# Crosshair II
## *Formula*

**ASUS**®

**Motherboard**

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# Notices

## Federal Communications Commission Statement

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

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

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

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

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

## Canadian Department of Communications Statement

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

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

# Safety information

## Electrical safety

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

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

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

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

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

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

## Operation safety

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

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

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

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

- Place the product on a stable surface.

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

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

# About this guide

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

## How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**

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

- **Chapter 2: Hardware information**

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

- **Chapter 3: Powering up**

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

- **Chapter 4: BIOS setup**

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

- **Chapter 5: Software support**

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

- **Chapter 6: NVIDIA® SLI™ technology support**

  This chapter tells how to install SLI-ready PCI Express graphics cards and how to use the SLI™ and Hybrid SLI® features.

- **Appendix: Debug code table**

  The Appendix includes 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: |
| | `format A:/S` |

# Crosshair II Formula specifications summary

| | |
|---|---|
| **CPU** | AMD® Socket AM2+ for AMD Phenom™ FX / Phenom / Athlon™ / Sempron™ processors<br>AMD Socket AM2 for Athlon 64 X2 / Athlon 64 FX / Athlon 64 / Sempron processors<br>AMD Cool 'n' Quiet™ Technology |
| **Chipset** | NVIDIA® nForce® 780a SLI™ |
| **System Bus** | Up to 5200 MT/s; HyperTransport™ 3.0 interface for AM2+ CPU<br>2000 / 1600 MT/s for AM2 CPU |
| **Memory** | Dual-channel memory architecture<br>- 4 x 240-pin DIMM sockets support unbuffered ECC/ non-ECC DDR2 1066*/800/667MHz memory modules<br>- Supports up to 8 GB system memory<br>*DDR2 1066 is supported by some of the AM2+ CPUs only. Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lists). |
| **VGA** | Integrated NVIDIA® GPU<br>Hybrid SLI Support (supports Windows® Vista™ only)<br>Maximum shared memory of 512MB<br>Supports HDMI™ Technology 1080P with a maximum resolution of 1920 x 1080 bpp; maximum DVI resolution of 1920 x 1200 bpp<br>Supports D-Sub with a maximum resolution of 1920 x 1440 bpp @ 75 Hz<br>Multi VGA output support: HDMI/DVI & D-Sub<br>Supports Microsoft® DirectX® 10, OpenGL® 2.0, Pixel Shader 4.0<br>Support PCIe 2.0/1.0 architecture |
| **Expansion Slots** | 3 x PCIe 2.0 x16 slots (support NVIDIA® SLI™ technology @ dual x16 or 3-way x8 x8 x8 speed)<br>2 x PCIe x1 slots (PCIEX1_1 (black) is compatible with the audio slot.)<br>2 x PCI 2.2 slots |
| **Storage** | Chipset supports:<br>- 1 x UltraDMA 133/100/66/33<br>- 6 x SATA 3.0 Gb/s connectors support RAID 0, 1, 0+1, 5, and JBOD<br>(Use SATA 1–4 connectors for IDE mode) |
| **LAN** | Dual Gigabit LAN, both featuring AI NET 2 |
| **High Definition Audio** | SupremeFX II Audio Card<br>- ADI 1988B 8-channel High Definition Audio CODEC<br>- Noise Filter<br>Coaxial / Optical S/PDIF Out ports at back I/O |
| **IEEE 1394** | 2 x IEEE 1394a ports (one at midboard; one at back panel) |

# Crosshair II Formula specifications summary

| | |
|---|---|
| **USB** | 12 x USB 2.0 ports (6 ports at midboard, 6 ports at back panel) |
| **ASUS ROG Overclocking Features** | Extreme Tweaker<br>New 8+2 phase power design<br>Intelligent overclocking tools:<br>  - CPU Level Up<br>  - AI Overclocking (intelligent CPU frequency tuner)<br>  - AI Booster Utility<br>  - O.C. Profile<br>Overclocking protection:<br>  - COP EX (Component Overheat Protection -EX)<br>  - Voltiminder LED<br>  - ASUS C.P.R. (CPU Parameter Recall) |
| **ASUS ROG Special Features** | LCD Poster<br>ROG BIOS Wallpaper<br>Onboard Switches: Power / Reset / Clr CMOS (at rear)<br>Q-Connector<br>ASUS Q-Fan Plus<br>ASUS EZ Flash 2<br>ASUS Q-Shield<br>ASUS MyLogo 3™<br>Stack Cool 2<br>100% All High-quality Conductive Polymer Capacitors |
| **Back Panel I/O Ports** | 1 x HDMI port<br>1 x VGA port<br>1 x PS/2 Keyboard (purple)<br>1 x S/PDIF Out (Coaxial + Optical)<br>1 x IEEE1394a port<br>2 x LAN (RJ45) ports<br>6 x USB 2.0/1.1 ports<br>1 x Clr CMOS switch |
| **Internal I/O Connectors** | 3 x USB 2.0 connectors support additional 6 USB 2.0 ports<br>1 x Floppy disk drive connector<br>1 x IDE connector for two devices<br>6 x SATA connectors (Use SATA 1–4 connectors for IDE mode)<br>8 x Fan connectors (1 x CPU / 1 x Power / 3 x Chassis / 3 x Optional)<br>3 x Thermal sensor connectors<br>1 x IEEE1394a connector<br>1 x S/PDIF Out connector<br>1 x Chassis Intrusion connector<br>24-pin ATX Power connector<br>8-pin ATX 12V Power connector<br>1 x En/Dis-able Clr CMOS slide switch<br>1 x LCD Poster connector<br>1 x System panel connector |

*(continued on the next page)*

# Crosshair II Formula specifications summary

| | |
|---|---|
| **BIOS Features** | 8 MB AWARD BIOS, PnP, DMI2.0, WfM2.0, SM BIOS 2.4, ACPI 2.0a Multi-Language BIOS |
| **Manageability** | WOL by PME, WOR by PME, Chassis Intrusion, PXE |
| **Accessories** | 3-Way SLI bridge<br>ASUS SLI bridge<br>LCD Poster<br>ASUS Optional Fan<br>SupremeFX II Audio Card<br>HDMI/DVI adapter<br>3 in 1 ASUS Q-connector kit<br>UltraDMA 133/100/66 cable<br>Floppy disk drive cable<br>Serial ATA cables<br>Serial ATA power cables<br>2-port USB2.0 + IEEE 1394a module<br>ASUS Q-Shield<br>Cable ties<br>User's manual |
| **Software** | The hottest 3D game: Company of Heroes—Opposing Fronts<br>Support DVD:<br>    Drivers<br>    ASUS PC Probe II<br>    ASUS Update<br>    ASUS AI Suite<br>    Futuremark® 3DMark® 06 Advanced Edition<br>    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.

# Product
# introduction

1

# Chapter summary

1

# 1.1    Welcome!

Thank you for buying an ASUS® Crosshair II Formula motherboard!

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

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

# 1.2    Package contents

Check your motherboard package for the following items.

| | |
|---|---|
| Motherboard | ASUS Crosshair II Formula |
| I/O module | USB 2.0 + IEEE 1394a module |
| Cables | Ultra DMA 133/100/66 cable<br>Floppy disk drive cable<br>Serial ATA cables<br>Serial ATA power cables |
| Accessories | **LCD Poster**<br>SupremeFX II Audio Card<br>HDMI/DVI adapter<br>ASUS Q-Shield<br>3-Way SLI bridge<br>ASUS SLI bridge<br>ASUS Optional Fan<br>3-in-1 ASUS Q-Connector Kit<br>Cable ties |
| Application DVD/CD | ASUS motherboard support DVD<br>The hottest game: Company of Heroes—Opposing Fronts<br>Kaspersky® Anti-virus software<br>Futuremark® 3DMark® 06 Advanced Edition |
| Documentation | User guide |

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

# 1.3 Special features

## 1.3.1 ROG Intelligent Performance & Overclocking features

### 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 4-13 and 5-33 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.

### 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, SB, PCIe bridge, 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.

### 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 4-13 for details.

### 8+2 Phase Power Design

ASUS 8+2 Phase Power Design, with independent power to vital components, ultimately enhances memory performance and ensures quick response and stability of CPU under heavy loading or overclocking modes.

### AI Booster 2

Overclocking has never been so fun with a user-friendly utility under Window that provides accurate settings for the CPU, chipset and memory. Now it's even easier to achieve astounding overclocking results without any hassles! See page 5-32 for details.

## ASUS O.C. Profile

Overclock immediately with OC profile presets. Much more than simple frequency settings, this profile contains comprehensive and detailed tuning to frequency, voltages, and even timings to give gamers a real professional level of overclocking configuration. See page 4-45 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.

## 1.3.2    ROG unique features

## Supreme FX II features

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

### Noise Filter

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

## 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 page 2-25 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 2-40 for details.

**BIOS Wallpaper**

BIOS Wallpaper is designed to make BIOS with style. Unlike ordinary blue and white BIOS screen, this feature allows you to set any photos you like as a wallpaper for your BIOS. Now you have a unique BIOS screen like never before! See page 4-43 for details.

**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.

**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 5-30 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 2-13 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 4-43 for details.

**AI Audio 2**

AI Audio 2 allows you to experience crisp, clear sounds by restoring and compensating for clarity and quality of compressed audio in all movies, music and games. It also provides stereo to multi-channel sound field expansion for realistic front and rear environments and virtualized surround sound for added vocal clarity when used in stereo speakers or headphones. See pages 5-12 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 page 2-39 for details.

### ASUS Q-Shield

The specially designed ASUS Q-Shield does without the usual "fingers"— making it convenient and easy to install. With better electric conductivity, it ideally protects your motherboard against static electricity and shields it against Electronic Magnetic Interference (EMI). See page 2-25 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 4-4 and 4-47 for details.

### ASUS CrashFree BIOS 2

The ASUS CrashFree BIOS 2 allows users to restore corrupted BIOS data using the motherbaord support DVD that contains the BIOS file. See page 4-8 for details.

### 1.3.3    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.

**AMD® Socket AM2+ Phenom™ FX / Phenom X4 / Phenom X2 / Athlon™ X2 / Sempron™ CPU support**

This motherboard supports AMD® Socket AM2+ multi-core processors with unique L3 cache and delivers better overclocking capabilities with less power consumption. It features dual-channel DDR2 1066 memory support and accelerates data transfer rate up to 5200MT/s via HyperTransport™ 3.0 based system bus. See page 2-8 for details.

**HyperTransport™ 3.0 support**

HyperTransport™ 3.0 technology provides 2.6 times more bandwidth than HyperTransport™ 1.0, radically improving system efficiency to create a smoother, faster computing environment.

**AMD® Socket AM2 Athlon™ 64 X2 / Athlon™ 64 FX / Athlon™ 64 / Sempron™ CPU support**

This motherboard supports AMD® Socket AM2 single-core Athlon™ 64 / Sempron™ and dual-core Athlon™ 64 X2 / Athlon™ 64 FX processors with 2MB / 1MB / 512KB L2 cache based on 64-bit architecture. It features 2000 / 1600 MT/s HyperTransport™-based system bus, dual-channel un-buffered DDR2 800 memory support, and AMD® Cool 'n' Quiet™ Technology. See page 2-8 for details.

**NVIDIA® nForce® 780a SLI chipset**

The NVIDIA® nForce 780a SLI chipset supports the NVIDIA® Scalable Link Interface (SLI™) technology that allows three graphics processing units (GPUs) in a single system. It's designed for enthusiast, extreme overclocking capability, ultimate gaming performance with SLI technology support. It's definitely one of the fastest platform in the world. The NVIDIA® nForce 780a SLI chipset also supports six (6) Serial ATA 3 Gb/s devices, PCI Express™ x16 slots with NVIDIA® SLI™ support at dual x16 mode or at triple x8 mode, and up to 12 USB 2.0 ports.

## Native DDR2 1066 memory support

This motherboard is the AMD® platform with native DDR2 1066 support. It provides faster data transfer rate and more bandwidth to increase memory computing efficiency, enhancing system performance in 3D graphics and other memory demanding applications. See page 2-14 for details.

> DDR2 1066 is supported by some of the AM2+ CPUs only. Refer to www.asus. com for the supported CPU models.

## Hybrid SLI™

Hybrid SLI™ technology is a unique hybrid multi-GPU technology built upon NVIDIA. Hybrid SLI technology today includes two primary features: GeForce Boost and HybridPower™. GeForece Boost turbo-charges performance of NVIDIA discrete graphics cards when combined with motherboard GPUs. HybridPower™ unleashes graphics performance when needed and enables low-power operation when performance is not needed. You can switch from the discrete GeForce GPU(s) to the motherboard GPU for a quiet, low power PC experience.

## NVIDIA® 3-Way SLI™ (Scalable Link Interface)

NVIDIA 3-Way SLI™ (Scalable Link Interface) takes advantage of the increased bandwidth of the PCI Express 2.0 bus architecture and features intelligent hardware and software that allows three GPUs to efficiently work together to deliver earth-shattering, scalable performance. For some applications nearly triple performance! See Chapter 6 for details.

## HDMI/DVI support

HDMI (High-Definition Multimedia Interface) is a set of digital video standards that delivers multi-channel audio and uncompressed digital video through a single cable for full HD 1080p visuals. Supporting HDCP copy protection such as HD DVD and Blu-ray Discs, HDMI provides you with the highest-quality home theater experience.

With the bundled HDMI to DVI adapter, this motherboard also supports DVI output. DVI (Digital Visual Interface) provides high quality visuals for digital display devices like LCD monitors. The interface of this motherboard supports dual VGA outputs for both HDMI/DVI and RGB. See page 2-28 for details.

> Since the Intel® driver for Windows® XP OS does not include screen scraper defense, you can only play HD DVD or Blu-Ray Disc under Windows® Vista™.

