enabled]

Power On By PS/2 Keyboard [Disabled]

Allows you to disable the Power On by PS/2 keyboard function or set specific keys on the PS/2 keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.
Configuration options: [Disabled] [Space Bar] [Ctrl-Esc] [Power Key]

4.6.6 Hardware Monitor

```
                    BIOS SETUP UTILITY
                         Power

  Hardware Monitor
  ─────────────────────────────────────        CPU Temperature

  CPU Temperature              [47°C/116.5°F]
  MB Temperature               [32°C/89.5°F]

  CPU Fan Speed                [4500RPM]
  CPU Q-Fan Control            [Disabled]
  Chassis Q-Fan Control        [Disabled]
  Chassis Fan 1 Speed          [N/A]
  Chassis Fan 2 Speed          [N/A]
  Chassis Q-Fan Controls       [Disabled]

  VCORE Voltage                [ 1.304V]      ←→   Select Screen
  3.3V   Voltage               [ 3.248V]      ↑↓   Select Item
  5V     Voltage               [ 5.112V]      +-    Change Field
  12V    Voltage               [12.096V]      F1    General Help
                                              F10   Save and Exit
                                              ESC   Exit

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```

CPU Temperature [xxxºC/xxxºF]
MB Temperature [xxxºC/xxxºF]

The onboard hardware monitor automatically detects and displays the motherboard and CPU temperatures. Select [Ignored] if you do not wish to display the detected temperatures.

CPU Fan Speed [xxxxRPM] or [Ignored] / [N/A]

The onboard hardware monitor automatically detects and displays the CPU fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows [N/A].

CPU Q-Fan Control [Disabled]

Allows you to enable or disable the CPU Q-fan.
Configuration options: [Disabled] [Enabled]

> The following item appears only when you enable CPU Q-Fan Control.

CPU Fan Profile [Optimal]

Allows you to set the appropriate performance level of the ASUS Q-Fan. When set to [Optimal], the CPU fan automatically adjusts depending on the CPU temperature. Set this item to [Silent Mode] to minimize fan speed for quiet CPU fan operation, or [Performance Mode] to achieve maximum CPU fan speed. Configuration options: [Optimal] [Silent Mode] [Performance Mode]

Chassis Fan 1/2 Speed [xxxxRPM] or [Ignored] / [N/A]

The onboard hardware monitor automatically detects and displays the chassis fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows [N/A].

Chassis Q-Fan Controls [Disabled]

Allows you to enable or disable the Chassis Q-fan.
Configuration options: [Disabled] [Enabled]

> The following items appear only when you enable Chassis Q-Fan Control.

Chassis Fan Ratio [Auto]

Allows you to select a fan speed ratio in the low CPU temperature.
Configuration options [Auto] [90%] [80%] [70%] [60%]

> A very low fan speed ratio may cause fan speed drop and trigger the hardware monitor warning message.

Chassis Target Temperature [37°C]

Chassis fan speed will auto-adjust to reach this target temperature.
Configuration options: [28°C] [31°C] [34°C] [37°C] [40°C] [43°C] [46°C]

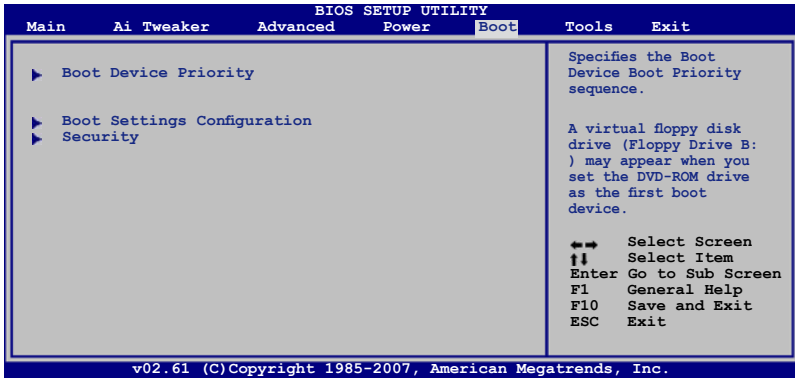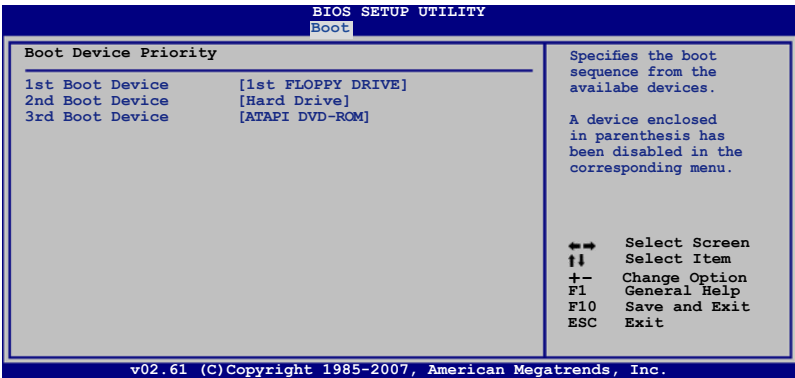## VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select [Ignored] if you do not want to detect this item.

4.7 Boot menu

The Boot menu items allow you to change the system boot options. Select an item then press <Enter> to display the sub-menu.

```
                        BIOS SETUP UTILITY
   Main    Ai Tweaker    Advanced    Power    Boot    Tools    Exit

                                              Specifies the Boot
 ▶  Boot Device Priority                      Device Boot Priority
                                              sequence.

 ▶  Boot Settings Configuration               A virtual floppy disk
 ▶  Security                                  drive (Floppy Drive B:
                                              ) may appear when you
                                              set the DVD-ROM drive
                                              as the first boot
                                              device.

                                              ←→    Select Screen
                                              ↑↓    Select Item
                                              Enter Go to Sub Screen
                                              F1    General Help
                                              F10   Save and Exit
                                              ESC   Exit

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```

4.7.1 Boot Device Priority

```
                        BIOS SETUP UTILITY
                              Boot

 Boot Device Priority                         Specifies the boot
                                              sequence from the
 1st Boot Device        [1st FLOPPY DRIVE]    availabe devices.
 2nd Boot Device        [Hard Drive]
 3rd Boot Device        [ATAPI DVD-ROM]       A device enclosed
                                              in parenthesis has
                                              been disabled in the
                                              corresponding menu.

                                              ←→    Select Screen
                                              ↑↓    Select Item
                                              +-    Change Option
                                              F1    General Help
                                              F10   Save and Exit
                                              ESC   Exit

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```

1st ~ xxth Boot Device [xxx Drive]

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Configuration options: [1st FLOPPY DRIVE] [Hard Drive] [ATAPI DVD-ROM] [Disabled]

4.7.2 Boot Settings Configuration

```
                          BIOS SETUP UTILITY
                          Boot

   Boot Settings Configuration                        Allows BIOS to skip
                                                      certain tests while
   Quick Boot                    [Enabled]            booting. This will
   Full Screen Logo              [Enabled]            decrease the time needed
   AddOn ROM Display Mode        [Force BIOS]         to boot the system.
   Bootup Num-Lock               [On]
   Wait For 'F1' If Error        [Enabled]
   Hit 'DEL' Message Display     [Enabled]
   Interrupt 19 Capture          [Disabled]




                                                   ←→   Select Screen
                                                   ↑↓   Select Item
                                                   +-   Change Option
                                                   F1   General Help
                                                   F10  Save and Exit
                                                   ESC  Exit

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```

Quick Boot [Enabled]

Enabling this item allows the BIOS to skip some power on self tests (POST) while booting to decrease the time needed to boot the system. When set to [Disabled], BIOS performs all the POST items. Configuration options: [Disabled] [Enabled]

Full Screen Logo [Enabled]

This allows you to enable or disable the full screen logo display feature. Configuration options: [Disabled] [Enabled]

> Set this item to [Enabled] to use the ASUS MyLogo3™ feature.

AddOn ROM Display Mode [Force BIOS]

Sets the display mode for option ROM. Configuration options: [Force BIOS] [Keep Current]

Bootup Num-Lock [On]

Allows you to select the power-on state for the NumLock. Configuration options: [Off] [On]

Wait For 'F1' If Error [Enabled]

When set to [Enabled], the system waits for the <F1> key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]
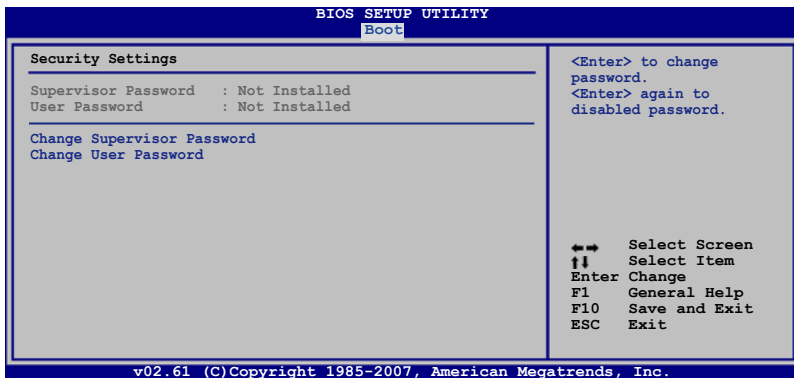
Hit 'DEL' Message Display [Enabled]

When set to [Enabled], the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Disabled]

When set to [Enabled], this function allows the option ROMs to trap Interrupt 19. Configuration options: [Disabled] [Enabled]

4.7.3   Security

The Security menu items allow you to change the system security settings. Select an item then press <Enter> to display the configuration options.

```
                          BIOS SETUP UTILITY
                              Boot

   Security Settings                               <Enter> to change
                                                   password.
   Supervisor Password    : Not Installed          <Enter> again to
   User Password          : Not Installed          disabled password.

   Change Supervisor Password
   Change User Password




                                                   ←→    Select Screen
                                                   ↑↓    Select Item
                                                   Enter Change
                                                   F1    General Help
                                                   F10   Save and Exit
                                                   ESC   Exit

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```

Change Supervisor Password

Select this item to set or change the supervisor password. The **Supervisor Password** item on top of the screen shows the default **Not Installed**. After you set a password, this item shows **Installed**.

To set a Supervisor Password:

1.   Select the **Change Supervisor Password** item and press <Enter>.
2.   From the password box, type a password composed of at least six letters and/or numbers, then press <Enter>.
3.   Confirm the password when prompted.

The message "Password Installed" appears after you successfully set your password.
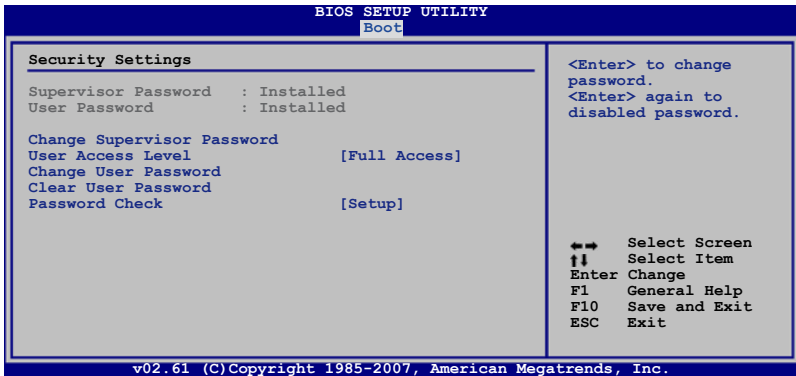
To change the supervisor password, follow the same steps as in setting a user password.

To clear the supervisor password, select the **Change Supervisor Password** then press <Enter>. The message "Password Uninstalled" appears.

> If you forget your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section **2.6 Jumper** for information on how to erase the RTC RAM.

After you have set a supervisor password, the other items appear to allow you to change other security settings.

```
                        BIOS SETUP UTILITY
                                Boot

  Security Settings                              <Enter> to change
                                                 password.
  Supervisor Password   : Installed              <Enter> again to
  User Password         : Installed              disabled password.

  Change Supervisor Password
  User Access Level             [Full Access]
  Change User Password
  Clear User Password
  Password Check                [Setup]

                                                 ←→    Select Screen
                                                 ↑↓    Select Item
                                                 Enter Change
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit

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```

User Access Level [Full Access]

This item allows you to select the access restriction to the Setup items.
Configuration options: [No Access] [View Only] [Limited] [Full Access]

[No Access] prevents user access to the Setup utility.

[View Only] allows access but does not allow change to any field.

[Limited] allows changes only to selected fields, such as Date and Time.

