

**Rampage
Extreme**

ASUS[®]

Motherboard

E3935

Second Edition V2

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Contents

Contents	iii
Notices	viii
Safety information	ix
About this guide	x
Rampage Extreme specifications summary	xii

Chapter 1: Product introduction

1.1	Welcome!	1-1
1.2	Package contents	1-1
1.3	Special features	1-2
1.3.1	Product highlights	1-2
1.3.2	ROG Intelligent Performance & Overclocking features... ..	1-5
1.3.3	ROG unique features	1-7
1.3.4	ASUS special features	1-8

Chapter 2: Hardware information

2.1	Before you proceed	2-1
2.2	Motherboard overview	2-4
2.2.1	Motherboard layout	2-4
2.2.2	SupremeFX X-Fi audio card layout	2-4
2.2.3	Layout contents	2-5
2.2.4	Placement direction	2-6
2.2.5	Screw holes	2-6
2.3	Central Processing Unit (CPU)	2-7
2.3.1	Installing the CPU	2-8
2.3.2	Installing the CPU heatsink and fan	2-11
2.3.3	Uninstalling the CPU heatsink and fan	2-12
2.4	System memory	2-13
2.4.1	Overview	2-13
2.4.2	Memory configurations	2-13
2.4.3	Installing a DIMM	2-16
2.4.4	Removing a DIMM	2-16
2.5	Expansion slots	2-17
2.5.1	Installing an expansion card	2-17
2.5.2	Configuring an expansion card	2-17
2.5.3	Interrupt assignments	2-18

Contents

2.5.4	PCI slots.....	2-19
2.5.5	PCI Express x1 slots.....	2-19
2.5.6	PCI Express x16 slots.....	2-19
2.6	Slide switch and jumper.....	2-20
2.7	Connectors.....	2-22
2.7.1	Rear panel connectors.....	2-22
2.7.2	Internal connectors.....	2-24
2.7.3	Onboard switches.....	2-36
2.7.4	Tweakt.....	2-37
2.8	Installing accessories.....	2-39
2.8.1	Installing the optional fan.....	2-39
2.8.2	Installing the audio card.....	2-40
2.8.3	Installing EL I/O shield and LCD Poster.....	2-41
2.8.4	Installing Fusion Block System accessory.....	2-42
2.8.5	Replacing NB or MOS Thermal Kit.....	2-44
2.8.6	Installing DIY Pedestal.....	2-46
2.9	Starting up for the first time.....	2-47
2.10	Turning off the computer.....	2-48
2.10.1	Using the OS shut down function.....	2-48
2.10.2	Using the dual function power switch.....	2-48
 Chapter 3: BIOS setup		
3.1	Managing and updating your BIOS.....	3-1
3.1.1	ASUS Update utility.....	3-1
3.1.2	ASUS EZ Flash 2 utility.....	3-4
3.1.3	AFUDOS utility.....	3-5
3.1.4	ASUS CrashFree BIOS 3 utility.....	3-7
3.2	BIOS setup program.....	3-8
3.2.1	BIOS menu screen.....	3-9
3.2.2	Menu bar.....	3-9
3.2.3	Navigation keys.....	3-9
3.2.4	Menu items.....	3-10
3.2.5	Sub-menu items.....	3-10
3.2.6	Configuration fields.....	3-10
3.2.7	Pop-up window.....	3-10
3.2.8	Scroll bar.....	3-10

Contents

3.2.9	General help	3-10
3.3	Extreme Tweaker menu	3-11
3.3.1	Configure System Performance Settings	3-12
3.4	Main menu	3-21
3.4.1	System Time	3-21
3.4.2	System Date	3-21
3.4.3	Legacy Diskette A	3-21
3.4.4	Language	3-21
3.4.5	SATA 1–6.....	3-22
3.4.6	Storage Configuration	3-23
3.4.7	AHCI Configuration	3-24
3.4.8	System Information	3-25
3.5	Advanced menu	3-26
3.5.1	Chipset.....	3-26
3.5.2	Onboard Devices Configuration	3-27
3.5.3	USB Configuration	3-29
3.5.4	PCI PnP	3-30
3.5.5	LCD Poster and LED Control	3-30
3.5.6	Other Configuration.....	3-32
3.6	Power menu.....	3-33
3.6.1	Suspend Mode	3-33
3.6.2	Repost Video on S3 Resume.....	3-33
3.6.3	ACPI 2.0 Support	3-33
3.6.4	ACPI APIC Support.....	3-33
3.6.5	APM Configuration	3-34
3.6.6	Hardware Monitor	3-35
3.7	Boot menu	3-38
3.7.1	Boot Device Priority	3-38
3.7.2	Boot Settings Configuration	3-39
3.7.3	BIOS Boot Priority	3-40
3.7.4	Security	3-41
3.8	Tools menu	3-43
3.8.1	ASUS EZ Flash 2.....	3-43
3.8.2	ASUS O.C. Profile.....	3-44
3.8.3	AI NET 2.....	3-45

Contents

3.8.4	BIOS Flashback	3-46
3.9	Exit menu	3-47

Chapter 4: Software support

4.1	Installing an operating system	4-1
4.2	Support DVD information	4-1
4.2.1	Running the support DVD	4-1
4.2.2	Drivers menu	4-2
4.2.3	Utilities menu	4-3
4.2.4	Make disk menu	4-5
4.2.5	Manual menu	4-6
4.2.6	Video menu	4-6
4.2.7	ASUS Contact information	4-7
4.2.8	Other information	4-7
4.3	Software information	4-9
4.3.1	ASUS MyLogo3™	4-9
4.3.2	AI NET 2	4-11
4.3.3	Sound Blaster X-Fi audio utility	4-12
4.3.4	ASUS PC Probe II	4-16
4.3.5	ASUS EPU-6 Engine	4-22
4.3.6	ASUS AI Suite	4-26
4.3.7	ASUS AI Nap	4-28
4.3.8	ASUS Fan Xpert	4-29
4.3.9	ASUS AI Booster	4-31
4.3.10	CPU Level Up	4-32
4.3.11	ROG Speeding HDD	4-33
4.4	RAID configurations	4-40
4.4.1	RAID definitions	4-40
4.4.2	Installing Serial ATA hard disks	4-41
4.4.3	Intel® RAID configurations	4-41
4.5	Creating a RAID driver disk	4-49
4.5.1	Creating a RAID driver disk without entering the OS ...	4-49
4.5.2	Creating a RAID driver disk in Windows®	4-49

Appendix: CPU features

A.1	Intel® EM64T	A-1
------------	---------------------------	------------

Contents

- A.2 Enhanced Intel SpeedStep® Technology (EIST)A-1**
 - A.2.1 System requirements A-1
 - A.2.2 Using the EIST A-2
- A.3 Intel® Hyper-Threading TechnologyA-3**
 - Using the Hyper-Threading Technology A-3
- A.4 Debug code tableA-4**

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 adapter 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: 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 4: Software support**
This chapter describes the contents of the support DVD that comes with the motherboard package and the software.
- **Appendix: CPU features**
The Appendix describes the CPU features and technologies that the motherboard supports as well as the debug code table for the LCD Poster.