## Serial ATA 3.0 Gb/s technology

This motherboard supports the next-generation hard drives based on the Serial ATA (SATA) 3Gb/s storage specification, delivering enhanced scalability and doubling the bus bandwidth for high-speed data retrieval and saves. See page 2-30 for details.

## PCIe 2.0

This motherboard supports the latest PCIe 2.0 device for twice the current speed and bandwidth. This enhances system performance while still providing backward compatibility to PCIe 1.0 devices. See page 2-21 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 2-26 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 2-27 and 2-32 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 2-27 for details.

## 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.

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

# Hardware information 2

# Chapter summary

2

# 2.1 Before you proceed

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

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

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

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

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

• Before you install or remove any component, 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, southbridge, and bridge (PCIe). 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 **4.3 Extreme Tweaker** menu.

1. **CPU LED**

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



CPU_CRAZY
CPU_HIGH
CPU_NORMAL
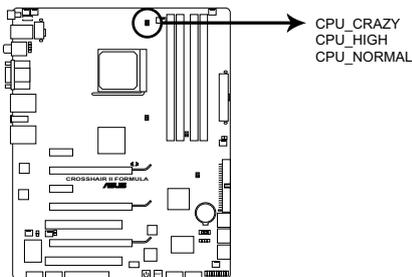
**CROSSHAIR II FORMULA CPU LED**

|  | Normal (green) | High (yellow) | Crazy (red) |
|---|---|---|---|
| **Vcore Voltage** | 0.775–1.3625 | 1.375–1.4875 | 1.5000– |

2.   **Memory LED**

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

DDR_CRAZY
DDR_HIGH
DDR_NORMAL
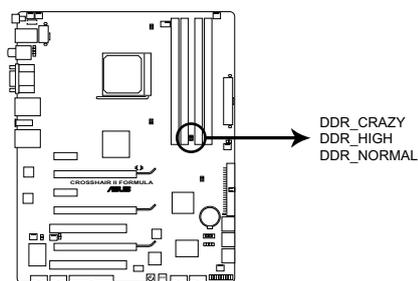
**CROSSHAIR II FORMULA DDR LED**

|  | Normal (green) | High (yellow) | Crazy (red) |
|---|---|---|---|
| **DDR2 Voltage** | 1.80–2.10 | 2.12–2.50 | 2.52– |

3.   **Southbridge / Bridge (PCIe) LEDs**

The Southbridge LED has two different voltage displays: SB Voltage or HT Voltage; you can select the voltage to display in BIOS. The Bridge (PCIe) LED displays BR Voltage. Refer to the illustration below for the LED location and the table below for LED definition.

SB_CRAZY
SB_HIGH
SB_NORMAL

BR_CRAZY
BR_HIGH
BR_NORMAL
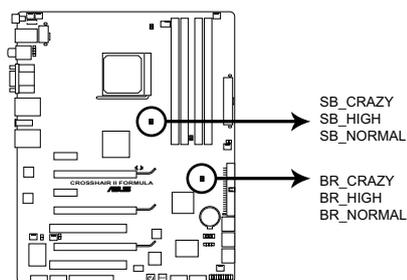
**CROSSHAIR II FORMULA Southbridge/Bridge(PCIe) LED**

|  | Normal (green) | High (yellow) | Crazy (red) |
|---|---|---|---|
| **SB Voltage** | 1.10–1.30 | 1.32–1.50 | 1.52– |
| **HT Voltage** | 1.20–1.40 | 1.42–1.60 | 1.62– |
| **BR Voltage** | 1.20–1.40 | 1.42–1.60 | 1.62– |

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.

HD_LED
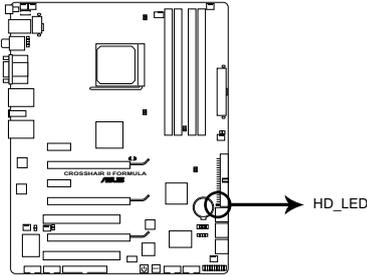
**CROSSHAIR II FORMULA Hard Disk LED**

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.
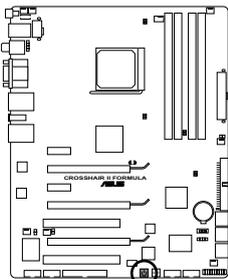
**CROSSHAIR II FORMULA Power on switch**

# 2.2 Motherboard overview

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

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

## 2.2.1 Placement direction

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

## 2.2.2 Screw holes

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

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

**Place this side towards the rear of the chassis**

CROSSHAIR II FORMULA

/ISUS
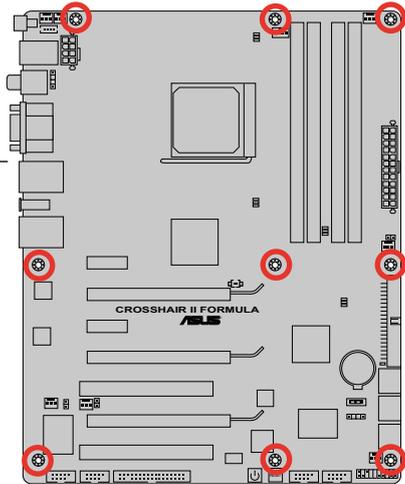
## 2.2.3 Motherboard layout
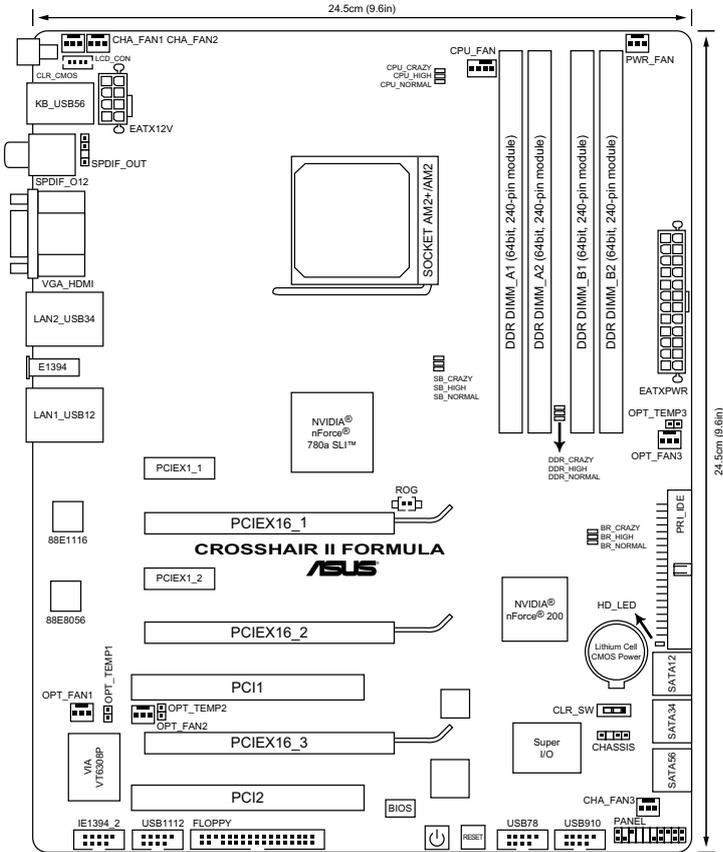


Refer to **2.8 Connectors** for more information about rear panel connectors and internal connectors.

## 2.2.4 Audio card layout
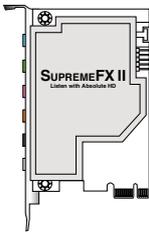
## 2.2.5　Layout contents

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| 2. | PCI slots | 2-21 |
| 3. | PCI Express x 1 slots | 2-21 |
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| Rear panel connectors | | Page |
|-----------------------|--|------|
| 1. | PS/2 keyboard port (purple) | 2-26 |
| 2. | Coaxial S/PDIF Out port | 2-26 |
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| 5.* | Line In port (light blue) | 2-27 |
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| 9.* | Rear Speaker Out port (black) | 2-27 |
| 10.* | Side Speaker Out port (gray) | 2-27 |
| 11. | USB 2.0 ports 1 and 2 | 2-27 |
| 12. | IEEE 1394a port | 2-27 |
| 13. | USB 2.0 ports 3 and 4 | 2-27 |
| 14. | HDMI port | 2-28 |
| 15. | Optical S/PDIF Out port | 2-28 |
| 16. | USB 2.0 ports 5 and 6 | 2-28 |
| 17. | Clear CMOS switch | 2-28 |

*These audio ports are on the Supreme FX II audio card.

| Internal connectors | Page |
|---|---|
| 1. IDE connector (40-1 pin PRI_IDE) | 2- 29 |
| 2. NVIDIA® nForce 780a SLI Serial ATA connectors (7-pin SATA1–4 [blue]; 7-pin SATA5–6 [black]) | 2- 30 |
| 3. Floppy disk drive connector (34-1 pin FLOPPY) | 2- 31 |
| 4. USB connectors (10-1 pin USB78; USB910; USB1112) | 2- 31 |
| 5. IEEE 1394a port connector (10-1 pin IE1394_2) | 2- 32 |
| 6. Thermal sensor cable connectors (2-pin OPT_TEMP1/2/3) | 2- 32 |
| 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) | 2- 33 |
| 8. Chassis intrusion connector (4-1 pin CHASSIS) | 2- 34 |
| 9. Digital audio connector (4-1 pin SPDIF_OUT, for ASUS HDMI VGA card) | 2- 34 |
| 10. ATX power connectors (24-pin EATXPWR; 8-pin EATX12V) | 2- 35 |
| 11. ROG connector (2-pin ROG) | 2-37 |
| 12. System panel connector (20-8 pin PANEL) | 2-38 |

| Onboard switches | Page |
|---|---|
| 1. Power-on switch | 2-40 |
| 2. Reset switch | 2-40 |

# 2.3 Central Processing Unit (CPU)

The motherboard comes with an AM2+/AM2 socket designed for AMD® Socket AM2+ Phenom™ FX / Phenom / Athlon™ / Sempron™ processor or for Socket AM2 Athlon 64 X2 / Athlon 64 FX / Athlon 64 / Sempron processor.

The AM2+/AM2 socket has a different pinout from the 940-pin socket designed for the AMD Opteron processor. Make sure you use a CPU designed for the AM2+/AM2 socket. 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!

## 2.3.1 Installing the CPU

To install a CPU:

1.    Locate the CPU socket on the motherboard.
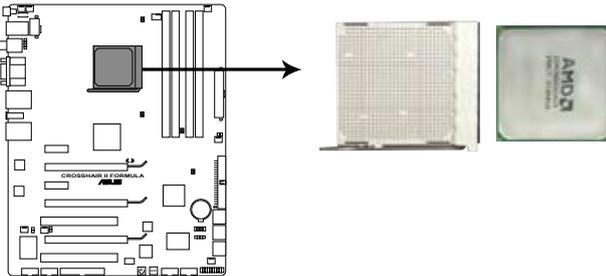
**CROSSHAIR II FORMULA CPU socket AM2+/AM2**

2.    Unlock the socket by pressing the lever sideways, then lift it up to a 90º angle.
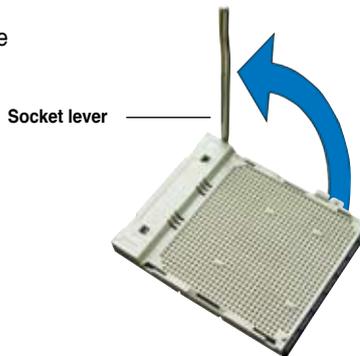
**Socket lever**

Make sure that the socket lever is lifted up to a 90º angle; otherwise, the CPU will not fit in completely.

3.   Position the CPU above the socket such that the CPU corner with the gold triangle matches the socket corner with a small triangle.

4.   Carefully insert the CPU into the socket until it fits in place.

**Gold triangle**

**Small triangle**
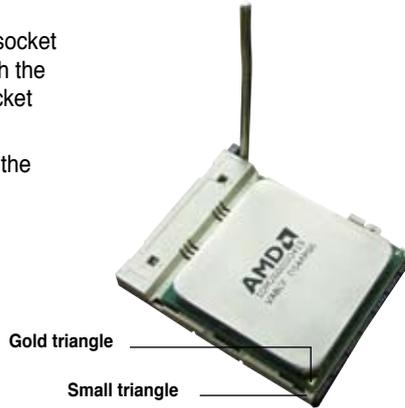
5.   When the CPU is in place, push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.

6.   Install a CPU heatsink and fan following the instructions that came with the heatsink package.

## 2.3.2 Installing the heatsink and fan

The AMD® Phenom™ FX / Phenom / Athlon™ 64 X2 / Athlon 64 FX / Athlon 64 / Sempron™ processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

Make sure that you use only AMD-certified 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 heatsink fits properly on the retention module base.

- The retention module base is already installed on the motherboard upon purchase.

- You do not have to remove the retention module base when installing the CPU or installing other motherboard components.

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



**CPU fan**

**CPU heatsink**

**Retention module base**

**Retention bracket**

**Retention bracket lock**
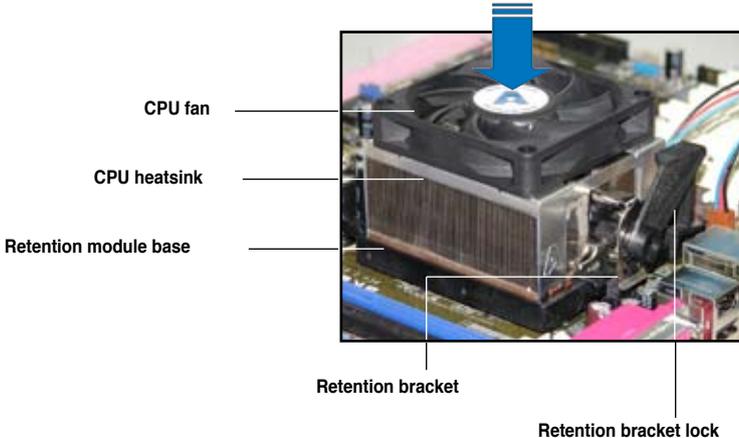
Your boxed CPU heatsink and fan assembly should come with installation instructions for the CPU, heatsink, and the retention mechanism. If the instructions in this section do not match the CPU documentation, follow the latter.