[Full Access] allows viewing and changing all the fields in the Setup utility.

Change User Password

Select this item to set or change the user password. The **User Password** item on
top of the screen shows the default **Not Installed**. After you set a password, this
item shows Installed.

To set a User Password:

1.   Select the **Change User Password** item and press <Enter>.
2.   On the password box that appears, type a password composed of at least six
      letters and/or numbers, then press <Enter>.
3.   Confirm the password when prompted.

The message "Password Installed" appears after you set your password
successfully.

To change the user password, follow the same steps as in setting a user password.

Clear User Password

Select this item to clear the user password.

Password Check [Setup]

When set to [Setup], BIOS checks for user password when accessing the Setup
utility. When set to [Always], BIOS checks for user password both when accessing
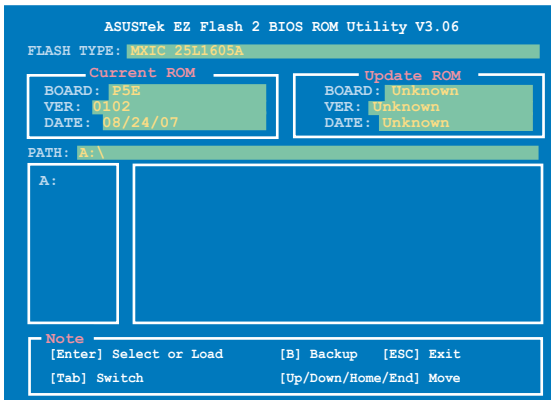Setup and booting the system. Configuration options: [Setup] [Always]

4.8 Tools menu

The Tools menu items allow you to configure options for special functions. Select an item then press <Enter> to display the sub-menu.
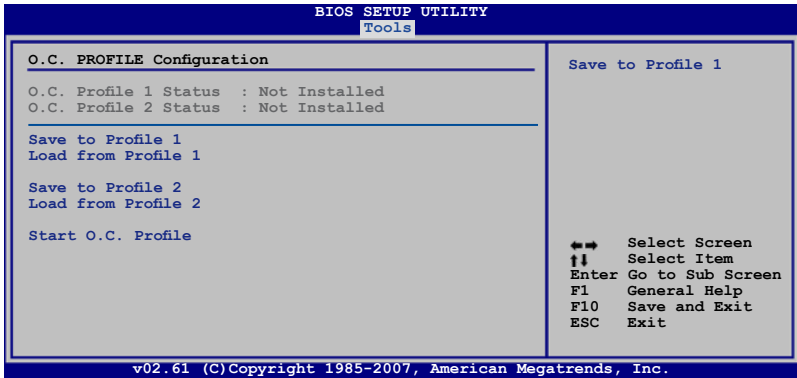
```
                          BIOS SETUP UTILITY
    Main      Ai Tweaker     Advanced     Power     Boot     Tools     Exit

    ASUS EZ Flash 2                                    Press ENTER to run
                                                       the utility to select
  ▶ ASUS O.C. Profile                                  and update BIOS.
  ▶ Ai Net 2                                           This utility doesn't
                                                       support :
                                                       1.NTFS format




                                                       ←→    Select Screen
                                                       ↑↓    Select Item
                                                       +-    Change Field
                                                       Enter Go to Sub Screen
                                                       F1    General Help
                                                       F10   Save and Exit
                                                       ESC   Exit

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```
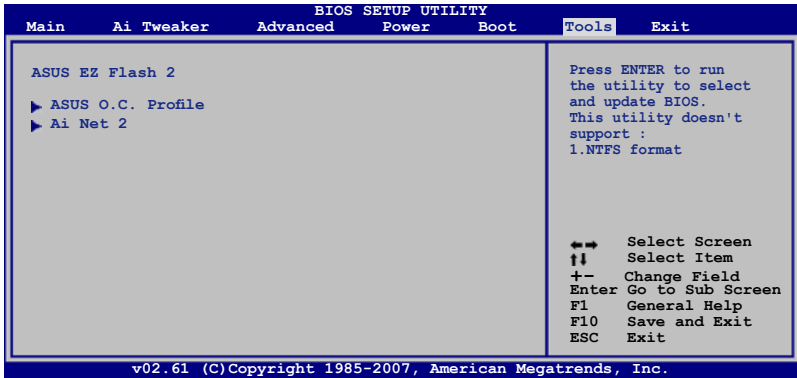
4.8.1 ASUS EZ Flash 2

Allows you to run ASUS EZ Flash 2. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice. Please see page 4-4, section 4.1.2 for details.

```
        ASUSTek EZ Flash 2 BIOS ROM Utility V3.06
   FLASH TYPE: MXIC 25L1605A

   ┌── Current ROM ──┐          ┌── Update ROM ──┐
     BOARD: P5E                   BOARD: Unknown
     VER:  0102                   VER:  Unknown
     DATE: 08/24/07               DATE: Unknown

   PATH: A:\

     A:

     A:




   ┌─ Note ─
   [Enter] Select or Load      [B] Backup    [ESC] Exit

   [Tab] Switch                [Up/Down/Home/End] Move
```

4.8.2   ASUS O.C. Profile

This item allows you to store or load multiple BIOS settings.

```
                         BIOS SETUP UTILITY
                              Tools
─────────────────────────────────────────────────────────────────
 O.C. PROFILE Configuration                     Save to Profile 1
 ─────────────────────────────────
 O.C. Profile 1 Status  : Not Installed
 O.C. Profile 2 Status  : Not Installed

 Save to Profile 1
 Load from Profile 1

 Save to Profile 2
 Load from Profile 2

 Start O.C. Profile
                                              ←→   Select Screen
                                              ↑↓   Select Item
                                              Enter Go to Sub Screen
                                              F1   General Help
                                              F10  Save and Exit
                                              ESC  Exit

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```

Save to Profle 1/2

Allows you to save the current BIOS file to the BIOS Flash. Press <Enter> to save the file.

Load from Profile 1/2

Allows you to load the previous BIOS settings saved in the BIOS Flash. Press <Enter> to load the file.

Start O.C. Profile

Allows you to run the utility to save and load CMOS. Press <Enter> to run the utility.

```
                 ASUSTek O.C. Profile Utility V1.06


         ─── Current CMOS ───           ─── Restore CMOS ───
         BOARD: P5E                      BOARD: Unknown
         VER: 0102                       VER: Unknown
         DATE: 08/24/07                  DATE: Unknown

       PATH: A:\

        A:




         ─ Note ─
             [Enter] Select or Load    [B] Backup    [ESC] Exit

             [Tab] Switch              [Up/Down/Home/End] Move
```
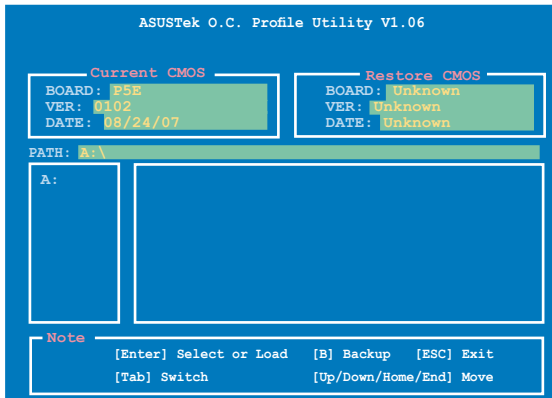
🖉   •   This function can support devices such as a USB flash disk or a floppy
         disk with FAT 32/16 format and single partition only.
    •   DO NOT shut down or reset the system while updating the BIOS to
         prevent the system boot failure!

4.8.3   Ai Net 2

```
                        BIOS SETUP UTILITY
                            Tools
                                                    Marvell Check LAN
                                                    cable during POST.
    Pair  Status  Length

    1-2    N/A    Marvell Controller 0
    3-6    N/A
    4-5    N/A
    7-8    N/A

    1-2    N/A    Realtek Controller 0
    3-6    N/A
    4-5    N/A
    7-8    N/A

    Marvell POST Check LAN cable   [Disabled]



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```
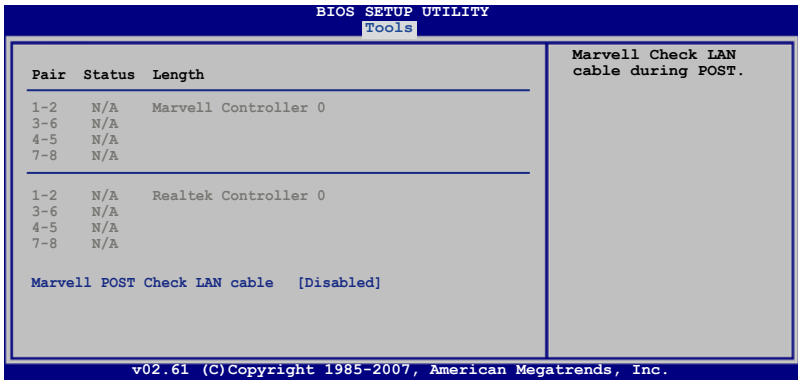
Marvell POST Check LAN Cable [Disabled]

Enables or disables checking of the Marvell LAN cable during the Power-On Self-Test (POST). Configuration options: [Disabled] [Enabled]

4.9   Exit menu

The Exit menu items allow you to load the optimal or failsafe default values for the BIOS items, and save or discard your changes to the BIOS items.

```
                          BIOS SETUP UTILITY
  Main      Ai Tweaker     Advanced     Power     Boot     Tools     Exit

                                                    Exit system setup after
   Exit & Save Changes                              saving the changes.
   Exit & Discard Changes
   Discard Changes                                  F10 key can be used for
                                                    this operation.
   Load Setup Defaults




                                                    ←→    Select Screen
                                                    ↑↓    Select Item
                                                    Enter Go to Sub Screen
                                                    Tab   Select Field
                                                    F1    General Help
                                                    F10   Save and Exit
                                                    ESC   Exit

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```

Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

Exit & Save Changes

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. An onboard backup battery sustains the CMOS RAM so it stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select **Ok** to save changes and exit.

If you attempt to exit the Setup program without saving your changes, the program prompts you with a message asking if you want to save your changes before exiting. Press <Enter> to save the changes while exiting.

Exit & Discard Changes

Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than System Date, System Time, and Password, the BIOS asks for a confirmation before exiting.

Discard Changes

This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select **Ok** to discard any changes and load the previously saved values.

Load Setup Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **Ok** to load default values. Select **Exit & Save Changes** or make other changes before saving the values to the non-volatile RAM.

This chapter describes the contents of
the support DVD that comes with the
motherboard package.

Software
support
5

Chapter summary

5

5.1   Installing an operating system

This motherboard supports Windows® XP/64-bit XP/Vista/64-bit Vista operating systems (OS). Always install the latest OS version and corresponding updates to maximize the features of your hardware.

> • Motherboard settings and hardware options vary. Use the setup procedures presented in this chapter for reference only. Refer to your OS documentation for detailed information.
>
> • Make sure that you install Windows® 2000 Service Pack 4 or the Windows® XP Service Pack2 or later versions before installing the drivers for better compatibility and system stability.

5.2   Support DVD information

The support DVD that came with the motherboard package contains the drivers, software applications, and utilities that you can install to avail all motherboard features.

> The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for updates.

5.2.1   Running the support DVD

Place the support DVD to the optical drive. The DVD automatically displays the Drivers menu if Autorun is enabled in your computer.
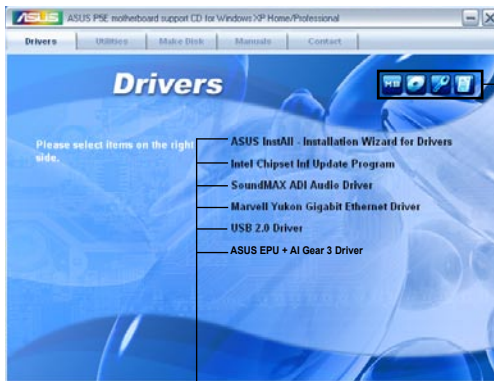
Click an icon to display support DVD/motherboard information

Click an item to install

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the DVD.

5.2.2 Drivers menu

The drivers menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.

ASUS InstAll - Installation Wizard for Drivers

Launches the ASUS InstAll driver installation wizard.

Intel Chipset Inf Update Program

Installs the Intel® chipset inf update program.

SoundMAX ADI Audio Driver

Installs the SoundMAX® ADI1988 audio driver and application.

Marvell Yukon Gigabit Ethernet Driver

Installs the Marvell Yukon Gigabit Ethernet Driver.

USB 2.0 Driver

Installs the Universal Serial Bus 2.0 (USB 2.0) driver.