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 /iExtreme.ROM
```

Rampage Extreme specifications summary

CPU	<p>LGA775 socket for Intel® Core™2 Extreme / Core™2 Quad / Core™2 Duo / Pentium® dual-core / Celeron® dual-core / Celeron® processors</p> <p>Intel® 45nm multi-core CPU support</p> <p>Compatible with Intel® 06/05B/05A processors</p> <p>*Refer to www.asus.com for Intel CPU support list</p>
Chipset	Intel® X48 / ICH9R with Intel® Fast Memory Access Technology
System Bus	1600/1333/1066/800 MHz
Memory	<p>Dual-channel memory architecture</p> <ul style="list-style-type: none"> - 4 x 240-pin DIMM sockets support unbuffered ECC/non-ECC DDR3 2000(O.C.)/1800(O.C.)/1600/1333/1066/800 MHz memory modules - Supports up to 8 GB system memory <p>*Supports Intel® Extreme Memory Profile (X.M.P.).</p> <p>**For the X.M.P. support, CPUs with FSB 1333 or above are recommended.</p> <p>***When installing total memory of 4GB capacity or more, Windows® 32-bit operation system may only recognize less than 3GB. Hence, a total installed memory of less than 3 GB is recommended.</p> <p>****Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lists).</p>
Expansion Slots	<p>2 x PCIe 2.0 x16 slots (@ full x16, x16 speed)</p> <p>3 x PCIe x1 (PCIEX1_1 (black) is compatible with the audio slot.)</p> <p>2 x PCI 2.2 slots</p>
CrossFireX™ Technology	Supports ATI CrossFireX™ Technology graphics cards
Storage	<p>Intel® ICH9R Southbridge:</p> <ul style="list-style-type: none"> - 6 x SATA 3.0 Gb/s ports - Intel® Matrix Storage Technology supports RAID 0, 1, 5, and 10 <p>Marvell® 88SE6121 controller:</p> <ul style="list-style-type: none"> - 1 x Ultra DMA 133/100/66/33 for up to 2 PATA devices - 1 x External SATA 3.0 Gb/s port (SATA On-the-Go) <p>Silicon Image SIL5723 controller (SPEEDING HDD Technology):</p> <ul style="list-style-type: none"> - 2 x SATA 3.0 Gb/s ports - Supports EZ Backup and Super Speed
LAN	<p>Dual Gigabit LAN controllers, both featuring AI NET 2</p> <p>Supports Teaming Technology</p>

(continued on the next page)

Rampage Extreme specifications summary

High Definition Audio	SupremeFX X-Fi Audio Card <ul style="list-style-type: none"> - ADI 2000B 8-channel High Definition Audio CODEC - EAX® Advanced™ HD 4.0 - X-Fi CMSS®-3D - X-Fi Crystalizer™ - Creative ALchemy - Supports 1 x S/PDIF out header - Supports Coaxial / Optical S/PDIF Out ports on rear
IEEE 1394	2 x IEEE 1394a ports (one onboard; one at rear panel)
USB	12 x USB 2.0 ports (6 ports onboard; 6 ports at rear panel)
ROG Exclusive Overclocking features	Fusion Block System with optional thermal kit on MOS and NB Extreme Tweaker TweakIt Extreme Engine <ul style="list-style-type: none"> - 16-phase power design for CPU - 3-phase power design for Northbridge - 2-phase power design for Memory - ML Caps on CPU, NB, and memory respectively iROG Loadline Calibration Intelligent overclocking tools: <ul style="list-style-type: none"> - CPU Level Up - AI Overclocking (intelligent CPU frequency tuner) - AI Booster Utility - O.C. Profile Overclocking protection: <ul style="list-style-type: none"> - COP EX (Component Overheat Protection -EX) - Voltminder LED - ASUS C.P.R. (CPU Parameter Recall)
ROG Special Features	Speeding HDD BIOS Flashback LCD Poster Onboard Switches: TweakIt / Power / Reset / Clr CMOS (at rear panel) EL I/O Q-Fan Plus ROG BIOS Wallpaper ASUS EPU-6 Engine ASUS Fan Xpert ASUS Q-Connector ASUS EZ Flash 2 ASUS CrashFree BIOS 3 ASUS MyLogo 3™

(continued on the next page)

Rampage Extreme specifications summary

Back Panel I/O Ports	<ul style="list-style-type: none"> 1 x PS/2 Keyboard port 1 x eSATA port 1 x IEEE1394a port 2 x LAN (RJ45) ports 6 x USB 2.0/1.1 ports 1 x Clr CMOS switch
Internal I/O Connectors	<ul style="list-style-type: none"> 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 (Blue) 2 x Speeding HDD connectors (Black) 8 x Fan connectors (1 x CPU / 1 x Power / 3 x Chassis / 3 x Optional) 3 x Thermal sensor connectors 1 x IEEE1394a connector 1 x Chassis Intrusion connector 1 x En/Dis-able Clr CMOS slide switch 1 x LCD Poster connector 1 x EL I/O connector 1 x ROG connector 1 x System panel connector 24-pin ATX Power connector 8-pin ATX 12V Power connector
BIOS Features	<ul style="list-style-type: none"> 16 Mb Flash ROM, AMI BIOS, PnP, DMI2.0, WfM2.0, SM BIOS 2.4, ACPI 2.0a Multi-Language BIOS
Manageability	<ul style="list-style-type: none"> WOL by PME, WOR by PME, Chassis Intrusion, PXE
Accessories	<ul style="list-style-type: none"> Fusion Block System Accessory Optional Thermal Kit for NB and MOS SupremeFX X-Fi Audio Card LCD Poster ASUS Optional Fan DIY Pedestal 3 in 1 ASUS Q-connector kit UltraDMA 133/100/66 cable Floppy disk drive cable Serial ATA signal cables Serial ATA power cables 2-port USB2.0 + IEEE 1394a module EL I/O Shield Thermal sensor cables Cable ties User's manual

(continued on the next page)

Rampage Extreme specifications summary

Software	Support DVD: <ul style="list-style-type: none">- Drivers and applications- ASUS PC Probe II- ASUS Update- ASUS AI Suite- Sound Blaster X-Fi utility- Futuremark® 3DMark® 06 Advanced Edition- Kaspersky® Anti-virus software
Form Factor	ATX Form Factor, 12"x 9.6" (30.5 cm x 24.5 cm)

*Specifications are subject to change without notice.

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

1 Product introduction

Chapter summary



- 1.1 Welcome! 1-1
- 1.2 Package contents..... 1-1
- 1.3 Special features..... 1-2

1.1 Welcome!

Thank you for buying an ROG Rampage Extreme 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	ROG Rampage Extreme
I/O module	USB 2.0 + IEEE 1394a module
Cables	Ultra DMA 133/100/66 cable Floppy disk drive cable Serial ATA signal cables Serial ATA power cables Thermal sensor cables
Accessories	Fusion Block System Accessory Optional Thermal Kit for NB and MOS SupremeFX X-Fi Audio Card LCD Poster ASUS Optional Fan DIY Pedestal 3-in-1 ASUS Q-Connector Kit EL I/O Shield Cable ties
Application DVD	ROG 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

Republic of Gamers



The Republic of Gamers consists only the best of the best. We offer the best hardware engineering, the fastest performance, the most innovating ideas, and we welcome the best gamers to join in. In the Republic of Gamers, mercy rules are only for the weak, and bragging rights means everything. We believe in making statements and we excel in competitions. If your character matches our trait, then join the elite club, make your presence felt, in the Republic of Gamers.

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



This motherboard supports the latest Intel® Core™ 2 Extreme / Core™ 2 Quad / Core™ 2 Duo processors in the LGA775 package. It is excellent for multi-tasking, multi-media and enthusiastic gamers with 1600/1333/1066/800 MHz FSB. The Intel® Core™ 2 series processor is one of the most powerful CPUs in the world. This motherboard also supports Intel® CPUs in the new 45nm manufacturing process. See page 2-7 for details.

Intel® X48 Chipset



The Intel® X48 Express Chipset is the latest chipset designed to support dual-channel DDR3 1600/1333/1066/800 architecture, 1600/1333/1066/800 FSB (Front Side Bus), dual PCI Express x16 graphics, and multi-core CPUs. With the specially included Intel® Fast Memory Access technology, available memory bandwidth usage is optimized and memory access latency is reduced.

Dual-channel DDR3 memory support



The motherboard supports DDR3 memory that features data transfer rates of 2000(O.C.)/1800(O.C.)/1600/1333/1066/800 MHz to meet the higher bandwidth requirements of the latest operation system, 3D graphics, multimedia, and Internet applications. The dual-channel DDR3 architecture doubles the bandwidth of your system memory to boost system performance, eliminating bottlenecks with peak bandwidths of up to 17 GB/s. Furthermore, the supply voltage for the memory is reduced from 1.8 V for DDR2 to just 1.5 V for DDR3. This voltage reduction limits the power consumption and heat generation of DDR3 which makes it an ideal memory solution. See page 2-13 for details.

PCe 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. See page 2-19 for details.

ATI CrossFireX™ Technology

ATI's CrossFireX™ boosts image quality along with rendering speed, eliminating the need to scale down screen resolutions to get the high image quality you want. CrossFireX™ ignites with the higher antialiasing, anisotropic filtering, shading, and texture settings you desire. Adjust your display configurations, experiment with your advanced 3D settings, and check the effect with a real-time 3D-rendered preview within ATI's Catalyst™ Control Center to rule your CrossFireX™ system.

Serial ATA 3.0 Gb/s technology and SATA-On-The-Go

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. The external SATA port located at the back I/O provides smart setup and hot-plug functions. Easily backup photos, videos and other entertainment contents to external devices. See pages 2-23, 2-26, and 2-27 for details.

Dual Gigabit LAN

The integrated dual Gigabit LAN design allows a PC to serve as a network gateway for managing traffic between two separate networks. This capability ensures rapid transfer of data from WAN to LAN without any added arbitration or latency. See page 2-22 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 2-22 and 2-28 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 2-23 for details.

100% Japan-made Conductive Polymer Capacitors



This motherboard uses all high-quality Japan-made conductive polymer capacitors onboard for durability, improved lifespan, and enhanced thermal capacity.

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.

1.3.2 ROG Intelligent Performance & Overclocking features

Fusion Block System

The Fusion Block System is a more efficient thermal solution than competing followers with complicated looks. The Fusion Block System is a hybrid thermal design that combines the ROG's renowned heatpipe design with the additional ability to connect to a water cooling system. By taking the entire integrated solution into design consideration, with a single connection, user can enjoy exceptional thermal improvement to north bridge, south bridge, and even VRM. We also provide a super optional thermal kit that is used on NB and MOS to improve heat dissipation. The Fusion Block System is the most versatile, the most efficient, and the most advanced thermal system there is on a motherboard.

Extreme Engine

Extreme Engine ensures stable power supply under the most demanding load to mission-critical components such as the processor, the system memory and the north bridge on the motherboard. The special power design of the Extreme Engine means users have the option to venture into high voltage options in the BIOS, allowing for even higher performance enhancements. The "Extreme" ROG motherboard with the Extreme Engine even armed with high-performance ML-Caps, ensuring extra edge during extreme overclocking.

With the power efficiency as high as 96%, ASUS ROG motherboards with the Extreme Engine produces less energy loss and less heat. The intelligent power phase can be changed on the fly, yielding even more heat dissipation.

TweakIt

TweakIt is designed for control freaks. Following the success of the Extreme Tweaker overclocking feature, ASUS has engineered TweakIt to give users flexible overclocking control even when running benchmark programs! The joystick-like control puts every overclocking option in the user's fingertips, allowing the users performance optimization options during game play to gain the competitive edge. TweakIt brings a brand new dimension to the game of overclocking and benchmarking. See pages 2-37 and 2-38 for details.

Speeding HDD

Ever wish you could save time waiting for loading games as well as accessing massive data? Speeding HDD allows gamers to achieve HDD transferring speed almost twice as fast as before! And more than just speed, setting it up is just as quick and simple without all troublesome procedures. Very much like dual-channel memory or SLI/Crossfire setup, gamers only need to connect 2 hard disks in the marked SATA connectors, and system would automatically do the rest! See pages 2-27, 3-28, and 4-33 for details.

iROG



iROG is a special IC which enables several ROG highlighted functions that give you full disposal of the motherboard at any stage! This design allows advanced user control and management to be processed at a hardware level. iROG greatly increases fun during overclocking for PC enthusiasts and it provides system maintenance and management with more control and efficiency.

BIOS Flashback



Overclocker's prayer to have BIOS flexibility is answered! With the new BIOS Flashback, PC enthusiasts can overclock with even more confidence. BIOS Flashback gives overclockers the ability to save two versions of the BIOS simultaneously. Very much like the "SaveGame" function, one BIOS can be used for the overclocking adventure, while the other BIOS is to be stored with any previous version. BIOS Flashback brings the ultimate convenience to overclockers! See pages 2-21 and 3-46 for details.

CPU Level Up



Ever wish that you could have a more expansive CPU? Upgrade your CPU at no additional cost with ROG's CPU Level Up! Simply choose a processor you want to OC to, and the motherboard will do the rest for you. See the new CPU speed and enjoy the performance instantly! Overclocking is never as easy as this. See pages 3-12 and 4-32 for details.

Extreme Tweaker



Extreme Tweaker is the one stop shop to fine-tune your system to optimal performance. No matter if you are looking for frequency adjustment, over-voltage options, or memory timing settings, they are all here! See page 3-12 for details.

Voltiminder LED



In the pursuit of extreme performance, overvoltage adjustment is critical but risky. Acting as the "red zone" of a tachometer, the Voltiminder LED displays the voltage status for CPU, NB, SB, and Memory in a intuitive color-coded fashion. The Voltiminder LED allows quick voltage monitoring for overclockers. See pages 2-1 and 2-2 for details.

Component Overheat Protection-EX (COP EX)



The COP EX allows overclockers to increase chipset voltages without the worries of overheating. It can also be used to monitor and save an overheating GPU. The COP EX allows more freedom and less constraint for maximum performance achievement.

Loadline Calibration

Maintaining ample voltage support for the CPU is critical during overclocking. The Loadline calibration ensures stable and optimal CPU voltage under heavy loading. It helps overclockers enjoy the motherboard's ultimate OC capabilities and benchmark scores.

1.3.3 ROG unique features

SupremeFX X-Fi features



You may enjoy good quality sound from the thoughtful design of SupremeFX card on a hardware level. Activating X-Fi CMSS3D and Crystalizer will enable accurate virtual 3D surround sound and enhancement on sound quality experience. You will be able to experience realistic dynamic sound effects with games. See pages 2-31 and 4-12 for details.

External LCD Poster

The new LCD Poster now posts critical POST information in an ever friendly and flexible external display. When system malfunction occurs, the LCD Poster automatically detects device failure and translates the errors on the LCD during POST. Unlike other competing 2 digit displays, users do not need to read “gibberish” to find out what is wrong. See pages 2-37 and 2-41 for details.

Onboard Switches

With an easy press during overclocking, this exclusive onboard switch allows gamers to effortlessly fine-tune the performance without having to short the pins or moving jumpers. See page 2-36 for details.

EL I/O

Today's users demand more than good performance—they demand more heart touching services and user-friendly features. The motherboard comes with the EL I/O, an impressive design that increases convenience in connecting devices on the back I/O. The cool EL lights up your I/O panel under your desk, in the dark, or in a LAN Party. No more jamming devices into the wrong connectors when you are in the dark! See page 2-41 for details.

Q-Fan Plus technology

The Q-Fan function automatically detects temperature and adjusts fan speed accordingly to achieve quiet and efficient cooling. With Q-Fan Plus, special temperature sensor cable is provided to detect temperature on any device. When used with a optional fans, you may activate Q-Fan function on up to 3 additional devices of your choice!

1.3.4 ASUS special features

ASUS Quiet Thermal Solution

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

Fanless Design—Stack Cool 2

ASUS Stack Cool 2 is a fan-less and zero-noise cooling solution that lowers the temperature of critical heat generating components. The motherboard uses a special design on the printed circuit board (PCB) to dissipate heat these critical components generate.

Fan Xpert

ASUS Fan Xpert intelligently allows users to adjust both the CPU and chassis fan speed according to different ambient temperature, which is caused by different climate conditions in different geographic regions and system loading. Built-in variety of useful profiles offer flexible controls of fan speed to achieve a quiet and cool environment. See page 4-29 for details.

ASUS Power Saving Solution

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

ASUS EPU-6 Engine

The new ASUS EPU, the world's first power saving engine, has been upgraded to a new 6-engine version, which provides total system power savings by detecting current PC loadings and intelligently moderating power in real-time. With auto phase switching for components (which includes the CPU, VGA card, memory, chipset, drives and system fan), the EPU automatically provides the most appropriate power usage via intelligent acceleration and overclocking, helping save power and money. See page 4-22 for details.