2.	Attach one end of the retention bracket to the retention module base.

3.	Align the other end of the retention bracket (near the retention bracket lock) to the retention module base. A clicking sound denotes that the retention bracket is in place.

Make sure that the fan and heatsink assembly perfectly fits the retention mechanism module base, otherwise you cannot snap the retention bracket in place.

4.	Push down the retention bracket lock on the retention mechanism to secure the heatsink and fan to the module base.

5.    When the fan and heatsink assembly is in place, connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN.

CPU_FAN

CPU FAN PWM
CPU FAN IN
CPU FAN PWR
GND

**CROSSHAIR II FORMULA CPU fan**
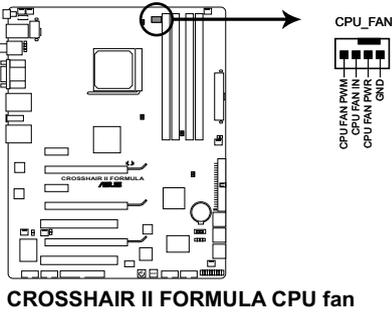
•    Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

•    This connector is backward compatiable with old 3-pin CPU fan.

### 2.3.3    Installing the optional fans

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

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



2.  Fit the fan to the grooved edge of the heatsink.
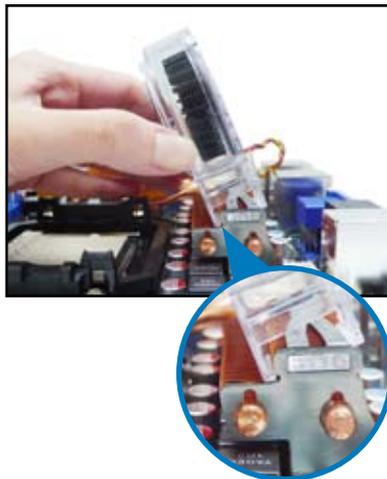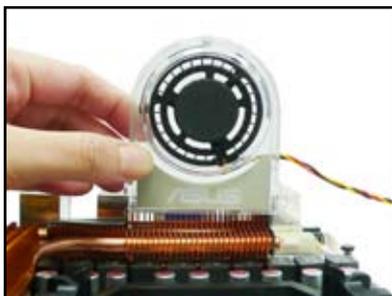


3.  Carefully push down the fan until it snugly fits the heatsink, then connect the fan cable.



4.  The photo shows the fan installed on the motherboard.
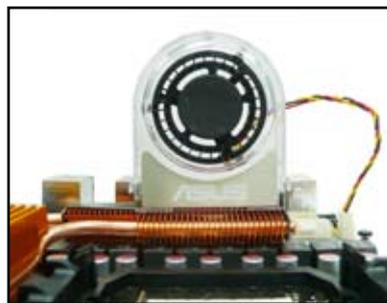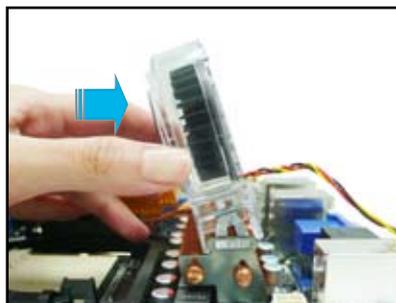


> • Plug the optional fan cable to the CHA_FAN1/2 connector on the motherboard.
>
> • Make sure the optional fan is installed correctly to prevent damage to the fan and motherboard components.

# 2.4 System memory

## 2.4.1 Overview

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

The figure illustrates the location of the DDR2 DIMM sockets:
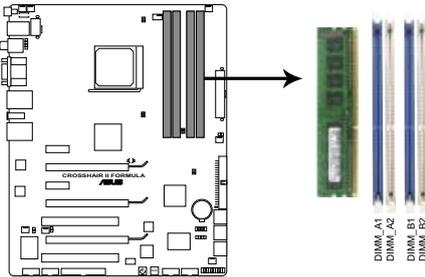


**CROSSHAIR II FORMULA 240-pin DDR2 DIMM sockets**

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

## 2.4.2    Memory configurations

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

**Recommended Memory Configurations**

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

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

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

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

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

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

**Notes on memory limitations**

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

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

# Crosshair II Formula Motherboard Qualified Vendors Lists (QVL) DDR2-800MHz capability for AM2 CPU

| Size | Vendor | Chip No. | CL | SS/DS | Part No. | A* | B* | C* |
|------|--------|----------|-----|-------|----------|----|----|----|
| 1024MB | KINGSTON | Heat-Sink Package | 4-4-4-12 | DS | KHX6400D2LL/1G | • | • | • |
| 1024MB | KINGSTON | Heat-Sink Package | 4-4-4-12 | SS | KHX6400D2LLK2/1GN | | • | • |
| 1024MB | KINGSTON | V59C1512804QBF25 | N/A | DS | KVR800D2N5/1G | • | • | • |
| 1024MB | KINGSTON | Heat-Sink Package | N/A | SS | KHX6400D2ULK2/1G | • | • | • |
| 2048MB | KINGSTON | E1108ACBG-8E-E | N/A | DS | KVR800D2N5/2G | • | • | • |
| 2048MB | Qimonda | HYB18T1G800C2F-25F | 5 | DS | HYS64T256020EU-25F-C2 | • | • | • |
| 2048MB | Qimonda | HYB18T1G800C2F-2.5 | 6 | DS | HYS64T256020EU-2.5-C2 | • | • | • |
| 512MB | Hynix | HY5PS12821CFP-S5 | 5-5-5 | SS | HYMP564U64CP8-S5 | • | • | • |
| 1024MB | Hynix | HY5PS12821CFP-S5 | 5-5-5 | DS | HYMP512U64CP8-S5 | • | • | • |
| 1024MB | CORSAIR | Heat-Sink Package | 4 | DS | CM2X1024-6400C4 | • | • | • |
| 1024MB | ELPIDA | E1108AB-8E-E(ECC) | 5 | SS | EBE10EE8ABFA-8E-E | • | • | • |
| 2048MB | ELPIDA | E1108AB-8E-E(ECC) | 5 | DS | EBE21EE8ABFA-8E-E | • | | |
| 1024MB | Crucial | Heat-Sink Package | 4 | DS | BL12864AA804.16FD | • | • | • |
| 1024MB | Crucial | Heat-Sink Package | 4 | DS | BL12864AL804.16FD3 | • | • | • |
| 1024MB | Crucial | Heat-Sink Package | 4 | DS | BL12864AA804.16FD3 | • | • | • |
| 512MB | Apacer | AM4B5708JQJS8E | N/A | SS | 78.91G9I.9K5 | • | | • |
| 1024MB | Apacer | AM4B5808CQJS8E | N/A | SS | 78.01GA0.9K5 | • | | • |
| 2048MB | Apacer | AM4B5808CQJS8E | 5 | DS | 78.A1GA0.9K4 | • | • | • |
| 512MB | A-DATA | AD29608A8A-25EG | N/A | SS | M2OAD6G3H3160G1E53 | • | • | • |
| 1024MB | A-DATA | AD26908A8A-25EG | N/A | DS | M2OAD6G3I4170I1E58 | • | • | • |
| 512MB | KINGMAX | KKA8FEIBF-HJK-25A | N/A | SS | KLDC28F-A8KI5 | | • | • |
| 1024MB | KINGMAX | KKA8FEIBF-HJK-25A | N/A | DS | KLDD48F-ABKI5 | • | • | |
| 512MB | Super Talent | Heat-Sink Package | N/A | SS | T800UA12C4 | | • | • |
| 1024MB | Super Talent | Heat-Sink Package | N/A | DS | T800UB1GC4 | • | • | • |
| 512MB | NANYA | NT5TU64M8BE-25C | 5 | SS | NT512T64U880BY-25C | | • | • |
| 1024MB | NANYA | NT5TU64M8BE-25C | 5 | DS | NT1GT64U8HB0BY-25C | • | • | • |
| 1024MB | NANYA | NT5TU64M8CE-25D | N/A | DS | NT1GT64U8HCOBY-25D | • | • | • |
| 2048MB | NANYA | NT5TU128M8CE-AC | 5 | DS | NT2GT64U8HC0BY-AC | • | | |
| 512MB | PSC | A3R12E3HEF641B9A05 | 5 | SS | AL6E8E63B8E1K | | • | • |
| 1024MB | PSC | A3R12E3HEF641B9A05 | 5 | DS | AL7E8E63B-8E-1K | | • | • |
| 256MB | TwinMOS | E2508AB-GE-E | 5 | SS | 8G-24IK2-EBT | | | • |
| 1024MB | Elixir | N2TU51280BE-25C | N/A | DS | M2Y1G64TU8HB0B-25C | • | • | • |

**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 DDR2-1066/800/667MHz QVL.

# Crosshair II Formula Motherboard Qualified Vendors Lists (QVL)
## DDR2-667MHz capability for AM2 CPU

| Size | Vendor | Chip No. | CL | SS/DS | Part No. | DIMM socket A* | B* | C* |
|---|---|---|---|---|---|---|---|---|
| 512MB | KINGSTON | D6408TEBGGL3U | 5 | SS | KVR667D2N5/512 | • | • | |
| 1024MB | KINGSTON | E5108AGBG-6E-E | N/A | DS | KVR667D2N5/1G | • | • | • |
| 2048MB | KINGSTON | E1108AB-6E-E | N/A | DS | KVR667D2N5/2G | • | • | • |
| 2048MB | Qimonda | HYB18T1GB00C2F-3S | 5 | DS | HYS64T256020EU-3S-C2 | • | • | • |
| 512MB | SAMSUNG | K4T51083QE | 5 | SS | M378T6553EZS-CE6 | | • | • |
| 1024MB | SAMSUNG | K4T51083QE | 5 | DS | M378T2953EZ3-CE6 | • | • | • |
| 1024MB | Hynix | HY5PS12821CFP-Y5 | 5 | DS | HYMP512U64CP8-Y5 | • | • | • |
| 512MB | CORSAIR | 64M8CFEG | N/A | SS | VS512MB667D2 | • | • | • |
| 1024MB | CORSAIR | 64M8CFEG | N/A | DS | VS1GB667D2 | • | • | • |
| 512MB | ELPIDA | E5108AE-6E-E | 5 | SS | EBE51UD8AEFA-6E-E | • | • | • |
| 512MB | A-DATA | AD29608A8A-3EG | 5 | SS | M2OAD5G3H3166I1C52 | • | • | • |
| 1024MB | A-DATA | AD29608A8A-3EG | 5 | DS | M2OAD5G3I4176I1C52 | • | • | • |
| 2048MB | A-DATA | NT5TU128M8BJ-3C | N/A | DS | M2ONY5H3J4170I1C5Z | • | • | • |
| 512MB | crucial | Heat-Sink Package | 3 | SS | BL6464AA663.8FD | • | • | |
| 1024MB | crucial | Heat-Sink Package | 3 | DS | BL12864AA663.16FD | • | • | |
| 1024MB | crucial | Heat-Sink Package | 3 | DS | BL12864AL664.16FD | • | • | |
| 1024MB | crucial | Heat-Sink Package | 3 | DS | BL12864AA663.16FD2 | • | • | |
| 512MB | Apacer | AM4B5708JQJS7E | N/A | SS | 78.91G92.9K5 | • | • | • |
| 1024MB | Apacer | AM4B5808CQJS7E | N/A | SS | 78.01G9O.9K5 | • | • | • |
| 2048MB | Apacer | AM4B5808CQJS7E | N/A | DS | 78.A1G9O.9K4 | • | • | • |
| 512MB | Kingmax | KKEA88B4LAUG-29DX | 5 | SS | KLCC28F-A8KB5 | • | • | • |
| 1024MB | Kingmax | KKEA88B4LAUG-29DX | 5 | DS | KLCD48F-A8KB5 | • | • | • |
| 512MB | Super Talent | Heat-Sink Package | 5 | SS | T6UA512C5 | | • | • |
| 1024MB | Super Talent | Heat-Sink Package | 5 | DS | T6UB1GC5 | • | • | • |
| 512MB | TwinMOS | TMM6208G8M30C | 5 | SS | 8D-23JK5M2ETP | | • | • |
| 2048MB | NANYA | NT5TU128M8BJ-3C | 5 | DS | NT2GT64U8HB0JY-3C | • | • | • |
| 512MB | NANYA | NT5TU64M8BE-3C | 5 | SS | NT512T64U88B0BY-3C | • | • | |
| 512MB | PSC | A3R12E3GEF637BLC5N | 5 | SS | AL6E8E63B-6E1K | • | • | • |
| 1024MB | PSC | A3R12E3GEF637BLC5N | 5 | DS | AL7E8E63B-6E1K | • | • | • |

### 2.4.3 Installing a DIMM

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

To install a DIMM:

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

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

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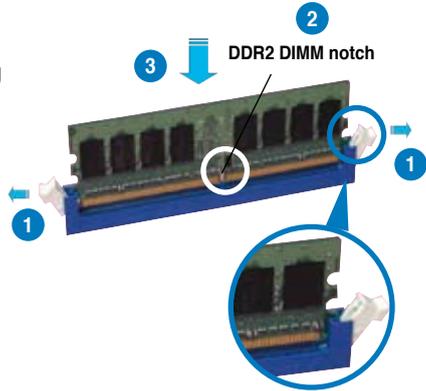
**DDR2 DIMM notch**

**Unlocked retaining clip**

✏️
- A DDR2 DIMM is keyed with a notch so that it fits in only one direction. Do not force a DIMM into a socket to avoid damaging the DIMM.
- The DDR2 DIMM sockets do not support DDR DIMMs. Do not install DDR DIMMs to the DDR2 DIMM sockets.