ASUS EPU + AI Gear 3 Driver

Installs the EPU + AI Gear 3 driver.

Install this driver before the ASUS AI Suite utility.

5.2.3   Utilities menu

The Utilities menu shows the applications and other software that the motherboard supports.

ASUS InstAll-Installation Wizard for Utilities

Installs all of the utilities through the Installation Wizard.

Marvell Yukon VCT Application

Installs the Marvell® Yukon Virtual Cable Tester™ (VCT) application that diagnoses and reports LAN cable faults and shorts using the Time Domain Reflectometry (TDR) technology.

ASUS PC Probe II

This smart utility monitors the fan speed, CPU temperature, and system voltages, and alerts you of any detected problems. This utility helps you keep your computer in healthy operating condition.

ASUS AI Suite

Installs the ASUS AI Suite.

ASUS Update

The ASUS Update utility allows you to update the motherboard BIOS in Windows® environment. This utility requires an Internet connection either through a network or an Internet Service Provider (ISP).

You can also install the following utilities from the ASUS Superb Software Library DVD.

Anti-Virus Utility

The anti-virus application detects and protects your computer from viruses that destroys data. You can also download the utility by clicking the Security tab.

Anti-Virus Utility Download

Allows you to choose the language version and download the anti-virus application from the website.

Corel Snapfire Plus SE

Installs the Corel Snapfire Plus SE software. You can also download the utility by clicking the Photo-Editing tab.

DVD Copy5 Trial

Installs the WinDVD Copy5 Trial version. You can also download the utility by clicking the DVD Burner tab.

5.2.4   Make Disk menu

The Make Disk menu contains items to create the Intel ICH9R or JMicron® JMB368 RAID/AHCI driver disk.

Intel ICH9 32/64 bit RAID/AHCI Driver

Allows you to create an ICH9R 32/64bit RAID/AHCI driver disk.

5.2.5 Manuals menu

The Manuals menu contains a list of supplementary user manuals. Click an item to open the folder of the user manual.

> Most user manual files are in Portable Document Format (PDF). Install the Adobe® Acrobat® Reader from the Utilities menu before opening a user manual file.

5.2.6 ASUS Contact information

Click the Contact tab to display the ASUS contact information. You can also find this information on the inside front cover of this user guide.

5.2.7 Other information

The icons on the top right corner of the screen give additional information on the motherboard and the contents of the support DVD. Click an icon to display the specified information.

Motherboard Info

Displays the general specifications of the motherboard.

Browse this DVD

Displays the support DVD contents in graphical format.

Technical support form

Displays the ASUS Technical Support Request Form that you have to fill out when requesting technical support.

Filelist

Displays the contents of the support DVD and a brief description of each in text format.

5.3 Software information

Most of the applications in the support DVD have wizards that will conveniently guide you through the installation. View the online help or readme file that came with the software application for more information.

5.3.1 ASUS MyLogo3™

The ASUS MyLogo3™ utility lets you customize the boot logo. The boot logo is the image that appears on screen during the Power-On Self-Tests (POST). The ASUS MyLogo3™ is automatically installed when you install the ASUS Update utility from the support DVD. See section "5.2.3 Utilities menu" for details.

> • Before using the ASUS MyLogo3™, use the AFUDOS utility to make a copy of your original BIOS file, or obtain the latest BIOS version from the ASUS website. See section **4.1.4 AFUDOS utility**.
>
> • Make sure that the BIOS item Full Screen Logo is set to [Enabled] if you wish to use ASUS MyLogo3™. See section **4.7.2 Boot Settings Configuration**.
>
> • You can create your own boot logo image in GIF, or BMP file formats.
>
> • The file size should be smaller than 150 K.

To launch the ASUS MyLogo3™:

1. Launch the ASUS Update utility. Refer to section "4.1.1 ASUS Update utility" for details.

2. Select **Options** from the drop down menu, then click **Next**.

3. Check the option **Launch MyLogo** to replace system boot logo before flashing BIOS, then click **Next**.

4. Select **Update BIOS** from a file from the drop down menu, then click **Next**.

5. When prompted, locate the new BIOS file, then click **Next**. The ASUS MyLogo window appears.

6. From the left window pane, select the folder that contains the image you intend to use as your boot logo.

7.   When the logo images appear on the right window pane, select an image to enlarge by clicking on it.
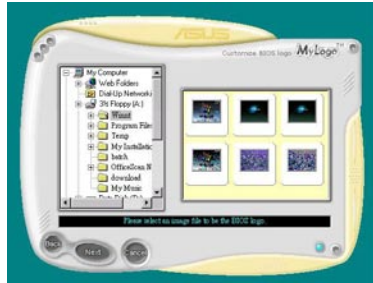
8.   Adjust the boot image to your desired size by selecting a value on the Ratio box.

9.   When the screen returns to the ASUS Update utility, flash the original BIOS to load the new boot logo.

10. After flashing the BIOS, restart the computer to display the new boot logo during POST.

5.3.2 AI NET 2

The AI NET 2 features the Marvell® Virtual Cable Tester™ (VCT). VCT is a cable diagnostic utility that reports LAN cable faults and shorts using the Time Domain Reflectometry (TDR) technology. The VCT detects and reports open and shorted cables, impedance mismatches, pair swaps, pair polarity problems, and pair skew problems of up to 64 ns at one meter accuracy.

The VCT feature reduces networking and support costs through a highly manageable and controlled network system. This utility can be incorporated in the network systems sofware for ideal field support as well as development diagnostics.

Using the Virtual Cable Tester™

To use the the Marvell® Virtual Cable Tester™ utility:

1. Launch the VCT utility from the Windows® desktop by clicking **Start > All Programs > Marvell > Virtual Cable Tester**.

2. Click **Virtual Cable Tester** from the menu to display the screen below.
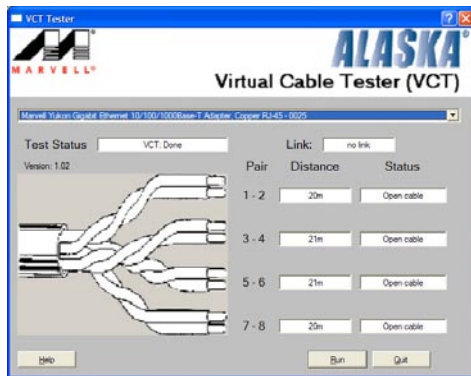
3. Click the **Run** button to perform a cable test.

- The VCT only runs on systems with Windows® XP or Windows® Vista™ operating systems.

- The VCT utility only tests Ethernet cables connected to Gigabit LAN port(s).

- The Run button on the Virtual Cable Tester™ main window is disabled if no problem is detected on the LAN cable(s) connected to the LAN port(s).

- If you want the system to check the status of the LAN cable before entering the OS, enable the item Post Check LAN Cable in the BIOS Setup.

5.3.3   AI Audio 2 (SoundMAX® High Definition Audio utility)

The ADI AD1988B High Definition Audio CODEC provides 8-channel audio capability through the SoundMAX® audio utility with AudioESP™ software to deliver the ultimate audio experience on your PC. The software implements high quality audio synthesis/rendering, 3D sound positioning, and advanced voice-input technologies.

Follow the installation wizard to install the ADI AD1988B Audio Driver from the support DVD that comes with the motherboard package to activate the SoundMAX® audio utility.

You must use 4-channel, 6-channel or 8-channel speakers for this setup.

If the SoundMAX® audio utility is correctly installed, you will find the SoundMAX®/ SoundMAX® BlackHawk icon on the taskbar.

## A.	SoundMAX BlackHawk (AI Audio 2)

If you are using Windows Vista™ operating system, from the taskbar, double-click on the SoundMAX® BlackHawk icon to display the SoundMAX® control panel.

Enabling AI Audio 2

Click the power button [image] to activate digital signal processing. AI Audio 2, with the new SoundMAX® BlackHawk by Sonic Focus, brings you more multi-media enjoyment.

Fidelity Compensation
After you click the power button, the utility will compensate for the fidelity lost in the compression process and make the audio output quasi-original when reverting the compressed audio streams back to the uncompressed condition.

Sound Field Expansion
AI Audio 2 also expands the stereophonic sound field to a multi-channel one with realistic front and rear environment.

Surround Virtualization
Activating this function virtualizes surround sound with the vocal clarity added for use with stereo speakers or headphones.

SoundMAX BlackHawk (AI Audio2) is available only under the Windows® Vista™ operating system.

Playback Settings

To configure the playback settings, click the **Playback** button on the control panel. You can adjust the volume of the **Speakers** and **SPDIF Interface** or mute the audio.

Preset settings

Click and expand the drop-down menu to select your preferred Digital Signal Processing (DSP) preset. Move the sliders to customize the values of **Voice Clarity**, **Dynamics**, **Brilliance**, and **Deep Bass** of each preset. Click Save to save the changes to the current preset. Or, click **Reset** to discard the changes and restore the preset to the factory defaults.

Surround settings

Allows you to change the settings of the stereo speakers. Move the sliders to change the listener position or adjust the center channel volume. Press the **Test Speakers** button to perform speaker test.

Port settings

Click this port settings tab to display the rear panel ports configuration for the speakers or rear panel digital port configuration for the SPDIF interface.

Recording Settings

To change the recording settings, click the **Recording** button on the control panel. You can adjust the speaker delay of **Microphone** or **Line In** by moving the slider rightward or leftward.

Record testing
Click the tab to perform test recording and play the test sample through the speakers or the SPDIF interface.
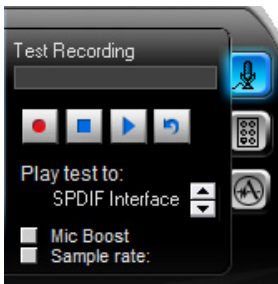
Port settings
Click the tab to display the rear panel ports for Microphone or Line In.

ANDREA settings
Allows you to select an enhanced microphone input features, including **No Filtering**, **Speakerphone**, **Voice Recording**, and **Directional Beam**.

More Settings

Click for the further configurations.

Equalizer
Allows you to configure and customize all the DSP presets frequencies.

Speakers
Allows you to adjust the **Speaker Trim** and **Speaker Delay**.
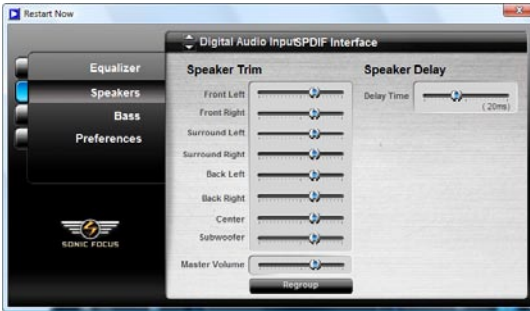
Bass
Allows you to do the Bass management.

Preferences
Displays the preference options for this utility, version information, AudioESP, etc.
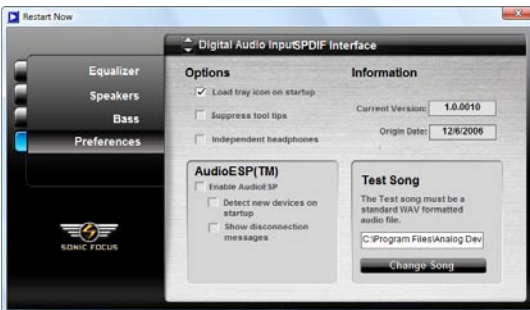
B.   SoundMAX

If you are using Windows XP operating system, from the taskbar, double-click on the SoundMAX® icon to display the SoundMAX® Control Panel.

Audio Setup Wizard

By clicking the icon from the SoundMAX® control panel, you can easily configure your audio settings. Simply follow the succeeding screen instructions and begin enjoying High Definition Audio.

Jack configuration

This screen helps you configure your computer's audio ports, depending on the audio devices you have installed.
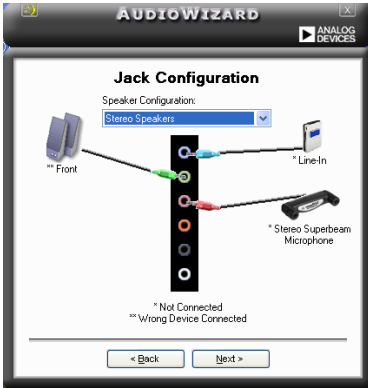
Adjust speaker volume

This screen helps you adjust speaker volume. Click the **Test** button to hear the changes you have made.

Adjust microphone volume

This screen helps you adjust microphone volume. You will be asked to read pre-written text to allow the AudioWizard to adjust the volume as you speak.