AI Nap



With AI Nap, the system can continue running at minimum power and noise when you are temporarily away. To wake the system and return to the OS environment, simply click the mouse or press a key. See page 4-28 for details.

Optional Fan



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 pages 2-39 and 2-44 for details.

ASUS MyLogo 3



ASUS MyLogo 3 is a new feature present in the motherboard that allows you to personalize and add style to your system with customizable and animated boot logos. See page 3-39 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 Q-Connector



The ASUS Q-Connector allows you to connect or disconnect chassis front panel cables in one easy step with one complete module. This unique adapter eliminates the trouble of plugging in one cable at a time, making connection quick and accurate. See pages 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 3-44 for details.

ASUS EZ Flash 2



EZ Flash 2 is a user-friendly BIOS update utility. Simply launch this tool and update BIOS using a USB flash disk without entering the OS. You can update your BIOS in a few clicks without preparing an additional floppy diskette or using an OS-based flash utility. See pages 3-4 and 3-43 for details.

C.P.R. (CPU Parameter Recall)

When the system hangs due to overclocking failure, there is no need to open the system chassis to clear CMOS data. Simply reboot the system, and the BIOS automatically restores the CPU default settings for each parameter.



Due to the chipset behavior, AC power off is required before using C.P.R. function.

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

A large, light gray, stylized number '2' is positioned behind the word 'Hardware' in the title.

2.1	Before you proceed	2-1
2.2	Motherboard overview.....	2-4
2.3	Central Processing Unit (CPU)	2-7
2.4	System memory	2-13
2.5	Expansion slots.....	2-17
2.6	Slide switch and jumper	2-20
2.7	Connectors	2-22
2.8	Installing accessories.....	2-39
2.9	Starting up for the first time.....	2-47
2.10	Turning off the computer.....	2-48

2.1 Before you proceed

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



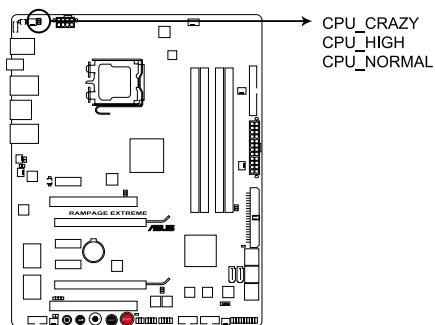
- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
- Hold components by the edges to avoid 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, ensure that 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 LEDs

The motherboard comes with LEDs that indicate the voltage conditions of CPU, memory, northbridge, and southbridge. You may adjust the voltages in BIOS. There are also an LED for hard disk drive activity and an onboard switch for power status. For more information about voltage adjustment, refer to **3.3 Extreme Tweaker menu**.

1. CPU LED

The CPU LED has two voltage displays: CPU Voltage and CPU PLL Voltage; you can select the voltage to display in BIOS. Refer to the illustration below for the location of the CPU LED and the table below for LED definition.

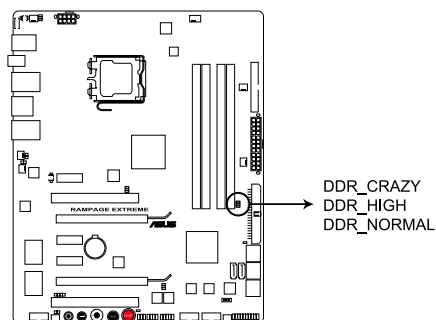


RAMPAGE EXTREME CPU LED

	Normal (green)	High (yellow)	Crazy (red)
CPU Voltage	1.10000–1.50000	1.50625–1.69375	1.70000–
CPU PLL Voltage	1.50000–1.60000	1.62000–1.80000	1.82000–

2. Memory LED

Refer to the illustration below for the location of the memory LED and the table below for LED definition.

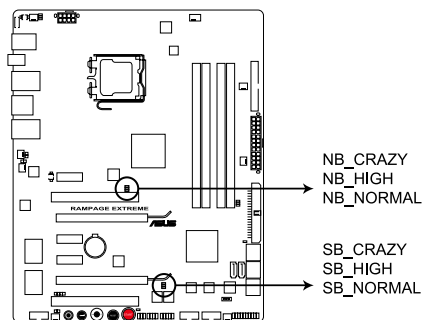


RAMPAGE EXTREME DDR LED

	Normal (green)	High (yellow)	Crazy (red)
DRAM Voltage	1.50–1.90	1.92–2.30	2.32–

3. Northbridge/Southbridge LEDs

The northbridge and southbridge LEDs each have two different voltage displays. The northbridge LED displays either the North Bridge Voltage or the FSB Termination Voltage. The southbridge LED shows either the South Bridge 1.05V Voltage or the South Bridge 1.5V Voltage. You can select the voltage to display in BIOS. Refer to the illustration below for the location of the northbridge/southbridge LEDs and the table below for LED definition.

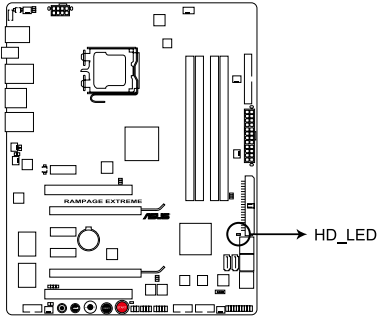


RAMPAGE EXTREME North/South Bridge LED

	Normal (green)	High (yellow)	Crazy (red)
North Bridge Voltage	1.25–1.64	1.65–1.84	1.85–
FSB Termination Voltage	1.10–1.40	1.42–1.60	1.62–
South Bridge 1.05 Voltage	1.050–1.541	1.554–1.792	1.796–
South Bridge 1.5 Voltage	1.50–1.60	1.65–1.75	1.80–

4. Hard Disk LED

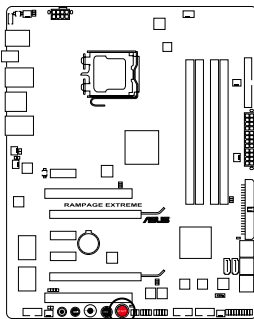
The hard disk LED is designed to indicate the hard disk activity. It blinks when data is being written into or read from the hard disk drive. The LED does not light up when there is no hard disk drive connected to the motherboard or when the hard disk drive does not function.



RAMPAGE EXTREME Hard Disk LED

5. Power LED

The motherboard comes with a power-on switch that 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 power-on switch.



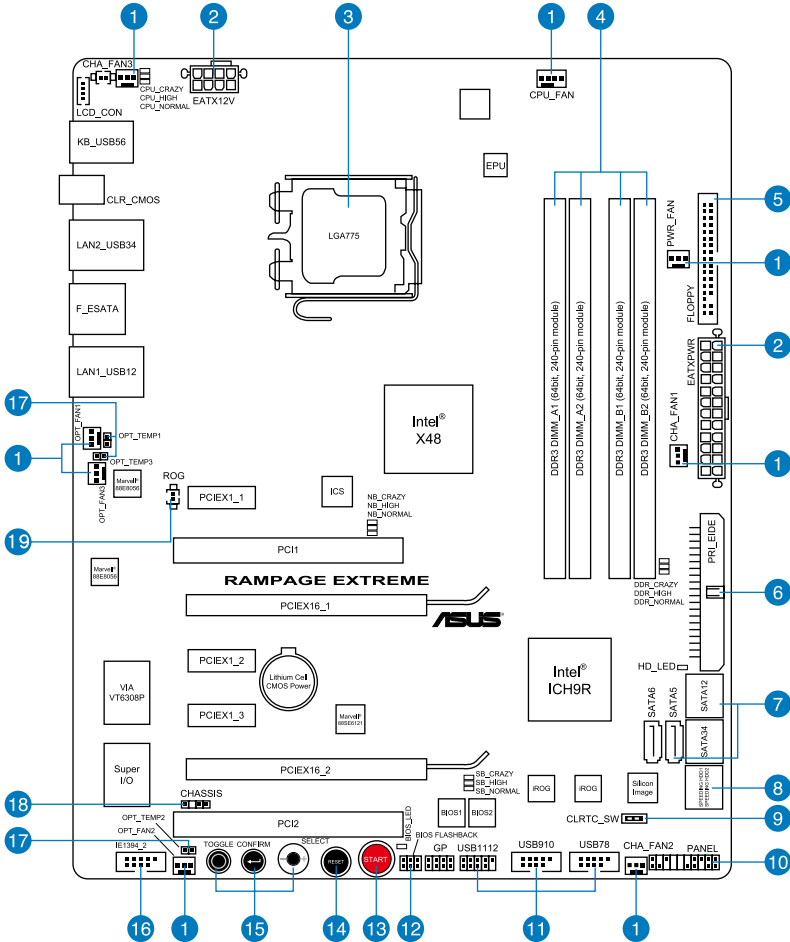
RAMPAGE EXTREME Power on switch



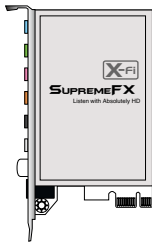
When you turn on the ATX power supply, the **Power LED** flashes three times to indicate that the system is ready to boot. Wait till the flash stops before you press the power-on switch.

2.2 Motherboard overview

2.2.1 Motherboard layout



2.2.2 SupremeFX X-Fi audio card layout



Refer to pages 2-22 and 2-31 for details about the audio jacks and connectors on this card.

2.2.3 Layout contents

Connectors/Jumpers/Switches/Slots		Page
1.	CPU, chassis, and power fan connectors (4-pin CPU_FAN; 3-pin CHA_FAN1-3; 3-pin PWR_FAN; 3-pin OPT_FAN1-3)	2-29
2.	ATX power connectors (24-pin EATXPWR, 8-pin ATX12V)	2-32
3.	LGA775 CPU Socket	2-8
4.	DDR3 DIMM slots	2-13
5.	Floppy disk drive connector (34-1 pin FLOPPY)	2-24
6.	IDE connector (40-1 pin PRI_EIDE)	2-25
7.	ICH9R Serial ATA RAID connectors (7-pin SATA1-6 [blue])	2-26
8.	SIL5723 Serial ATA connectors (7-pin SPEEDING HDD1/2 [black])	2-27
9.	Clear RTC RAM (3-pin CLRTC_SW)	2-20
10.	System panel connector (20-8 pin PANEL)	2-34
11.	USB connectors (10-1 pin USB78; USB910; USB1112)	2-28
12.	BIOS flash setting (6-pin BIOS_FLASHBACK)	2-21
13.	Power-on switch	2-36
14.	Reset switch	2-36
15.	TOGGLE, CONFIRM, SELECT switches	2-37
16.	IEEE 1394a port connector (10-1 pin IE1394_2)	2-28
17.	Thermal sensor cable connectors (2-pin OPT_TEMP1-3)	2-30
18.	Chassis intrusion connector (4-1 pin CHASSIS)	2-30
19.	ROG connector (2-pin ROG)	2-33



Refer to **2.7 Connectors** for more information about rear panel connectors and internal connectors.

2.2.4 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.

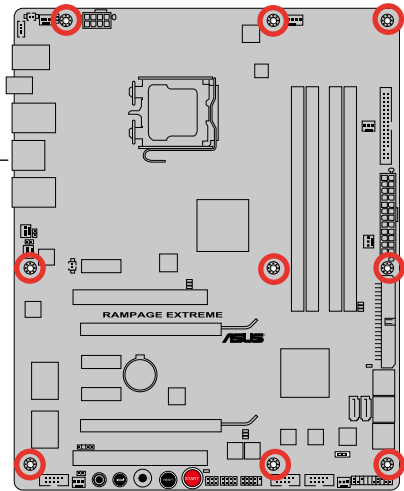
2.2.5 Screw holes

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



2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Core™2 Extreme / Core™2 Quad / Core™2 Duo / Pentium® dual-core / Celeron® dual-core / Celeron® 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.
 - Due to the chipset limitation, we recommend you use FSB 800MHz CPU or above.
-

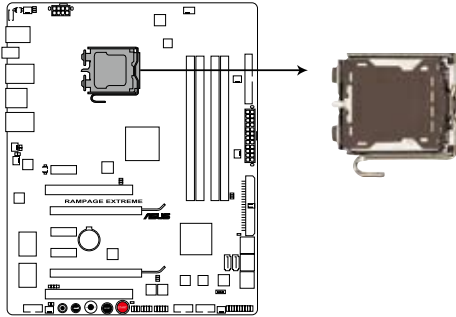


-
- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only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



RAMPAGE EXTREME CPU socket 775

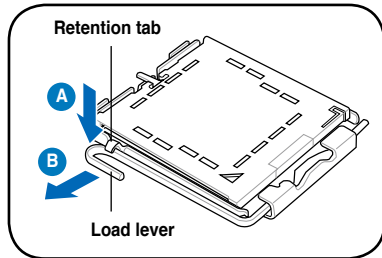


Before installing the CPU, make sure that the cam box is facing towards you and the load lever is on your left.

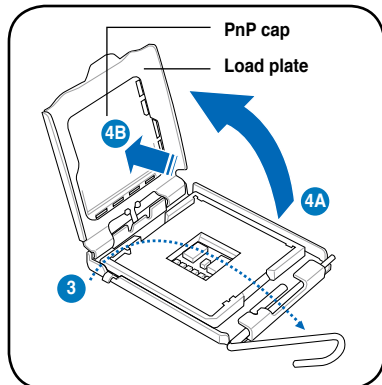
2. Press the load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.



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



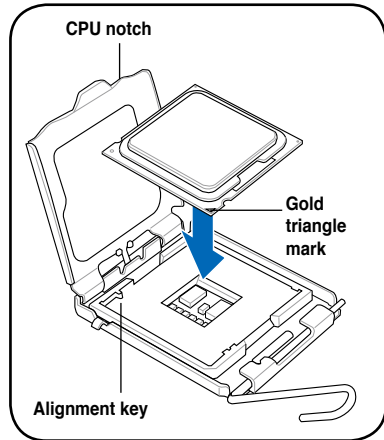
3. Lift the load lever in the direction of the arrow to a 135° angle.
4. Lift the load plate with your thumb and forefinger to a 100° angle (4A), then push the PnP cap from the load plate window to remove (4B).



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.



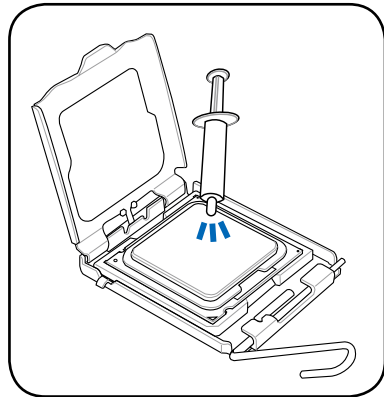
The CPU fits in only one correct orientation. **DO NOT** force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!



6. Apply several drops of thermal paste to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.



Some heatsinks come with pre-applied thermal paste. If so, skip this step.

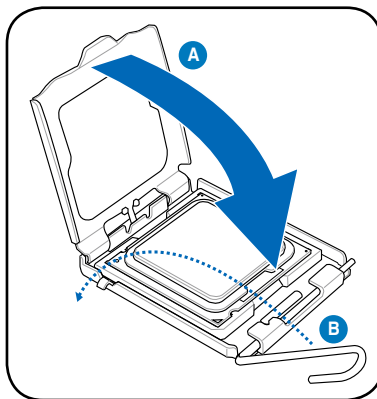


The Thermal Interface Material is toxic and inedible. If it gets into your eyes or touches your skin, ensure to wash it off immediately, and seek professional medical help.



To prevent contaminating the paste, **DO NOT** spread the paste with your finger directly.

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



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.



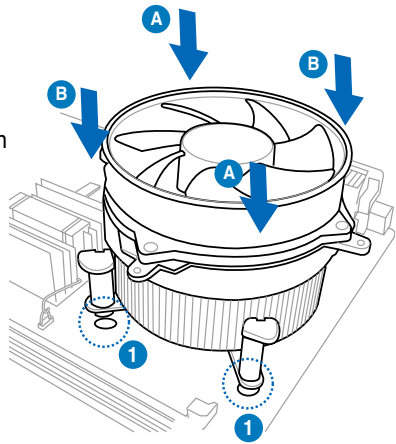
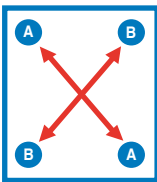
Make sure that you have installed the motherboard to the chassis before you install the CPU fan and heatsink assembly.



If you purchased a separate CPU heatsink and fan assembly, ensure that the Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.

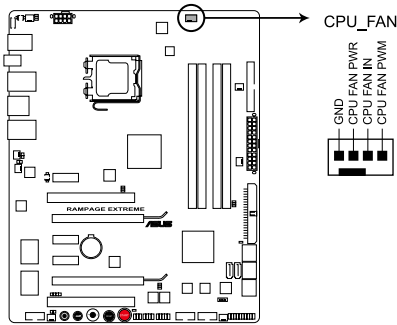
To install the CPU heatsink and fan:

1. Place the heatsink on top of the installed CPU, making sure that the four fasteners match the holes on the motherboard.
2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.



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

3. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN.



RAMPAGE EXTREME CPU fan connector

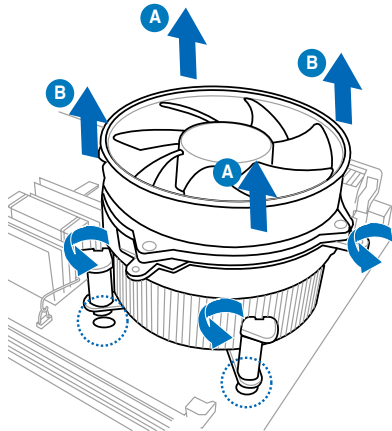
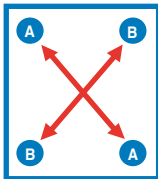


DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

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.

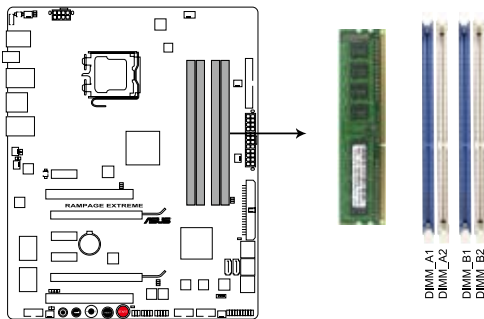
2.4 System memory

2.4.1 Overview

The motherboard comes with four Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.

A DDR3 module has the same physical dimensions as a DDR2 DIMM but is notched differently. DDR3 modules are developed for better performance with less power consumption.

The figure illustrates the location of the DDR3 DIMM sockets:



RAMPAGE EXTREME 240-pin DDR3 DIMM sockets

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

2.4.2 Memory configurations

You may install 512 MB, 1 GB, 2 GB unbuffered ECC/non-ECC DDR3 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.
-



- 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

- The default memory operation frequency is dependent on its SPD. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, see section **3.3 Extreme Tweaker menu** for manual memory frequency adjustment.
 - The memory modules may require a better cooling system to work stably under full loading (4 DIMMs) or overclocking setting.
-

Rampage Extreme Motherboard Qualified Vendors Lists (QVL) DDR3-1333MHz capability

Size	Vendor	Part No.	SS/ DS	Chip No.	DIMM support		
					A*	B*	C*
1024MB	CORSAIR	CM3X1024-1333C9DHX	DS	Heat-Sink Package	*	*	*
1024MB	KINGMAX	FLFD45F-B8EE9	SS	J1108BASE-DJ-E	*	*	
1024MB	Kingston	KVR1333D3N8/1G	DS	IDSH51-03A1F1C-13G	*	*	*
1024MB	Kingston	KVR1333D3N8/1G	DS	J5308BASE-DG-E	*	*	*
2048MB	MICRON	MT16JTF25664AY-1G4BYTES	DS	Z9HWR	*	*	*
1024MB	MICRON	MT8JTF12864AY-1G4BYTES	SS	Z9HWR	*	*	*
1024MB	OCZ	OCZ3RPX1333EB2GK	SS	Heat-Sink Package	*	*	
2048MB	Qimonda	IMSH2GU13A1F1C-13H	DS	IDSH1G-03A1F1C-13H	*	*	*
1024MB	Qimonda	IMSH1GU03A1F1C-13H	SS	IDSH1G-03A1F1C-13H	*	*	*
2048MB	SAMSUNG	M378B5673DZ1-CH9	DS	K4B1G0846D	*	*	*
2048MB	SAMSUNG	M391B5673DZ1-CH9	DS	K4B1G0846D(ECC)	*	*	
1024MB	SAMSUNG	M378B2873DZ1-CH9	SS	K4B1G0846D	*	*	*
1024MB	SAMSUNG	M391B2873DZ1-CH9	SS	K4B1G0846D(ECC)	*	*	
1024MB	Patriot	PDC32G1333LLK	SS	Heat-Sink Package	*	*	*

Rampage Extreme Motherboard Qualified Vendors Lists (QVL) DDR3-1067MHz capability

Size	Vendor	Part No.	SS/ DS	Chip No.	DIMM support		
					A*	B*	C*
1024MB	A-DATA	M3OEL3G3I4130A1B5Z	DS	J5308BASE-AE-E-S	*	*	*
1024MB	CORSAIR	CM3X1024-1066C7	DS	Heat-Sink Package	*	*	*
1024MB	Crucial	CT12864BA1067.8SFB	SS	Z9HWQ	*	*	*
1024MB	ELPIDA	EBJ11UD8BAFA-AG-E	DS	J5308BASE-AC-E	*	*	*
1024MB	Hynix	HMT112U6AFP8C-G7N0	SS	H5TQ1G83AFP7C	*	*	*
1024MB	Hynix	HYMT112U64ZNF8-G7	SS	HY5TQ1G831ZNF7-G7	*	*	*
2048MB	Hynix	HMT125U6AFP8C-G7N0	DS	H5TQ1G83AFP7C	*	*	*
2048MB	Hynix	HYMT125U64ZNF8-G7	DS	HY5TQ1G831ZNF7-G7	*	*	*
1024MB	Kingston	KVR1066D3N7/1G	DS	J5308BASE-AC-E	*	*	*
1024MB	MICRON	MT8JTF12864AY-1G1D1	SS	7VD22	*	*	*
2048MB	MICRON	MT16JTF25664AY-1G1D1	DS	7VD22	*	*	*
1024MB	Qimonda	IMSH1GU03A1F1C-10F	SS	IDSH1G-03A1F1C-10F	*	*	*
1024MB	Qimonda	IMSH1GU03A1F1C-10G	SS	IDSH1G-03A1F1C-10G	*	*	*
1024MB	Qimonda	IMSH1GU13A1F1C-10F	DS	IDSH51-03A1F1C-10F	*	*	*
2048MB	Qimonda	IMSH2GU13A1F1C-10F	DS	IDSH1G-03A1F1C-10F	*	*	*
2048MB	Qimonda	IMSH2GU13A1F1C-10G	DS	IDSH1G-03A1F1C-10G	*	*	*
1024MB	WINTEC	3DU3191A-10	DS	IDSH51-03A1F1C-10F	*	*	*



SS - Single-sided / DS - Double-sided

DIMM support:

- **A***: Supports one module inserted in any slot as Single-channel memory configuration.
- **B***: Supports one pair of modules inserted into either the blue slots or the white slots as one pair of Dual-channel memory configuration.
- **C***: Supports four modules inserted into both the blue and white slots as two pairs of Dual-channel memory configuration.



Visit the ASUS website for the latest DDR3-1600/1333/1067/800MHz QVL.

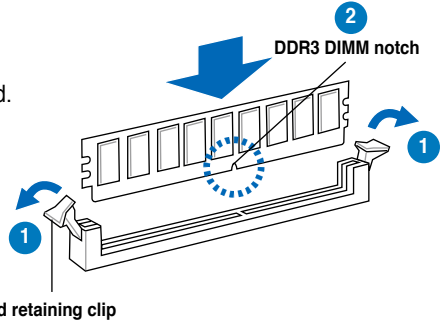
2.4.3 Installing a DIMM



Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

To install a DIMM

1. Unlock a DDR3 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.

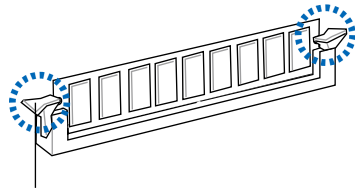


Unlocked retaining clip



A DDR3 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.

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

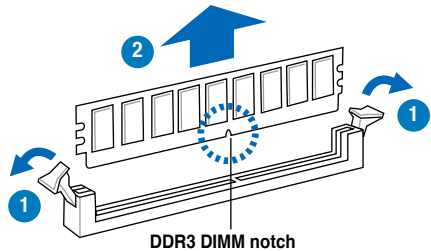


Locked Retaining Clip

2.5.4 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.

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 3 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
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	Onboard USB Controller
15	10	SATA Primary 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 (8056)	shared	–	–	–	–	–	–	–
SATA (6121)	shared	–	–	–	–	–	–	–
LAN (8056)	–	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	–
Audio Azalia	shared	–	–	–	–	–	–	–
IEEE 1394	–	–	–	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

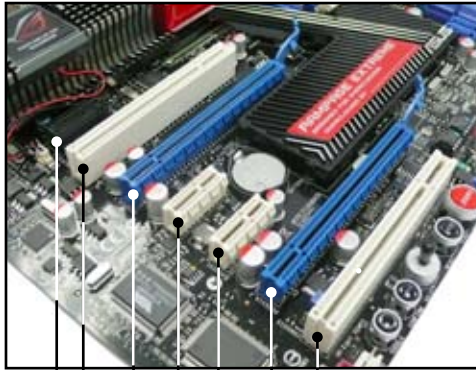
This motherboard supports PCI Express x1 network cards, SCSI cards and other cards that comply with the PCI Express specifications. Refer to the figure below for the location of the slots.



- 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 x16 slots

This motherboard supports two ATI CrossFireX™ 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
PCI slot
PCI Express x16 slot
PCI Express x1 slot
PCI Express x16 slot
PCI slot
PCI Express x1 slot



- We recommend that you provide sufficient power when running CrossFireX™ mode. See page 2-32 for details.
- Install two ATI graphics cards from the same GPU family that support CrossFireX™ mode.
- If you install two VGA cards, we recommend that you plug the rear chassis fan cable to the motherboard connector labeled OPT_FAN1/2/3 for better thermal environment. See page 2-29 for the connector location.

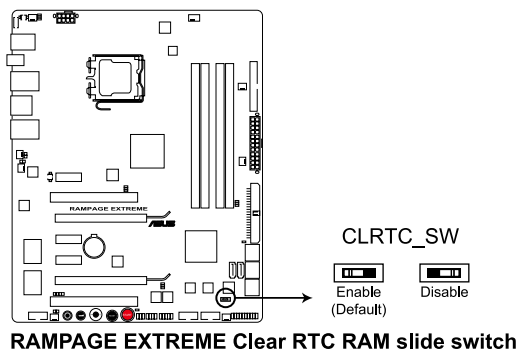
2.6 Slide switch and jumper

1. Clear RTC RAM (3-pin CLRRTC_SW)

This onboard slide switch allows you to enable the **clr CMOS** switch on the back I/O. You can clear the CMOS memory and system setup parameters by erasing the CMOS RTC RAM data. The **clr CMOS** switch on the back I/O helps you easily clear the system setup information such as system passwords.

To erase the RTC RAM:

1. Press down the **clr CMOS** switch on the back I/O.
2. Hold down the key during the boot process and enter BIOS setup to re-enter data.



clr CMOS switch behavior

System power state	G3*	S5*	S0 (DOS mode)	S0 (OS mode)	S1	S3	S4
Clearing CMOS	•	•	•**				

*G3: Power off without +5VSB power (AC power loss); S5: Power off with +5VSB power

**The system shuts down immediately.



- The **clr CMOS** switch will not function if the CLRRTC_SW switch is moved to the Disable position, but the shutdown function in S0 mode (DOS mode) still works.
- Make sure to re-enter your previous BIOS settings after you clear the CMOS.
- You do not need to clear the RTC when the system hangs due to CPU overclocking. With the C.P.R. (CPU Parameter Recall) feature, shut down and reboot the system so the BIOS can automatically reset CPU parameter settings to default values. If the system hangs due to overclocking of memory timing or chipset voltage and the power button fails to function, pressing down the **clr CMOS** switch will shut down the system and clear CMOS simultaneously.

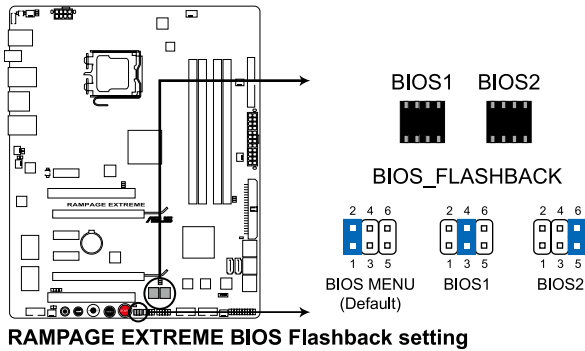
2. BIOS flash setting (6-pin BIOS_FLASHBACK)

Two sets of BIOS Flash ROM (BIOS 1 and BIOS 2) are present on this motherboard. This jumper allows you to select either BIOS as the one to boot, or back up or restore BIOS content from one ROM to the other.

Moving the jumper cap to **pins 1-2 (default)** allows you to enter **BIOS MENU** to select which BIOS to boot.

Moving the jumper cap to **pins 3-4** enables the system to boot from **BIOS 1**.

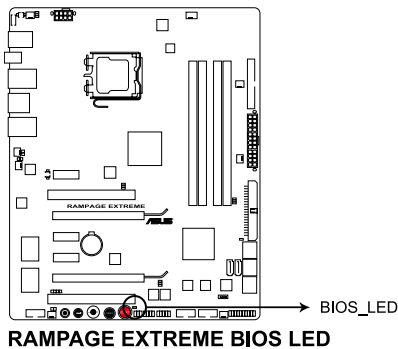
Moving the jumper cap to **pins 5-6** enables the system to boot from **BIOS 2**.



Refer to **3.7.3 BIOS Boot Priority** for further information.

BIOS LED

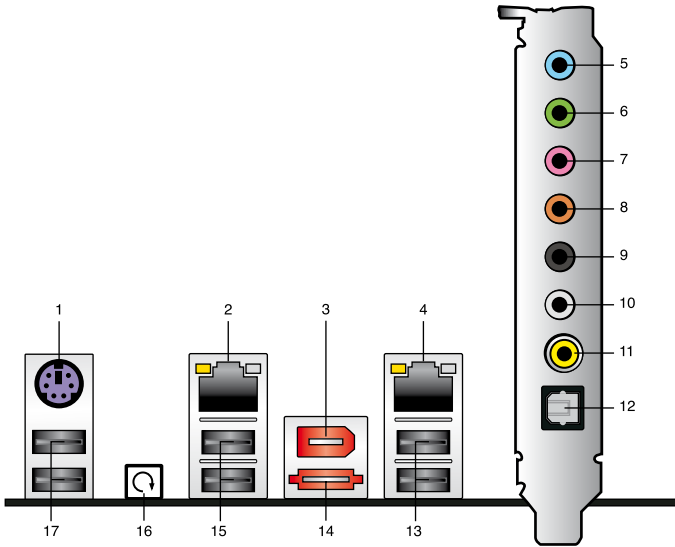
When the BIOS backup starts, the system will enter the soft-off state and the BIOS LED will blink to indicate that the backup is proceeding.



Refer to **3.8.4 BIOS Flashback** for further information.

2.7 Connectors

2.7.1 Rear panel connectors

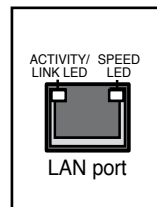


1. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.
2. **LAN 2 (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.