### 2.4.4 Removing a DIMM

To remove a DIMM:

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

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

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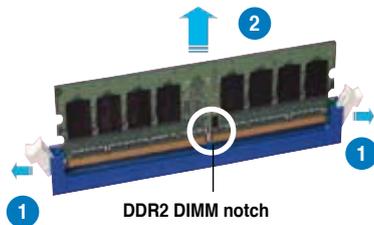
2. Remove the DIMM from the socket.

# 2.5    Expansion slots

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

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

## 2.5.1    Installing an expansion card

To install an expansion card:

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

## 2.5.2    Configuring an expansion card

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

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

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

## 2.5.3    Interrupt assignments

| IRQ | Priority | Standard function |
|-----|----------|-------------------|
| 0 | 1 | System Timer |
| 1 | 2 | Keyboard Controller |
| 2 | – | Redirect to IRQ#9 |
| 4 | 12 | Reserved |
| 5 | 13 | IRQ Holder for PCI Steering* |
| 6 | 14 | Floppy Disk Controller |
| 7 | 15 | NVIDIA nForce 780a SLI |
| 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 | Reserved |
| 13 | 8 | Numeric Data Processor |
| 14 | 9 | Primary IDE Channel |

### IRQ assignments for this motherboard

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| PCIE x16_1 | shared | shared | shared | shared | – | – | – | – |
| PCIE x16_2 | shared | shared | shared | shared | – | – | – | – |
| PCIE x16_3 | shared | shared | shared | shared | – | – | – | – |
| USB 1.0 controller 1 | – | – | – | shared | – | – | – | – |
| USB 1.0 controller 2 | – | – | – | shared | – | – | – | – |
| USB 1.0 controller 3 | – | – | – | shared | – | – | – | – |
| USB 1.0 controller 4 | – | – | – | shared | – | – | – | – |
| USB 2.0 controller | – | – | – | shared | – | – | – | – |
| HD audio | 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 has three PCI Express x16 slots that support PCI Express x16 graphic cards complying with the PCI Express specifications. With three graphics cards installed, the motherboard can enable multi-display. All of the three PCI Express x16 slots support PCIe 2.0 devices.

This motherboard supports 3 SLI-ready Express x16 graphics cards that comply with the PCI Express specifications.



Audio/PCI Express x1 slot
PCI Express x 16 slot
PCI Express x 1 slot
PCI Express x16 slot
PCI slot
PCI Express x 16 slot
PCI slot
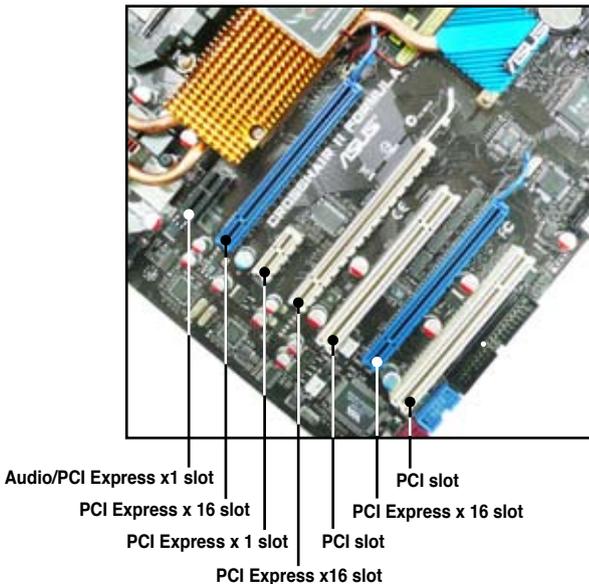
## Primary PCI Express x16 slots

The primary PCI Express x16 slots support PCI Express x16 graphics cards that comply with the PCI Express specifications.

## Universal PCI Express x16 slots (max. x8 mode)

This motherboard also supports universal PCI Express x16 slots with a maximum speed of 8 GB/s. The operating frequency of this slot changes, depending on the type of PCI Express card you install. Refer to the table below for details.

| VGA configuration | PCI Express operating mode | | |
|---|---|---|---|
| | PCIex16_1 | PCIex16_2 | PCIex16_3 |
| Single VGA/PCIe card | x16 | x8 | x16 |
| Dual VGA/PCIe card | x16 | N/A | x16 |
| Triple VGA/PCIe card | x16 | x8 | x8 |

When running 3-Way SLI™ mode, the PCIe operating frequency will reach x8, x8, x8.

- We recommend that you install a VGA card to the primary (blue) PCI Express x16 slots, and install any other PCI Express device to the universal (white) PCI Express x16 slot.

- Currently, only NVIDIA® SLI™-Ready **GeForce® 8800 Ultra** and **GeForce® 8800 GTX** graphics cards support 3-Way SLI™ mode.

- 3-Way SLI™ mode is supported by Windows® Vista OS only. For more information, go to NVIDIA® official website (www.nvidia.com).

- Currently, only NVIDIA® **GeForce® 8500 GT** and **GeForce® 8400 GS** graphics cards support GeForce Boost function under Hybrid SLI™ mode.

- Currently, only NVIDIA® **GeForce® 9800 GX2** and **GeForce® 9800 GTX** graphics cards support Hybrid Power function under Hybrid SLI™ mode.

- Hybrid SLI™ mode is supported by Windows® Vista OS only. For more information, go to www.nvidia.com/hybridsli.

- Before enabling the HybridPower™ function, ensure that you have connected your display to the onboard VGA port or the HDMI/DVI port at the rear panel. Refer to **2.8.1 Rear panel connectors** for details.

- Connect a rear chassis fan to the motherboard connector labeled OPT_FAN1/2 when using multiple graphics cards for better thermal environment. See page 2-32 for details.

- We recommend that you provide sufficient power when running NVIDIA® SLI™ mode. See page 2-34 for details.

# 2.6 Slide switch

**1. Clear RTC RAM (3-pin CLRTC_SW)**

This jumper allows you to enable the **clr CMOS** switch. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The **clr CMOS** switch on the back I/O helps you easily to 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 <Del> key during the boot process and enter BIOS setup to re-enter data.

CLR_SW

Enable (Default)    Disable
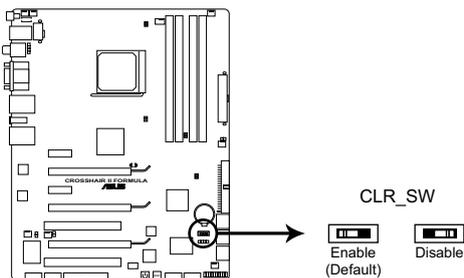
**CROSSHAIR II FORMULA Clear RTC RAM slide switch**

## 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 dowm immediately.**

- The **clr CMOS** switch will not function if the jumper cap on CLRTC_SW is moved to the Disable position, but the shutdwon 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.

## 2.7 Audio card, I/O shield, and LCD Poster installation

### 2.7.1 Audio card Installation

1. Take out the Audio card from the package.



2. Locate the audio slot on the motherboard.
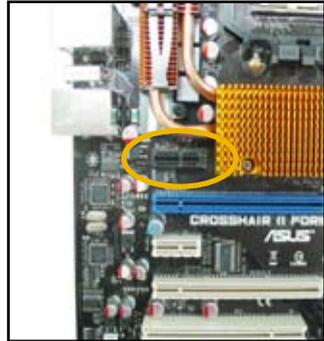


3. Align the card connector with the slot and press firmly until the card sits on the slot completely.



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

## 2.7.2 I/O shield and LCD Poster Installation

1. Install the 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 I/O openings.

3. Thread the LCD Poster cable through the opening until its stopper snaps into place.

4. Plug the LCD Poster cable into the onboard connector labeled **LCD_CON**.
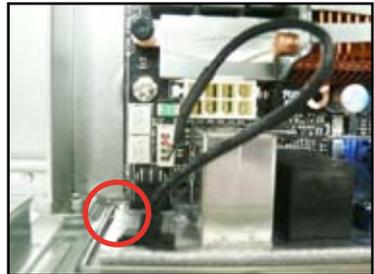
5. Place the LCD Poster on the chassis or to wherever you like.

# 2.8 Connectors

## 2.8.1 Rear panel connectors
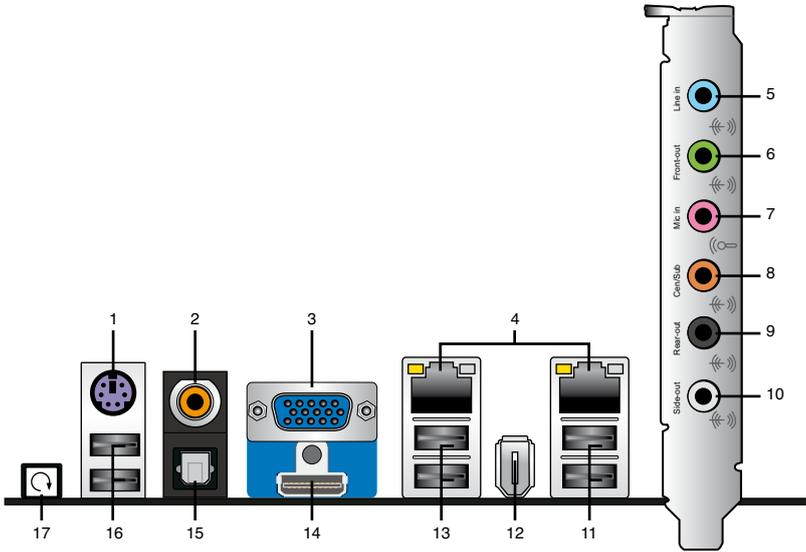


1. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

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

3. **VGA por**t. This port is for a VGA monitor or other VGA-compatible devices.

4. **LAN 1/2 (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.

### 32-bit OS LAN port LED indications

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

**\* Blinking**

### 64-bit OS LAN port LED indications

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

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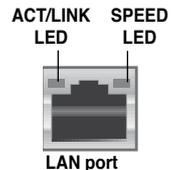
5.  **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.

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

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

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

14. **HDMI port.** This port is for a high-
    definition multimedia interface (HDMI)
    connector.

    • This motherboard comes with
      dual-VGA outputs through the
      onboard VGA and HDMI ports.
      You can simultaneously connect
      two displays to these ports.

    • With the bundled HDMI-to-DVI
      adapter, this motherboard also
      supports DVI output.

---

Before enabling the HybridPower™ function, ensure that you have connected
your display to the onboard VGA port or the HDMI/DVI port at the rear panel.

---

**Playback of HD DVD and Blu-Ray Discs**
The speed and bandwidth of the CPU/Memory, DVD player, and drivers will
affect the playback quality. Following is a configuration example for your
reference. Using the CPU/Memory of higher speed and bandwidth with the
higher-version DVD player and drivers will upgrade the playback quality.

**CPU: AMD Athlon 4400+**
**DIMM: DDR2-800 512MB**
**Playback software: PowerDVD Ultra v7.3**

---

15. **Optical S/PDIF Out port.** This port connects an external audio output device
    via an optical S/PDIF cable.
16. **USB 2.0 ports 5 and 6.** These 4-pin Universal Serial Bus (USB) ports are
    available for connecting USB 2.0 devices.
17. **Clear CMOS switch.** Press the clear CMOS switch to clear setup information
    when the system hangs due to overclocking.

## 2.8.2    Internal connectors

**1.    IDE connector (40-1 pin PRI_IDE)**

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.

PRI_IDE
**NOTE:** Orient the red markings on the IDE ribbon cable to PIN 1.

PIN1
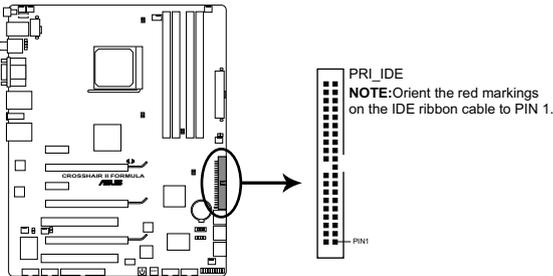
**CROSSHAIR II FORMULA IDE connector**

2. **NVIDIA® nForce 780a SLI Serial ATA connectors (7-pin SATA1–4 [blue]; 7-pin SATA5–6 [black])**

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

   If you install Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 0+1, RAID 5, or JBOD configuration through the onboard NVIDIA® nForce 780a SLI controller.



**CROSSHAIR II FORMULA SATA connectors**
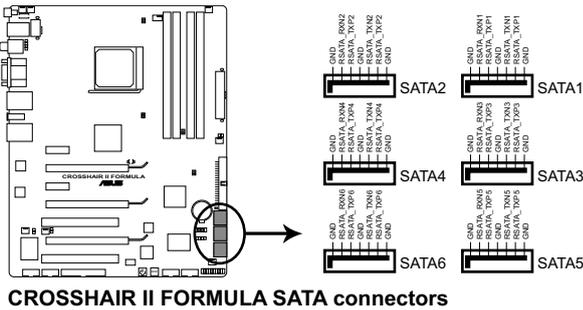
- SATA1–4 connectors are set to [IDE] by default. If you intend to create a Serial ATA RAID set using these connectors, set the **SATA Operation Mode** item to [RAID] in the BIOS. See section **4.5.6 MCP Storage Config** for details.

- SATA 5–6 connectors support AHCI mode and RAID mode only. Make sure to install the AHCI driver or RAID driver in the bundled support DVD before connecting devices to SATA 5–6 connectors. Otherwise, the devices will not work.

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

- Before creating a RAID set, refer to **5.4.2 NVIDIA® 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/RAID 1/RAID 5/RAID 10) is available only if you are using Windows® XP or later version.