Audio preferences

Click the ![hammer icon] icon to go to the Preferences page. This page allows you to change various audio settings.

General options
Click the General tab to choose your playback and recording devices, enable/disable the AudioESP™ feature, and enable/disable digital output.

Listening Environment options
Click the Listening Environment tab to set up your speaker, acoustic environment, and enable/disable the Virtual Theater Surround function.

Microphone options
Click the Microphone tab allows you to optimize your microphone input settings.

5.3.4 ASUS PC Probe II

PC Probe II is a utility that monitors the computer's vital components, and detects and alerts you of any problem with these components. PC Probe II senses fan rotations, CPU temperature, and system voltages, among others. Because PC Probe II is software-based, you can start monitoring your computer the moment you turn it on. With this utility, you are assured that your computer is always at a healthy operating condition.

Installing PC Probe II

To install PC Probe II on your computer:

1. Place the support DVD to the optical drive. The Drivers installation tab appears if your computer has an enabled Autorun feature.

    If Autorun is not enabled in your computer, browse the contents of the support DVD to locate the setup.exe file from the ASUS PC Probe II folder. Double-click the **setup.exe** file to start installation.

2. Click the **Utilities** tab, then click **ASUS PC Probe II**.
3. Follow the screen instructions to complete installation.

Launching PC Probe II

You can launch the PC Probe II right after installation or anytime from the Windows® desktop.

To launch the PC Probe II from the Windows® desktop, click **Start > All Programs > ASUS > PC Probe II > PC Probe II v1.xx.xx**. The PC Probe II main window appears.

After launching the application, the PC Probe II icon appears in the Windows® taskbar. Click this icon to close or restore the application.

Using PC Probe II

Main window
The PC Probe II main window allows you to view the current status of your system and change the utility configuration. By default, the main window displays the Preference section. You can close or restore the Preference section by clicking on the triangle on the main window right handle.

Click to close the Preference panel

Button	Function
CONFIG	Opens the Configuration window
	Opens the Report window
DMI	Opens the Desktop Management Interface window
PCI	Opens the Peripheral Component Interconnect window
WMI	Opens the Windows Management Instrumentation window
USAGE	Opens the hard disk drive, memory, CPU usage window
◁▷	Shows/Hides the Preference section
⊖	Minimizes the application
⊗	Closes the application

Sensor alert
When a system sensor detects a problem, the main window right handle turns red, as the illustrations below show.

When displayed, the monitor panel for that sensor also turns red. Refer to the Monitor panels section for details.

Preferences

You can customize the application using the Preference section in the main window. Click the box before each preference to activate or deactivate.

Hardware monitor panels

The hardware monitor panels display the current value of a system sensor such as fan rotation, CPU temperature, and voltages.

The hardware monitor panels come in two display modes: hexagonal (large) and rectangular (small). When you check the Enable Monitoring Panel option from the Preference section, the monitor panels appear on your computer's desktop.

Large display

Small display

Changing the monitor panels position
To change the position of the monitor panels in the desktop, click the arrow down button of the Scheme options, then select another position from the list box. Click OK when finished.

Moving the monitor panels
All monitor panels move together using a magnetic effect. If you want to detach a monitor panel from the group, click the horseshoe magnet icon. You can now move or reposition the panel independently.
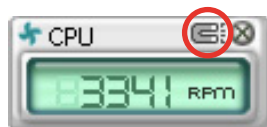
Adjusting the sensor threshold value
You can adjust the sensor threshold value in the monitor panel by clicking the or buttons. You can also adjust the threshold values using the Config window.

You cannot adjust the sensor threshold values in a small monitoring panel.

Click to increase value

Click to decrease value
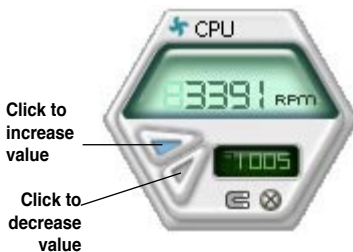
Monitoring sensor alert

The monitor panel turns red when a component value exceeds or is lower than the threshold value. Refer to the illustrations below.

Large display

Small display

WMI browser

Click [WMI] to display the WMI (Windows Management Instrumentation) browser. This browser displays various Windows® management information. Click an item from the left panel to display on the right panel. Click the plus sign (+) before WMI Information to display the available information.
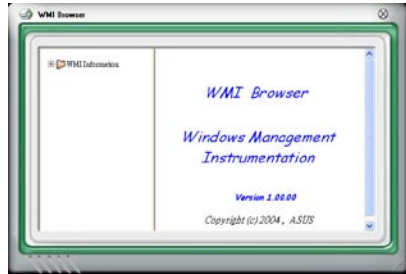
> You can enlarge or reduce the browser size by dragging the bottom right corner of the browser.

DMI browser

Click [DMI] to display the DMI (Desktop Management Interface) browser. This browser displays various desktop and system information. Click the plus sign (+) before DMI Information to display the available information.

PCI browser

Click ![PCI] to display the PCI (Peripheral Component Interconnect) browser. This browser provides information on the PCI devices installed on your system. Click the plus sign (+) before the PCI Information item to display available information.
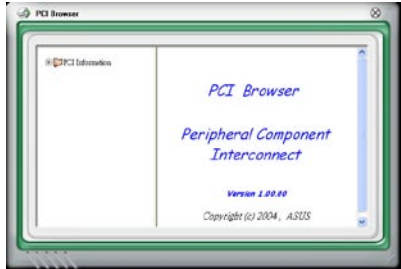
Usage

The Usage browser displays real-time information on the CPU, hard disk drive space, and memory usage. Click ![USAGE] to display the Usage browser.

CPU usage
The CPU tab displays real-time CPU usage in line graph representation. If the CPU has an enabled Hyper-Threading, two separate line graphs display the operation of the two logical processors.
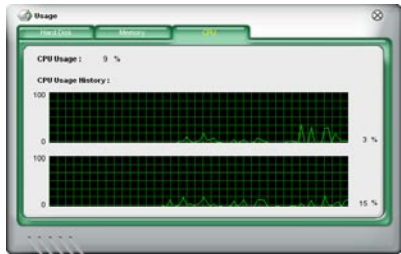
Hard disk drive space usage
The Hard Disk tab displays the used and available hard disk drive space. The left panel of the tab lists all logical drives. Click a hard disk drive to display the information on the right panel. The pie chart at the bottom of the window represents the used (blue) and the available HDD

Memory usage
The Memory tab shows both used and available physical memory. The pie chart at the bottom of the window represents the used (blue) and the available
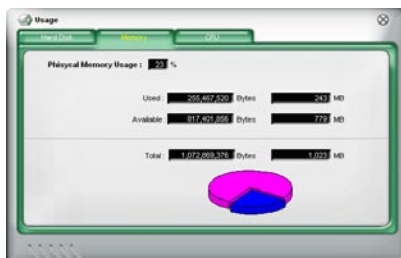
Configuring PC Probe II

Click [CONFIG] to view and adjust the sensor threshold values.

The Config window has two tabs: Sensor/Threshold and Preference. The Sensor/Threshold tab enables you to activate the sensors or to adjust the sensor threshold values. The Preference tab allows you to customize sensor alerts, or change the temperature scale.

Loads the default threshold values for each sensor

Applies your changes

Cancels or ignores your changes

Loads your saved configuration

Saves your configuration

5.3.5 ASUS AI Suite

ASUS AI Suite allows you to launch AI Gear 2, AI N.O.S., AI Booster, AI Nap, and Q-Fan 2 utilities easily.

> Install the **ASUS EPU + AI Gear 3 Driver** before the ASUS AI Suite utility. Otherwise, the ASUS AI Suite will not function properly.

Installing AI Suite

To install AI Suite on your computer:

1. Place the support DVD to the optical drive. The Drivers installation tab appears if your computer has an enabled Autorun feature.
2. Click the Utilities tab, then click **AI Suite**.
3. Follow the screen instructions to complete installation.

Launching AI Suite

You can launch AI Suite right after installation or anytime from the Windows® desktop.

To launch AI Suite from the Windows® desktop, click **Start** > **All Programs** > **ASUS** > **AI Suite** > **AI Suite v1.xx.xx**. The AI Suite main window appears.

After launching the application, the AI Suite icon appears in the Windows® taskbar. Click this icon to close or restore the application.

Using AI Suite

Click the AI Gear 3, AI Nap, AI Booster, or Q-Fan 2 icon to launch the utility, or click the Normal icon to restore the system to normal state.

Press to restore to normal

Press to launch AI Gear 3

Press to launch AI Booster

Press to launch AI Nap

Press to launch Q-Fan 2
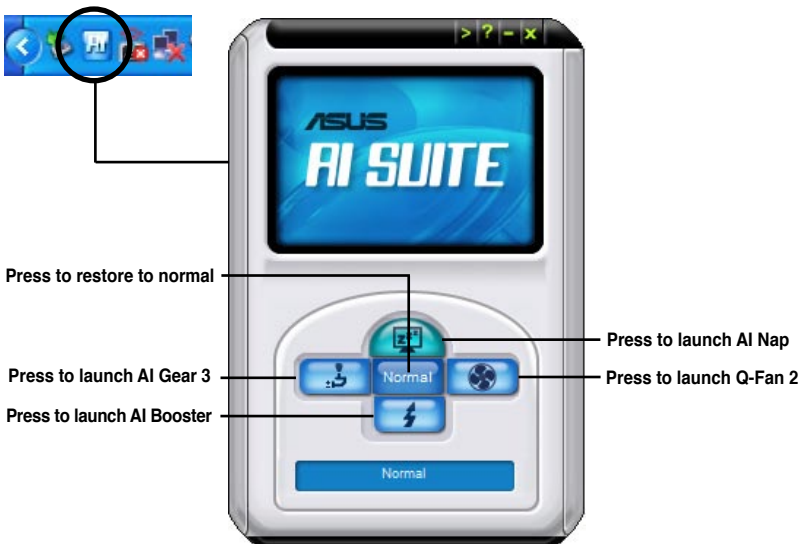
Other feature buttons

Click ![>] on right corner of the main window to open the monitor window.

Displays the CPU/ system temperature, CPU/memory/PCIE voltage, and CPU/ chassis fan speed

Displays the FSB/CPU frequency
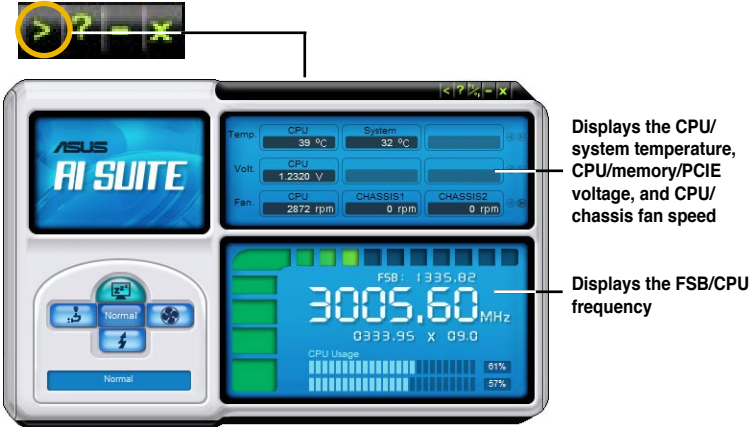
Click ![°C/°F] on right corner of the expanded window to switch the temperature from degrees Centigrade to degrees Fahrenheit.
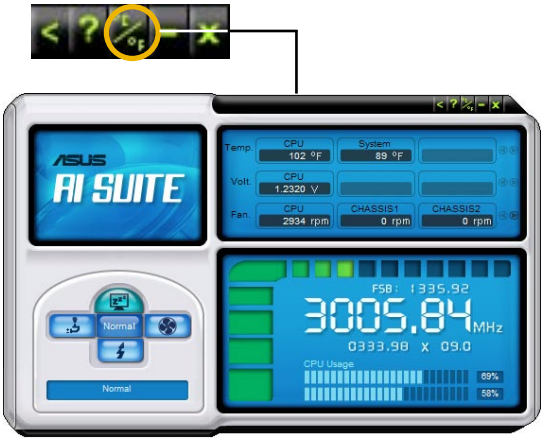
5.3.6   ASUS AI Gear 3 (ASUS EPU Utility)

ASUS AI Gear 3 is a utility designed to configure and support all ASUS EPU (Energy Processing Unit) features. This easy-to-use utility provides four system performance profiles that adjusts the processor frequency and vCore voltage for different computing needs.