3. **IEEE 1394a port.** This 6-pin IEEE 1394a port provides high-speed connectivity for audio/video devices, storage peripherals, PCs, or portable devices.
4. **LAN 1 (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.

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



5. **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.
6. **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.
7. **Microphone port (pink).** This port connects a microphone.
8. **Center/Subwoofer port (orange).** This port connects the center/subwoofer speakers.
9. **Rear Speaker Out port (black).** This port connects the rear speakers on a 4-channel, 6-channel, or 8-channel audio configuration.
10. **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

11. **Coaxial S/PDIF Out port.** This port connects an external audio output device via a coaxial S/PDIF cable.
12. **Optical S/PDIF Out port.** This port connects an external audio output device via an optical S/PDIF cable.
13. **USB 2.0 ports 1 and 2.** These 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
14. **External SATA port.** This port connects to an external Serial ATA hard disk drive.



DO NOT insert a SATA connector into this external SATA port.

15. **USB 2.0 ports 3 and 4.** These 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
16. **Clear CMOS switch.** Press the clear CMOS switch to clear setup information when the system hangs due to overclocking.
17. **USB 2.0 ports 5 and 6.** These 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

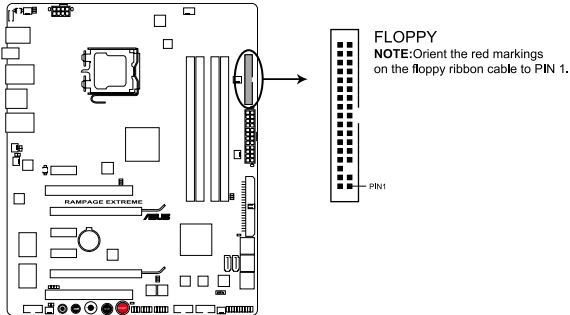
2.7.2 Internal connectors

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.



RAMPAGE EXTREME Floppy disk drive connector

2. IDE connector (40-1 pin PRI_EIDE)

The onboard IDE connector is for the Ultra DMA 133/100/66 signal cable. There are three connectors on each Ultra DMA 133/100/66 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.

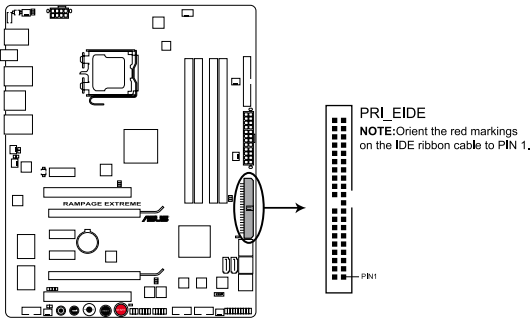
	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
Slave	Slave		



- 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 133/100/66 IDE devices.



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

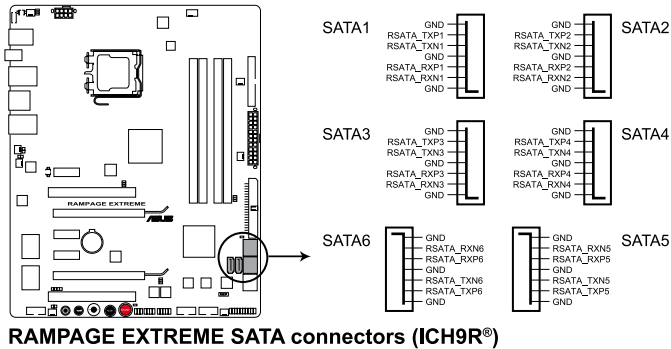


RAMPAGE EXTREME EIDE connector

3. ICH9R Serial ATA connectors (7-pin SATA1-6 [blue])

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

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

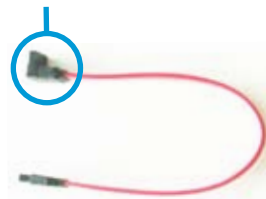


- These connectors are set to Standard IDE mode by default. In Standard IDE mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the **Configure SATA as** item in the BIOS to [RAID]. See section **3.4.6 Storage Configuration** for details.
- Before creating a RAID set, refer to section **4.4.3 Intel® RAID configurations** or the manual bundled in the motherboard support DVD.
- You must install the Windows® XP Service Pack 1 before using Serial ATA hard disk drives. The Serial ATA RAID feature (RAID 0, 1, 5, and 10) is available only if you are using Windows® XP or later version.
- When using hot-plug and NCQ, set the **Configure SATA as** in the BIOS to [AHCI]. See section **3.4.6 Storage Configuration** for details.



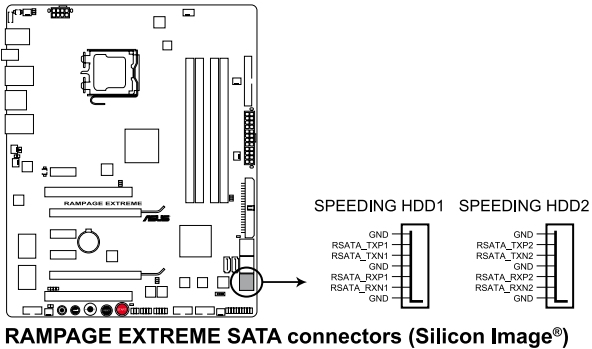
Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

right angle side



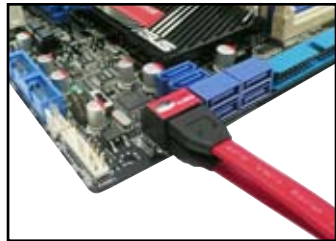
4. SIL5723 Serial ATA RAID connectors (7-pin SPEEDING HDD1/2 [black])

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives. If you install SATA hard disk drives, you can create a **Super Speed** or an **EZ Backup** configuration with the Speeding HDD Technology through the onboard Silicon Image® SIL5723 controller.



To install SATA hard disk drives:

1. Prepare two SATA hard disk drives.
2. Connect SATA signal cables from the hard drives to the **SPEEDING HDD 1** and **SPEEDING HDD 2** connectors.
3. Connect power supply to the hard drives.



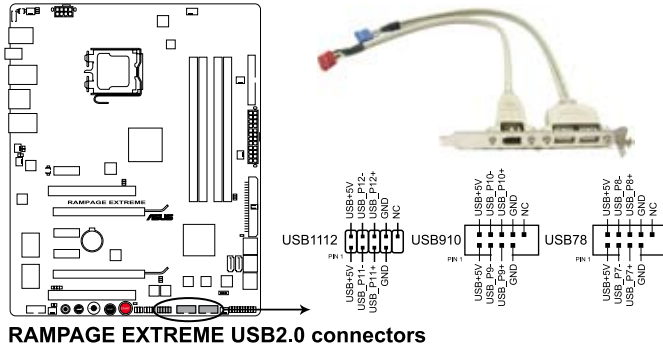
- The **SPEEDING HDD1/2** connectors do not support ATAPI devices or hot-plug function.
- **Back up your data stored in the two SATA hard drives before using Speeding HDD function.** In **EZ Backup** mode, data stored in the drive connected to **SPEEDING HDD2** port will be erased. In **Super Speed** mode, data stored in both drives will be erased.



Refer to **4.3.11 ROG Speeding HDD** for more information.

5. USB connectors (10-1 pin USB 78; USB 910; USB1112)

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.



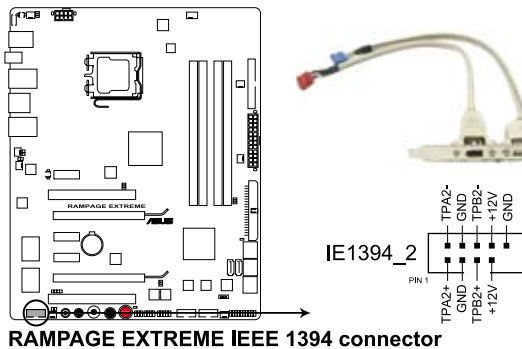
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



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.

6. 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.



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



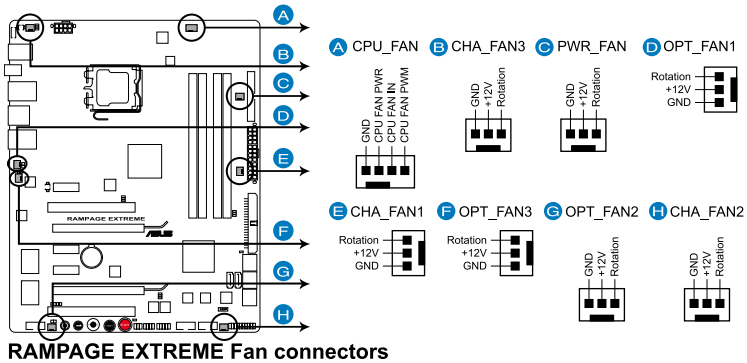
You can connect the 1394 cable to ASUS Q-Connector (1394, red) first, and then install the Q-Connector (1394) to the 1394 connector onboard.

7. CPU, chassis, and optional fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN1-3, 3-pin PWR_FAN, 3-pin OPT_FAN1-3)

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.



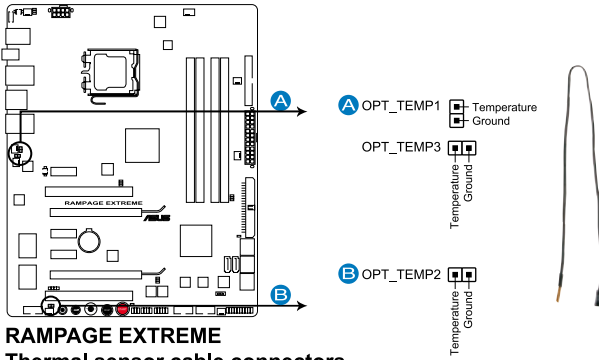
DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors!



- Only the CPU_FAN, CHA_FAN1-3, and OPT_FAN1-3 connectors support the ASUS Fan Xpert feature.
- If you install two VGA cards, we recommend that you plug the chassis fan cable to the motherboard connector labeled OPT_FAN1/2/3 for better thermal environment.

8. Thermal sensor cable connectors (2-pin OPT_TEMP1/2/3)

These connectors are for temperature monitoring. Connect the thermal sensor cables to these connectors and place the other ends to the devices which you want to monitor temperature. The optional fan1/2/3 can work with the temperature sensors for a better cooling effect.

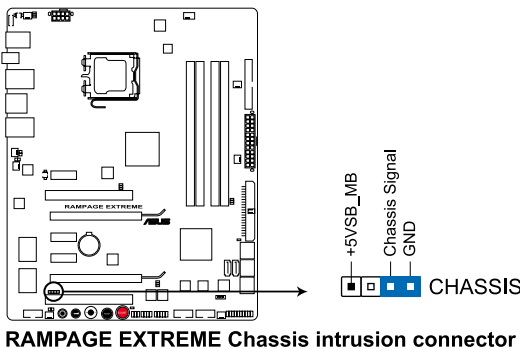


Enable **OPT FAN1/2/3** **overheat protection** in BIOS if you connect thermal sensor cables to these connectors. Refer to page 3-36 for details.

9. 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.



10. Audio connectors

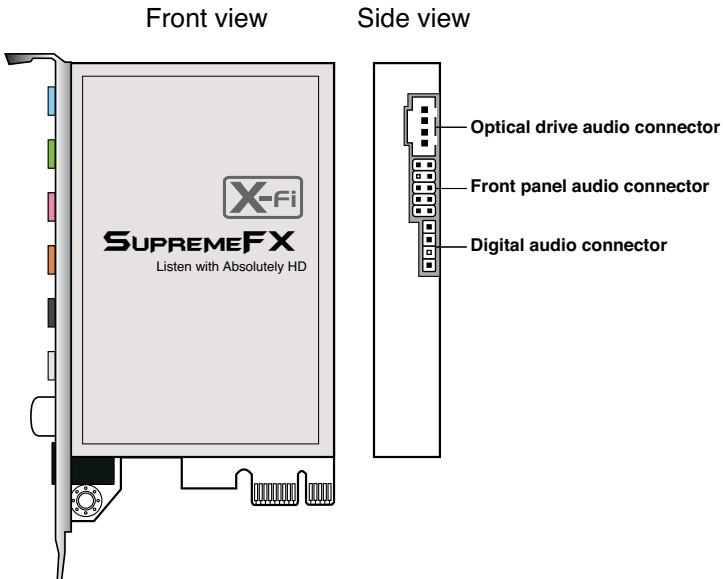
Optical drive audio connector: This connector allows you to receive stereo audio input from sound sources such as a CD-ROM, TV tuner, or MPEG card.

Front panel audio connector: This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC' 97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.



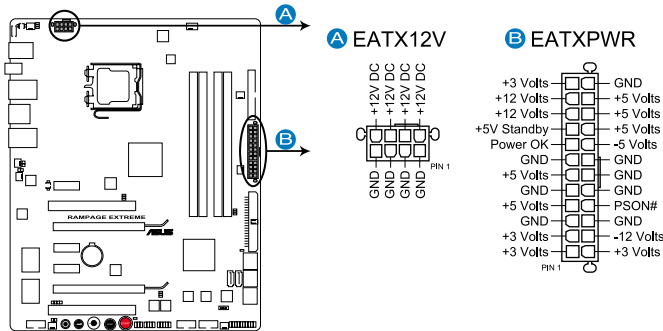
- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this connector, make sure that the **Front Panel Support Type** item in the BIOS is set to [HD Audio]. If you want to connect an AC' 97 front panel audio module to this connector, set the item to [AC97]. Refer to **3.5.2 Onboard Devices Configuration** for details.

Digital audio connector: This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port(s).



11. 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.



RAMPAGE EXTREME ATX power connectors



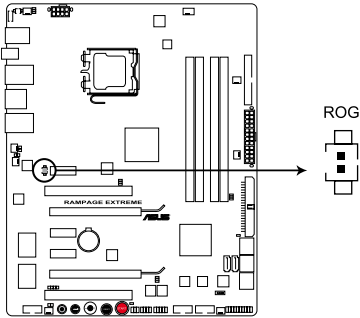
- Make sure to remove the cap on the EATX12V connector before connecting an 8-pin EPS +12V power plug.
- Use only an 8-pin EPS +12V power plug for the EATX12V connector.



- 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 8-pin EATX12V standby 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 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.
- 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.

12. ROG connector (2-pin ROG)

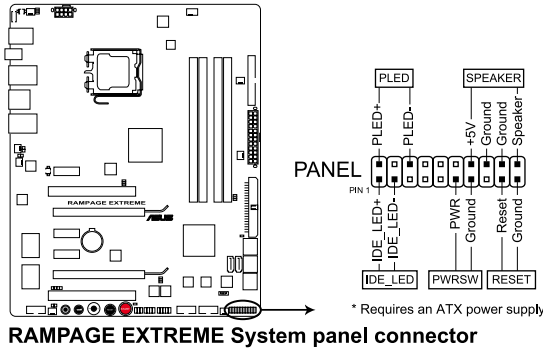
This connector is for the box labeled as Republic of Gamers on the heatpipe assembly. Connect the cable of the box to this connector, and the box lights up when the system is on.



RAMPAGE EXTREME ROG connector

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

This connector supports several chassis-mounted functions.



- **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)**

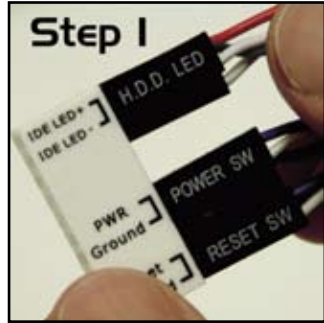
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

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.

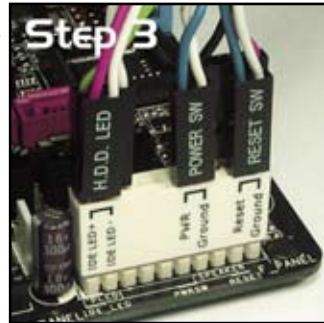
Refer to the labels on the Q-Connector to know the detailed pin definitions, then match them to the respective front panel cable labels.



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.

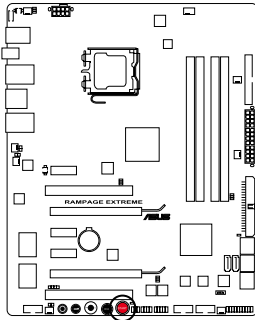


2.7.3 Onboard switches

Onboard switches allow you to fine-tune performance when working on a bare or open-case system. This is ideal for overclockers and gamers who continually change settings to enhance system performance.

1. Power-on switch

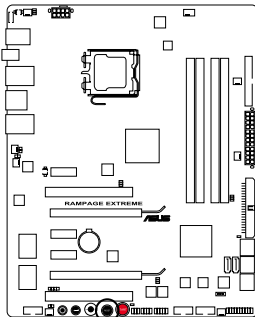
Press the power-on switch to wake/power up the system.



RAMPAGE EXTREME Power on switch

2. Reset switch

Press the reset switch to reboot the system.



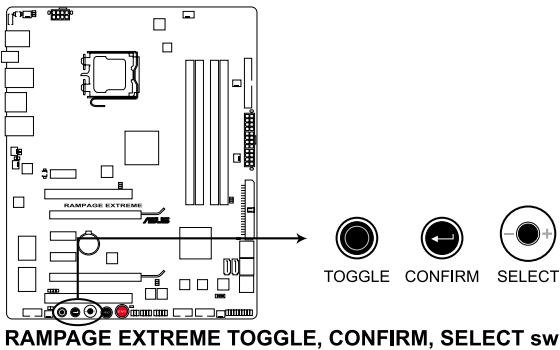
RAMPAGE EXTREME Reset switch

2.7.4 TweakIt

TweakIt, along with the LCD Poster, allows you full control over system voltages and frequency to fulfill your overclocking desire **during game play**. You can also monitor hardware information or configure BIOS boot selection and BIOS backup. TweakIt consists of the TOGGLE button, the CONFIRM button, and the SELECT joystick:

- **TOGGLE:** Press to go back to the previous option.
- **CONFIRM:** Press to enter an option or confirm your settings.
- **SELECT:** Joystick left (previous; decrease) / right (next; increase) to select an option or adjust value.

Refer to the following illustration for their location.



Using TweakIt

1. Connect the LCD Poster to the **LCD_CON** connector on the motherboard.
2. Turn on the system. After the power-on self tests (POST), the LCD Poster shows system time.
3. Press the **CONFIRM** button to enter TweakIt options and configure your own settings with **TOGGLE**, **CONFIRM**, and **SELECT**.



Tweakt options

The following table shows Tweakt options. For detailed voltage and frequency settings, refer to **3.3 Extreme Tweaker menu**. For BIOS boot selection and backup settings, refer to **3.7.3 BIOS Boot Priority** and **3.8.4 BIOS Flashback**.

Options		Usages and Notes
1 HWINFO	1 VOLT	0 ALL 1 VTTCPU 2 VTTDDR 3 NB 4 CPUPLL 5 SB1_5V 6 SB1_1V 7 DDR 8 CPU
	2 TEMP	0 ALL 1 OPT_1 2 OPT_2 3 OPT_3 4 POWER 5 NB 6 SB 7 MB
	3 FAN	0 ALL 1 CPUFAN 2 PWRFAN 3 OPT_1 4 OPT_2 5 OPT_3 6 CHA_1 7 CHA_2 8 CHA_3
	4 FREQ	
		Selecting "0 ALL" shows all the values in a continuous loop. These values are automatically detected and therefore are not configurable.
2 DYNAOV	1 DDR 2 NB 3 VCORE 4 VTTCPU 5 CPUPLL 6 SB1_5V 7 SB1_1V	
3 DYNAOC	FRQXXX	
		Move the SELECT joystick to adjust value and then press CONFIRM . These functions are available in S0 state only.
4 BIOS	1 BOOT SEL	1 BIOS1 2 BIOS2
	2 UPDATE	1 B1→B2 2 B2→B1
		Select which BIOS to boot (available in S5 state only). Back up BIOS content from BIOS1/2 to BIOS2/1 (available in S0 state only).

*S0: System in the normal working state

S5: System in the soft off state (power off with +5VSB power)

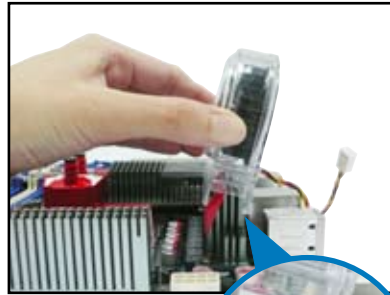
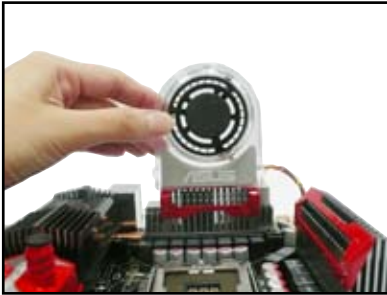
2.8 Installing accessories

2.8.1 Installing the optional fan

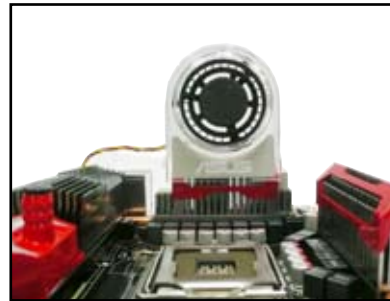
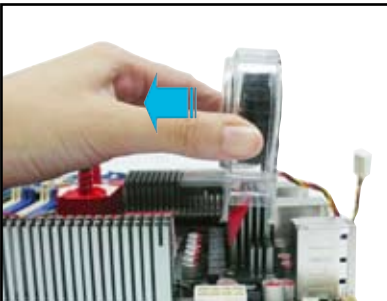


Install the optional fan only if you are using a passive cooler or a water cooler. Installing the optional fan with an active CPU cooler will interfere with the airflow and destabilize the system.

1. Position the fan above the pipe and heatsink assembly.
2. Fit the fan to the grooved edge of the heatsink.



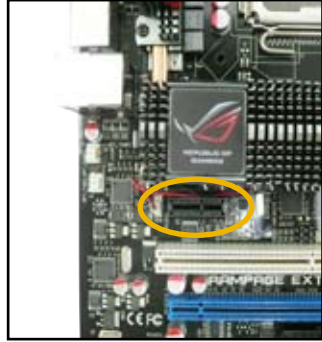
3. Carefully pull the fan until it snugly fits the heatsink, and then connect the fan cable.
4. The photo shows the fan installed on the motherboard.



- Plug the optional fan cable to the CHA_FAN3 or OPT_FAN1/3 connector on the motherboard.
- Make sure the optional fan is installed correctly to prevent damage to the fan and motherboard components.

2.8.2 Installing the audio card

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.

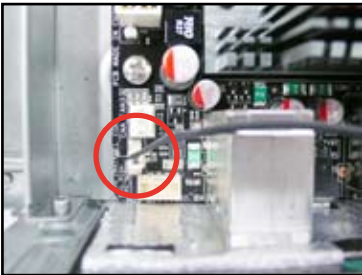


2.8.3 Installing EL I/O shield and LCD Poster

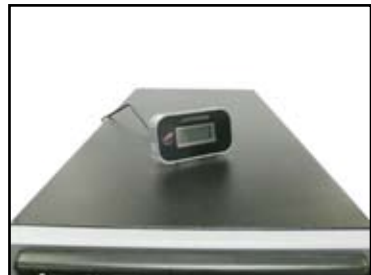
1. Install the EL I/O shield to the chassis by snapping it in place from inside.
2. Orient the motherboard and install it to the chassis. Make sure that the motherboard external ports fit the shield openings.



3. Locate the **EL_CON** connector and connect the shield cable to the connector in a correct orientation.
4. Thread the LCD Poster cable through the back I/O shield opening until the stopper fits the opening.








5. Locate and connect the LCD Poster cable to the **LCD_CON** connector.
6. Place the LCD Poster on the chassis or to wherever you like.



2.8.4 Installing Fusion Block System accessory

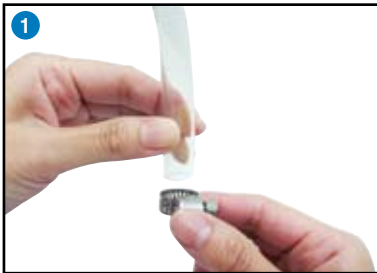
Install your watercooling system to the motherboard using the bundled accessories to obtain the best thermal solution.

Package contents

		
3/8" ID tubes x 2	1/2" to 3/8" ID fittings x 2	10mm to 3/8" ID fittings x 2
		
3/4" ID tube clamps x 2	1/2" ID tube clamps x 6	

For watercooling system with 3/8" ID tubes

1. Loosen the screw of a 1/2" ID tube clamp and fit the tube into the clamp.
2. Connect the tube to the waterblock and tighten the screw of the clamp using a screwdriver.
3. Repeat Step 1 and 2 for another tube. Make sure that both tubes are well connected to prevent leak, and then fill the coolant into the reservoir.



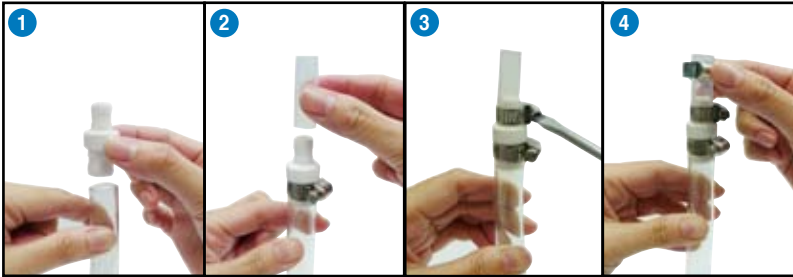
For watercooling system with 1/2" or 10mm ID tubes

1. Insert a fitting (1/2" to 3/8" ID or 10mm to 3/8" ID) into the tube.



Your watercooling system may come with tube clamps. Use a clamp to fasten the fitting and the tube together.

2. Connect a supplied 3/8" ID tube to the fitting.
3. Loosen the screw of a 1/2" ID tube clamp and hitch it to the bottom end of the 3/8" ID tube. Tighten the clamp screw with a screwdriver.
4. Hitch another clamp to the top end of the 3/8" ID tube.



5. Connect the assembled tube to the waterblock and tighten the screw of the clamp using a screwdriver.
6. Repeat Step 1 to 5 for another tube. Make sure that both tubes are well connected to prevent leak, and then fill the coolant into the reservoir.



Follow the installation instructions to prevent leak and damage to the motherboard!

2.8.5 Replacing NB or MOS Thermal Kit

Replacing the North Bridge (NB) Thermal Kit

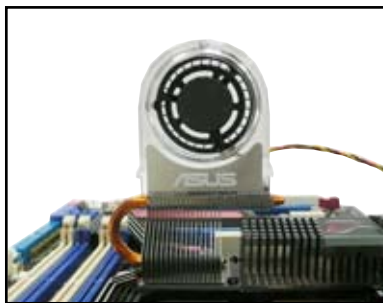
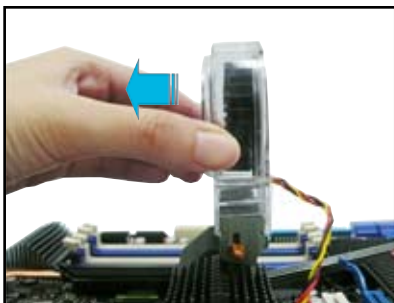
1. Loosen the waterblock screws and remove the waterblock. Keep the two screws for later use.
2. Place the NB Thermal Kit on the heatpipe assembly and align the screw holes.



3. Fasten the NB Thermal Kit to the heatpipe assembly with the screws you removed in Step 1.
4. To install the optional fan, fit the fan to the grooved edge of the heatsink.

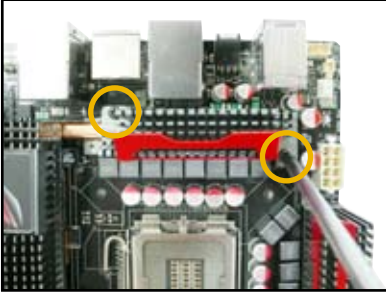


5. Carefully pull the fan until it snugly fits the heatsink.
6. Connect the fan cable to the OPT_FAN1/3 connector.

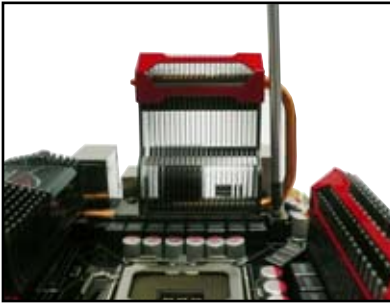


Replacing the MOS Thermal Kit

1. Loosen the MOS heatsink screws and remove the heatsink. Keep the two screws for later use.
2. Place the MOS Thermal Kit on the heatpipe assembly and align the screw holes.



3. Fasten the MOS Thermal Kit to the heatpipe assembly with the screws you removed in Step 1.

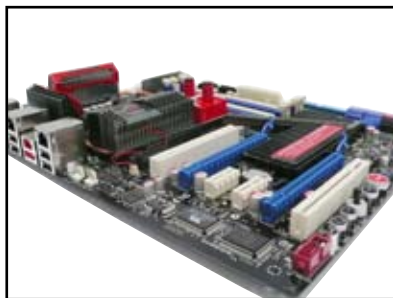


2.8.6 Installing DIY Pedestal

1. Take out the DIY Pedestal from the motherboard package.



2. Arrange and stick the DIY Pedestal to the back of your motherboard.
3. Place the motherboard with the DIY Pedestal as desired to get more efficient heat dissipation.



-
- The tape on the rubber studs is for one-time use. Replace the tape if the adhesive surface does not work.
 - You can use the DIY Pedestal in ways that suit your needs.
-

2.9 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 3.

2.10 Turning off the computer

2.10.1 Using the OS shut down function

If you are using Windows® Vista:

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

If you are using Windows® XP:

1. Click the **Start** button and 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.

2.10.2 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 **3.6 Power Menu** 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 **3**

3.1	Managing and updating your BIOS	3-1
3.2	BIOS setup program	3-8
3.3	Extreme Tweaker menu	3-11
3.4	Main menu	3-20
3.5	Advanced menu	3-25
3.6	Power menu	3-33
3.7	Boot menu	3-38
3.8	Tools menu	3-43
3.9	Exit menu	3-46

3.1 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 bootable floppy disk, 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.

3.1.1 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.

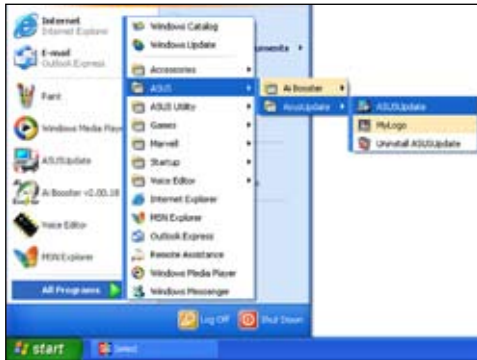


Quit all Windows® applications before you update the BIOS using this utility.

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**.

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



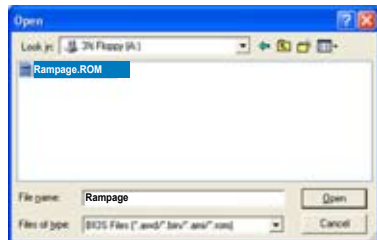
Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

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



- Locate the BIOS file from the Open window, then click **Open**.
- Follow the screen instructions to complete the update process.



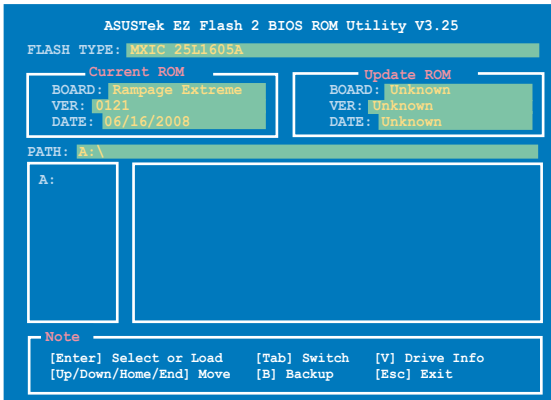
3.1.2 ASUS EZ Flash 2 utility

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.



- (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 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 system boot failure!

3.1.3 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.

- Copy the AFUDOS utility (afudos.exe) from the motherboard support DVD to the bootable floppy disk you created earlier.
- 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 /iExtreme.ROM
```