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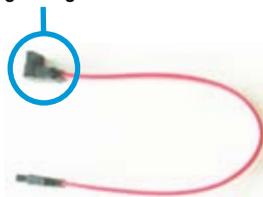
**3. Floppy disk drive connector (34-1 pin FLOPPY)**

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.

FLOPPY

PIN1

**NOTE:** Orient the red markings on the floppy ribbon cable to PIN 1.

**CROSSHAIR II FORMULA Floppy disk drive connector**
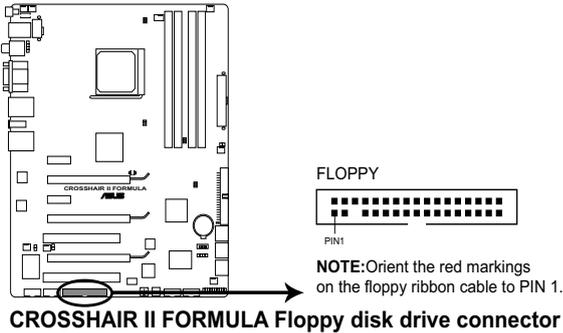
**4. USB connectors (10-1 pin USB 78; USB 910; USB1112)**

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.

USB1112    USB910    USB78

USB+5V    USB+5V    USB+5V
USB_P12-   USB_P10-   USB_P8-
USB_P12+   USB_P10+   USB_P8+
GND       GND       GND
NC        NC        NC

PIN 1    PIN 1    PIN 1

USB+5V    USB+5V    USB+5V
USB_P11-   USB_P9-   USB_P7-
USB_P11+   USB_P9+   USB_P7+
GND       GND       GND

**CROSSHAIR II FORMULA USB 2.0 connectors**
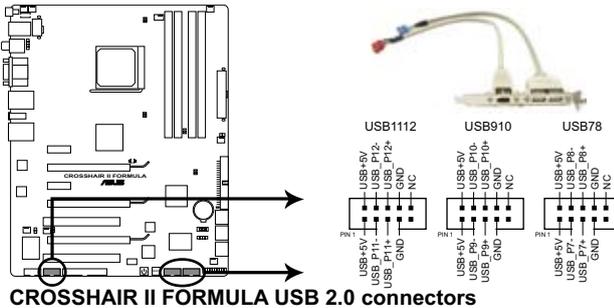
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

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

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

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



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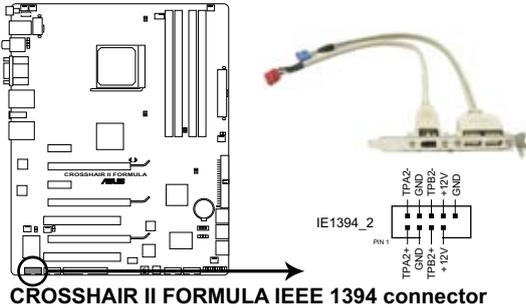
Never connect a USB cable to the IEEE 1394a connector. Doing so will damage the motherboard!

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

## 6. 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.



**CROSSHAIR II FORMULA Thermal sensor cable connectors**
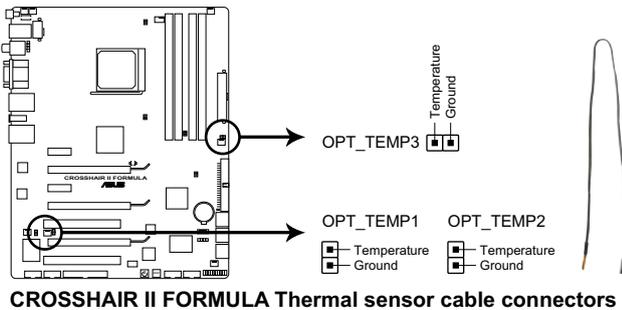
Enable **OPT1/2/3 Cable Overheat Protection** in BIOS if you connect thermal sensor cables to these connectors. Refer to page 4-38 for details.

The thermal sensor cable is purchased separately.

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!
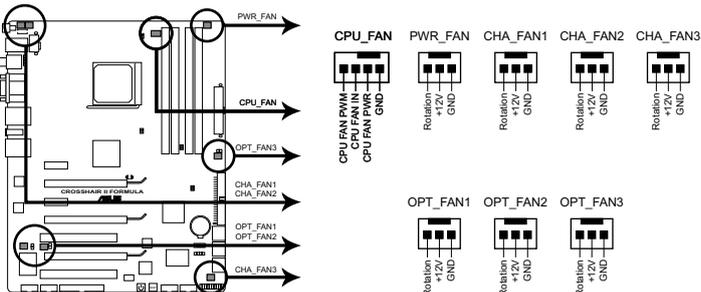


**CROSSHAIR II FORMULA FAN connectors**

- Only the CPU_FAN, CHA_FAN1–3, and OPT_FAN1–3 connectors support
  the ASUS Q-Fan Plus feature.

- If you install multiple VGA cards, we recommend that you plug the chassis
  fan cable to the motherboard connector labled OPT_FAN1/2 for better
  thermal environment.

**8. 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.
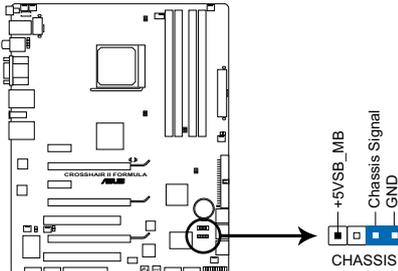


**CROSSHAIR II FORMULA Chassis intrusion connector**

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

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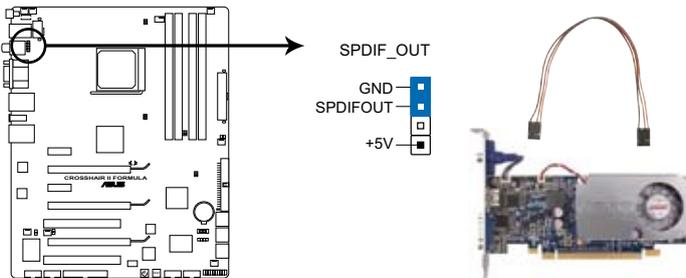


**CROSSHAIR II FORMULA Digital audio connector**

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

## 10. 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.

EATX12V

| GND | +12V DC |
|---|---|
| GND | +12V DC |
| GND | +12V DC |
| GND | +12V DC |

PIN 1

EATXPWR

| +3 Volts | GND |
|---|---|
| +12 Volts | +5 Volts |
| +12 Volts | +5 Volts |
| +5V Standby | +5 Volts |
| Power OK | -5 Volts |
| GND | GND |
| +5 Volts | GND |
| GND | GND |
| +5 Volts | PSON# |
| GND | GND |
| +3 Volts | -12 Volts |
| +3 Volts | +3 Volts |

PIN 1
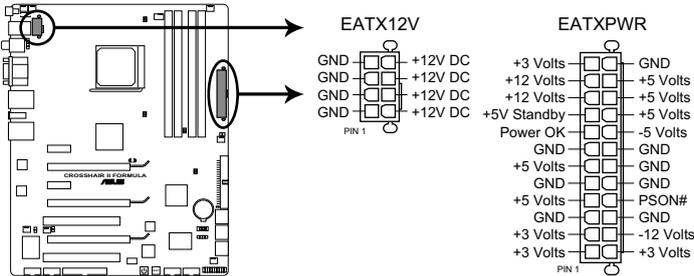
**CROSSHAIR II FORMULA ATX power connectors**

---

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

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

---

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

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

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

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

- If you want to use two or more high-end PCI Express x16 cards, use a PSU with 1000 W power or above to ensure the system stability.

- If you want to use 3-Way SLI™ configuration, visit the NVIDIA website (www.nvidia.com) for the qualified PSU vendor list.

# Power supply requirements

| Heavy Loading | |
|---|---|
| CPU | Phenom 9600 |
| Memory | 1 GB*4 |
| VGA | 8800 Ultra*3 |
| SATA-HDD | 6 |
| IDE-CDROM | 1 |
| IDE-HDD | 1 |
| USB | 4 |

| | +12V_8Pin | +12V_24pin | +5V_24pin | +3V_24pin | +12V_VGA1 | +12V_VGA2 | +12V_VGA3 |
|---|---|---|---|---|---|---|---|
| Voltage (V) | 12.14 | 12.21 | 5.22 | 3.456 | 12.2 | 12.2 | 12.2 |
| Current (A) | 11.32 | 13.71 | 6.41 | 6.98 | 6.51 | 6.59 | 6.6 |
| Power (W) | 137.425 | 167.399 | 33.460 | 24.123 | 79.422 | 80.398 | 80.52 |
| | SATA-HDD | IDE-CDROM | IDE-HDD | USB | Total PSU | | |
| Quantity | 6 | 1 | 1 | 4 | Po_max(w) | | |
| Power | 10.45 | 10 | 12.68 | 2.5 | 698.127 | | |
| Total Power | 62.7 | 10 | 12.68 | 10 | | | |

| Normal Loading | |
|---|---|
| CPU | Athlon 64 X2 5000+ |
| Memory | 1 GB*4 |
| VGA | 8800 Ultra*2 |
| SATA-HDD | 4 |
| IDE-CDROM | 1 |
| IDE-HDD | 0 |
| USB | 4 |

| | +12V_8Pin | +12V_24pin | +5V_24pin | +3V_24pin | +12V_VGA1 | +12V_VGA2 | +12V_VGA3 |
|---|---|---|---|---|---|---|---|
| Voltage (V) | 12.14 | 12.21 | 5.225 | 3.455 | 12.2 | 12.2 | |
| Current (A) | 6.74 | 8.92 | 6.22 | 6.87 | 6.52 | 6.82 | |
| Power (W) | 81.824 | 108.913 | 32.500 | 23.736 | 79.544 | 83.204 | 0 |
| | SATA-HDD | IDE-CDROM | IDE-HDD | USB | Total PSU | | |
| Quantity | 4 | 1 | 0 | 4 | Po_max(w) | | |
| Power | 10.45 | 10 | 12.68 | 2.5 | 471.521 | | |
| Total Power | 41.8 | 10 | 0 | 10 | | | |

| Light Loading | |
|---|---|
| **CPU** | Sempron 1100+ |
| **Memory** | 1 GB*2 |
| **VGA** | 8800 Ultra*1 |
| **SATA-HDD** | 2 |
| **IDE-CDROM** | 1 |
| **IDE-HDD** | 0 |
| **USB** | 4 |

| | +12V_8Pin | +12V_24pin | +5V_24pin | +3V_24pin | +12V_VGA1 | +12V_VGA2 | +12V_VGA3 |
|---|---|---|---|---|---|---|---|
| Voltage (V) | 12.19 | 12.21 | 5.22 | 3.456 | 12.16 | | |
| Current (A) | 3.19 | 5.55 | 5.04 | 5.36 | 6.5 | | |
| Power (W) | 38.886 | 67.766 | 26.309 | 18.524 | 79.04 | 0 | 0 |
| | SATA-HDD | IDE-CDROM | IDE-HDD | USB | Total PSU | | |
| Quantity | 2 | 1 | 0 | 4 | Po_max(w) | | |
| Power | 10.45 | 10 | 12.68 | 2.5 | 271.425 | | |
| Total Power | 20.9 | 10 | 0 | 10 | | | |

11. **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.
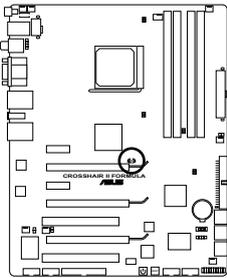


**CROSSHAIR II FORMULA ROG connector**

**12. System panel connector (20-8 pin PANEL)**

This connector supports several chassis-mounted functions.
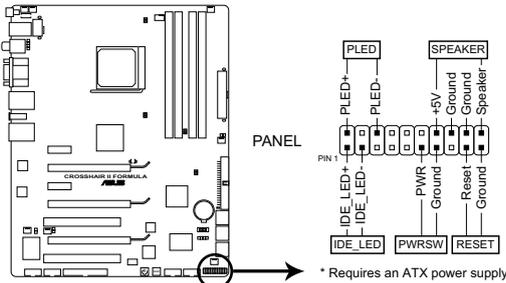


**CROSSHAIR II FORMULA System panel connector**

- **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.
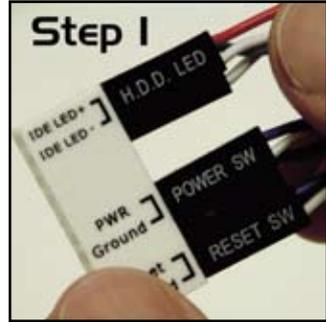
2. Install the ASUS Q-Connector to the system panel connector, making sure the orientation matches the labels on the motherboard.
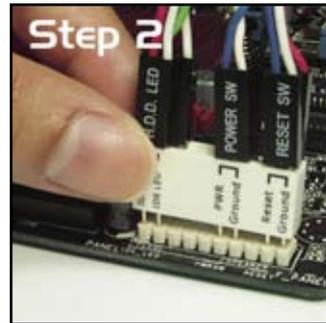
3. The front panel functions are now enabled. The figure shows the Q-Connector properly installed on the motherboard.

## 2.8.3    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.
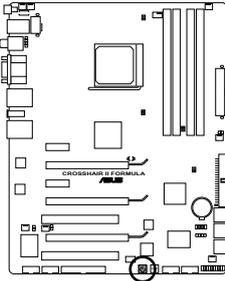


**CROSSHAIR II FORMULA Power on switch**

**2.    Reset switch**

Press the reset switch to reboot the system.
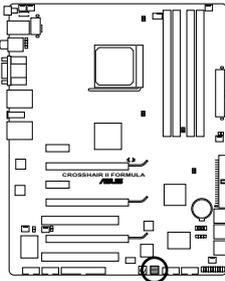


**CROSSHAIR II FORMULA Reset switch**

This chapter describes the power up
sequence, the vocal POST messages,
and ways of shutting down the system.