After installing ASUS AI Suite from the bundled support DVD, you can launch ASUS AI Gear 3 by double-clicking the AI Suite icon on your Windows OS taskbar and then click the AI Gear 3 button on the AI Suite main window.

Here are some simple ways to use AI Gear 3:

•	Click the four gear mode buttons below, including **Turbo**, **High Performance**, **Medium Power Saving**, and **Max. Power Saving**, or shift the gear to the performance setting that you like.

•	Click **Calibration** first, and switch to **Auto** mode to have AI Gear 3 automatically adjust the system performance according to the CPU loading.

•	Under **Auto** mode, Click **Settings** to set the time for the system to enter AI Nap mode.

Calibration

Auto Mode

Settings

Turbo Mode

High Performance Mode

Medium Power Saving Mode

Max Power Saving Mode
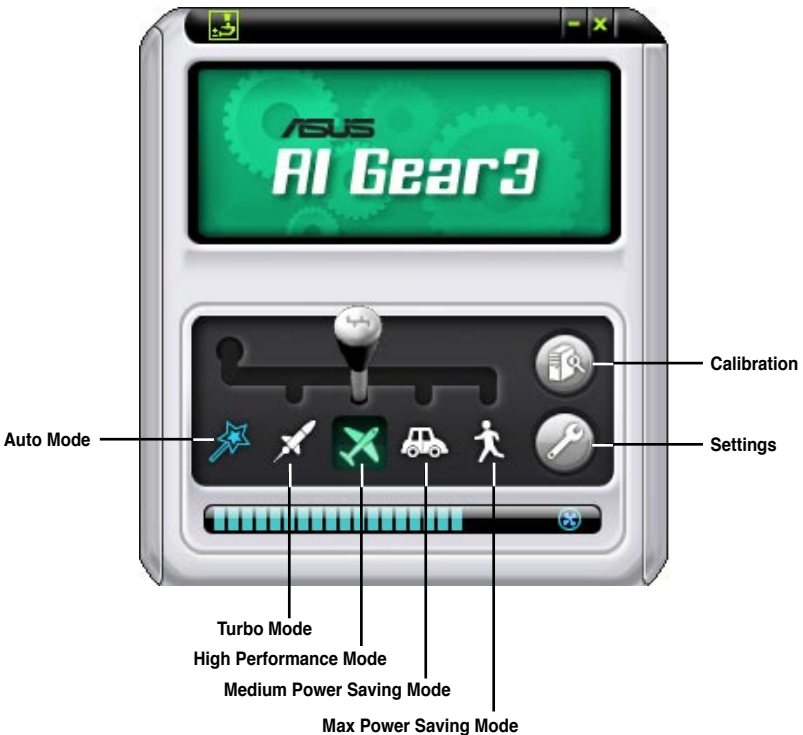
5.3.7   ASUS AI Nap

This feature allows you to minimize the power consumption of your computer whenever you are away. Enable this feature for minimum power consumption and a quieter system operation.

After installing AI Suite from the bundled Support DVD, you can launch the utility by double-clicking the AI Suite icon on the Windows OS taskbar and click the AI Nap button on the AI Suite main window.

Click **Yes** on the confirmation screen.
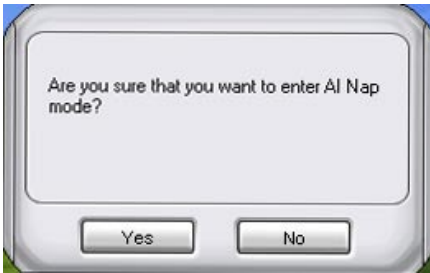
To exit AI Nap mode, press the system power or mouse button then click **Yes** on the confirmation screen.
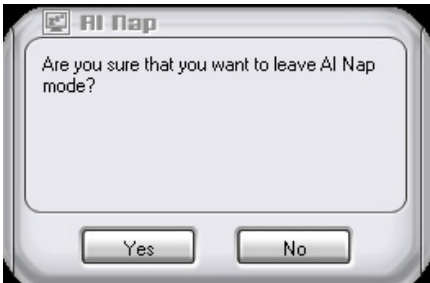
To switch the power button functions from AI Nap to shutting down, just right click the **AI Suite** icon on the OS taskbar, select **AI Nap** and click **Use power button**. Unclick the the item to switch the function back.

5.3.8   ASUS Q-Fan 2

This ASUS Q-Fan 2 Control feature allows you to set the appropriate performance level of the CPU Q-Fan 2 or the Chassis Q-Fan 2 for more efficient system operation. After enabling the Q-Fan 2 function, the fans can be set to automatically adjust depending on the temperature, to decrease fan speed, or to achieve the maximum fan speed.

After installing AI Suite from the bundled Support DVD, you can launch the utility by double-clicking the AI Suite icon on the Windows® OS taskbar and click the Q-Fan 2 button on the AI Suite mAIn window.

Click the drop-down menu button and display the fan names. Select **CPU Q-Fan** or **CHASSIS Q-Fan**. Click the **Enabled** box to activate this function.

Enable Q-Fan 2 box

drop-down list button

Profile list appears after clicking the **Enabled** box. Click the drop-down list button and select a profile. **Optimal** mode makes the fans adjust speed with the temperature; **Silent** mode minimizes fan speed for quiet fan operation; **Performance** mode boosts the fan to achieve maximal fan speed for the best cooling effect.

click to display the drop-down list and select a Q-Fan 2 mode
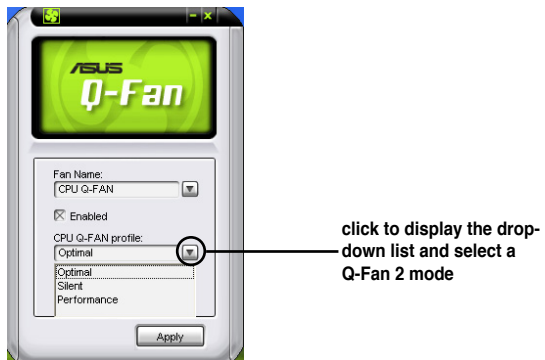
Click **Apply** at the bottom to save the setup.

5.3.9 ASUS AI Booster

The ASUS AI Booster application allows you to overclock the CPU speed in WIndows® environment without the hassle of booting the BIOS.

After installing AI Suite from the bundled Support DVD, you can launch the utility by double-clicking the AI Suite icon on the Windows® OS taskbar and click the AI Booster button on the AI Suite main window.
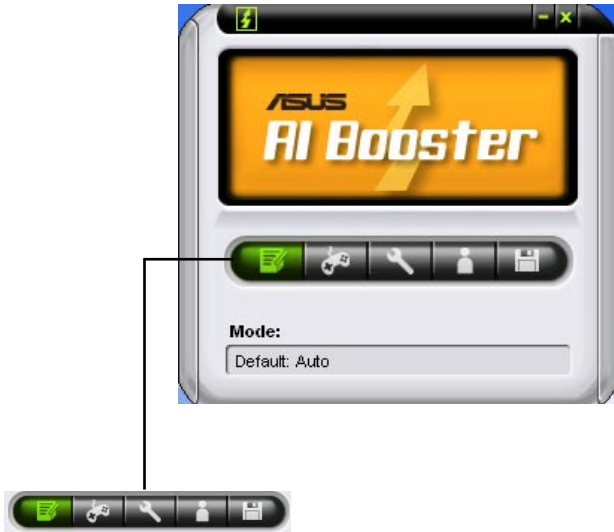
The options on the taskbar allow you to use the default settings, adjust CPU/ Memory/PCI-E frequency manually, or create and apply your personal overclocking configurations.

5.3.10 ASUS AI Direct Link

ASUS AI Direct Link allows you to form a computer-to-computer network via a network cable to share files with high transfer rate. You must first connect two computers (at least one of them is ASUS product) using a network cable, and then install the utility to both computers to avail the AI Direct Link feature.

- Turn off your firewall software other than Windows Firewall before launching AI Direct Link.
- The transfer rate is limited if you use a 10/100 LAN card.

Using AI Direct Link

To enable the incoming folder:

1. From the Windows® taskbar, right click on the AI Direct Link icon and select **Incoming folder > Enable incoming folder**.

For Windows XP Home edition users, click **Steps of enabling file sharing** on this pop-up message and follow the instructions to enable the incoming folder.
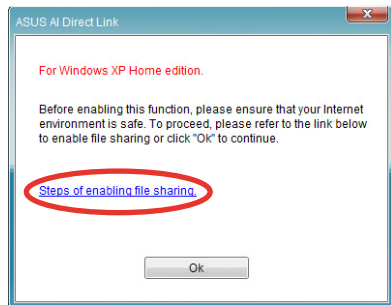
2. If you want to to verify the incoming user, select **Use my account** and set your username and password. Otherwise, select **Use public account**.

For security's sake, it is recommended that you set a username and password.
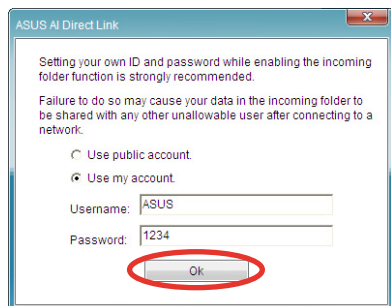
3. Click **OK** and the "Ready for incoming" message appears.

To disable the incoming folder, select **Incoming folder > Disable incoming folder**.
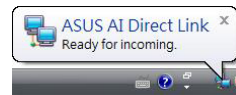
4. Right click on the AI Direct Link icon and select **Incoming folder > Open incoming folder**. The **AIDirectLinkIncoming** folder opens. Put the files you want to share into this folder. The authorized user has full access to this folder.
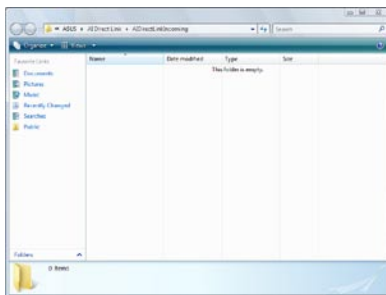

The default path of the AIDirectLinkIncoming folder is C:\Program Files\ASUS\AI Direct Link. To change its location, disable the incoming folder first. Then, select **Incoming folder > Change incoming folder** to open the system directories, and move the AIDirectLinkIncoming folder under another directory.

To connect to another computer:

This function is valid for ASUS products only.

1. From the Windows® taskbar, right click on the AI Direct Link icon and select **Connect**. The following screen displays.

2. Click **Refresh**. The software starts searching for the connected computer.
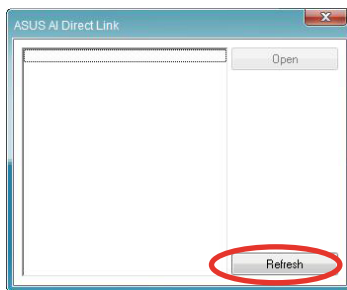
3. The name of the computer found is listed. Click **Open** to open its shared folder.

4. If necessary, enter the authorized username and password. Click **OK** to log in and have full access to this shared folder.
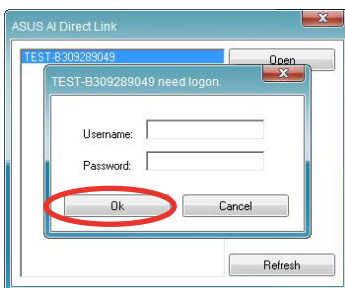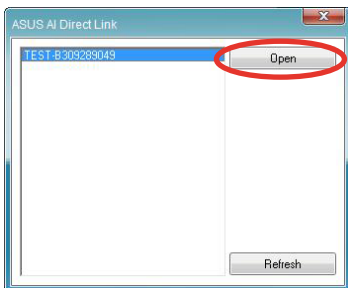
5.4 RAID configurations

The motherboard comes with the Intel® ICH9R Southbridge RAID controller that allows you to configure IDE and Serial ATA hard disk drives as RAID sets.

5.4.1 RAID definitions

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

Intel® Matrix Storage. The Intel® Matrix Storage technology supported by the ICH9R chip allows you to create a RAID 0, RAID 1, RAID 5, and RAID 10 function to improve both system performance and data safety. You can also combine two RAID sets to get higher performance, capacity, or fault tolerance provided by the difference RAID function. For example, RAID 0 and RAID 1 set can be created by using only two identical hard disk drives.

If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support DVD to a floppy disk/USB device before you install an operating system to the selected hard disk drive. Refer to section **5.5 Creating a RAID driver disk** for details.

5.4.2   Installing Serial ATA hard disks

The motherboard supports Serial ATA hard disk drives. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for a RAID configuration:

1.   Install the SATA hard disks into the drive bays.
2.   Connect the SATA signal cables.
3.   Connect a SATA power cable to the power connector on each drive.