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

```
A:\>afudos /iExtreme.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!

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

```
A:\>afudos /iExtreme.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:\>
```

3.1.4 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, the floppy disk, 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.

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 "Extreme.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!
-

3.2 BIOS setup program

This motherboard supports two programmable firmware chips that you can update using the provided utility described in section 3.1 **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 firmware 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 during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

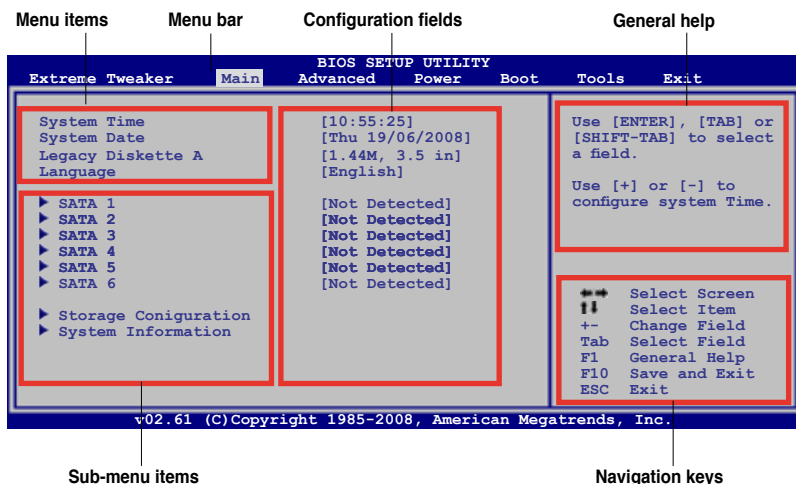
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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 3.9 **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.
-

3.2.1 BIOS menu screen



3.2.2 Menu bar

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

- Extreme Tweaker** For changing the overclocking settings
- Main** For changing the basic system configuration
- 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.

3.2.3 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.



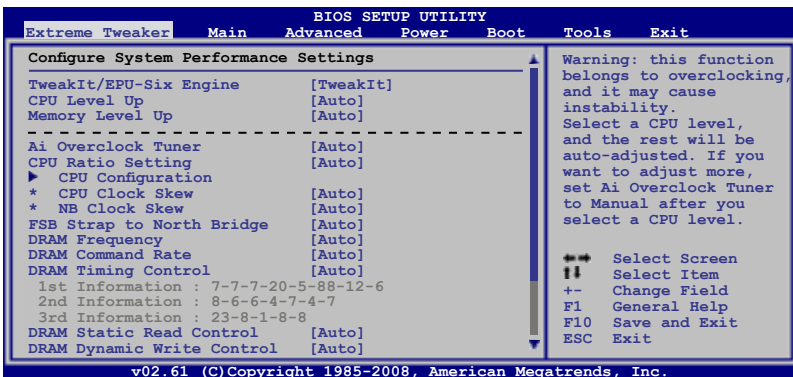
Some of the navigation keys differ from one screen to another.

3.3 Extreme Tweaker menu

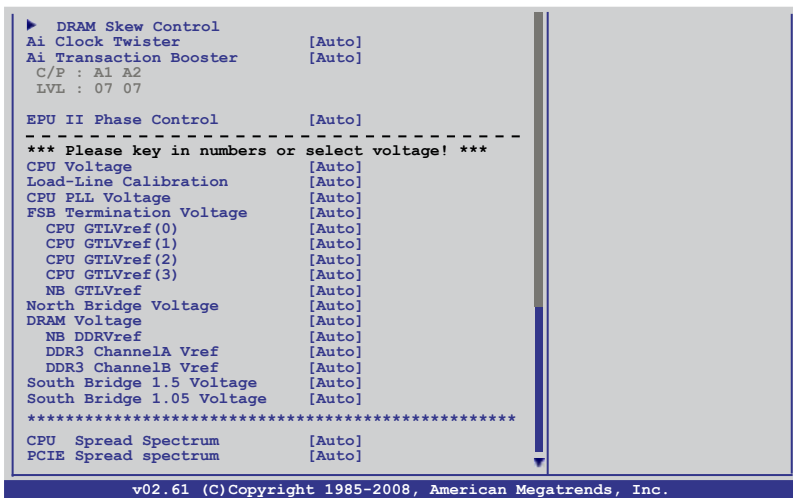
The Extreme Tweaker menu items allow you to configure overclocking-related items.



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



Scroll down to see more items.



3.3.1 Configure System Performance Settings

TweakIt/EPU-Six Engine [TweakIt]

Allows you to select either the TweakIt or the EPU-Six Engine function.
Configuration options: [TweakIt] [EPU-Six Engine]

CPU Level Up [Auto]

Allows you to select a CPU level, and the related parameters will be automatically adjusted according to the selected CPU level. If you want to manually configure the settings in detail, set **Ai Overclock Tuner** to [Manual] after selecting a CPU level.
Configuration options: [Auto] [E6400] [E6550] [E6600] [E6700] [X6800] [E6850] [Crazy]



The configuration options may vary depending on your CPU model.

Memory Level Up [Auto]

Allows you to select a memory level, and the related parameters will be automatically adjusted according to the selected memory level. If you want to manually configure the settings in detail, set **Ai Overclock Tuner** to [Manual] after selecting a memory level. Configuration options: [Auto] [PC3-13600] [PC3-14400]



- The configuration options may vary depending on your memory model.
 - You are allowed to select either a CPU level or a memory level at one time.
-

Ai Overclock Tuner [Auto]

Allows selection of CPU/memory overclocking options to achieve desired CPU/memory internal frequency. Select any of the preset overclocking configuration options:

Manual	Allows you to individually set overclocking parameters.
Auto	Loads the standard settings for the system.
X.M.P.	Loads the optimal settings for the system.
CPU Level Up	Allows you to select a CPU level, and the related parameters will be adjusted automatically.
Memory Level Up	Allows you to select a memory level, and the related parameters will be adjusted automatically.



The following item appears only when you set **Ai Overclock Tuner** to [X.M.P].

eXtreme Memory Profile [Profile #1]

Allows you to select the memory profile during overclocking between [Profile #1] (high performance) and [Profile #2] (high frequency). This item appears only when you set **Ai Overclock Tuner** to [X.M.P].
Configuration options: [Profile #1] [Profile #2]



The following three items appear when you set **Ai Overclock Tuner** to [Manual].

OC From CPU Level Up [Auto]

After you select a CPU level and set **Ai Overclock Tuner** to [Manual], the **FSB Frequency** item will be adjusted accordingly. Configuration options: [Auto] [E6400] [E6550] [E6600] [E6700] [X6800] [E6850] [Crazy]

OC From Memory Level Up [Auto]

After you select a CPU level and set **Ai Overclock Tuner** to [Manual], the **FSB Frequency** and **DRAM Frequency** items will be adjusted accordingly. Configuration options: [Auto] [PC3-13600] [PC3-14400]

FSB Frequency [XXX]

Displays the frequency sent by the clock generator to the system bus and PCI bus. Use the <+> and <-> keys to adjust the FSB frequency. You can also type the desired FSB 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

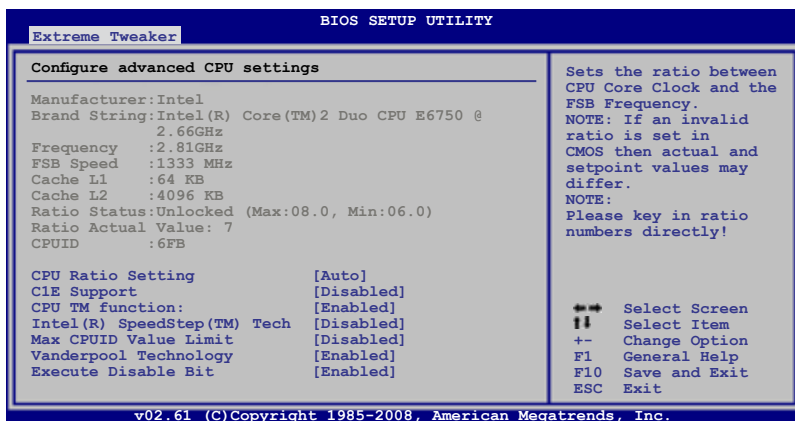
Front Side Bus	FSB 1600	FSB 1333	FSB 1066	FSB 800
CPU External Frequency	400 MHz	333 MHz	266 MHz	200 MHz

CPU Ratio Setting [Auto]

Allows you to adjust the ratio between CPU Core Clock and FSB Frequency. Enter a ratio using the numeric keypad, and the system will detect possible values. Use the <+> and <-> keys to select a ratio. The valid value ranges differently according to your CPU model.

CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects. See the screen on the next page.



CPU Ratio Setting [Auto]

Allows you to adjust the ratio between CPU Core Clock and FSB Frequency. Enter a ratio using the numeric keypad, and the system will detect possible values. Use the <+> and <-> keys to select a ratio. The valid value ranges differently according to your CPU model.

C1E Support [Disabled]

Allows you to enable or disable Enhanced Halt State support.
Configuration options: [Disabled] [Enabled]

CPU TM function [Enabled]

This function enables the overheated CPU to throttle the clock speed to cool down. Configuration options: [Disabled] [Enabled]

Intel(R) SpeedStep (TM) Tech [Disabled]

When set to [Disabled], the CPU runs at its default speed. When set to [Enabled], the CPU speed is controlled by the operating system. This item appears only when you set the **CPU Ratio Control** item to [Auto].
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]

Vanderpool Technology [Enabled]

Configuration options: [Disabled] [Enabled]

Execute Disable Bit Capability [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]

CPU Clock Skew [Auto]

Configuration options: [Auto] [Normal] [Delay 100ps] [Delay 200ps] [Delay 300ps] –[Delay 1400ps]

NB Clock Skew [Auto]

Configuration options: [Auto] [Normal] [Delay 100ps] [Delay 200ps] [Delay 300ps] –[Delay 1400ps]

FSB Strap to North Bridge [Auto]

Configuration options: [Auto] [200MHz] [266MHz] [333MHz] [400MHz]

PCIe Frequency [XXX]

Allows you to set the PCI Express frequency. Use the <+> and <-> keys to adjust the PCIe frequency. You can also type the desired value using the numeric keypad. The values range from 100 to 180. This item appears when you set **Ai Overclock Tuner** to [Manual].

DRAM Frequency [Auto]

Allows you to set the DDR3 operating frequency.

Configuration options: [Auto] [DDR3-667MHz] [DDR3-800MHz] [DDR3-835MHz] [DDR3-887MHz] [DDR3-1002 MHz] [DDR3-1066MHz] [DDR3-1111MHz] [DDR3-1333MHz]



The configuration options may vary depending on the CPU/memory level you select. The DDR3 frequency higher than 1333 MHz is the overclocking state.



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

DRAM Command Rate [Auto]

Select [1N] to obtain better DRAM performance; select [2N] to enhance DRAM overclocking ability. Configuration options: [Auto] [1N] [2N]

DRAM Timing Control [Auto]

Configuration options: [Auto] [Manual]



The following items become configurable when you set **DRAM Timing Control** to [Manual].

1st Information : 7-7-7-20-5-88-12-6 (These values are auto-detected)

CAS# Latency [5 DRAM Clocks]

Configuration options: [4 DRAM Clocks] [5 DRAM Clocks]–[11 DRAM Clocks]

RAS# to CAS# Delay [5 DRAM Clocks]

Configuration options: [3 DRAM Clocks] [4 DRAM Clocks]–[18 DRAM Clocks]

RAS# PRE Time [5 DRAM Clocks]

Configuration options: [3 DRAM Clocks] [4 DRAM Clocks]–[18 DRAM Clocks]

RAS# ACT Time [15 DRAM Clocks]

Configuration options: [3 DRAM Clocks] [4 DRAM Clocks]–[34 DRAM Clocks]

RAS# to RAS# Delay [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

REF Cycle Time [Auto]

Configuration options: [Auto] [30 DRAM Clocks] [36 DRAM Clocks]
[48 DRAM Clocks] [60 DRAM Clocks] [72 DRAM Clocks] [82 DRAM Clocks]
[88 DRAM Clocks] [90 DRAM Clocks] [100 DRAM Clocks] [110 DRAM Clocks]

WRITE Recovery Time [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

READ to PRE Time [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

2nd Information : 8-6-6-4-7-4-7 (These values are auto-detected)

READ to WRITE Delay (S/D) [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

WRITE to READ Delay (S) [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

WRITE to READ Delay (D) [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

READ to READ Delay (S) [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

READ to READ Delay (D) [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

WRITE to WRITE Delay (S) [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

WRITE to WRITE Delay (D) [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

3rd Information : 23-8-1-8-8 (These values are auto-detected)

WRITE to PRE Delay [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[31 DRAM Clocks]

READ to PRE Delay [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

PRE to PRE Delay [Auto]

Configuration options: [Auto] [1 DRAM Clocks] [2 DRAM Clocks] [3 DRAM Clocks]

ALL PRE to ACT Delay [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

ALL PRE to REF Delay [Auto]

Configuration options: [Auto] [1 DRAM Clocks]–[15 DRAM Clocks]

DRAM Static Read Control [Auto]

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

DRAM Dynamic Write Control [Auto]

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

DRAM Skew Control***DRAM CMD Skew on Channel A/B [Auto]***

Configuration options: [Auto] [Advance 175ps] [Advance 150ps]
[Advance 125ps] [Advance 100ps] [Advance 75ps] [Advance 50ps]
[Advance 25ps] [Normal] [Delay 25ps] [Delay 50ps] [Delay 75ps]
[Delay 100ps] [Delay 125ps] [Delay 150ps] [Delay 175ps]

DRAM CLK Skew on DIMM A1/A2/B1/B2 [Auto]

Configuration options: [Auto] [Advance 350ps] [Advance 325ps]
[Advance 300ps] [Advance 275ps] [Advance 250ps] [Advance 225ps]
[Advance 200ps] [Advance 175ps] [Advance 150ps] [Advance 125ps]
[Advance 100ps] [Advance 75ps] [Advance 50ps] [Advance 25ps] [Normal]

DRAM CTL Skew on DIMM A1/A2/B1/B2 [Auto]

Configuration options: [Auto] [Advance 175ps] [Advance 150ps]
[Advance 125ps] [Advance 100ps] [Advance 75ps] [Advance 50ps]
[Advance 25ps] [Normal] [Delay 25ps] [Delay 50ps] [Delay 75ps]
[Delay 100ps] [Delay 125ps] [Delay 150ps] [Delay 175ps]

Ai Clock Twister [Auto]

Allows you to configure the DRAM performance. Setting this item to [Light] enhances the DRAM compatibility. Setting this item to [Strong] enhances the DRAM performance. Configuration options: [Auto] [Lighter] [Light] [Moderate] [Strong] [Stronger]

Ai Transaction Booster [Auto]

Configuration options: [Auto] [Manual]

C/P : A1 A2 (These values are auto-detected)

LVL : 07 07 (These values are auto-detected)



The following items appears when you set **Ai Transaction Booster** to [Manual].

Common Performance Level [05] (This value is auto-detected)

Set this item to a higher level for better compatibility or a lower level for better performance. Use the <+> and <-> keys to adjust the value or type the desired value using the numeric keypad. The values range from 1 to 31.

Pull-In of CHA PH2 [Disabled]

Set this item to [Enabled] to enhance DRAM Channel A, Phase 1 to 2. The number of phases is determined by DRAM frequency and FSB strap. Configuration options: [Disabled] [Enabled]

EPU II Phase Control [Auto]

Configuration options: [Auto] [Full Phase]



The following items—CPU Voltage, CPU PLL Voltage, FSB Termination Voltage, North Bridge Voltage, DRAM Voltage, South Bridge 1.5 Voltage, South Bridge 1.05 Voltage—are adjusted by typing the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

CPU Voltage [Auto]

Allows you to select the CPU voltage. The text color in the configuration field corresponds to the onboard CPU LED color, both of which indicate voltage condition. When you set the **CPU LED Selection** item to [Vcore], the onboard CPU LED displays CPU voltage condition. Refer to page 2-1 for CPU LED definition. The values range from 1.10000V to 2.40000V with a 0.00625V interval.



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

Loadline Calibration [Auto]

Allows you to select the CPU Load-Line mode. Set to [Disabled] to follow Intel specifications, or to [Enabled] to improve CPU Vdroop directly. Configuration options: [Auto] [Disabled] [Enabled]

CPU PLL Voltage [Auto]

Allows you to select the CPU PLL voltage. The text color in the configuration field corresponds to the onboard CPU LED color, both of which indicate voltage condition. When you set the **CPU LED Selection** item to [CPU PLL], the onboard CPU LED displays CPU PLL voltage condition. Refer to page 2-1 for CPU LED definition. The values range from 1.50V to 3.00V with a 0.013V interval.

FSB Termination Voltage [Auto]

Allows you to select the Front Side Bus Termination voltage. The text color in the configuration field corresponds to the onboard NB LED color, both of which indicate voltage condition. When you set the **NB LED Selection** item to [VTT], the onboard northbridge LED displays FSB Termination voltage condition. Refer to page 2-2 for northbridge LED definition. The values range from 1.10V to 2.00V with a 0.013V interval.



Setting a high FSB termination voltage may damage the chipset and CPU.

CPU GTLVref (0/1/2/3) [Auto]

Allows you to set the CPU GTL reference voltage. You can also use the <+> and <-> keys to adjust the value.

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

NB GTLVref [Auto]

Allows you to set the North Bridge GTL reference voltage. You can also use the <+> and <-> keys to adjust the value.

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

North Bridge Voltage [Auto]

Allows you to select the northbridge voltage. The text color in the configuration field indicates voltage condition. When you set the **NB LED Selection** item to [NB], the onboard northbridge LED displays northbridge voltage condition. Refer to page 2-2 for northbridge LED definition. The values range from 1.25V to 2.05V with a 0.013V interval.

DRAM Voltage [Auto]

Allows you to select the DRAM voltage. The text color in the configuration field corresponds to the onboard memory LED color, both of which indicate voltage condition. Refer to page 2-2 for memory LED definition. The values range from 1.50V to 3.40V with a 0.013V interval.

NB DDRVref [Auto]

Allows you to set the North Bridge memory reference voltage. Different voltage might enhance NB memory overclocking ability. You can also use the <+> and <-> keys to adjust the value.

Configuration options: [Auto] [DDR3_REF-30mV] [DDR3_REF-20mV] [DDR3_REF-10mV] [DDR3_REF+10mV] [DDR3_REF+20mV] [DDR3_REF+30mV]

DDR3 ChannelA/B Vref [Auto]

Allows you to set the memory reference voltage. You can also use the <+> and <-> keys to adjust the value.

Configuration options: Configuration options: [Auto] [DDR3_REF-30mV] [DDR3_REF-20mV] [DDR3_REF-10mV] [DDR3_REF+10mV] [DDR3_REF+20mV] [DDR3_REF+30mV]

South Bridge 1.5 Voltage [Auto]

Allows you to select the southbridge 1.5V voltage. The text color in the configuration field indicates voltage condition. When you set the **SB LED Selection** item to [SB 1.5], the onboard southbridge LED displays southbridge 1.5V voltage condition. Refer to page 2-2 for southbridge LED definition. The values range from 1.50V to 2.05V with a 0.013V interval.

South Bridge 1.05 Voltage [Auto]

Allows you to select the southbridge voltage. The text color in the configuration field indicates voltage condition. When you set the **SB LED Selection** item to [SB 1.05], the onboard southbridge LED displays southbridge voltage condition. Refer to page 2-2 for southbridge LED definition. The values range from 1.05V to 2.00V with a 0.013V interval.

CPU Spread Spectrum [Auto]

Set to [Disabled] to enhance FSB overclocking ability or [Auto] for EMI control.
Configuration options: [Auto] [Disabled]

PCIE Spread Spectrum [Auto]

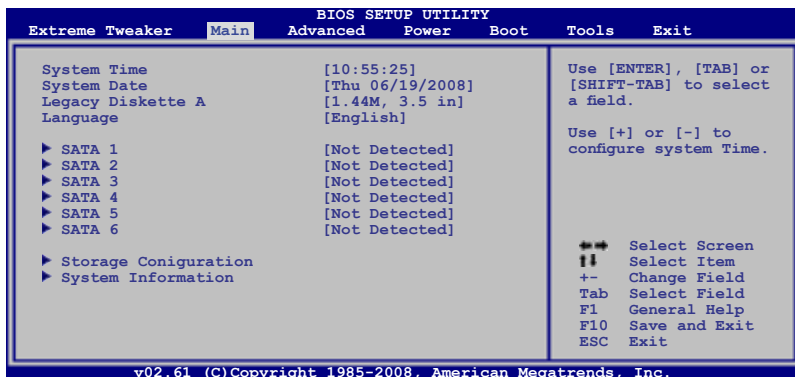
Set to [Disabled] to enhance PCIE overclocking ability or [Auto] for EMI control.
Configuration options: [Auto] [Disabled]

3.4 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 **3.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.



3.4.1 System Time [xx:xx:xx]

Allows you to set the system time.

3.4.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

3.4.3 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.]

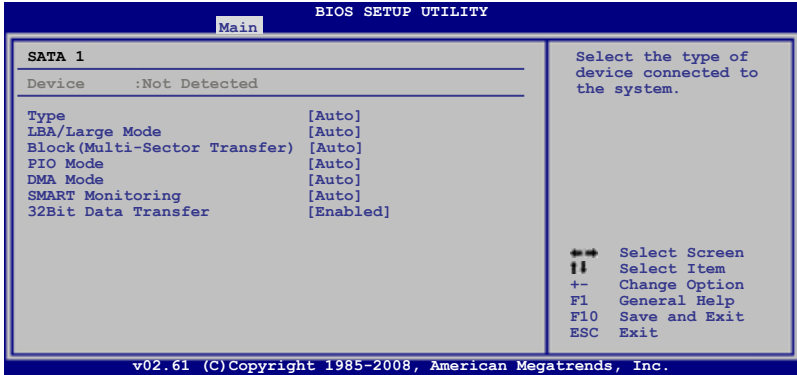
3.4.4 Language [English]

Allows you to choose the BIOS language version from the options.