# Powering up 3

# Chapter summary

3

# 3.1     Starting up for the first time

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

2.    Be sure that all switches are off.

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

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

5.    Turn on the devices in the following order:

    a.    Monitor

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

    c.    System power

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

    The system then runs the power-on self tests or POST. 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.

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

## 3.2 Turning off the computer

### 3.2.1 Using the OS shut down function

If you are using Windows® Vista™:

1. Click the **Start** button 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 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.

### 3.2.2 Using the dual function power switch

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

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

# BIOS setup

*4*

# Chapter summary

**4**

# 4.1 Managing and updating your BIOS

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

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

Refer to the corresponding sections for details on these utilities.

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

## 4.1.1 ASUS Update utility

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

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

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

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

### Installing ASUS Update

To install ASUS Update:

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

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

## Updating the BIOS through the Internet

To update the BIOS through the Internet:

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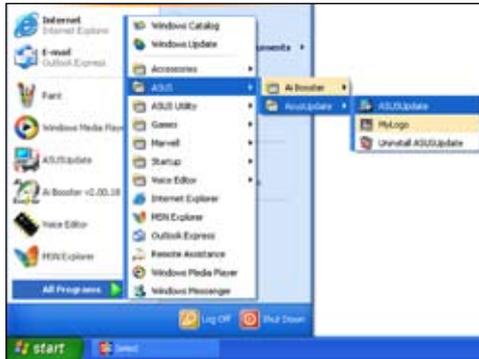




2.  Select Update BIOS from the Internet option from the drop-down menu, then click **Next**.

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

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

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

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

## Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

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

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

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

4.    Follow the screen instructions to complete the update process.
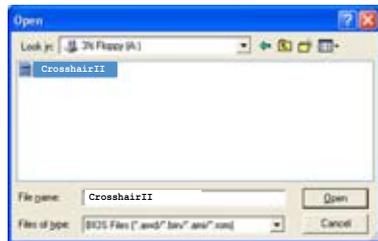
## 4.1.2    ASUS EZ Flash 2 utility

The ASUS EZ Flash 2 feature allows you to update the BIOS without having to go through the long process of 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 USB flash disk, then restart the system.

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

   (1)   Insert the USB flash disk that contains the BIOS file to the USB port.

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

```
             ASUSTek EZ Flash 2 BIOS ROM Utility B327
      FLASH TYPE: MXIC MX25L8005 8Mb SPI
             Current ROM                    Update ROM
      BOARD: CROSSHAIR II FORMULA        BOARD: Unknown
      VER: 0114                          VER: Unknown
      DATE: 02/27/2008                   DATE: Unknown

      PATH: A:\

       A:




         Note
         [Enter] Select        [S] Save         [ESC] Exit
         [Tab] Switch          [Up/Down/Home/End] Move
```
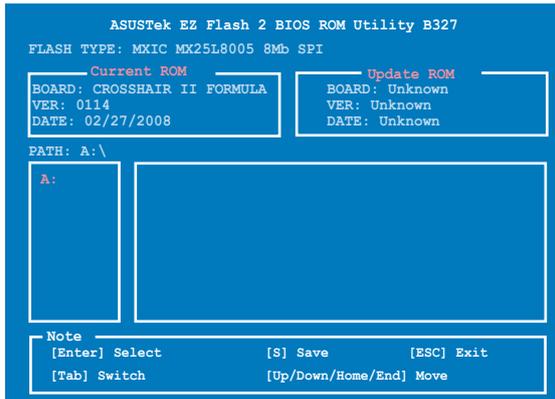
   (2)   Enter BIOS setup program. Go to the **Tools** menu to select **EZ Flash2** and press <Enter> to enable it.

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

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

> •    This function can support devices such as USB flash disk or hard disk **with FAT 32/16/12 format only**.
>
> •    Do not shut down or reset the system while updating the BIOS to prevent system boot failure!

### 4.1.3    Updating the BIOS

The Basic Input/Output System (BIOS) can be updated using the AwardBIOS
Flash Utility. Follow these instructions to update the BIOS using this utility.

1.   Download the latest BIOS file from the ASUS web site. Rename the file and
     save it to a CD ROM or a USB flash disk in **FAT 16/12 format**.

> Save only the updated BIOS file in the disk to avoid loading the wrong BIOS file.

2.   Copy the AwardBIOS Flash Utility (awdflash.exe) from the Software folder of
     the support DVD to theCD ROM or a USB flash disk with the latest BIOS file.

3.   Boot the system in DOS mode using the bootable CD ROM or a USB flash
     disk you created earlier.

4.   Under the DOS mode, use <X:> (X stands for the name of the disk
     assignment) to switch to the folder of CD ROM or USB flash disk you saved
     the BIOS file and AwardBIOS Flash Utility.

5.   At the prompt, type
     awdflash then press
     <Enter>. The Award
     BIOS Flash Utility screen
     appears.

```
        AwardBIOS Flash Utility for ASUS V1.18
 (C) Phoenix Technologies Ltd. All Rights Reserved

For MCP72XE-CROSSHAIRII-00      DATE:02/15/2008
Flash Type - MXIC MX25L8005 SPI

File Name to Program:




Message: Please input File Name!
```

6.   Type the BIOS file name
     in the File Name to
     Program field, then press
     <Enter>.

```
        AwardBIOS Flash Utility for ASUS V1.18
 (C) Phoenix Technologies Ltd. All Rights Reserved

For MCP72XE-CROSSHAIRII-00      DATE:02/15/2008
Flash Type - MXIC MX25L8005 SPI

File Name to Program: 0109.bin




Message: Do You Want To Save Bios (Y/N)
```

7. Press <N> when the utility prompts you to save the current BIOS file. The following screen appears.

8. The utility verifies the BIOS file in the CD ROM or the USB flash disk and starts flashing the BIOS file.

```
      AwardBIOS Flash Utility for ASUS V1.18
  (C) Phoenix Technologies Ltd. All Rights Reserved

For MCP72XE-CROSSHAIRII-00     DATE:02/15/2008
Flash Type - MXIC MX25L8005 SPI

File Name to Program: 0109.bin

Programming Flash Memory - OFE00 OK


    █ Write OK      █ No Update    █ Write Fail

  Warning: Don't Turn Off Power Or Reset System!
```
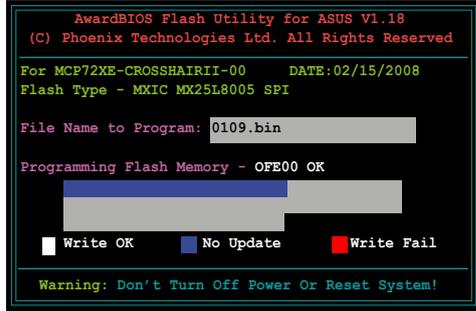
Do not turn off or reset the system during the flashing process!

9. The utility displays a Flashing Complete message indicating that you have successfully flashed the BIOS file. Remove the disk then press <F1> to restart the system.

```
      AwardBIOS Flash Utility for ASUS V1.18
  (C) Phoenix Technologies Ltd. All Rights Reserved

For MCP72XE-CROSSHAIRII-00     DATE:02/15/2008
Flash Type - MXIC MX25L8005 SPI

File Name to Program: 0109.bin
              Flashing Complete
              Press <F1> to Continue


    █ Write OK      █ No Update    █ Write Fail

  F1 Reset
```
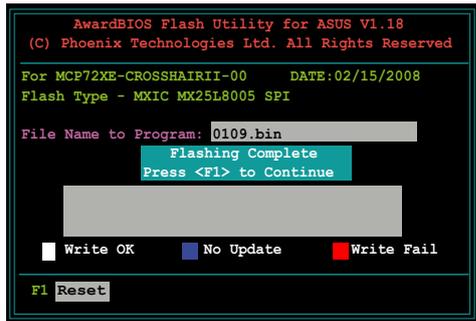
## 4.1.4    Saving the current BIOS file

You can use the AwardBIOS Flash Utility to save the current BIOS file. You can load the current BIOS file when the BIOS file gets corrupted during the flashing process.

Make sure that the CD ROM or the USB flash disk has enough disk space to save the file.

To save the current BIOS file using the AwardBIOS Flash Utility:

1.  Follow steps 1 to 6 of the previous section.

2.  Press <Y> when the utility prompts you to save the current BIOS file. The following screen appears.

```
     AwardBIOS Flash Utility for ASUS V1.18
 (C) Phoenix Technologies Ltd. All Rights Reserved

For MCP72XE-CROSSHAIRII-00      DATE:02/15/2008
Flash Type - MXIC MX25L8005 SPI

File Name to Program: 0109.bin

Save current BIOS as:



 Message:
```

3.  Type a filename for the current BIOS file in the Save current BIOS as field, then press <Enter>.

```
     AwardBIOS Flash Utility for ASUS V1.18
 (C) Phoenix Technologies Ltd. All Rights Reserved

For MCP72XE-CROSSHAIRII-00      DATE:02/15/2008
Flash Type - MXIC MX25L8005 SPI

File Name to Program:  0109.bin
             Checksum: 810DH
Save current BIOS as:  0110.bin



 Message: Please Wait!
```

4.  The utility saves the current BIOS file to the disk, then returns to the BIOS flashing process.

```
     AwardBIOS Flash Utility for ASUS V1.18
 (C) Phoenix Technologies Ltd. All Rights Reserved

For MCP72XE-CROSSHAIRII-00      DATE:02/15/2008
Flash Type - MXIC MX25L8005 SPI

File Name to Program:  0110.bin
            Now Backup System BIOS to
                      File!



 Message: Please Wait!
```

## 4.1.5    ASUS CrashFree BIOS 2 utility

The ASUS CrashFree BIOS 2 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 that contains the updated BIOS file.

> • **Prepare the motherboard support DVD containing the updated motherboard BIOS** before using this utility.
>
> • You can monitor the BIOS recovery process on your display only when installing an external graphics card.
>
> • **If you use the onboard VGA output, your display does not show when the BIOS recovery is proceeding.** Insert the support DVD to the optical drive and wait for a few minutes to restart your system.

### 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.

```
Award BootBlock BIOS v1.0
Copyright (c) 2000, Award Software, Inc.

BIOS ROM checksum error
Detecting IDE ATAPI device...
   Found CDROM, try to Boot from it... Pass
```

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

```
Award BootBlock BIOS v1.0
Copyright (c) 2000, Award Software, Inc.

BIOS ROM checksum error
Detecting IDE ATAPI device...
```

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

> • Only the USB flash disk with FAT 32/16/12 format and single partition can support ASUS CrashFree BIOS 2. The device size should be smaller than 8GB.
>
> • DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

# 4.2    BIOS setup program

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

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

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

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

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

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

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

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

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

## 4.2.1    BIOS menu screen

Menu items        Menu bar        Configuration fields        General help

```
                    Phoenix-AwardBIOS CMOS Setup Utility
 Extreme Tweaker   Main   Advanced   Power   Boot   Tools   Exit
 System Time              15 : 30 : 36              Select Menu
 System Date              Thu, Feb 21 2008
 Language                 [English]          Item Specific Help
 Legacy Diskette A:       [1.44M, 3.5 in.]
                                             Change the internal
 ▶   Primary IDE Master   [None]            time.
 ▶   Primary IDE Slave    [None]
 ▶   SATA 1               [None]
 ▶   SATA 2               [None]
 ▶   SATA 3               [None]
 ▶   SATA 4               [None]
     HDD SMART Monitoring  [Disabled]

     Installed Memory      256MB
     Usable Memory         191MB

 ▶   System Information

 F1:Help      ↑↓: Select Item     -/+: Change Value       F5: Setup Defaults
 ESC: Exit    →←: Select Menu    Enter: Select SubMenu    F10: Save and Exit
```

Sub-menu items                                    Legend bar

## 4.2.2    Menu bar

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

**Main**                For changing the basic system configuration

**Extreme Tweaker**     For changing the overclocking settings

**Advanced**            For changing the advanced system settings

**Power**               For changing the advanced power management (APM) configuration

**Boot**                For changing the system boot configuration

**Tools**               For configuring options for special functions

**Exit**                For selecting the exit options and loading default settings

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

> • The BIOS setup screens shown in this chapter 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 information.