5.4.3   Intel® RAID configurations

This motherboard supports RAID 0, RAID 1, RAID 5, RAID 10 (0+1) and Intel® Matrix Storage configurations for Serial ATA hard disks drives through the Intel® ICH8R Southbridge chip.

Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set(s). To do this:

1.   Enter the BIOS Setup during POST.
2.   Go to the Main Menu, select IDE Configuration, then press <Enter>.
3.   Select the item Configure SATA As, then press <Enter> to display the configuration options.
4.   Select RAID from the Configure SATA As item options, then press <Enter>.
5.   Select the item Onboard Serial-ATA BOOTROM, press <Enter>, then select Enabled from the options.
6.   Save your changes, then exit the BIOS Setup.

Refer to the system or the motherboard user guide for details on entering and navigating through the BIOS Setup.

Intel® Matrix Storage Manager Option ROM Utility

The Intel® Matrix Storage Manager Option ROM utility allows you to create RAID 0, RAID 1, RAID 10 (RAID 0+1), and RAID 5 set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

To enter the Intel® Application Accelerator RAID Option ROM utility:

1.   Install all the Serial ATA hard disk drives.

2.   Turn on the system.

3.   During POST, press <Ctrl+I> to display the utility main menu.

```
    Intel(R) Matrix Storage Manager Option ROM v5.0.0.1032 ICH9R wRAID5
          Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
    ═══════════════════════════[ MAIN MENU ]═══════════════════════════
                         1. Create RAID Volume
                         2. Delete RAID Volume
                         3. Reset Disks to Non-RAID
                         4. Exit


    ══════════════════════[ DISK/VOLUME INFORMATION ]══════════════════
    RAID Volumes:
    None defined.

    Physical Disks:
    Port Drive Model      Serial #            Size    Type/Status(Vol ID)
    0    XXXXXXXXXXX      XXXXXXX             XX.XXGB  Non-RAID Disk
    1    XXXXXXXXXXX      XXXXXXX             XX.XXGB  Non-RAID Disk
    2    XXXXXXXXXXX      XXXXXXX             XX.XXGB  Non-RAID Disk
    3    XXXXXXXXXXX      XXXXXXX             XX.XXGB  Non-RAID Disk




        [↑↓]-Select         [ESC]-Exit          [ENTER]-Select Menu
```

The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.
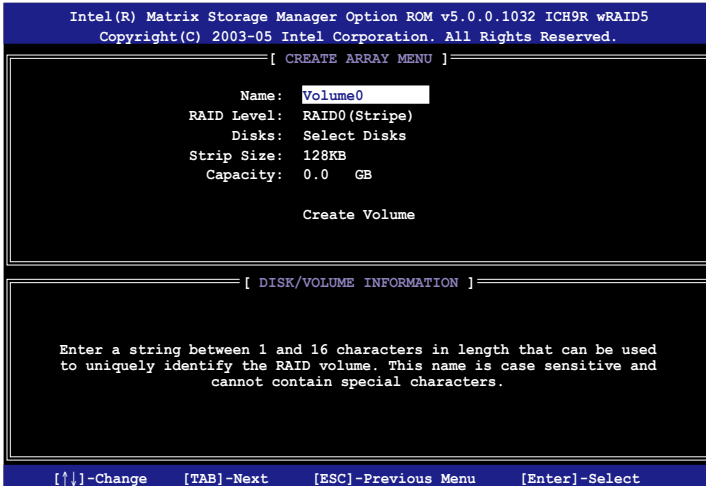
> The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.
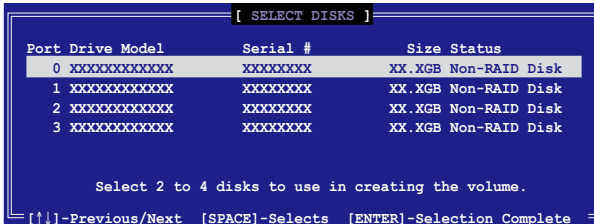
Creating a RAID 0 set (striped)

To create a RAID 0 set:

1. From the utility main menu, select 1. Create RAID Volume, then press
    <Enter>. This screen appears.

```
        Intel(R) Matrix Storage Manager Option ROM v5.0.0.1032 ICH9R wRAID5
             Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
    ════════════════════════[ CREATE ARRAY MENU ]════════════════════════

                          Name:    Volume0
                    RAID Level:    RAID0(Stripe)
                         Disks:    Select Disks
                    Strip Size:    128KB
                      Capacity:    0.0   GB


                              Create Volume


    ═══════════════════════[ DISK/VOLUME INFORMATION ]═══════════════════════



            Enter a string between 1 and 16 characters in length that can be used
           to uniquely identify the RAID volume. This name is case sensitive and
                              cannot contain special characters.




        [↑↓]-Change      [TAB]-Next      [ESC]-Previous Menu      [Enter]-Select
```

2. Enter a name for the RAID 0 set, then press <Enter>.
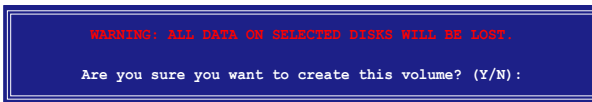3. When the RAID Level item is highlighted, press the up/down arrow key to
    select RAID 0(Stripe), then press <Enter>.
4. When the Disks item is highlighted, press <Enter> to select the hard disk
    drives to configure as RAID. This pop-up screen appears.

```
    ═══════════════════════[ SELECT DISKS ]═══════════════════════

    Port Drive Model          Serial #          Size Status
       0 XXXXXXXXXXXX          XXXXXXX           XX.XGB Non-RAID Disk
       1 XXXXXXXXXXXX          XXXXXXX           XX.XGB Non-RAID Disk
       2 XXXXXXXXXXXX          XXXXXXX           XX.XGB Non-RAID Disk
       3 XXXXXXXXXXXX          XXXXXXX           XX.XGB Non-RAID Disk



            Select 2 to 4 disks to use in creating the volume.

    [↑↓]-Previous/Next   [SPACE]-Selects   [ENTER]-Selection Complete
```

5. Use the up/down arrow key to highlight a drive, then press <Space> to
    select. A small triangle marks the selected drive. Press <Enter> after
    completing your selection.

6.   Use the up/down arrow key to select the stripe size for the RAID 0 array, then
      press <Enter>. The available stripe size values range from 4 KB to 128 KB.
      The default stripe size is 128 KB.

      TIP: We recommend a lower stripe size for server systems, and a higher stripe
      size for multimedia computer systems used mainly for audio and video editing.

7.   Key in the RAID volume capacity that you want, then press <Enter>. The
      default value indicates the maximum allowed capacity.

8.   Press <Enter> when the Create Volume item is highlighted. This warning
      message appears.

```
        WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.

     Are you sure you want to create this volume? (Y/N):
```

9.   Press <Y> to create the RAID volume and return to the main menu, or <N> to
      go back to the Create Volume menu.

Creating a RAID 1 set (mirrored)

To create a RAID 1 set:

1.   From the utility main menu, select 1. Create RAID Volume, then press
     <Enter>. This screen appears.

```
        Intel(R) Matrix Storage Manager Option ROM v5.0.0.1032 ICH9R wRAID5
             Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
    ═══════════════════════════[ CREATE ARRAY MENU ]═══════════════════════════

                          Name:   Volume1
                    RAID Level:   RAID1(Mirror)
                         Disks:   Select Disks
                    Strip Size:   N/A
                      Capacity:   XX.X  GB


                                  Create Volume


    ══════════════════════════[ DISK/VOLUME INFORMATION ]══════════════════════


            Enter a string between 1 and 16 characters in length that can be used
            to uniquely identify the RAID volume. This name is case sensitive and
                            cannot contain special characters.




       [↑↓]-Change      [TAB]-Next      [ESC]-Previous Menu      [Enter]-Select
```
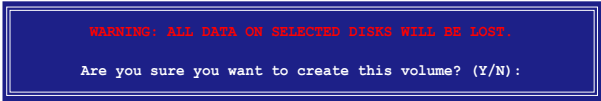
2.   Enter a name for the RAID 1 set, then press <Enter>.

3.   When the RAID Level item is highlighted, press the up/down arrow key to
     select RAID 1(Mirror), then press <Enter>.

4.   When the Capacity item is highlighted, key in the RAID volume capacity that
     you want, then press <Enter>. The default value indicates the maximum
     allowed capacity.

5.   Press <Enter> when the Create Volume item is highlighted. This warning
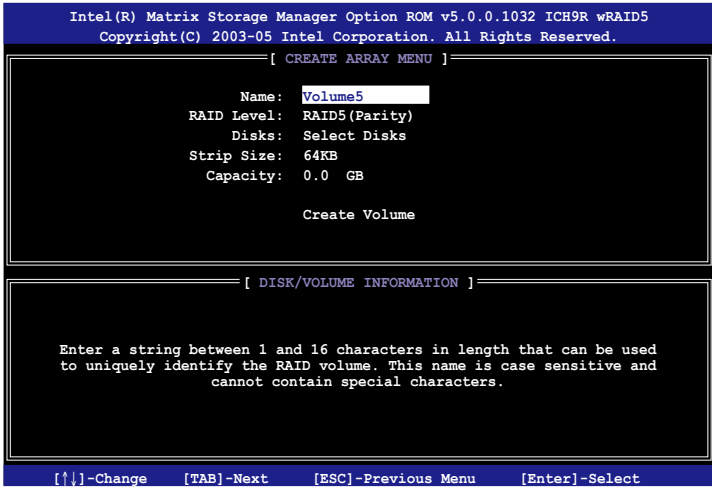   message appears.

```
            WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.

            Are you sure you want to create this volume? (Y/N):
```

6.   Press <Y> to create the RAID volume and return to main menu or <N> to go
     back to Create Volume menu.

Creating a RAID 10 set (RAID 0+1)
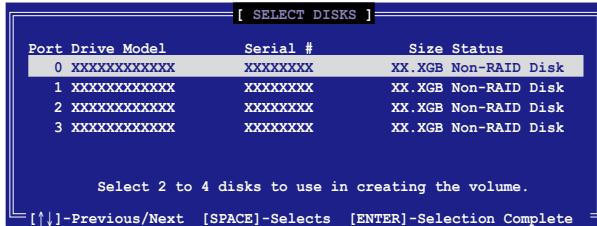
To create a RAID 10 set:

1. From the utility main menu, select 1. Create RAID Volume, then press
    <Enter>. This screen appears.

```
    Intel(R) Matrix Storage Manager Option ROM v5.0.0.1032 ICH9R wRAID5
          Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
 ══════════════════════════[ CREATE ARRAY MENU ]══════════════════════

                    Name:   Volume10
              RAID Level:   RAID10(RAID0+1)
                   Disks:   Select Disks
              Strip Size:   128KB
                Capacity:   XXX.X GB

                           Create Volume


 ══════════════════════[ DISK/VOLUME INFORMATION ]════════════════════



       Enter a string between 1 and 16 characters in length that can be used
       to uniquely identify the RAID volume. This name is case sensitive and
                         cannot contain special characters.




     [↑↓]-Change    [TAB]-Next    [ESC]-Previous Menu    [Enter]-Select
```

2. Enter a name for the RAID 10 set, then press <Enter>.

3. When the RAID Level item is highlighted, press the up/down arrow key to
    select RAID 10 (RAID 0+1), then press <Enter>.

4. When the Stripe Size item is highlighted, press the up/down arrow key to
    select the stripe size for the RAID 10 array, then press <Enter>. The available
    stripe size values range from 4 KB to 128 KB. The default stripe size is 64
    KB.

    > TIP: We recommend a lower stripe size for server systems, and a higher stripe
    > size for multimedia computer systems used mainly for audio and video editing.

5. Key in the RAID volume capacity that you want then press <Enter> when
    the Capacity item is highlighted. The default value indicates the maximum
    allowed capacity.

6.   Press <Enter> when the Create Volume item is highlighted. This warning
     message appears.

```
WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.

Are you sure you want to create this volume? (Y/N):
```

7.   Press <Y> to create the RAID volume and return to the main menu or <N> to
     go back to the Create Volume menu.

Creating a RAID 5 set (parity)

To create a RAID 5 set:

1.   From the utility main menu, select 1. Create RAID Volume, then press
     <Enter>. This screen appears.

```
      Intel(R) Matrix Storage Manager Option ROM v5.0.0.1032 ICH9R wRAID5
          Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
                          ═[ CREATE ARRAY MENU ]═

                         Name:   Volume5
                   RAID Level:   RAID5(Parity)
                        Disks:   Select Disks
                   Strip Size:   64KB
                     Capacity:   0.0  GB

                                 Create Volume


                      ═[ DISK/VOLUME INFORMATION ]═



        Enter a string between 1 and 16 characters in length that can be used
       to uniquely identify the RAID volume. This name is case sensitive and
                        cannot contain special characters.



     [↑↓]-Change    [TAB]-Next    [ESC]-Previous Menu    [Enter]-Select
```

2.   Enter a name for the RAID 5 set, then press <Enter>.
3.   When the RAID Level item is highlighted, press the up/down arrow key to
     select RAID 5(Parity), then press <Enter>.