Configuration options: [Chinese BIG5] [Chinese (GB)] [Japanese] [Français] [German] [English]

3.4.5 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.



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 [Auto] 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 [CDROM] if you are specifically configuring a CD-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] [CDROM] [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]

Selects the PIO 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]

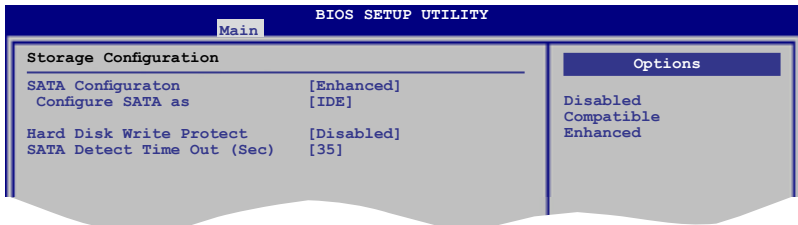
Sets the Smart Monitoring, Analysis, and Reporting Technology. Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

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

3.4.6 Storage 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.



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.

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 device is accessed through BIOS.

Configuration option: [Disabled] [Enabled]

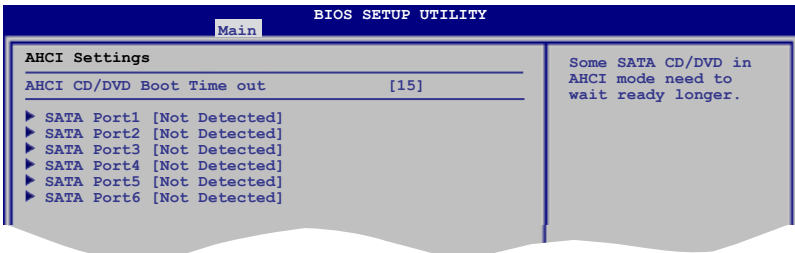
SATA Detect Time Out (Sec) [35]

Selects the time out value for detecting ATA/ATAPI devices.

Configuration options: [0] [5] [10] [15] [20] [25] [30] [35]

3.4.7 AHCI Configuration

This menu is for AHCI configuration. It appears only when you set the **Configure SATA as** item under **SATA Configuration** to [AHCI].

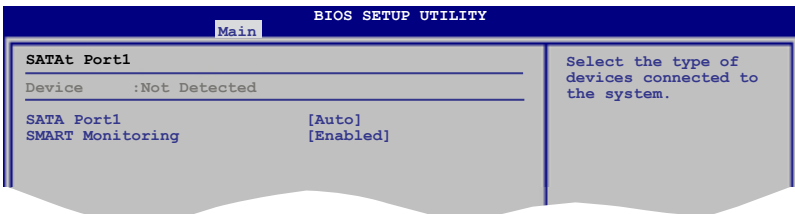


AHCI CD/DVD Boot Time out [15]

Configuration options: [0] [5] [10] [15] [20] [25] [30] [35]

SATA Port1–6 [XXX]

Displays the auto-detected SATA devices.



SATA Port1 [Auto]

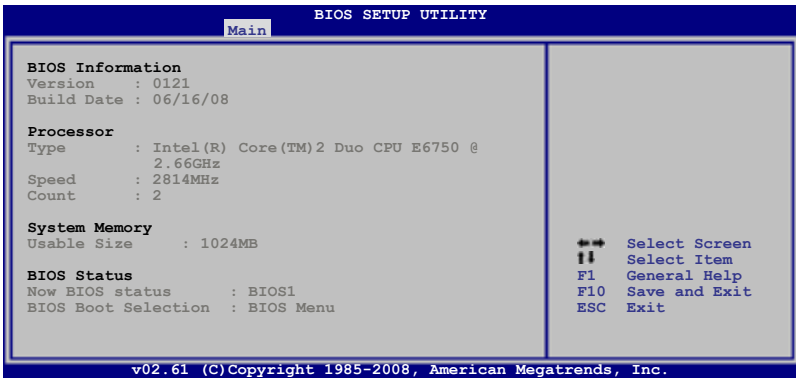
Allows you to select the type of device connected to the system.
Configuration options: [Auto] [Not Installed]

SMART Monitoring [Enabled]

Enables or disables the Self-Monitoring, Analysis and Reporting Technology (SMART). Configuration options: [Disabled] [Enabled]

3.4.8 System Information

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



ASUS BIOS

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

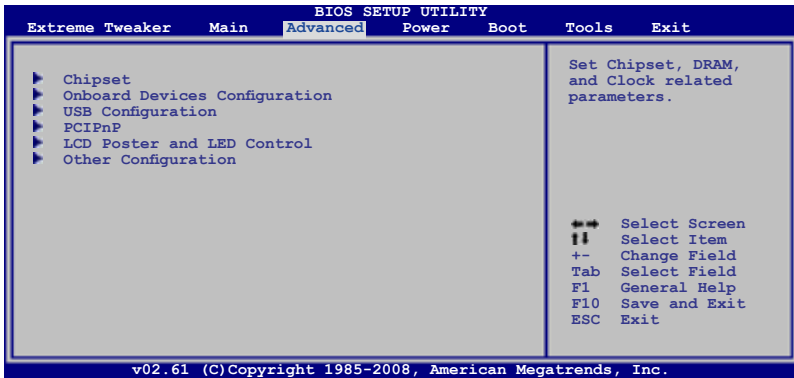
Displays the auto-detected system memory.

BIOS Status

Displays which BIOS the system boots and the way BIOS bootup selection is made.

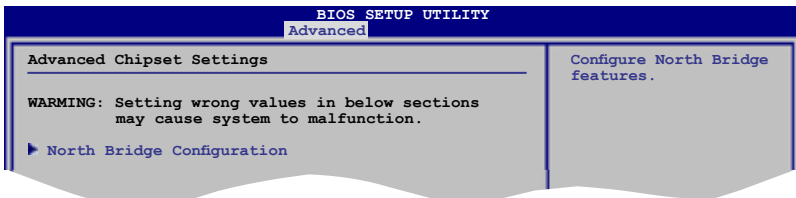
3.5 Advanced menu

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

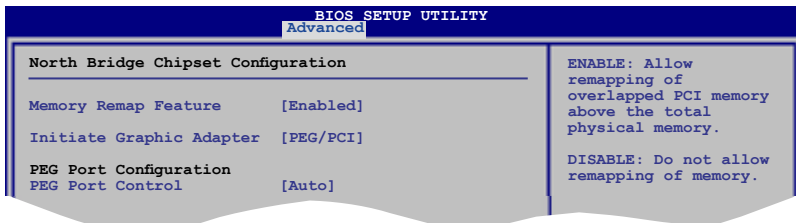


3.5.1 Chipset

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



North Bridge Chipset Configuration



Memory Remap Feature [Enabled]

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]

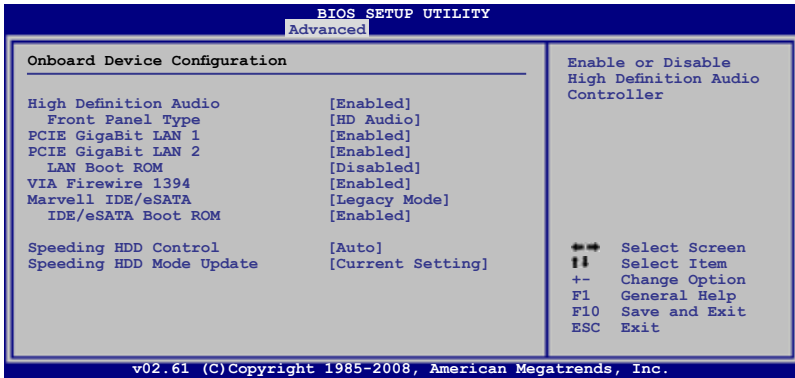
Initiate Graphic Adapter [PEG/PCI]

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

PEG Port Controller [Auto]

Configuration options: [Auto] [Disabled]

3.5.2 Onboard Devices Configuration



High Definition Audio [Enabled]

Allows you to enable or disable the High Definition Audio. The following item appears only when you enable this item.

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]

PCIE GigaBit LAN 1/2 [Enabled]

Configuration options: [Enabled] [Disabled]

LAN Boot ROM [Disabled]

Configuration options: [Disabled] [Enabled]

VIA Firewire1394 [Enabled]

Configuration options: [Enabled] [Disabled]

Marvell IDE/eSATA [Legacy Mode]

Allows you to enable or disable the onboard Marvell IDE/eSATA controller.

Configuration options: [Legacy Mode] [Disabled]

IDE/eSATA Boot ROM [Enabled]

This item appears only when you set the previous item to [Legacy Mode].

Configuration options: [Disabled] [Enabled]

Speeding HDD Control [Auto]

Allows you to enable or disable the **SPEEDING HDD1** and **SPEEDING HDD2**

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

Speeding HDD Mode Update [Current setting]

Set this item to [Mode change] to show further settings of the Speeding HDD feature. Configuration options: [Current setting] [Mode change]



The following three items appear when you set **Speeding HDD Mode Update** to [Mode change].

Update To Super Speed [Press Enter]

Allows you to use **Super Speed** function. Connect two identical SATA hard drives to the **SPEEDING HDD1** and **SPEEDING HDD2** ports, and then press the <Enter> key.

Update To EZ Backup [Press Enter]

Allows you to use **EZ Backup** function. Connect two identical SATA hard drives to the **SPEEDING HDD1** and **SPEEDING HDD2** ports, and then press the <Enter> key.



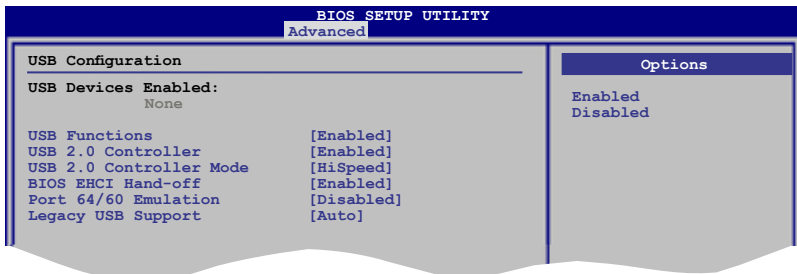
- **Back up your data stored in these two SATA hard drives before using Speeding HDD function.** In **EZ Backup** mode, data stored in the drive connected to **SPEEDING HDD2** port will be erased. In **Super Speed** mode, data stored in both drives will be erased.
 - Refer to **4.3.11 ROG Speeding HDD** for more information.
-

Update To Normal Mode [Press Enter]

In this mode, both **SPEEDING HDD1** and **SPEEDING HDD2** ports function as ordinary SATA ports.

3.5.3 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.



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 functions. The following sub-items appear when this item is set to [Enabled]. 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 OS. 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.

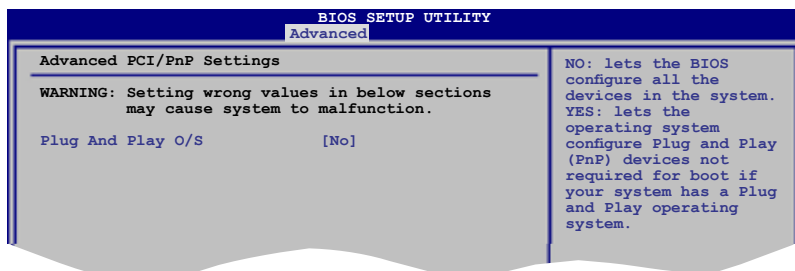
Configuration options: [Disabled] [Enabled] [Auto]

3.5.4 PCI PnP

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



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

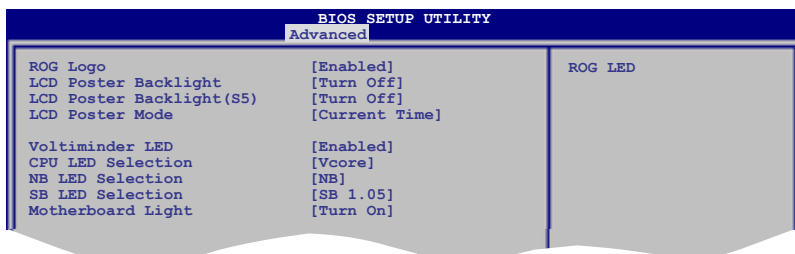


Plug And Play O/S [No]

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]

3.5.5 LCD Poster and LED Control



ROG Logo [Enabled]

If this item is set to [Enabled], the box labeled as Republic of Gamers on the heatpipe assembly lights up when the system is on.

Configuration options: [Enabled] [Disabled]

LCD Poster Backlight [Turn Off]

Allows you to turn on/off the LCD Poster backlight when the system is working.

Configuration options: [Turn On] [Turn Off]

LCD Poster Backlight (S5) [Turn Off]

Allows you to turn on/off the LCD Poster backlight when the system is in soft-off state. Configuration options: [Turn On] [Turn Off]

LCD Poster Mode [Current Time]

Allows the LCD Poster to display either hardware information or time.

Configuration options: [Current Time] [HWM Information]



The following item becomes configurable when you set **LCD Poster Mode** to [HWM Information].

HWM Select Mode

Allows you to select which hardware information to display on the LCD

Poster. Configuration options: [All Voltage] [All Temperature] [All Fan Speed]

Voltiminder LED [Enabled]

Allows you to enable or disable the onboard Voltiminder LED.

Configuration options: [Enabled] [Disabled]

CPU LED Selection [Vcore]

Allows you to switch the onboard CPU LED display between CPU voltage

[Vcore] and CPU PLL voltage [CPU PLL].

Configuration options: [Vcore] [CPU PLL]

NB LED Selection [NB]

Allows you to switch the onboard northbridge LED display between North Bridge Voltage [NB] and FSB Termination Voltage [VTT].

Configuration options: [NB] [VTT]

SB LED Selection [SB 1.05]

Allows you to switch the onboard southbridge LED display between South Bridge 1.05 Voltage [SB 1.05] and South Bridge 1.5 Voltage [SB 1.5].

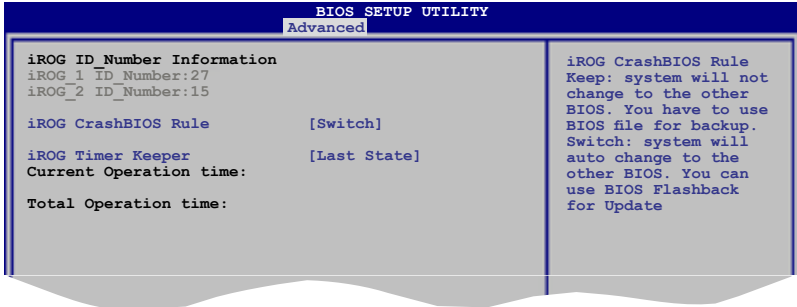
Configuration options: [SB 1.1] [SB 1.5]

Motherboard light [Turn On]

Allows you to turn on/off the motherboard light.

Configuration options: [Turn On] [Turn Off]

3.5.6 Other Configuration



iROG CrashBIOS Rule [Switch]

When this item is set to [Switch], the system will automatically switch between BIOS1 and BIOS2 so that you are allowed to use the BIOS Flashback function.

When this item is set to [Keep], the system will not switch between BIOS1 and BIOS2, and therefore BIOS Flashback cannot work.

Configuration options: [Switch] [Keep]

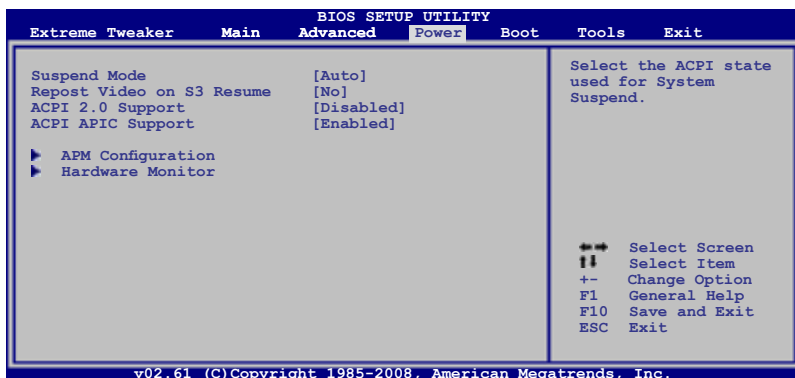
iROG Time Keeper [Last State]

Allows you to set the iROG Time Keeper operation mode.

Configuration options: [Last State] [Disabled] [Enabled]

3.6 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.



3.6.1 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]

3.6.2 Repost Video on S3 Resume [No]

Determines whether to invoke VGA BIOS POST on S3/STR resume.

Configuration options: [No] [Yes]

3.6.3 ACPI 2.0 Support [Disabled]

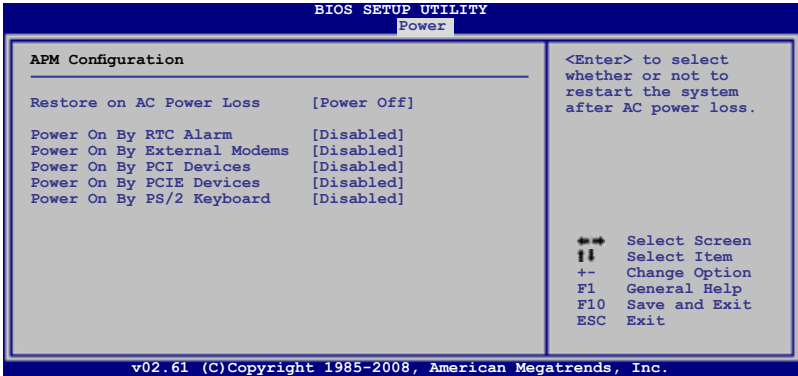
Specifies the Advanced Configuration and Power Interface (ACPI) version supported. Configuration options: [Disabled] [Enabled]

3.6.4 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]

3.6.5 APM Configuration



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 External Modems [Disabled]

This allows either settings of [Enabled] or [Disabled] for powering up the computer when the external modem receives a call while the computer is in Soft-off mode.

Configuration options: [Disabled] [Enabled]



The computer cannot receive or transmit data until the computer and applications are fully running. Thus, connection cannot be made on the first try. Turning an external modem off and then back on while the computer is off causes an initialization string that turns the system power on.

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.

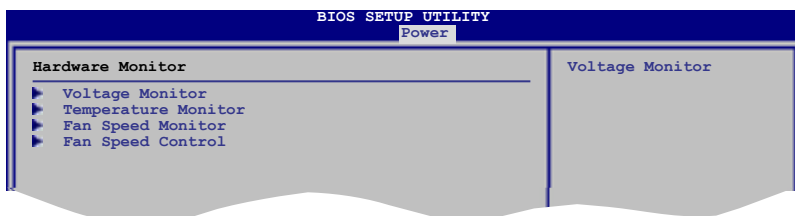
Configuration options: [Disabled] [Enabled]

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]

3.6.6 Hardware Monitor



Voltage Monitor

CPU Voltage; CPU PLL Voltage; FSB Termination Voltage; North Bridge 1.25 Voltage; DRAM Voltage; DRAM VTT Voltage; South Bridge 1.05 Voltage; South Bridge 1.5 Voltage; 3.3V Voltage; 5V Voltage; 12V Voltage

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators.

Temperature Monitor

CPU Temperature; MB Temperature; NB Temperature; SB Temperature; POWER Temperature; OPT FAN1/2/3 Temperature [xxx°C/xxx°F]

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

NB overheat protection; SB overheat protection [90°C]

The system automatically shuts down when the northbridge or southbridge chipset is heated over the set temperature to protect it from damage.

Configuration options: [Disabled] [70°C] [80°C] [90°C]

OPT FAN1/2/3 overheat protection [90°C]

Allows you to set the temperature over which the system automatically shuts down when any of the thermal sensor cables connected to the motherboard detects device overheat to protect the device from damage.

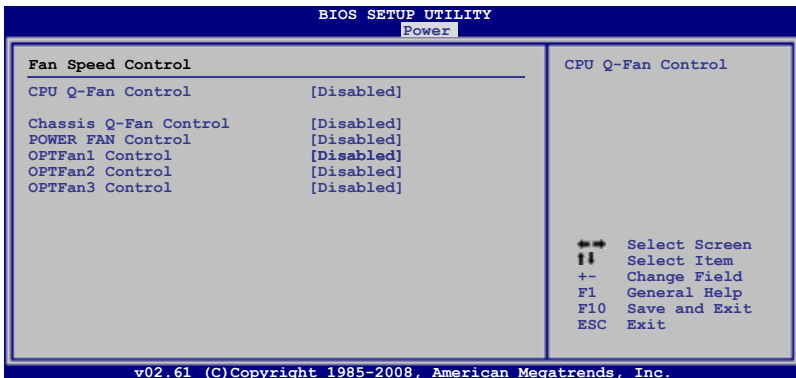
Configuration options: [Disabled] [70°C] [80°C] [90°C]

Fan Speed Monitor

CPU Fan, Chassis Fan1/2/3, POWER Fan, OPT Fan1/2/3 Speed [xxxxRPM] or [Ignored] / [N/A]

The onboard hardware monitor automatically detects and displays the CPU fan, chassis fan, power fan, and optional fan speed in rotations per minute (RPM). If any of the fans is not connected to the motherboard, the field shows 0. These items are not user-configurable.

Fan Speed Control



CPU Q-Fan Control [Disabled]

Allows you to enable or disable the CPU Q-fan control feature.

Configuration options: [Disabled] [Enabled]



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

CPU Fan Profile [Standard]

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

Configuration options: [Standard] [Silent] [Turbo]

Chassis Q-Fan Control [Disabled]

Allows you to enable or disable the chassis Q-fan control feature.

Configuration options: [Disabled] [Enabled]



The following item appears when you enable **Chassis Q-Fan Control**.

Chassis Fan Profile [Standard]

Allows you to set the appropriate performance level of the ASUS Q-Fan. When set to [Standard], the chassis fan automatically adjusts depending on the chassis temperature. Set this item to [Silent] to minimize fan speed for quiet chassis fan operation, or [Turbo] to achieve maximum chassis fan speed.

Configuration options: [Standard] [Silent] [Turbo]

POWER FAN Control [Disabled]

Allows you to select the power fan control mode. When this item is set to [Duty Mode], you can configure the **Power Fan Duty** item. If you set this item to [Q-Fan Mode], you are allowed to configure the **Power Fan Full Speed Temp** item. Configuration options: [Disabled] [Duty Mode] [Q-Fan Mode]

Power Fan Duty [50]

Allows you to set the fan duty cycle. This item appears when the **POWER FAN Control** item is set to [Duty Mode].

Configuration options: [50] [60] [70] [80] [90] [100]

Power Fan Full Speed Temp [60°C]

Allows you to set the temperature at which the power fan rotates at full speed.

This item appears when the **POWER FAN Control** item is set to [Q-Fan Mode].

Configuration options: [60°C] [70°C] [80°C] [90°C]

OPTFan1/2/3 Control [Disabled]

Allows you to select the optional fan control mode. When this item is set to [Duty Mode], you can configure the **OPTFan1/2/3 Duty** item. If you set this item to [Q-Fan Mode], you are allowed to configure the **OPTFan1/2/3 Full Speed Temp** item.

Configuration options: [Disabled] [Duty Mode] [Q-Fan Mode]



You need to connect the thermal sensor cables to the OPT_TEMP1/2/3 connectors to enable this function.

OPTFan1/2/3 Duty [50]

Allows you to set the fan duty cycle. This item appears when the **OPTFan1/2/3 Control** item is set to [Duty Mode].

Configuration options: [50] [60] [70] [80] [90] [100]

OPTFan1/2/3 Full Speed Temp [60°C]

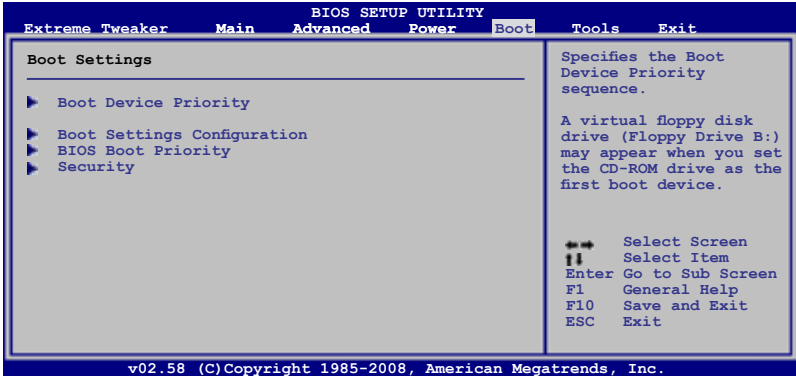
Allows you to set the temperature at which the power fan rotates at full speed.

This item appears when the **OPTFan1/2/3 Control** item is set to [Q-Fan Mode].

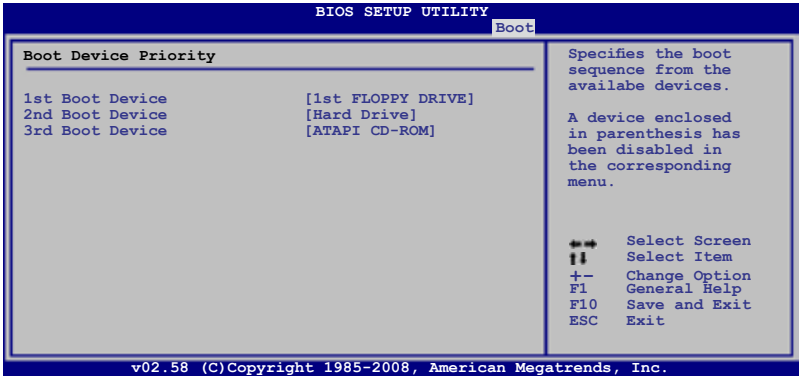
Configuration options: [60°C] [70°C] [80°C] [90°C]

3.7 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.



3.7.1 Boot Device Priority

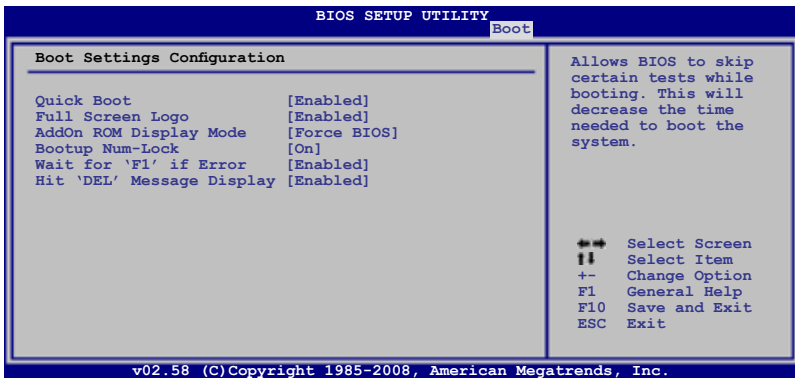


1st–xxth Boot Device [xxx Drive]

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: [xxx Drive] [Disabled]

3.7.2 Boot Settings Configuration



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 MyLogo 3™ 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]

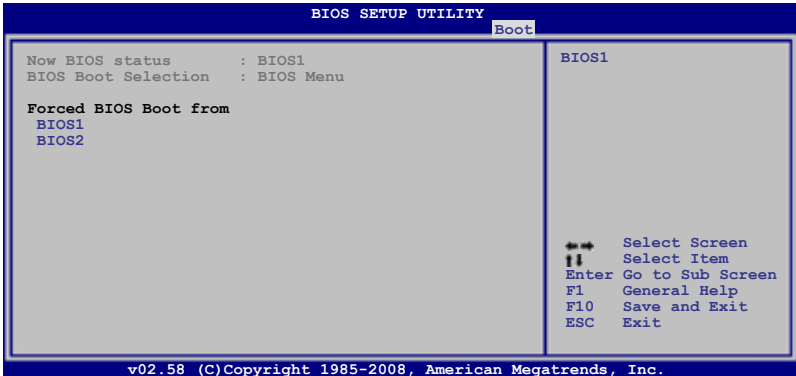
Hit 'DEL' Message Display [Enabled]

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

3.7.3 BIOS Boot Priority



- This item appears only when you move the **BIOS_FLASHBACK** jumper cap to pins 1-2: **BIOS MENU**.
- Refer to **2. BIOS flash setting (6-pin BIOS_FLASHBACK)** in **2.6 Slide switch and jumper** for further information.



Now BIOS status

Shows “BIOS1” or “BIOS2” depending on from which BIOS the system boots.

BIOS Boot Selection

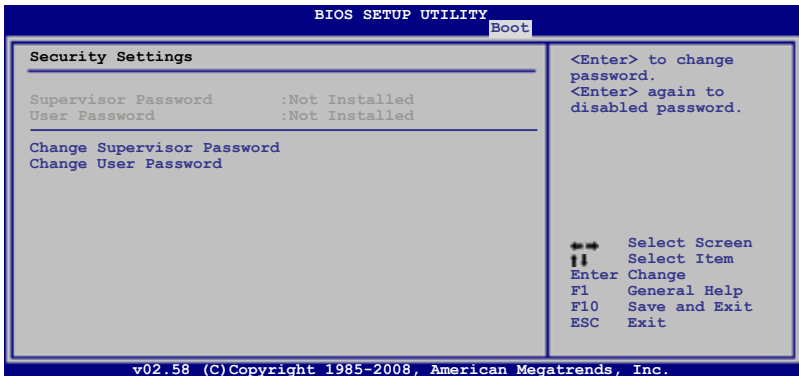
Shows “BIOS Menu” to indicate that you make BIOS bootup selection through BIOS menu rather than by moving the BIOS_FLASHBACK jumper cap.

Forced BIOS Boot from

Allows you to select from which BIOS the system boots. Highlight [BIOS1] or [BIOS2] and press <Enter>, and the system will reboot.

3.7.4 Security

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



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.

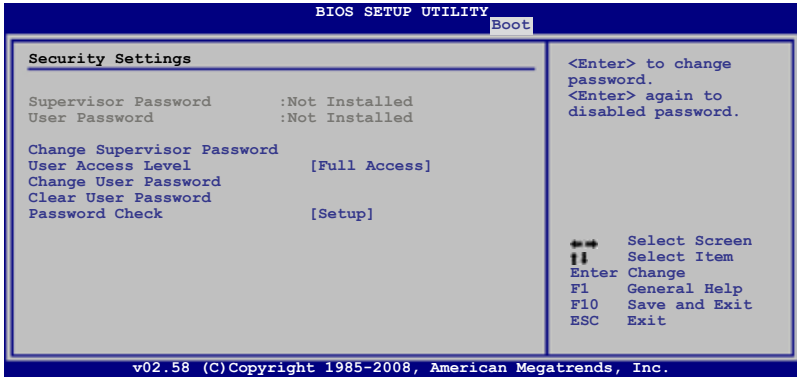
To change the supervisor password, follow the same steps as in setting a user password.

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 Slide switch and 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.



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

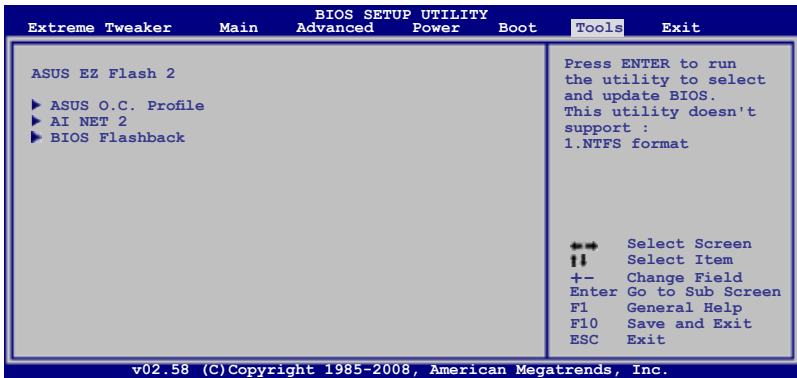
Select this item to clear the user password.

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]

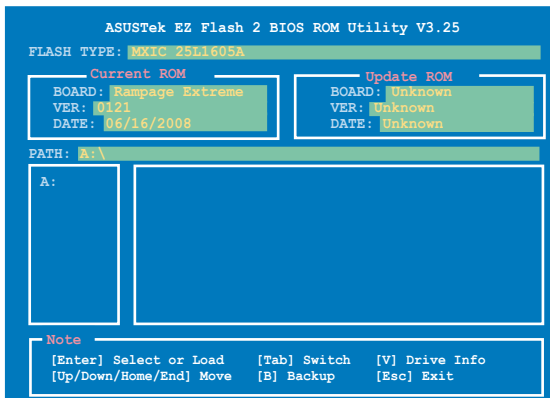
3.8 Tools menu

The Tools menu items allow you to configure options for special functions. Select an item then press <Enter> to display the sub-menu.



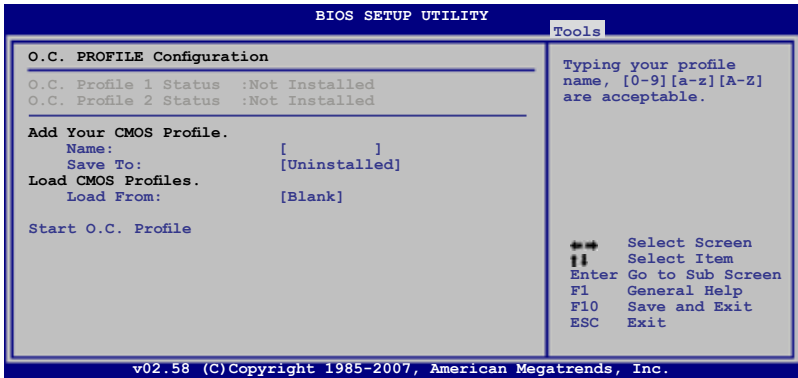
3.8.1 ASUS EZ Flash 2

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 3-4, section 3.1.2 for details.



3.8.2 ASUS O.C. Profile

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



Add Your CMOS Profile

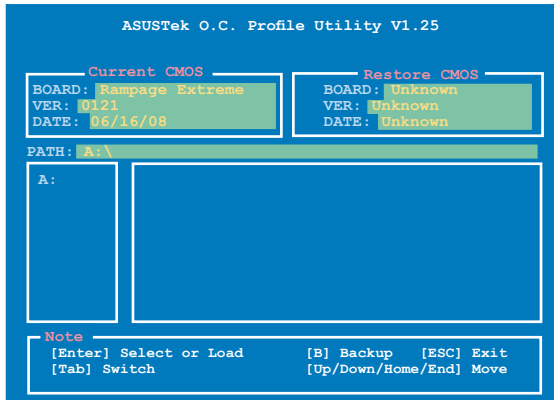
Allows you to save the current BIOS file to the BIOS Flash. Type a filename and select [Uninstalled], [Profile 1], or [Profile 2]. Press <Enter> to save the file.

Load CMOS Profiles

Allows you to load the previous BIOS settings saved in the BIOS Flash. Select [Blank], [Profile 1], or [Profile 2] and press <Enter> to load the file.

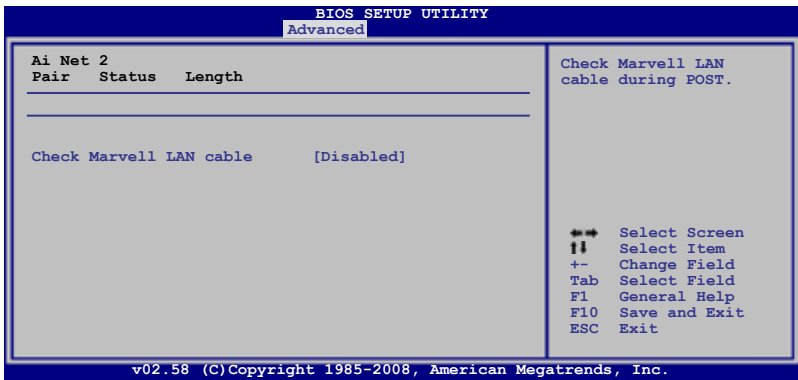
Start O.C. Profile

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



- 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 the system boot failure!

3.8.3 AI NET 2

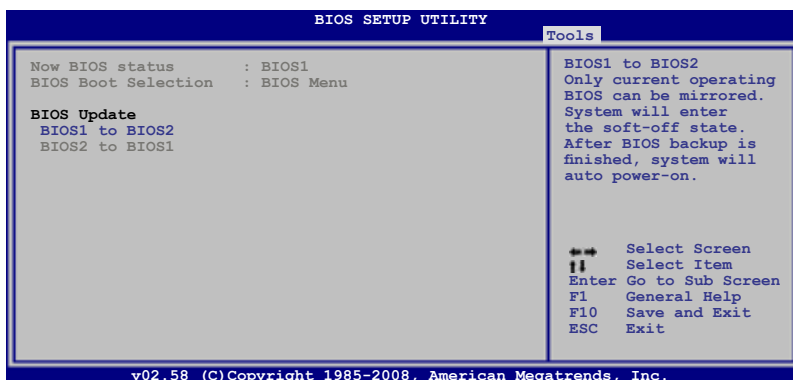


Check Marvell LAN Cable [Disabled]

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

3.8.4 BIOS Flashback

This menu allows you to back up or restore BIOS content from BIOS 1 to BIOS2, and vice versa.



To perform BIOS Flashback:

1. Highlight [BIOS1 to BIOS2] or [BIOS2 to BIOS1] and press <Enter>.



If **Now BIOS status** shows **BIOS1** (you are currently using BIOS1), then only the [BIOS1 to BIOS2] option is available, if **BIOS2**, then [BIOS2 to BIOS1].

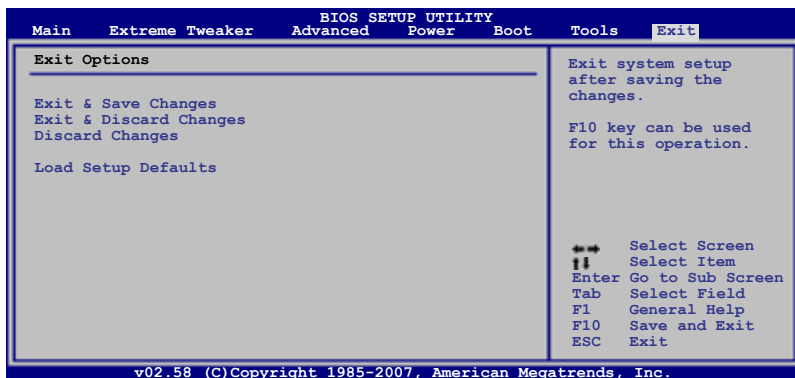
2. The system enters the soft-off state and the onboard **BIOS LED** will blink to indicate that the update is proceeding.