### 4.2.3    Legend bar

At the bottom of the Setup screen is a legend bar. The keys in the legend bar allow you to navigate through the various setup menus. The following table lists the keys found in the legend bar with their corresponding functions.

| Navigation Key | Function |
|---|---|
| **<F1>** | Displays the General Help screen |
| **<F5>** | Loads setup default values |
| **<Esc>** | Exits the BIOS setup or returns to the main menu from a sub-menu |
| **Left or Right arrow** | Selects the menu item to the left or right |
| **Up or Down arrow** | Moves the highlight up or down between fields |
| **Page Down or – (minus)** | Scrolls backward through the values for the highlighted field |
| **Page Up or + (plus)** | Scrolls forward through the values for the highlighted field |
| **<Enter>** | Brings up a selection menu for the highlighted field |
| **<F10>** | Saves changes and exit |

### 4.2.4    Menu items

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

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

### 4.2.5    Sub-menu items

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

### 4.2.6    Configuration fields

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

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

## 4.2.7    Pop-up window

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

```
                    Phoenix-AwardBIOS CMOS Setup Utility
 ┌────────────────────────────────────────────────────────────────────────┐
 │ Extreme Tweaker   Main   Advanced   Power   Boot   Tools   Exit          │
 ├──────────────────────────────────────────┬─────────────────────────────┤
 │ System Time               15 : 30 : 36   │    Select Menu              │
 │ System Date               Thu, Feb 21 2008├─────────────────────────────┤
 │ Language                  [English]       │  Item Specific Help▶         │
 │ Legacy Diskette A:      ┌──────────────────────────┐ the internal        │
 │ ▶  Primary IDE Maste    │ Legacy Diskette A:       │                     │
 │ ▶  Primary IDE Slave    │                          │                     │
 │ ▶  SATA 1               │ Disabled      ..... [ ]  │                     │
 │ ▶  SATA 2               │ 720K , 3.5 in. ..... [ ] │                     │
 │ ▶  SATA 3               │ 1.44M, 3.5 in. ..... [▮] │                     │
 │ ▶  SATA 4               │                          │                     │
 │    HDD SMART Monitor     │                          │                     │
 │                          │                          │                     │
 │    Installed Memory      │                          │                     │
 │    Usable Memory         │ ↑↓ :Move   ENTER:Accept  ESC:Abort │           │
 │                          └──────────────────────────┘                     │
 │ ▶  System Information                                                      │
 ├──────────────────────────────────────────────────────────────────────────┤
 │ F1:Help       ↑↓ : Select Item    -/+: Change Value    F5: Setup Defaults │
 │ ESC: Exit     →←: Select Menu     Enter: Select SubMenu  F10: Save and Exit│
 └──────────────────────────────────────────────────────────────────────────┘
```

                              **Pop-up menu**

## 4.2.8    General help

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

# 4.3 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.

```
               Phoenix-AwardBIOS CMOS Setup Utility
 Extreme Tweaker   Main    Advanced   Power    Boot    Tools    Exit

     CPU Level Up              [Auto]         ▲       Select Menu

     AI Tuning                 [Auto]                Item Specific Help▶
   x Overclock Options          Disabled
   x N.O.S. Option              Disabled             Warning: this
   x CPU Frequency              200                  function belongs
     CPU Multiplier            [Auto]                to overclocking,
     K8<->NB HT Speed          [Auto]                and it may cause
     K8<->NB HT Width          [Auto]                instability. Select
     PCIE Clock                [100]                 a CPU level, and the
                                                     rest will be auto-
   ▶ DRAM Configuration                              adjusted. If you want
     SLI-Ready Memory          [Disabled]            to adjust more, set
   x SLI-Ready Memory CPUOC     CPUOC o%             Ai Overclock Tuner
                                                     to Manual after you
     Vcore Voltage             [Auto]                select a CPU level.
     VDDNB Voltage             [Auto]
     DDR2 Voltage              [Auto]
     SB Voltage                [Auto]
     HT Voltage                [Auto]
     VDDA Voltage              [Auto]
     BR Voltage                [Auto]        ▼

 F1:Help      ↑↓ : Select Item    -/+: Change Value      F5: Setup Defaults
 ESC: Exit    →←: Select Menu     Enter: Select SubMenu   F10: Save and Exit
```

Scroll down to see more items.

```
     DDR2 Controller Ref Voltage  [Auto]
     DDR2 Channel A Ref Voltage   [Auto]
     DDR2 Channel B Ref Voltage   [Auto]
   ▶ CPU Configuration
   ▶ Spread Spectrum Control

 F1:Help      ↑↓ : Select Item    -/+: Change Value      F5: Setup Defaults
 ESC: Exit    →←: Select Menu     Enter: Select SubMenu   F10: Save and Exit
```

## 4.3.1 Configuring System Performance Settings

### 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 Tuning** to [Manual] after selecting a CPU level. Configuration options: [Auto] [Athlon64 3800+] [Athlon64 4000+] [Crazy]

🖉 • The configuration options vary with your CPU model.
   • The option [Crazy] appears when you use an Athlon64 4000+ / Athlon LE-1620 / AthlonX2 BE2400 / AthlonX2 6000+ CPU.

## AI Tuning [Auto]

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

| Manual | Allows you to individually set overclocking parameters. |
|---|---|
| Auto | Loads the optimal settings for the system. |
| Standard | Loads the standard settings for the system. |
| AI Overclock | Loads overclocking profiles with optimal parameters for stability when overclocking. |
| AI N.O.S. | ASUS Non-delay Overclocking System feature intelligently determines the system load and automatically boosts the performance for the most demanding tasks. |
| CPU Level Up | Allows you to select a CPU level, and the related parameters will be adjusted automatically. |

The following item becomes configurable when you set **AI Tuning** to [AI Overclock].

## Overclock Options [Disabled]

Allows you to set the overclocking options.
Configuration options: [Disabled] [Overclock 3%] [Overclock 5%] [Overclock 8%] [Overclock 10%]

The following item become configurable when you set **AI Tuning** to [AI N.O.S.].

## N.O.S. Option [Disabled]

Allows you to set the overclocking options.
Configuration options: [Disabled] [Overclock 3%] [Overclock 5%] [Overclock 8%] [Overclock 10%]

The following items become configurable when you set **AI Tuning** to [Manual].

## CPU Frequency [200]

Use the <+> and <-> keys or the numeric keypad to enter the desired value. The values range from 200 to 600.

## CPU Multiplier [Auto]

The configuration options may vary with your CPU model.
Configuration options: [Auto] [5x] [5.5x] [6x] [6.5x]–[9.5x] [10x] [10.5x]

## K8<->NB HT Speed [Auto]

The configuration options may vary with your CPU model.
Configuration options: [Auto] [200 MHz] [400 MHz] [600 MHz] [800 MHz] [1 GHz]

## K8<->NB HT Width [Auto]

Configuration options: [↓ 8 ↑8] [↓16 ↑16] [Auto]

## PCIE Clock [100]

Allows you to set the PCIEX16_1/2/3 overclocking frequency. Use the <+> and <-> keys or the numeric keypad to enter the desired value. The values range from 100 to 200.

## DRAM Configuration

```
            Phoenix-AwardBIOS CMOS Setup Utility

  Extreme Tweaker

          Memory Timing Setting                    Select Menu

    Memory Clock Frequency     [Auto]       Item Specific Help▶
    Tcl                        [Auto]
    Trcd                       [Auto]       Setting platform
    Trp                        [Auto]       Memclock or limit
    Tras                       [Auto]       value.
    1T/2T Memory Timing        [Auto]
    Memory DCT Mode            [Unganged Mode]
    Memory Hole Remapping      [Enabled]
    AI Clock Skew              [Auto]
  x Channel A Clock Skew        Normal
  x Channel B Clock Skew        Normal
  ▶ Advanced Memory Settings
  ▶ DRAM Timing Control
  ▶ Output Driver Control

    Current DRAM Timing    1066MHz-5-3-3- 6-2T

  F1:Help      ↑↓ : Select Item    -/+: Change Value      F5: Setup Defaults
  ESC: Exit    →←: Select Menu      Enter: Select SubMenu  F10: Save and Exit
```

*memory Clock Frequency [Auto]*
Allows you to set the DDR2 overclocking frequency.
Configuration options: [Auto] [DDR2 400] [DDR2 533] [DDR2 667] [DDR2 800]

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

*Tcl [Auto]*
Configuration options: [Auto] [3] [4] [5] [6] [7]

*Trcd [Auto]*
Configuration options: [Auto] [3] [4] [5] [6]

*Trp [Auto]*
Configuration options: [Auto] [3] [4] [5] [6]

*Tras [Auto]*
Configuration options: [Auto] [5] [6]–[18]

*1T/2T Memory Timing [Auto]*
Configuration options: [Auto] [1T] [2T]

*Memory DCT Mode [Unganged Mode]*
This item appears only when you use an AM2+ CPU.
Configuration options: [Ganged Mode] [Unganged Mode]

*Memory Hole Remapping [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]**

*AI Clock Skew [Auto]*
Allows you to adjust the DRAM clock skew for both Channel A and B.
Configuration options: **[Auto] [Manual]**

> The following two items become configurable when you set **AI Clock Skew** to [Manual].

**Channel A/Channel B Clock Skew [Normal]**
Configuration options: [Advance 900ps] **[Advance 750ps] [Advance 600ps]** [Advance 450ps] [Advance 300ps] [Advance 150ps] [Normal] [Delay 150ps] [Delay 300ps] [Delay 450ps] [Delay 600ps] [Delay 750ps] [Delay 900ps]

*Advance Memory Settings*

**CPU On-die Termination [Auto]**
Configuration options: [Auto] [300 ohm] [150 ohm] [75 ohm]

**Trc [Auto]**
Configuration options: [Auto] [11] [12]–[25] [26]

**Twr [Auto]**
Configuration options: [Auto] [3] [4] [5] [6]

**Trrd [Auto]**
Configuration options: [Auto] [2] [3] [4] [5]

**Trwt [Auto]**
Configuration options: [Auto] [2] [3]–[8] [9]

**Twtr [Auto]**
Configuration options: [Auto] [1] [2] [3]

**Trtp [Auto]**
Configuration options: [Auto] [2/4] [3/5]

**Twrrd [Auto]**
Configuration options: [Auto] [0] [1] [2] [3]

**Twrwr [Auto]**
Configuration options: [Auto] [1] [2] [3]

**Trdrd [Auto]**
Configuration options: [Auto] [2] [3] [4] [5]

**Tref [Auto]**
Configuration options: [Auto] [7.8 us] [3.9 us]

**Trfc [Auto]**
Configuration options: [Auto] [0] [1] [2] [3] [4]

**Dynamic Idle Cycle Counter [Auto]**
Configuration options: [Auto] [Disabled] [Enabled]

**Idle Cycle Limit [Auto]**
Configuration options: [Auto] [0 cycles] [4 cycles] [8 cycles] [16 cycles] [32 cycles]
[64 cycles] [128 cycles]

**DCQ Bypass Maximum [Auto]**
Configuration options: [Auto] [0x] [1x] [2x]–[14x] [15x]

**DRAM Burst Length [Auto]**
Configuration options: [Auto] [64-byte] [32-byte]

**DRAM Bank Interweaving [Enabled]**
Configuration options: [Disabled] [Enabled]

**Bank Swizzle Mode [Enabled]**
Configuration options: [Disabled] [Enabled]

*DRAM Timing Control*

**CKE Fine Delay [Auto]**
Configuration options: [Auto] [No Delay] [1/64 MEMCLK delay] [2/64 MEMCLK
delay] [3/64 MEMCLK delay]–[30/64 MEMCLK delay] [31/64 MEMCLK delay]

**CKE Setup Time [Auto]**
Configuration options: [Auto] [1/2 MEMCLK] [1 MEMCLK]

**CS/ODT Fine Delay [Auto]**
Configuration options: [Auto] [No Delay] [1/64 MEMCLK delay] [2/64 MEMCLK
delay] [3/64 MEMCLK delay]–[30/64 MEMCLK delay] [31/64 MEMCLK delay]

**CS/ODT Setup Time [Auto]**
Configuration options: [Auto] [1/2 MEMCLK] [1 MEMCLK]

**Address/Command Fine Delay [Auto]**
Configuration options: [Auto] [No Delay] [1/64 MEMCLK delay] [2/64 MEMCLK
delay] [3/64 MEMCLK delay]–[30/64 MEMCLK delay] [31/64 MEMCLK delay]

**Address/Command Setup Time [Auto]**
Configuration options: [Auto] [1/2 MEMCLK] [1 MEMCLK]

**Read DQS Timing Control [Auto]**
Configuration options: [Auto] [No Delay] [1/96 MEMCLK delay] [2/96 MEMCLK
delay] [3/96 MEMCLK delay]–[46/96 MEMCLK delay] [47/96 MEMCLK delay]

**Write Data Timing Control [Auto]**
Configuration options: [Auto] [No Delay] [1/96 MEMCLK delay] [2/96 MEMCLK delay] [3/96 MEMCLK delay]–[46/96 MEMCLK delay] [47/96 MEMCLK delay]

**DQS Receiver Enable Timing [Auto]**
Configuration options: [Auto] [0 ps] [50 ps] [100 ps] [150 ps]–[8650 ps] [8700 ps]

*Output Driver Control*

**CKE Drive Strength [Auto]**
Configuration options: [Auto] [1.00x] [1.25x] [1.50x] [2.00x]

**CS/ODT Drive Strength [Auto]**
Configuration options: [Auto] [1.00x] [1.25x] [1.50x] [2.00x]

**Add/CMD Drive Strength [Auto]**
Configuration options: [Auto] [1.00x] [1.25x] [1.50x] [2.00x]

**MEMCLK Drive Strength [Auto]**
Configuration options: [Auto] [0.75x] [1.00x] [1.25x] [1.50x]

**Data Drive Strength [Auto]**
Configuration options: [Auto] [0.75x] [1.00x] [1.25x] [1.50x]

**DQS Drive Strength [Auto]**
Configuration options: [Auto] [0.75x] [1.00x] [1.25x] [1.50x]

**DRAM Drivers Weak Mode [Auto]**
Configuration options: [Auto] [Normal] [Weak]

*Current DRAM Timing*
This value is detected automatically.

## SLI-Ready Memory [Disabled]

Allows you to select SPD profile for SLI-Ready Memory
Configuration options: [Disabled] [Optimal] [High Performance] [High Frequency]

The following item becomes configurable when you set **SLI-Ready Memory** to options other than [disabled].

*SLI-Ready Memory CPUOC [CPUOC 0%]*
Allows you to select CPU overclocking percentage.
Configuration options: [CPUOC 0%] [CPUOC 1%] [CPUOC 2%]–
[CPUOC 13%] [CPUOC 14%] [CPUOC MAX]

## Vcore Voltage [Auto]

Allows you to select the Vcore (CPU) voltage. The text color in the configuration field corresponds to the onboard CPU LED color, both of which indicate voltage condition. Refer to page 2-1 for CPU LED definition.
Configuration options: [Auto] [0.7750V] [0.7875V] [0.8000V] [0.8125V]–**[1.9750V]** [1.9875V] [2.0000V]

⚠️ 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.