4. The Disks item is highlighted, press <Enter> to select the hard disk drives to configure as RAID. The following pop-up screen appears.

```
┌──────────────[ SELECT DISKS ]──────────────┐
│ Port Drive Model      Serial #      Size Status            │
│   0 XXXXXXXXXXXX      XXXXXXXX      XX.XGB Non-RAID Disk    │
│   1 XXXXXXXXXXXX      XXXXXXXX      XX.XGB Non-RAID Disk    │
│   2 XXXXXXXXXXXX      XXXXXXXX      XX.XGB Non-RAID Disk    │
│   3 XXXXXXXXXXXX      XXXXXXXX      XX.XGB Non-RAID Disk    │
│                                                            │
│                                                            │
│      Select 2 to 4 disks to use in creating the volume.    │
│                                                            │
└─[↑↓]-Previous/Next  [SPACE]-Selects  [ENTER]-Selection Complete─┘
```

5. Use the up/down arrow key to highlight the drive you want to set, then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.

6. When the Stripe Size item is highlighted, press the up/down arrow key to select the stripe size for the RAID 5 array, then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The default stripe size is 64 KB.

> TIP: We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

7. Key in the RAID volume capacity that you want, then press <Enter> when the Capacity item is highlighted. The default value indicates the maximum allowed capacity.

8. Press <Enter> when the Create Volume item is highlighted. This warning message appears.

```
┌──────────────────────────────────────────────────────┐
│                                                        │
│        WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST. │
│                                                        │
│     Are you sure you want to create this volume? (Y/N): │
│                                                        │
└──────────────────────────────────────────────────────┘
```

9. Press <Y> to create the RAID volume and return to the main menu or <N> to go back to the Create Volume menu.

5.5 Creating a RAID driver disk

A floppy disk with the RAID driver is required when installing Windows® XP operating system on a hard disk drive that is included in a RAID set. For Windows® Vista™ operating system, use either a floppy disk or a USB device with the RAID driver.

5.5.1 Creating a RAID driver disk without entering the OS

To create a RAID/SATA driver disk without entering the OS:

1. Boot your computer.
2. Press <Del> during POST to enter the BIOS setup utility.
3. Set the optical drive as the primary boot device.
4. Insert the support DVD into the optical drive.
5. Save changes and exit BIOS.
6. Press any key when the system prompts "Press any key to boot from the optical drive."
7. When the menu appears, press <1> to create a RAID driver disk.
8. Insert a formatted floppy disk into the floppy drive then press <Enter>.
9. Follow succeeding screen instructions to complete the process.

5.5.2 Creating a RAID/SATA driver disk in Windows®

To create a RAID driver disk in Windows®:

1. Start Windows®.
2. Place the motherboard support DVD into the optical drive.
3. Go to the Make Disk menu, then click **Intel ICH9 32/64bit RAID/AHCI Driver** to create an Intel® ICH9R RAID driver disk.
4. Insert a floppy disk/USB device into the floppy disk drive/USB port.
5. Follow succeeding screen instructions to complete the process.

> Write-protect the floppy disk to avoid computer virus infection.

To install the RAID driver in Windows® XP:

1. During the OS installation, the system prompts you to press the F6 key to install third-party SCSI or RAID driver.
2. Press <F6> then insert the floppy disk with RAID driver into the floppy disk drive.
3. When prompted to select the SCSI adapter to install, make sure you select **ICH9R**.
4. Follow the succeeding screen instructions to complete the installation.

To install the RAID driver in Windows® Vista™:

1. Insert the floppy disk/USB device with RAID driver into the floppy disk drive/USB port.
2. During the OS installation, select **Intel ICH9R**.
3. Follow the succeeding screen instructions to complete the installation.

This chapter tells how to install ATI®
CrossFire™ graphics cards to avail of
ATI's Multi-Video Processing technology.

ATI® CrossFire™ technology support

Chapter summary

6

6.1 Overview

The motherboard supports the ATI® CrossFire™ technology that allows you to install multi-graphics processing units (GPU) graphics cards. Follow the installation procedures in this section.

6.1.1 Requirements

- CrossFire™ Edition graphics card (Master)
- CrossFire™-ready graphics card (Slave)
- CrossFire™-ready motherboard
- Make sure that your power supply unit (PSU) can provide at least the minimum power required by your system. See **9. ATX Power connectors** on page 2-33 for details.

- Visit the ATI website or download the Radeon® X850 Crossfire™ Edition User's Guide from the support DVD for detailed hardware requirements and installation procedures.

- The ATI CrossFire™ technology supports only the following operating systems:
    - Windows® XP 32-bit (Home or Professional) with Service Pack 2 (SP2)
    - Windows® XP Professional 64-bit Edition.

- Make sure that your graphics card driver supports the ATI® CrossFire™ Technology. Download the latest driver from the ATI website (www.ati.com)

- The maximum resolution of Radeon™ X850 CrossFire™ Edition is 1600 x 1200 at 65 MHz when you use DVI output.

6.1.2 Before you begin

Uninstall other graphics card drivers in your system

To uninstall other graphics card drivers:

1. Close all current applications.
2. Go to **Control Panel** > **Add/Remove Programs**.
3. Select your current graphics card driver/s.
4. Select **Add/Remove**.
5. Restart your system.

6.2 Installing CrossFire™ graphics cards

✎ Before installing a CrossFire™ system, refer to the user guide that came with the ATI® CrossFire™ Edition graphics card.

To install the graphics cards:

1. Prepare one CrossFire™ Edition (Master) graphics card and one CrossFire™-ready (Slave) graphics card.
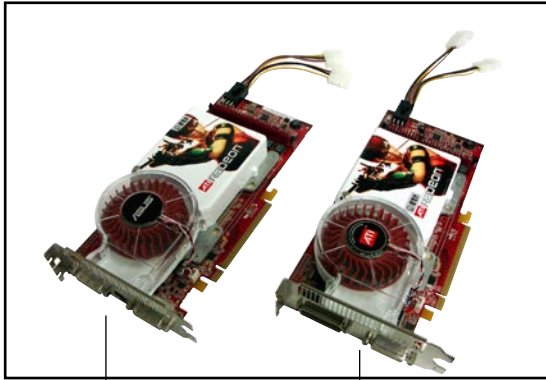
Slave graphics card   **Master graphics card**

2. Insert the CrossFire™ Edition (Master) graphics card into the PCI Express x16_1 slot. Make sure that the card is properly seated on the slot.
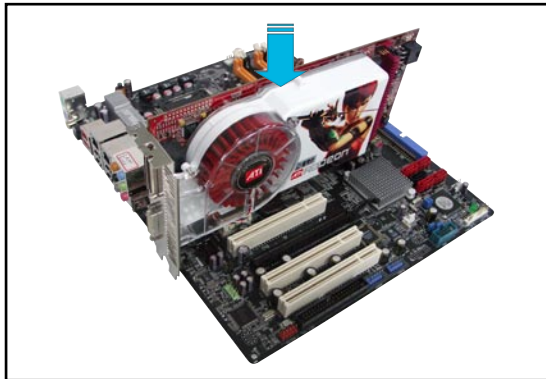
3. Insert the CrossFire™-ready (Slave) graphics card into the PCI Express x16_2 slot. Make sure that the card is properly seated on the slot.
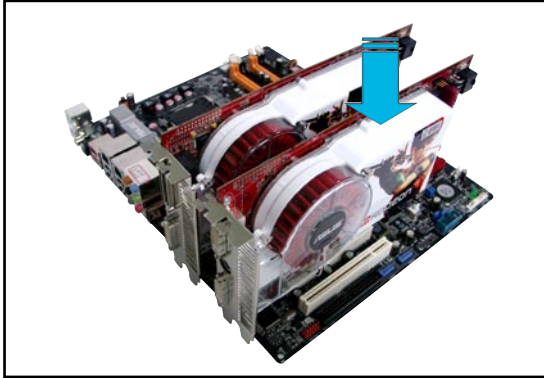
4. Connect an auxiliary power source from the power supply to the graphics cards.
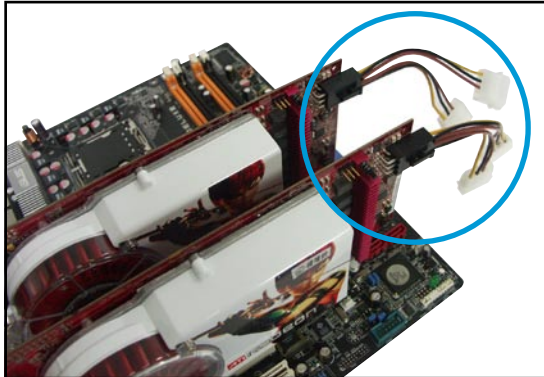
5.   Connect one end of the external cable to the Master graphics card.
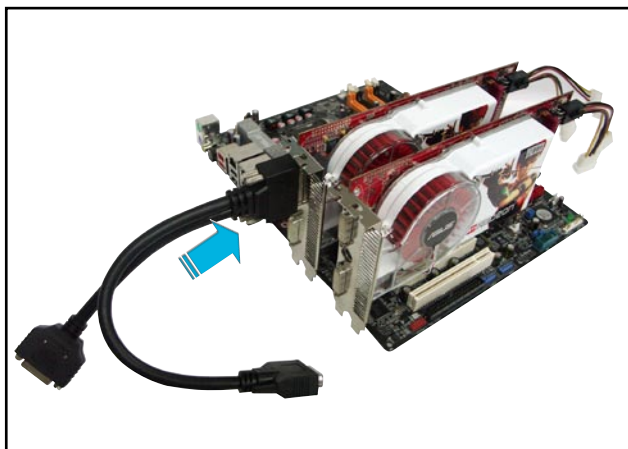
6.   Connect the other end of the external cable to the Slave graphics card.
7.   Connect the loose end to the corresponding port on your monitor.
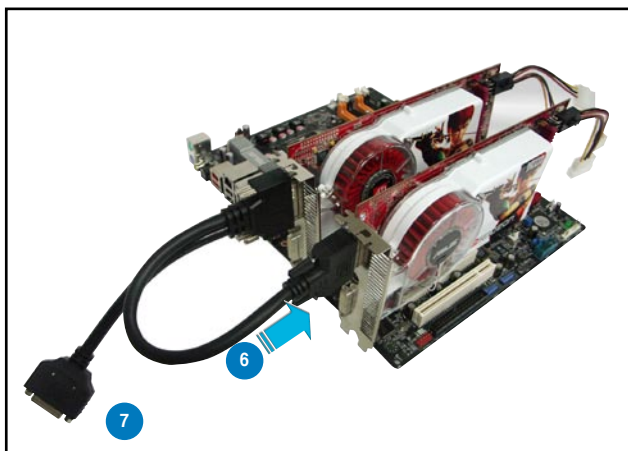
6.3 Software information

6.3.1 Installing the device drivers

Refer to the documentation that came with your graphics card package to install the device drivers.

> The ATI CrossFire™ technology supports only the following operating systems:
> - Windows® XP 32-bit (Home or Professional) with Service Pack 2 (SP2)
> - Windows® XP Professional 64-bit Edition.
> - Windows® Vista 32/64 bit Edition. (Will be ready later. Visit the ATI website (www.ati.com)

1. Turn on your system and log in with administrator rights.

2. Windows® auto-detects the CrossFire™ graphics cards and displays the Found New Hardware Wizard window. Click **Cancel**.