3. When the update is complete, the system will restart automatically.



Refer to **2. BIOS flash setting (6-pin BIOS_FLASHBACK)** in **2.6 Slide switch and jumper** for further information.

3.9 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.



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 YES 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 YES 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 YES 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 and the software.

4 Software support

4.1	Installing an operating system	4-1
4.2	Support DVD information	4-1
4.3	Software information	4-9
4.4	RAID configurations	4-40
4.5	Creating a RAID driver disk.....	4-49

4.1 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 Pack 2 or later versions before installing the drivers for better compatibility and system stability.

4.2 Support DVD information

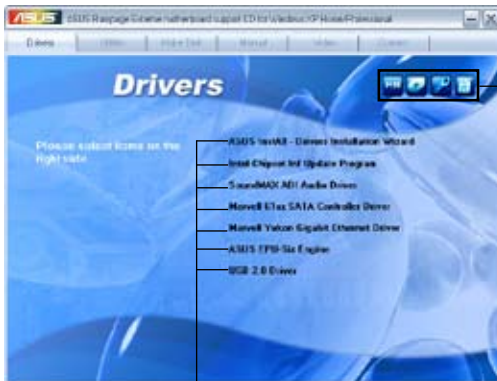
The support DVD that came with the motherboard package contains the drivers, software applications, and utilities that you can install to avail all motherboard features.



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

4.2.1 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.

4.2.2 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® ADI2000B audio driver and application.

Marvell 61xx SATA Controller Driver

Installs the Marvell® 61xx SATA controller driver.

Marvell Yukon Gigabit Ethernet Driver

Installs the Marvell Yukon Gigabit Ethernet Driver.

ASUS EPU-Six Engine

Installs the ASUS EPU-Six Engine driver and utility.



Do not install ASUS Six-Engine if you use the TweakIt function. Operating both functions simultaneously might damage your motherboard.

USB 2.0 Driver

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

4.2.3 Utilities menu

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



Click to display the next screen



Click to display the previous screen

ASUS InstAll-Installation Wizard for Utilities

Installs all of the utilities through the Installation Wizard.

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).

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.



Do not install ASUS PC Probe II if you use the TweakIt function. Operating both functions simultaneously might damage your motherboard.

ASUS AI Suite

Installs the ASUS AI Suite.



Do not install AI Suite if you use the TweakIt function. Operating both functions simultaneously might damage your motherboard.

Sound Blaster X-Fi

Installs Creative Sound Blaster X-Fi utility.

Speeding HDD

Installs the ROG Speeding HDD utility.

Marvell Yukon VCT Application

Installs the Marvell Yukon VCT applications.

Marvell Yukon NCU Application

Installs the Marvell Yukon CPA applications.

Adobe Acrobat Reader 8

Installs the Adobe® Acrobat® Reader that allows you to open, view, and print documents in Portable Document Format (PDF).

Microsoft DirectX 9.0c

Installs the Microsoft® DirectX 9.0c driver. The Microsoft DirectX® 9.0c is a multimedia technology that enhances computer graphics and sound. DirectX® improves the multimedia features of your computer so you can enjoy watching TV and movies, capturing videos, or playing games in your computer. Visit the Microsoft website (www.microsoft.com) for updates.

Anti-Virus Utility

The anti-virus application scans, identifies, and removes computer viruses. View the online help for detailed information.

3DMark06 Software

Installs the 3Dmark06 software.

Corel MediaOne Starter

Installs the Corel MediaOne Starter application to easily manage, edit share and protect your multimedia data.

Ulead Burn.Now

Installs the Ulead Burn.Now application for Audio DVD, CD and data disc creation.

Ulead PhotoImpact 12 SE

Installs the Ulead PhotoImpact 12 SE software.

Winzip 11

Installs the Winzip utility for easy file-compression and protection.

CyberLink PowerBackup

Installs the CyberLink Powerbackup software.

4.2.4 Make disk menu

The Make disk menu contains items to create the Intel ICH9R driver disk.



Intel ICH9R 32/64 bit RAID/AHCI Driver Disk

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

4.2.5 Manual 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.



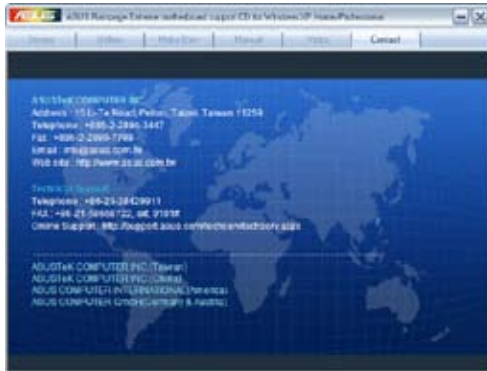
4.2.6 Video menu

Click the Video tab to display a list of video clips. Click the video titles to watch ROG users' outstanding performances with ROG motherboards.



4.2.7 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.



4.2.8 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.



4.3 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.

4.3.1 ASUS MyLogo3™

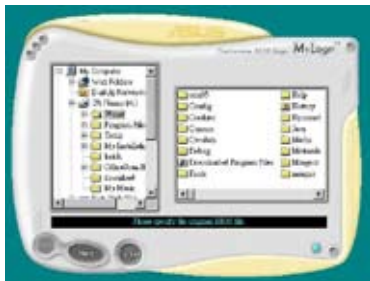
The ASUS MyLogo3™ utility lets you customize the boot logo. The boot logo is the image that appears on screen during the Power-On Self-Tests (POST). The ASUS MyLogo3™ is automatically installed when you install the ASUS Update utility from the support DVD. See section “4.2.3 Utilities menu” for details.



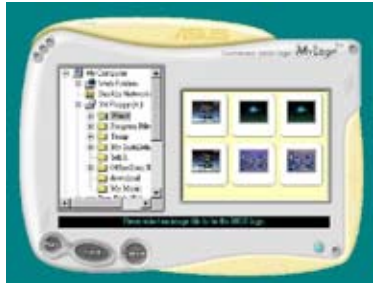
- Before using the ASUS MyLogo3™, use the AFUDOS utility to make a copy of your original BIOS file, or obtain the latest BIOS version from the ASUS website. See section 3.1.3 **AFUDOS utility**.
- Make sure that the BIOS item Full Screen Logo is set to [Enabled] if you wish to use ASUS MyLogo3™. See section 3.7.2 **Boot Settings Configuration**.
- You can create your own boot logo image in GIF 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 “3.1.1 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.

4.3.2 AI NET 2

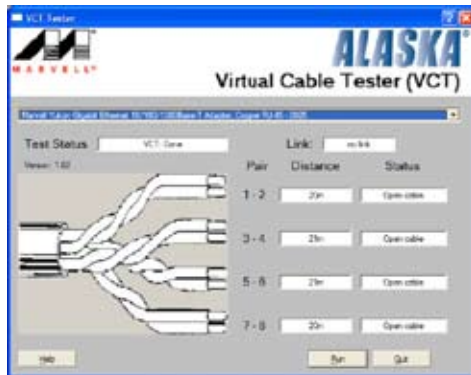
The AI NET 2 features the Marvell® Virtual Cable Tester™ (VCT). VCT is a cable diagnostic utility that reports LAN cable faults and shorts using the Time Domain Reflectometry (TDR) technology. The VCT detects and reports open and shorted cables, impedance mismatches, pair swaps, pair polarity problems,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

4.3.3 Sound Blaster X-Fi audio utility

With the SupremeFX X-Fi audio card installed to the motherboard, you will be able to enjoy excellent audio quality and experience realistic sound effects through the ADI AD2000B audio codec and Sound Blaster X-Fi interface. Activating X-Fi's CMSS3D, Crystalizer, and EAX will deliver accurate virtual surround sound and enhanced audio dynamics, which amount to ultimate gaming experience.

To install Sound Blaster X-Fi:

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 **Drivers** tab and click **SoundMAX ADI Audio Driver**.
3. Follow the screen instructions to complete installation.
4. Click the support DVD **Utilities** tab and click **Sound Blaster X-Fi**.
5. Follow the screen instructions to complete installation.



You need to install SoundMAX ADI Audio Driver to use Sound Blaster X-Fi audio utility.

If the Sound Blaster X-Fi audio utility is successfully installed, you will find the **Volume Panel** icon on the notification area.



Click the Volume Panel icon to display a list of Creative® media utilities that help you manage and play your media files. Click **Help** in each utility control panel to know more about them.



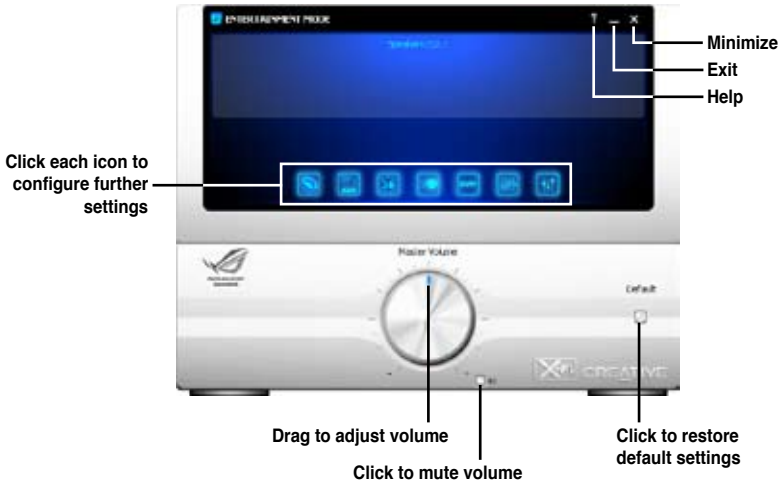
Double-click the Volume Panel icon to launch the Mixer control panel.

Click **Main Display**  to go to the Main Panel.



Main Panel

The Main Panel displays all the features and functions your SupremeFX X-Fi audio card supports. Click each icon to configure the following settings (from left to right): Speakers and Headphone, EAX Effects, X-Fi CMSS-3D, X-Fi Crystalizer, Smart Volume Management, Graphic Equalizer, and Mixer.



Speakers and Headphone Panel



This panel allows you to configure speakers/headphone settings including bass management and speaker volume. You can also test each speaker channel.



EAX Effects Panel



This panel contains environment effects that you can select to obtain a sense of realism during interactive 3D games.



X-Fi CMSS-3D Panel



This panel allows you to configure 3D virtual surround effects.



X-Fi Crystalizer Panel



Enable X-Fi Crystalizer to obtain more audio dynamics.



Smart Volume Management Panel

Enable Smart Volume Management (SVM) to avoid large volume fluctuations.



Graphic Equalizer Panel

This panel allows you to customize equalizer settings or select an EQ presets.



Mixer Panel

This panel allows you to select a recording device and adjust recording/playback devices volume.



4.3.4 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
	Opens the Configuration window
	Opens the Report window
	Opens the Desktop Management Interface window
	Opens the Peripheral Component Interconnect window
	Opens the Windows Management Instrumentation window
	Opens the hard disk drive, memory, CPU usage window
	Shows/Hides the Preference section
	Minimizes the application
	Closes the application

Sensor alert

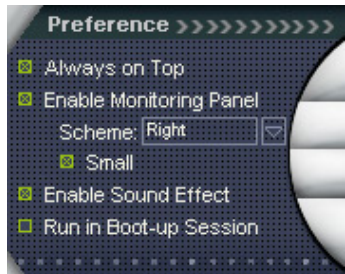
When a system sensor detects a problem, the main window right handle turns red, as the illustrations below show.



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

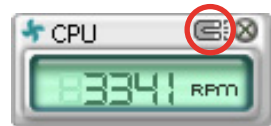
Changing the monitor panels position

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.

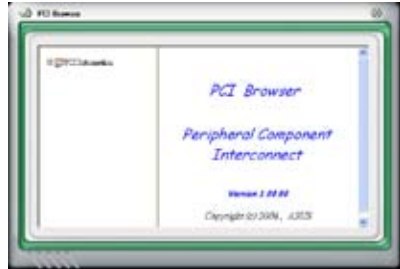
DMI browser

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 space.



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 physical memory.



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

4.3.5 ASUS EPU-6 Engine

ASUS EPU-6 Engine is an energy-efficient tool that satisfies different computing needs. This utility provides four modes that you can select to enhance system performance or save power. Selecting Auto mode will have the system shift modes automatically according to current system status. You can also customize each mode by configuring settings like CPU frequency, vCore Voltage, and Fan Control.

Installing 6 Engine

To install 6 Engine on your computer:

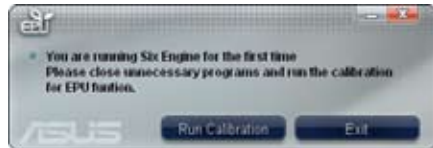
1. Place the support DVD to the optical drive. The Drivers installation tab appears if your computer has an enabled Autorun feature.
2. Click the **Drivers** tab and then click **ASUS EPU-Six Engine**.
3. Follow the screen instructions to complete installation.

Launching 6 Engine

Launch 6 Engine by double-clicking the 6 Engine icon on the Windows® notification area.



The first time you launch 6 Engine, the following message will appear, asking you to run Calibration first. Running calibration allows the system to detect CPU properties to optimize power management.



Click **Run Calibration** and wait for a few seconds. Then, the 6 Engine main menu appears.

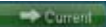
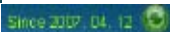

6 Engine main menu

The screenshot shows the ASUS 6 Engine main menu interface. Callouts point to various elements:


- Displays CPU Power and Total CPU Energy Saving:** Points to a small window showing CPU power and energy saving statistics.
- Displays the following message if no VGA power saving engine is detected:** Points to a warning message box.
- Lights up when power saving engine is activated:** Points to the 'Memory' component icon.
- Displays the amount of CO2 reduced:** Points to the 'Reduced CO2 Emission' bar graph.
- *Shifts between the display of Total and Current CO2 reduced:** Points to the 'Current' button next to the CO2 bar.
- Displays current mode:** Points to the 'Mode Setting' section.
- Auto Mode**, **Turbo Mode**, **High Performance Mode**, **Medium Power Saving Mode**, **Max. Power Saving Mode:** Labels for the mode selection buttons.
- Runs calibration:** Points to the 'Calibrate' button.
- Displays the system properties of each mode:** Points to the 'Tranquility' pentagon icon.
- Exits the utility:** Points to the 'Exit' button.

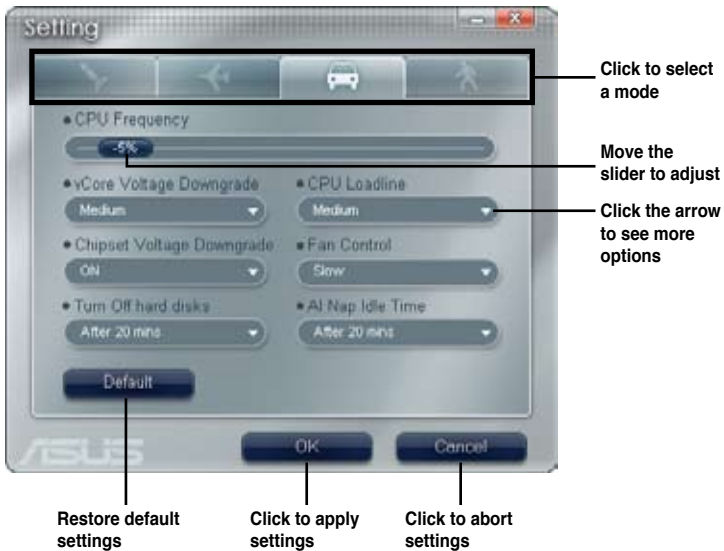
Advanced settings for each mode (refer to the next page for further information)



- * Click **Current**  to show the CO2 that has been reduced since you click the **Renew** button .
- * Click **Total**  to show the total CO2 that has been reduced since you launched 6 Engine.

Advanced settings menu

Click **Setting** () from the 6 Engine main menu to display configuration options in each mode. Some options in certain modes are dimmed, meaning that they are not available.



Configuration options in Advanced settings menu

The following lists the configuration options and their definitions in Advanced settings menu.

- **CPU Frequency:** Raises or lowers CPU frequency to a certain percentage.
- **vCore Voltage Downgrade:** Lowers CPU vCore voltage.
 - **High:** Downgrades voltage to the highest level for CPU power saving.
 - **Medium:** Downgrades voltage to the medium level.
 - **Small:** Downgrades voltage to the minimum level.
- **Chipset Voltage Downgrade:** Turns on/off chipset voltage.
- **Turn Off hard disks:** Turns off hard disk drives when they are not accessed after a certain time.
- **CPU Loadline:** Sets up the CPU loadline to manage CPU power saving.
 - **Light:** Saves CPU power to the minimum level.
 - **Medium:** Saves CPU power to the medium level.
 - **Heavy:** Saves CPU power to the highest level.

- **Fan Control:** Adjusts fan speeds to reduce noise and save system power.
 - **Quiet:** Lowers CPU fan speed and shuts off two chassis fans.
 - **Slow:** Lowers CPU fan and two chassis fan speeds.
- **AI Nap Idle Time:** Enters AI Nap mode after a certain time during system idle process.

Refer to the following table for the configuration options in each mode.

Configuration options	Turbo Mode	High Performance Mode	Medium Power Saving Mode	Maximum Power Saving Mode
CPU Frequency	Overclocking +1% to +30%	N/A	Downclocking -1% to -50%	Downclocking -1% to -50%
vCore Voltage Downgrade	N/A	N/A	Small/Medium/High	Small/Medium/High
Chipset Voltage Downgrade	N/A	N/A	On/Off	On/Off
Turn Off hard disks	Never/After 3 mins—After 5 hours	Never/After 3 mins—After 5 hours	Never/After 3 mins—After 5 hours	Never/After 3 mins—After 5 hours
CPU Loadline	N/A	N/A	Light/Medium/Heavy	Light/Medium/Heavy
Fan Control	N/A	N/A	Keep Bios Setting/Slow	Keep Bios Setting/Quiet
AI Nap Idle Time	Never/After 3 mins—After 5 hours	Never/After 3 mins—After 5 hours	Never/After 3 mins—After 5 hours	Never/After 3 mins—After 5 hours

4.3.6 ASUS AI Suite

ASUS AI Suite allows you to launch EPU-6 Engine, AI Booster, Fan Xpert, CPU Level Up, and AI Nap utilities easily.

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

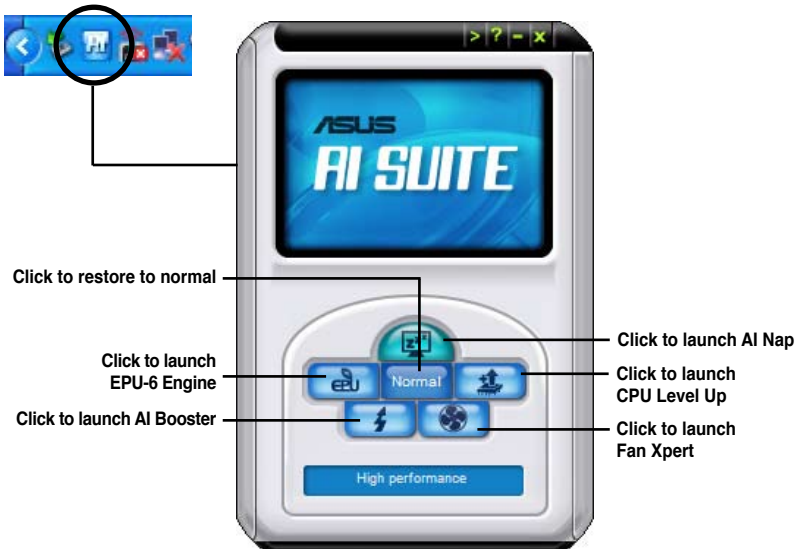
You can launch AI Suite right after installation or anytime from the Windows® desktop.

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.

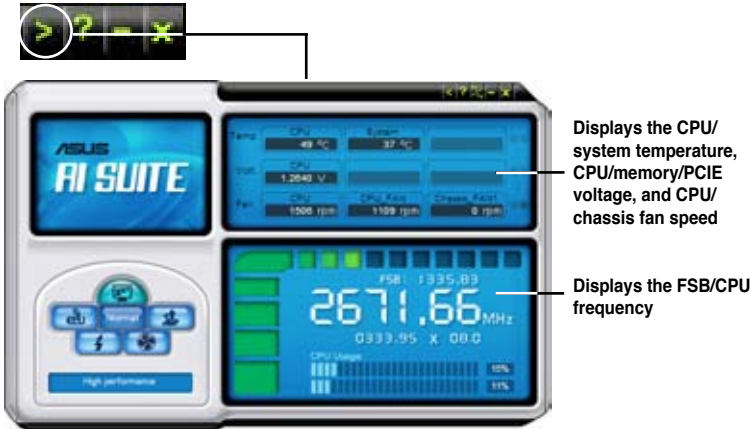
Using AI Suite


Click the EPU-6 Engine, AI Booster, Fan Xpert, CPU Level Up, or AI Nap icon to launch the utility, or click the Normal icon to restore the system to normal state.



Other feature buttons

Click  on right corner of the main window to open the monitor window.



Click  on right corner of the expanded window to switch the temperature from degrees Centigrade to degrees Fahrenheit.

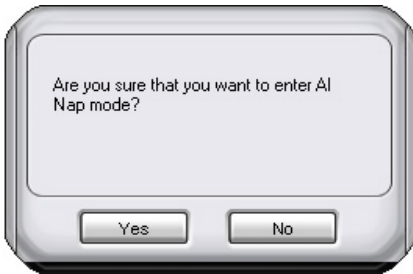


4.3.7 ASUS AI Nap

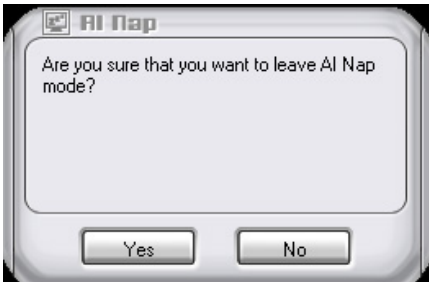
This feature allows you to minimize the power consumption of your computer whenever you are away. Enable this feature for minimum power consumption and a more quiet system operation.

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.

4.3.8 ASUS Fan Xpert

Asus Fan Xpert intelligently allows you to adjust both the CPU and chassis fan speeds according to different ambient temperatures caused by different climate conditions in different geographic regions and your PC's system loading. The built-in variety of useful profiles offer flexible controls of fan speed to achieve a quiet and cool environment.

Install AI Suite from the bundled support DVD. To launch the ASUS Fan Xpert utility, double-click the **AI Suite** icon on the Windows® notification bar and click the **Fan Xpert** button on the AI Suite main window.

Click the dropdown list button and display the fan types. Select **CPU Fan** or **Chassis Fan**.



Fan profile modes

- **Disable:** Select this mode to disable the **Fan Xpert** function.
- **Standard:** This mode makes the fan adjust speed in moderate pattern.
- **Silent:** This mode minimizes fan speed for quiet fan operation.
- **Turbo:** This mode boosts the fan to achieve maximal fan speed for the best cooling effect.
- **Intelligent:** This mode automatically adjusts the CPU fan speed with the ambient temperature.
- **Stable:** This mode keeps the CPU fan at the same speed to avoid noise caused by the unsteady fan rotation. However, the fan will speed up when the temperature exceeds 70°C.
- **User:** This mode allows you to change the CPU fan profile under certain limitation.



For **Chassis Fan**, only Disable/Standard/Silent/Turbo modes could be selected.



Click to close the Calibration window

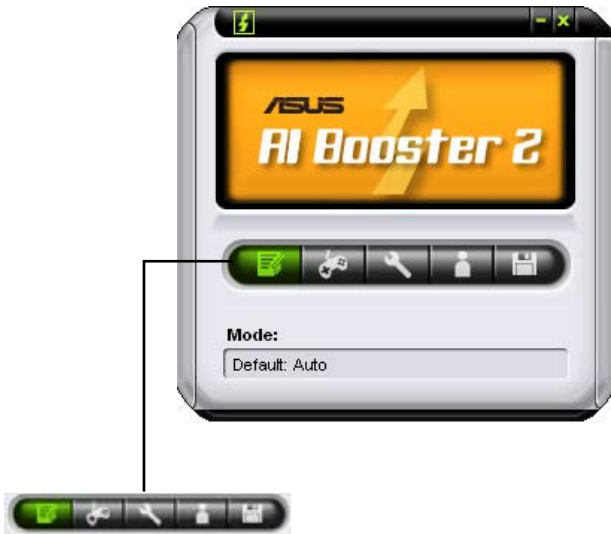


Click to get the calibration between the fan rotation and fan speed ratio

4.3.9 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.

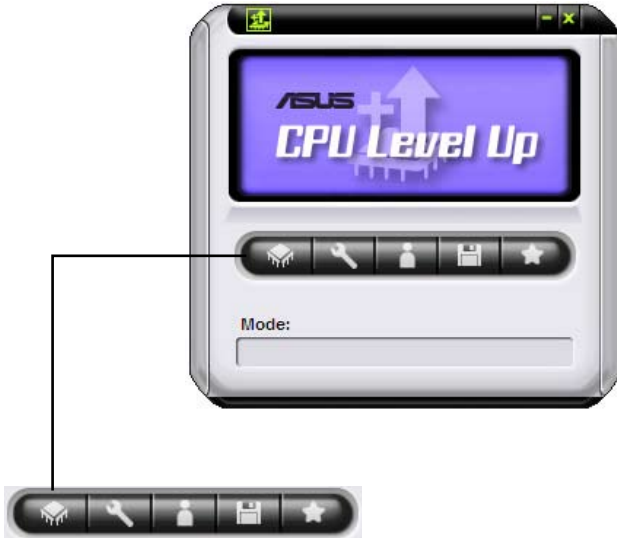
After installing AI Suite from the bundled support DVD, you can launch the utility by double-clicking the AI Suite icon on the Windows® OS taskbar and click the AI Booster button on the AI Suite main window.



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.

4.3.10 CPU Level Up

The CPU Level Up application allows you to overclock immediately with OC profile presets in Windows® environment without the hassle of entering BIOS. This application provides comprehensive and detailed tuning to frequencies, voltages, and even timings to create a real professional level of overclocking configurations. After installing AI Suite from the bundled Support DVD, launch the utility by double-clicking the AI Suite icon on the Windows® OS taskbar and click the CPU Level Up button on the AI Suite main window.



The options on the taskbar allow you to select the CPU level and adjust CPU frequency/ratio. You can also create an overclocking profile.



The items you are allowed to adjust in the may vary, depending on your motherboard features.

4.3.11 ROG Speeding HDD

ROG Speeding HDD secures the data stored in your hard disk drive and enhances hard drive performance, saving you the trouble of complicated configurations. With its friendly graphical user interface, you can easily make hard drive backups or increase the hard drive's transfer rate.

Installing Serial ATA hard drives

To use Speeding HDD in Windows® operating system, we recommend that you prepare three hard disks: one with operating system already installed, and the other two for Speeding HDD configuration.

To install Serial ATA hard disks for Speeding HDD configuration:

1. Install two SATA hard disks into the drive bays.
2. Plug one end of the SATA signal cables to each drive, and plug the other end of the cables to the **SPEEDING HDD1** and **SPEEDING HDD2** connectors on the motherboard. Refer to page 2-27 for the location of these two connectors.
3. Connect a SATA power cable to the power connector of each drive.



- For optimal performance, we highly recommend that you install identical drives of the same model and capacity.
- The onboard SPEEDING HDD1/2 connectors do not support ATAPI devices or hot-plug function.

Launching Speeding HDD in Windows® OS

After installing Speeding HDD from the bundled support DVD, double-click the **Speeding HDD** icon on the Windows® notification area.



The main screen appears. There are two modes for Speeding HDD: **EZ Backup** and **Super Speed**.



- Before using the Speeding HDD function, ensure that you have installed the Marvell 61xx driver to the system.
- When the Speeding HDD mode in BIOS setup is configured as **EZ Backup** or **Super Speed**, ensure that you install two hard disks to the SPEEDING1/2 connectors. Otherwise, the HDD LED on the front panel flashes.

Configuring EZ Backup

This mode allows one hard disk to back up the data on the other automatically. This helps you save your vital data even if one hard disk is damaged.



- We recommend that you use two new hard disks for this setup.
- This setup erases all original data in the hard disk connected to the **SPEEDING HDD2** connector on the motherboard. Back up the data in this hard disk before using this setup.

To start **EZ Backup** configuration:

1. Click **EZ Backup** from the main screen.
2. Click **Apply** to start configuration.



3. A warning message appears, reminding you that all original data in the hard disk connected to the **SPEEDING HDD2** connector will be erased. Click **Ok** to continue.
4. The setup is completed.



5. The **Speeding HDD** icon on the Windows® notification area turns green to indicate that **EZ Backup** is set up successfully.



Configuring Super Speed

This mode allows two hard disks to access data simultaneously. The dual channel design can largely enhance hard disk transfer rate.



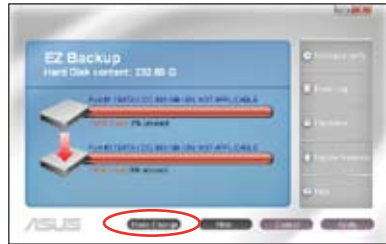
- We recommend that you use two new hard disks for this setup.
- This setup erases all original data in the two hard disks. Back up all data in them before using this setup.

To start **Super Speed** configuration:

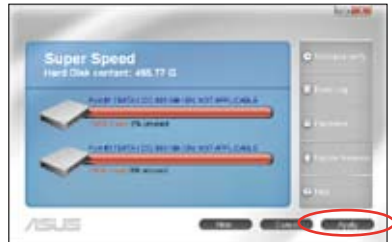
1. Click **Super Speed** from the main screen.



If you are in **EZ Backup** mode, click **Mode Change** to return to the main screen.



2. Click **Apply** to start configuration.



3. A warning message appears, reminding you that all original data in the two hard disks will be erased. Click **OK** to continue.
4. The setup is completed.
5. The **Speeding HDD** icon on the Windows® notification area turns green to indicate that **Super Speed** is set up successfully.



If one hard disk is corrupt, all data in both hard disks will be lost.

Changing to Normal Mode

This mode allows you to disable the **Speeding HDD** function and use the two SATA connectors as the other onboard SATA connectors.



When using one hard disk in **Normal Mode**, connect the hard disk to the **SPEEDING HDD1** connector on the motherboard.

To change to **Normal Mode**:

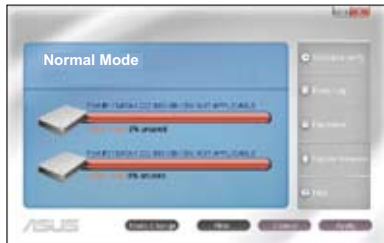
1. Click **Mode Change** to return to the main screen.



2. Click **Disable** to start configuration.



3. The setup is completed.



4. The **Speeding HDD** icon on the Windows® notification area turns gray to indicate that the **Speeding HDD** function is disabled.



Partitioning volumes

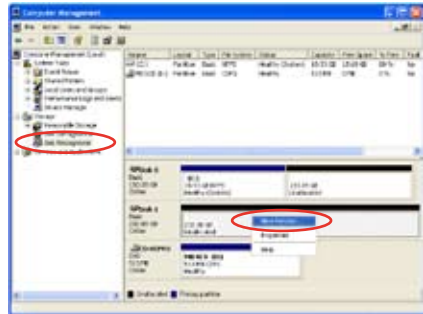
You have to partition volumes for the hard disk after Speeding HDD configuration.

To partition volumes:

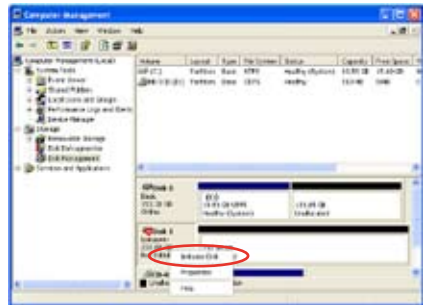
1. Right-click **My Computer** on the Windows® desktop, and then select **Manage** from the pop-up window.



2. Select **Disk Management**. Right-click the unallocated space of the disk, and then select **New Partition**.

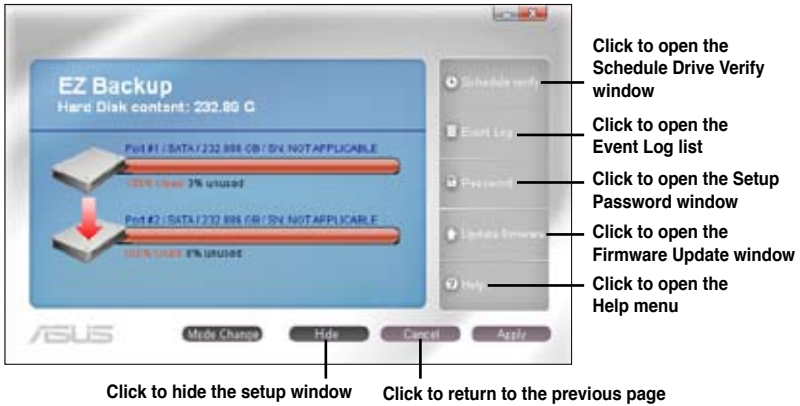


If the **New Partition** option is not available, right-click **Disk** item, and then select **Initialize Disk** to initialize the disk first.



3. A **New Partition Wizard** screen appears. Follow the onscreen instructions to complete the volume partition.

Other feature buttons



Schedule Drive Verify

Allows you to set up the schedule for verifying the hard disks. Click **Ok** to apply the settings; click **Cancel** to close the window; click **Right Now** to start verification at once.

Add / Modify / Delete

Allows you to create a new schedule, and modify/delete an existing schedule.

Schedule Activity

Allows you to set verification schedule daily, weekly, or monthly.

New Schedule

Allows you to set specific date and time for the schedule.

Physical Drive

Allows you to set schedule for the selected hard disk.

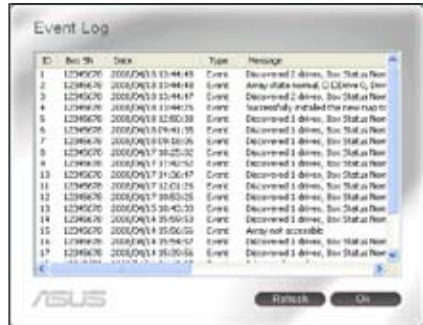
Scheduledd

Displays the date and time for the setup schedule.



Event Log

Displays event log list that might be helpful for troubleshooting and locating a system malfunction. Click **Refresh** to update the event log list; and click **Ok** to close the window.



Setup Password

Allows you to change the password for configuration access. Click the check box of the **Change password** column.



Key in the user name (admin), current password and new password. Click **Ok** to save the new settings.



Firmware Update

Allows you to update the firmware. Click **Browse** to locate the firmware file that you want to update. Then click **Download** to start the update process.



4.4 RAID configurations

The motherboard comes with the Intel® ICH9R Southbridge controller that supports RAID 0, RAID 1, RAID 10, and RAID 5 for six independent Serial ATA channels.

4.4.1 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 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.

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.

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 before you install an operating system to the selected hard disk drive. Refer to section **4.5 Creating a RAID driver disk** for details.

4.4.2 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.

4.4.3 Intel® RAID configurations

This motherboard supports RAID 0, RAID 1, RAID 5, RAID 10 and Intel® Matrix Storage configurations for Serial ATA hard disks drives through the Intel® ICH9R 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 **Storage 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. 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® Matrix Storage Manager 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 v8.0.0.1027 ICH9R wRAID5
Copyright(C) 2003-08 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]
1. Create RAID Volume          3. Reset Disks to Non-RAID
2. Delete RAID Volume         4. Exit

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
None defined.

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

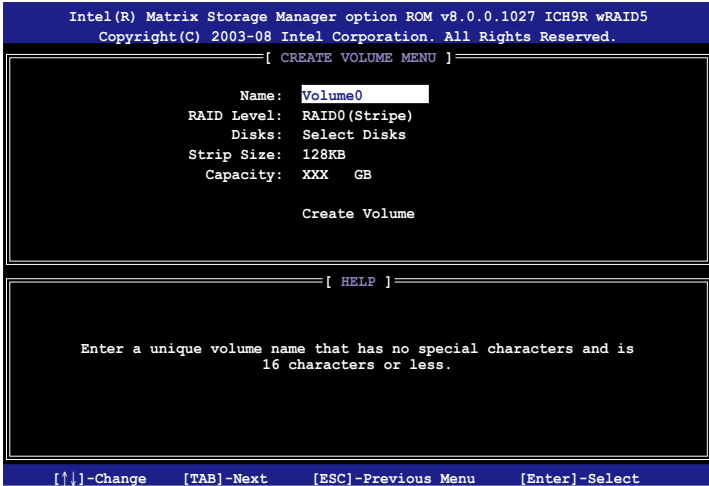


The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

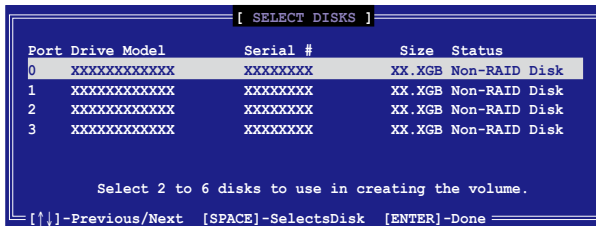
Creating a RAID 0 set (striped)

To create a RAID 0 set:

1. From the utility main menu, select **1. Create RAID Volume** and press <Enter>. The following screen appears.



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



5. Use the up/down arrow key to highlight a drive, and 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, and then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The default stripe size is 128 KB.



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. Enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum capacity allowed.
8. Press <Enter> when the Create Volume item is highlighted. The following warning message appears.

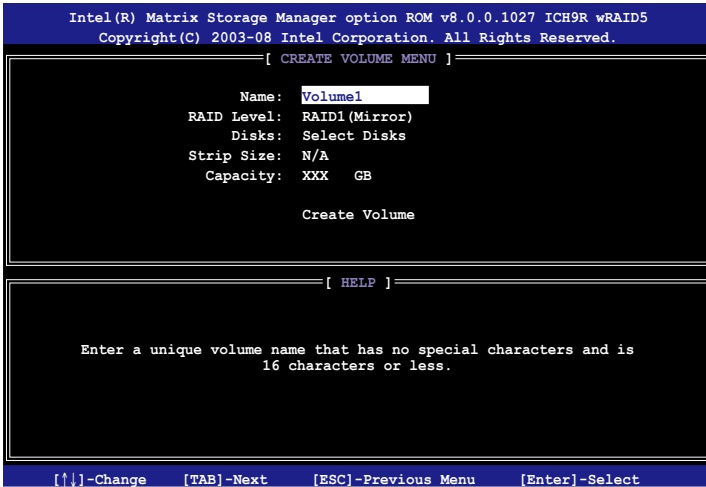
```
WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.  
Are you sure you want to create this volume? (Y/N) :
```

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** and press <Enter>. The following screen appears.



2. Enter a name for the RAID 1 set and 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, enter the RAID volume capacity that you want, and then press <Enter>. The default value indicates the maximum capacity allowed.
5. Press <Enter> when the Create Volume item is highlighted. The following warning message appears.

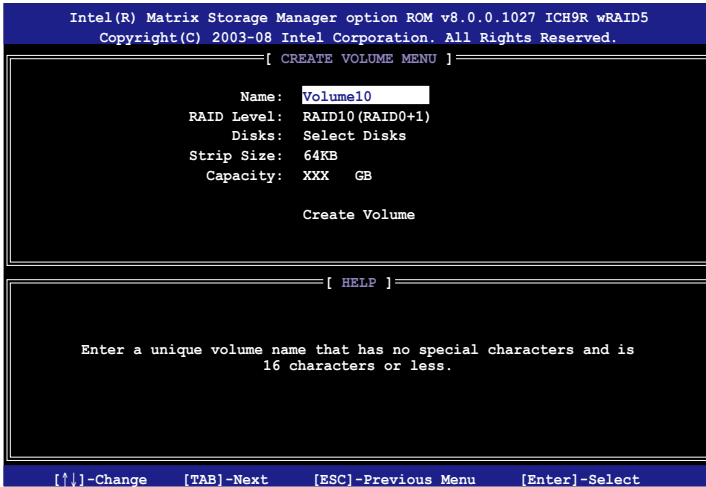


6. Press <Y> to create the RAID volume and return to main menu or <N> to go back to Create Volume menu.

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** and press <Enter>. The following screen appears.



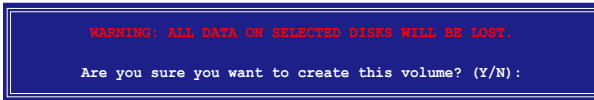
2. Enter a name for the RAID 10 set and press <Enter>.
3. When the RAID Level item is highlighted, press the up/down arrow key to select **RAID 10 (RAID 0+1)**, and then press <Enter>.
4. When the Stripe Size item is highlighted, press the up/down arrow key to select the stripe size for the RAID 10 array, and then press <Enter>. The available stripe size values range from 4 KB to 64 KB. The default stripe size is 64 KB.



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. Enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum capacity allowed.

6. Press <Enter> when the Create Volume item is highlighted. The following warning message appears.

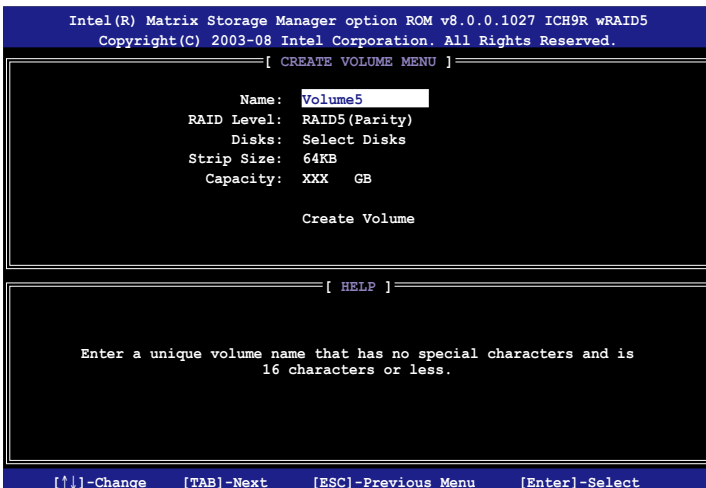


7. Press <Y> to create the RAID volume and return to the main menu or <N> to go back to the Create Volume menu.

Creating a RAID 5 set (parity)

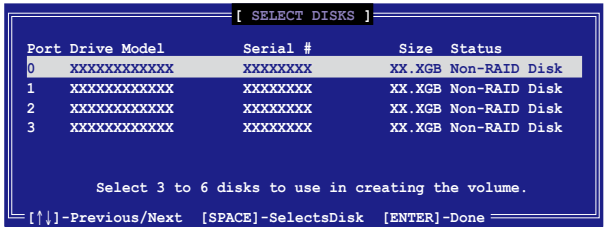
To create a RAID 5 set:

1. From the utility main menu, select **1. Create RAID Volume** and press <Enter>. The following screen appears.



2. Enter a name for the RAID 5 set and press <Enter>.
3. When the RAID Level item is highlighted, press the up/down arrow key to select **RAID 5(Parity)**, and then press <Enter>.

- The Disks item is highlighted, press <Enter> to select the hard disk drives to configure as RAID. The following screen appears.



- Use the up/down arrow key to highlight the drive you want to set, and then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.
- When the Stripe Size item is highlighted, press the up/down arrow key to select the stripe size for the RAID 5 array, and then press <Enter>. The available stripe size values range from 16 KB to 128 KB. The default stripe size is 64 KB.



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.

- Enter the RAID volume capacity that you want and then press <Enter>. The default value indicates the maximum allowed capacity.
- Press <Enter> when the Create Volume item is highlighted. The following warning message appears.



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

4.5 Creating a RAID driver disk

A floppy disk with the RAID driver is required when installing Windows® XP/Vista and later operating system on a hard disk drive that is included in a RAID set. For Windows Vista user, you can create a RAID driver disk with a floppy disk drive or a USB flash disk drive.

4.5.1 Creating a RAID driver disk without entering the OS

To create a RAID driver disk without entering the OS:

1. Boot your computer.
2. Press 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.

4.5.2 Creating a RAID 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, and then click **Intel ICH9R 32/64 bit RAID Driver Disk** to create an Intel® ICH9R RAID driver disk.
4. Insert a floppy disk into the floppy disk drive or connect a USB flash disk if you are using Windows Vista OS.
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 **Intel(R) SATA RAID Controller (Desktop 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(R) SATA RAID Controller (Desktop ICH9R)**.
3. Follow the succeeding screen instructions to complete the installation.

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



Chapter summary



A.1	Intel® EM64T.....	A-1
A.2	Enhanced Intel SpeedStep® Technology (EIST).....	A-1
A.3	Intel® Hyper-Threading Technology	A-3
A.4	Debug Code Table.....	A-4

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 3 for details.
- Visit www.intel.com for more information on the EIST feature.

A.2.1 System requirements

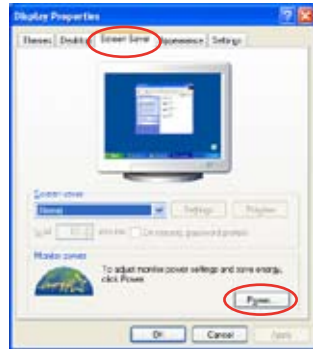
Before using EIST, check your system if it meets the following requirements:


- 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

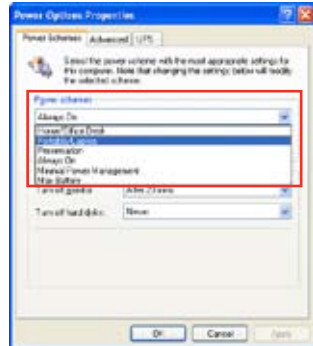
To use the EIST feature:

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 **Enhanced Intel SpeedStep (tm) Tech.** item to [Enabled], then press <Enter>. See page 3-14 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® 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® 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 -Program basic chipset registers
DET DRAM	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache
DC FCODE	Expand compressed BIOS code to DRAM
EFSHADOW	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
INIT IO	Initialize IO devices.
INIT HWM	Initialize Hardware Monitor.
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 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 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 ESCD & 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.
INIT CLK	Initialize clock generator.
CHECKCPU	Detect CPU information including brand, type and CPU level (586 or 686).
INTRINIT	Initial interrupts vector table.
INITINT9	Initialize INT 09 buffer
CPUSPEED	1. Program CPU internal MTRR (Pentium class CPU) 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.
VGA BIOS	Initialize VGA BIOS
TESTVRAM	1. Initialize multi-language 2. Put information on screen display, including BIOS logo, CPU type, CPU speed .
RESET KB	Reset keyboard.

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.
COUNTMEM	Calculate total memory by testing the last double word of each 64K page.
MP INIT	<ol style="list-style-type: none"> 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	Display PnP logo
ONBD IO	Initialize Onboard IO devices.
EN SETUP	Okay to enter 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	Assign resources to devices.
INIT FDC	<ol style="list-style-type: none"> 1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
DET IDE	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM.
COM/LPT	Detect serial ports & parallel ports.
DET FPU	Detect & install co-processor
CPU CHG	New CPU installed
EZ FLASH	Execute EZ Flash
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
SMARTERR	HDD smart function error
HM ERROR	Hard monitor error
AINETERR	AI NET error
CASEOPEN	Case open
PASSWORD	<p>Clear EPA or customization logo.</p> <ol style="list-style-type: none"> 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.

USB FINAL	Initialize 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.
INIT ROM	Initialize device option ROMs.
NUM LOCK	1. Program daylight saving 2. Update keyboard LED & typematic rate
UPDT DMI	1. Build MP table 2. Build & update ESCD 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)