3. Place the CrossFire™ installation DVD in your optical drive and install drivers from the opening menu.

4. Click **Next** to continue from the installation window that appears.

5. Read the License Agreement, then click **Yes**.
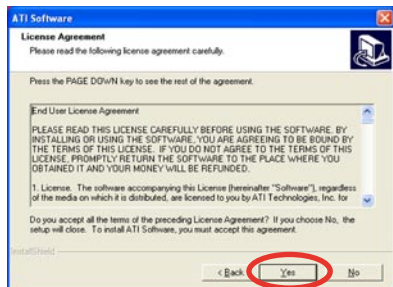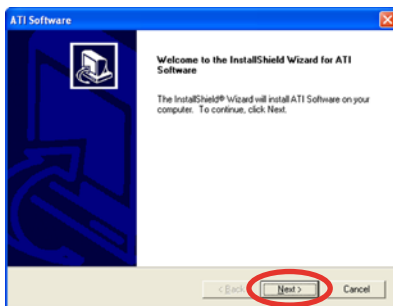
6. Select the components that you want to install, then click **Next**.
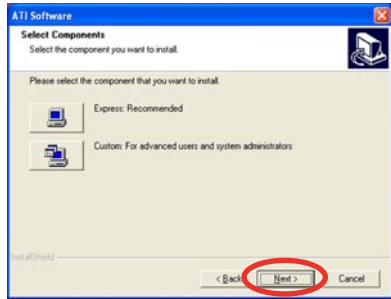
✎   • Select Express to install the HydraVision™ multi-monitor and desktop management software, as well as the ATI driver.

    • Select Custom to individually choose desired software components.

Setup prepares the installation wizard that will guide you to setup process.
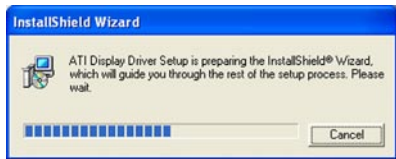
Windows automatically configures the ATI Catalyst Control Center. The status windows indicates the progress of the installation.
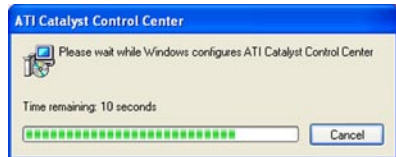
7. The Setup Complete window appears, indicating that the driver files have been copied to your computer.

    Click **Yes** to restart your computer now or **No** to restart later

8. Click **Finish**.
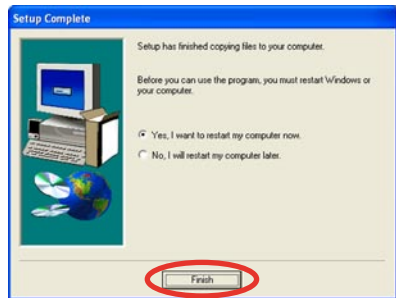
6.3.2   Using the Catalyst™ Control Center

The Catalyst™ Control Center allows you to access display features of the ATI hardware and software you installed. Use this application to adjust your graphic settings, enable/disable connected devices, and change your desktop orientation.

Launching the Catalyst™ Control Center

There are several ways to launch the Catalyst™ Control Center:

- On the Windows® task bar, click **Start** > **ATI Catalyst™ Control Center** > **Catalyst™ Control Center**
- Double-click the Catalyst™ Control Center desktop shortcut.

- On the Windows® task bar, double-click the Catalyst™ Control Center icon.

The Catalyst™ Control Center Dialog Box

View

The Catalyst™ Control Center provides two views:

Standard - simple view with wizards for beginners

Advance - allows advanced users to access and configure the complete features of the software

Set to **Advance** view to enable the CrossFire™ function.

To enable CrossFire™:

1. Set the view to **Advance**.

2. Click the Crossfire™ item in Graphics Settings.

3. In the CrossFire™ Settings dialog, tick the box opposite **Enable CrossFire™**.

4. Click **OK** to effect the setting.

Hotkeys
Click the **Hotkeys** tab on the Catalyst™ Control Center to access the Hotkeys Manager, which allows you to create key combinations as shortcuts for performing certain functions quickly.

Profiles
Click the **Profiles** tab on the Catalyst™ Control Center to access the Profiles
Manager, which allows you to create customized environments for your
desktop, video, and 3D applications.

Preferences
Click the **Preferences** tab on the Catalyst™ Control Center to select a
language, restore defaults, change skins, or enable/disable the System Tray
icon.

Help

Click the **Help** tab on the Catalyst™ Control Center to access the online help system, generate a Problem Report, and get the Catalyst™ Control Center version information.

The Appendix describes the CPU features
and technologies that the motherboard
supports as well as the debug code table
for the LCD Poster.

CPU features A

Chapter summary

A

A.1 Intel® EM64T

- The motherboard is fully compatible with Intel® LGA775 processors running on 32-bit operating systems.

- The motherboard comes with a BIOS file that supports EM64T. You can download the latest BIOS file from the ASUS website (www.asus.com/support/download/) if you need to update the BIOS file. See Chapter 4 for details.

- Visit www.intel.com for more information on the EM64T feature.

- Visit www.microsoft.com for more information on Windows® 64-bit OS.

Using the Intel® EM64T feature

To use the Intel® EM64T feature:

1. Install an Intel® CPU that supports the Intel® EM64T.

2. Install a 64-bit operating system (Windows® Vista 64-bit Edition or Windows® XP Professional x64 Edition).

3. Install the 64-bit drivers for the motherboard components and devices from the support DVD.

4. Install the 64-bit drivers for expansion cards or add-on devices, if any.

Refer to the expansion card or add-on device(s) documentation, or visit the related website, to verify if the card/device supports a 64-bit system.

A.2 Enhanced Intel SpeedStep® Technology (EIST)

- The motherboard comes with a BIOS file that supports EIST. You can download the latest BIOS file from the ASUS website (www.asus.com/support/download/) if you need to update the BIOS. See Chapter 4 for details.

- Visit www.intel.com for more information on the EIST feature.

A.2.1 System requirements

Before using EIST, check your system if it meets the following requirements:

- Intel® processor with EIST support
- BIOS file with EIST support
- Operating system with EIST support (Windows® Vista, Windows® XP SP2/ Linux 2.6 kernel or later versions).

## A.2.2   Using the EIST

To use the EIST feature:

1.   Turn on the computer, then enter the BIOS Setup.

2.   Go to the Advanced Menu, highlight CPU Configuration, then press <Enter>.

3.   Set the Intel(R) SpeedStep Technology item to [Automatic], then press <Enter>. See page 4-26 for details.

4.   Press <F10> to save your changes and exit the BIOS setup.

5.   After the computer restarts, right click on a blank space on the desktop, then select Properties from the pop-up menu.

6.   When the Display Properties window appears, click the Screen Saver tab.

7.   Click the Power button on the Monitor power section to open the Power Options Properties window.
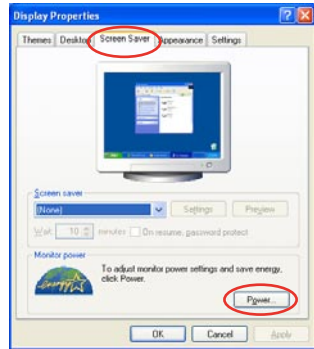
8.   On the Power schemes section, click ⌄, then select any option except Home/Office Desktop or Always On.

9.   Click Apply, then click OK.

10.   Close the Display Properties window.

      After you adjust the power scheme, the CPU internal frequency slightly decreases when the CPU loading is low.
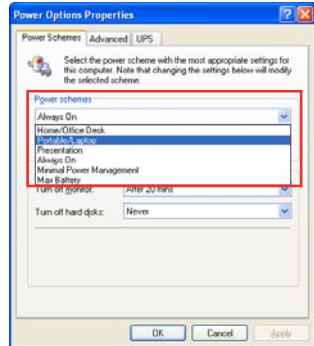
> The screen displays and procedures may vary depending on the operating system.

A.3   Intel® Hyper-Threading Technology

> • The motherboard supports Intel® Pentium® 4 LGA775 processors with Hyper-Threading Technology.
>
> • Hyper-Threading Technology is supported under Windows® Vista/XP and Linux 2.4.x (kernel) and later versions only. Under Linux, use the Hyper-Threading compiler to compile the code. If you are using any other operating systems, disable the Hyper-Threading Technology item in the BIOS to ensure system stability and performance.
>
> • Installing Windows® XP Service Pack 1 or later version is recommended.
>
> • Make sure to enable the Hyper-Threading Technology item in BIOS before installing a supported operating system.
>
> • For more information on Hyper-Threading Technology, visit www.intel.com/info/hyperthreading.

Using the Hyper-Threading Technology

To use the Hyper-Threading Technology:

1.   Install an Intel® Pentium® 4 CPU that supports Hyper-Threading Technology.

2.   Power up the system and enter the BIOS Setup. Under the Advanced Menu, make sure that the item **Hyper-Threading Technology** is set to [Enabled].

   The BIOS item appears only if you installed a CPU that supports Hyper-Threading Technology.

3.   Restart the computer.

A.4 Debug Code Table

Code	Description
CPU INIT	CPU Initiation
DET CPU	Test CMOS R/W functionality.
CHIPINIT	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
DET DRAM	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
DC FCODE	Expand compressed BIOS code to DRAM
EFSHADOW	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
DC XCODE	Expand the Xgroup codes locating in physical address 1000:0
INIT IO	Initial Superio_Early_Init switch.
CLR SCRN	1. Blank out screen 2. Clear CMOS error flag
INIT8042	1. Clear 8042 interface 2. Initialize 8042 self-test
ENABLEKB	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
DIS MS	1. Disable PS/2 mouse interface (optional). 2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Winbond 977 series Super I/O chips.
R/W FSEG	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
DET FLASH	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESDVD & DMI support.
TESTCMOS	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
PRG CHIP	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
INIT CLK	Initial Early_Init_Onboard_Generator switch.
CHECKCPU	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
INTRINIT	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
REC MPS	Initial EARLY_PM_INIT switch.
Reserved	Load keyboard matrix (notebook platform)
Reserved	HPM initialization (notebook platform)
SET FDD	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. 3. Prepare BIOS resource map for PCI & PnP use. If ESDVD is valid, take into consideration of the ESDVD's legacy information. 4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. 5. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it nto C000:0.
INITINT9	Initialize INT 09 buffer

CPUSPEED	1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address. 2. Initialize the APIC for Pentium class CPU. 3. Program early chipset according to CMOS setup. Example: onboard IDE controller. 4. Measure CPU speed. 5. Invoke video BIOS.
TESTVRAM	1. Initialize multi-language 2. Put information on screen display, including Award title, CPU type, CPU speed .
RESET KB	Reset keyboard except Winbond 977 series Super I/O chips.
8254TEST	Test 8254
8259MSK1	Test 8259 interrupt mask bits for channel 1.
8259MSK2	Test 8259 interrupt mask bits for channel 2.
8259TEST	Test 8259 functionality.
Reserved	Initialize EISA slot
COUNTMEM	1. Calculate total memory by testing the last double word of each 64K page. 2. Program write allocation for AMD K5 CPU.
MP INIT	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
USB INIT	Initialize USB
TEST MEM	Test all memory (clear all extended memory to 0)
SHOW MP	Display number of processors (multi-processor platform)
PNP LOGO	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.
Reserved	Initialize the combined Trend Anti-Virus code.
SHOW EZF	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
ONBD IO	1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onbaord_AUDIO switch.
EN SETUP	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
MSINSTAL	Initialize PS/2 Mouse
CHK ACPI	Prepare memory size information for function call: INT 15h ax=E820h
EN CACHE	Turn on L2 cache
SET CHIP	Program chipset registers according to items described in Setup & Auto-configuration table.
AUTO CFG	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".
INIT FDC	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
CUTIRQ12	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
DET IDE	Detect & install all IDE devices: HDD, LS120, ZIP, DVDROM…..
COM/LPT	Detect serial ports & parallel ports.
DET FPU	Detect & install co-processor

CPU CHG	CPU change
CPR FAIL	CPR error
FAN FAIL	Fan error
UCODEERR	UCODE error
FLOPYERR	Floppy error
KB ERROR	Keyboard error
HD ERR	HDD error
CMOS ERR	CMOS error
MS ERROR	Mouse error
80P ERR	80 port error
BOOT CHG	Boot device change
SMARTERR	HDD smart function error
HM ERROR	Hard monitor error
AINETERR	AI NET error
CASEOPEN	Case open
PASSWORD	Clear EPA or customization logo. 1. Call chipset power management hook. 2. Recover the text fond used by EPA logo (not for full screen logo) 3. If password is set, ask for password.
MEM2CMOS	Save all data in stack back to CMOS
INIT PNP USB FINAL	Initialize ISA PnP boot devices 1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs.
READ HDD BOOTMENU	Read HDD boot sector information for Trend Anti-Virus code 1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining
NUM LOCK	1. Program daylight saving 2. Update keyboard LED & typematic rate
UPDT DMI	1. Build MP table 2. Build & update ESDVD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table.
INT 19H	Boot attempt (INT 19h)