### VDDNB Voltage [Auto]

Allows you to select the VDDNB voltage.
Configuration options: [Auto] [+100mvV] [+150mvV] [+200mvV] [+250mvV] [+300mvV] [+350mvV] [+450mvV]

### DDR2 Voltage [Auto]

Allows you to select the Memory 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.
Configuration options: [Auto] [1.800V] [1.820V] [1.840V]–[3.380V] [3.400V]

### SB Voltage [Auto]

Allows you to select the Southbridge voltage. The text color in the configuration field corresponds to the onboard Southbridge LED color, both of which indicate voltage condition. When you set the **SB LED Selection** item to [SB Voltage], the onboard Southbridge LED displays Southbridge voltage condition. Refer to page 2-2 for Southbridge LED definition.
Configuration options: [Auto] [1.10V] [1.12V] [1.14V] [1.16V]–[2.98V] [3.00V]

### HT Voltage [Auto]

Allows you to select the HT voltage. The text color in the configuration field corresponds to the onboard Southbridge LED color, both of which indicate voltage condition. When you set the **SB LED Selection** item to [HT Voltage], the onboard Southbridge LED displays HT voltage condition. Refer to page 2-2 for Southbridge LED definition.
Configuration options: [Auto] [1.20V] [1.22V] [1.24V] [1.26V]–[2.98V] [3.00V]

### VDDA Voltage [Auto]

Allows you to select the VDDA voltage.
Configuration options: [Auto] [2.50V] [2.62V] [2.72V] [2.82V]–[2.92V] [3.02V]

### BR Voltage [Auto]

Allows you to select the Bridge (PCIe) voltage. The text color in the configuration field corresponds to the onboard Bridge (PCIe) LED color, both of which indicate voltage condition. Refer to page 2-2 for Bridge (PCIe) LED definition.
Configuration options: [Auto] [1.20V] [1.22V] [1.24V] [1.26V]–[2.98V] [3.00V]

### DDR2 Controller Ref Voltage [Auto]

Allows you to manually set the memory voltage, or you can set to [Auto] for the safe mode.
Configuration options: [Auto] [DDR2_REF] [DDR2_REF-30mv] [DDR2_REF-20mv] [DDR2_REF-10mv] [DDR2_REF+10mv] [DDR2_REF+20mv] [DDR2_REF+30mv]

### DDR2 Channel A/Channel B Ref Voltage [Auto]

Allows you to manually set the memory voltage, or you can set to [Auto] for the safe mode.
Configuration options: [Auto] [DDR2_REF] [DDR2_REF-30mv] [DDR2_REF-20mv] [DDR2_REF-10mv] [DDR2_REF+10mv] [DDR2_REF+20mv] [DDR2_REF+30mv]

### CPU Configuration
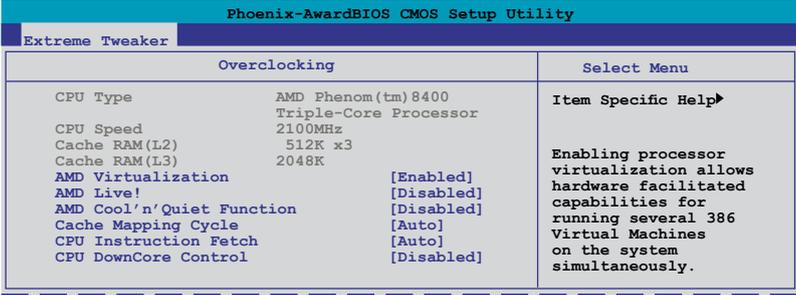
```
                Phoenix-AwardBIOS CMOS Setup Utility
  Extreme Tweaker

              Overclocking                        Select Menu

   CPU Type              AMD Phenom(tm)8400      Item Specific Help
                         Triple-Core Processor
   CPU Speed             2100MHz
   Cache RAM(L2)            512K x3             Enabling processor
   Cache RAM(L3)         2048K                  virtualization allows
   AMD Virtualization           [Enabled]      hardware facilitated
   AMD Live!                    [Disabled]      capabilities for
   AMD Cool'n'Quiet Function    [Disabled]      running several 386
   Cache Mapping Cycle          [Auto]          Virtual Machines
   CPU Instruction Fetch        [Auto]          on the system
   CPU DownCore Control         [Disabled]      simultaneously.
```

*AMD Virtualization [Enabled]*
Enabling this functions allows hardware capabilities to run several 386 virtual machines on the system simultaneously.
Configuration options: [Enabled] **[Disabled]**

*AMD Live! [Disabled]*
Enables or disables the AMD Live! technology.
Configuration options: [Disabled] [Enabled]

*AMD Cool 'n' Quiet Function [Disabled]*
Enables or disables the AMD Cool 'n' Quiet technology that supports P-state transitions in AMD processors. Configuration options: [Auto] [Disabled]

*Cache Mapping Cycle [Auto]*
Configuration options: [Auto] [Enabled] [Disabled]

*CPU Instruction Fetch [Auto]*
Configuration options: [Auto] [Enabled] [Disabled]

*CPU DownCore Control [Disabled]*
Configuration options: [1 Core] [2 Core] [Disabled]

**Spread Spectrum Control**

```
              Phoenix-AwardBIOS CMOS Setup Utility
 ┌─────────────────┐
 │ Extreme Tweaker │
 ├─────────────────┴──────────────────────────┬──────────────────┐
 │        Spread Spectrum Control              │   Select Menu    │
 ├─────────────────────────────────────────────┼──────────────────┤
 │   CPU Spread Spectrum          [Disabled]   │ Item Specific Help▶│
 │   PCIE Spread Spectrum         [Disabled]   │                  │
 │   SATA Spread Spectrum         [Down Spread]│                  │
 │                                             │                  │
 │                                             │                  │
 └─────────────────────────────────────────────┴──────────────────┘
```

*CPU Spread Spectrum [Disabled]*
Configuration options: [Disabled] [Enabled]

*PCIE Spread Spectrum [Disabled]*
Configuration options: [Disabled] [Down Spread]

*SATA Spread Spectrum [Down Spread]*
Configuration options: [Disabled] [Down Spread]

# 4.4 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 **4.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.*

```
                    Phoenix-AwardBIOS CMOS Setup Utility
 Extreme Tweaker    Main    Advanced   Power   Boot    Tools   Exit

  System Time             15 : 30 : 36              Select Menu
  System Date             Thu, Feb 21 2008
  Language                [English]          Item Specific Help

  Legacy Diskette A:      [1.44M, 3.5 in.]   Change the internal
                                             time.
► Primary IDE Master      [None]
► Primary IDE Slave       [None]
► SATA 1                  [None]
► SATA 2                  [None]
► SATA 3                  [None]
► SATA 4                  [None]
  HDD SMART Monitoring    [Disabled]

  Installed Memory        256MB
  Usable Memory           191MB

► System Information

 F1:Help        ↑↓ : Select Item    -/+: Change Value    F5: Setup Defaults
 ESC: Exit      →←: Select Menu     Enter: Select SubMenu  F10: Save and Exit
```

## 4.4.1 System Time [xx:xx:xx]

Allows you to set the system time.

## 4.4.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

## 4.4.3 Language [English]

Allows you to choose the BIOS language version from the options. Configuration options: [English] [French] [Deutsch] [Chinese (Trad.)] [Chinese (Simp.)] [Japanese]

## 4.4.4 Legacy Diskette A [1.44M, 3.5 in.]

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

## 4.4.5 Primary IDE Master/Slave

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

```
                  Phoenix-AwardBIOS CMOS Setup Utility

            Main

              Primary IDE Master                        Select Menu

       PIO Mode              [Auto]              Item Specific Help▶
       UDMA Mode             [Auto]
                                                 Set a PIO mode for the
       Primary IDE Master    [Auto]              IDE device. Mode0
       Access Mode           [Auto]              through 4 successive
                                                 increase in
       Capacity              0 MB                performance.

       Cylinder              0
       Head                  0
       Sector                0
       Transfer Mode         None



    F1:Help       ↑↓ : Select Item    -/+: Change Value       F5: Setup Defaults
    ESC: Exit     →←: Select Menu      Enter: Select SubMenu    F10: Save and Exit
```

The BIOS automatically detects the values opposite the dimmed items (Capacity, Cylinder, Head, Sector and Transfer Mode). These values are not user-configurable. These items show N/A if no IDE device is installed in the system.

### PIO Mode [Auto]

Sets the PIO mode for the IDE device.
Configuration options: [Auto] [Mode 0] [Mode 1] [Mode 2] [Mode 3] [Mode 4]

### UDMA Mode [Auto]

Disables or sets the UDMA mode. Configuration options: [Disable] [Auto]

### Primary IDE Master/Slave [Auto]

Select [Auto] to automatically detect an IDE hard disk drive. If automatic detection is successful, the BIOS automatically fills in the correct values for the remaining fields on this sub-menu. If the hard disk was already formatted on a previous system, the setup BIOS may detect incorrect parameters. Select [Manual] to manually enter the IDE hard disk drive parameters. If no drive is installed select [None]. Configuration options: [None] [Auto] [Manual]

## Access Mode [Auto]

The default [Auto] allows automatic detection of an IDE hard disk drive.
Select [CHS] for this item if you set the IDE Primary Master/Slave to [Manual].
Configuration options: [CHS] [LBA] [Large] [Auto]

Before attempting to configure a hard disk drive, make sure you have the correct configuration information supplied by the drive manufacturer. Incorrect settings may cause the system to fail to recognize the installed hard disk.

## Capacity

Displays the auto-detected hard disk capacity. This item is not configurable.

## Cylinder

Shows the number of the hard disk cylinders. This item is not configurable.

## Head

Shows the number of the hard disk read/write heads. This item is not configurable.

## Sector

Shows the number of sectors per track. This item is not configurable.

## Transfer Mode

Shows the Transfer mode. This item is not configurable.

After entering the IDE hard disk drive information into BIOS, use a disk utility, such as FDISK, to partition and format new IDE hard disk drives. This is necessary so that you can write or read data from the hard disk. Make sure to set the partition of the Primary IDE hard disk drives to active.

## 4.4.6 SATA 1–4

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.

```
                    Phoenix-AwardBIOS CMOS Setup Utility
          Main

                       SATA 1                          Select Menu

     Extended IDE Drive     [Auto]              Item Specific Help
     Access Mode            [Auto]
                                                Selects the type of
     Capacity               0 MB                fixed disk connected to
                                                the system.
     Cylinder               0
     Head                   0
     Landing Zone           0
     Sector                 0




     F1:Help      ↑↓ : Select Item    -/+: Change Value      F5: Setup Defaults
     ESC: Exit    →←: Select Menu     Enter: Select SubMenu  F10: Save and Exit
```

The BIOS automatically detects the values opposite the dimmed items (Capacity, Cylinder, Head, Landing Zone and Sector). These values are not user-configurable. These items show 0 if no SATA device is installed in the system.

### Extended IDE Drive [Auto]

Selects the type of fixed disk connected to the system.
Configuration options: [None] [Auto]

### Access Mode [Auto]

Sets the sector addressing mode. Configuration options: [Large] [Auto]

Before attempting to configure a hard disk drive, make sure you have the correct configuration information supplied by the drive manufacturer. Incorrect settings may cause the system to fail to recognize the installed hard disk.

### Capacity

Displays the auto-detected hard disk capacity. This item is not configurable.

### Cylinder

Shows the number of the hard disk cylinders. This item is not configurable.

### Head

Shows the number of the hard disk read/write heads. This item is not configurable.

### Landing Zone

Shows the number of landing zone per track. This item is not configurable.

**Sector**

Shows the number of sectors per track. This item is not configurable.

---

After entering the IDE hard disk drive information into BIOS, use a disk utility, such as FDISK, to partition and format new IDE hard disk drives. This is necessary so that you can write or read data from the hard disk. Make sure to set the partition of the Primary IDE hard disk drives to active.

---

## 4.4.7    HDD SMART Monitoring [Disabled]

Allows you to enable or disable the HDD Self-Monitoring Analysis and Reporting Technology (SMART) feature. Configuration options: [Disabled] [Enabled]

## 4.4.8    Installed Memory [xxx MB]

Shows the size of installed memory.

## 4.4.9    Usable Memory [xxx MB]

Shows the size of usable memory.

## 4.4.10    System Information

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

```
            Phoenix-AwardBIOS CMOS Setup Utility
    ┌──────────┐
    │   Main   │
    ├──────────┴──────────────────────────┬────────────────────────┐
    │      System Information              │      Select Menu        │
    ├─────────────────────────────────────┼────────────────────────┤
    │  BIOS Revision            0114       │  Item Specific Help▶    │
    │                                      │                         │
    │                                      │                         │
    │                                      │                         │
    │                                      │                         │
    │                                      │                         │
    │                                      │                         │
    │                                      │                         │
    ├─────────────────────────────────────┴────────────────────────┤
    │  F1:Help      ↑↓: Select Item    -/+: Change Value    F5: Setup Defaults │
    │  ESC: Exit    →←: Select Menu    Enter: Select SubMenu  F10: Save and Exit │
    └──────────────────────────────────────────────────────────────┘
```

**BIOS revision**

Displays the auto-detected BIOS version.

---

# 4.5 Advanced menu

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

```
                    Phoenix-AwardBIOS CMOS Setup Utility
  Extreme Tweaker   Main   Advanced   Power   Boot   Tools   Exit
 ┌──────────────────────────────────────────────┬──────────────────────────┐
 │  ▶  AI NET 2                                   │      Select Menu         │
 │  ▶  PCIPnP                                     │                          │
 │  ▶  Onboard Device Configuration               │   Item Specific Help▶    │
 │  ▶  USB Configuration                          │   Press [Enter] to set.  │
 │  ▶  IDE Function Setup                         │                          │
 │  ▶  MCP Storage Config                         │                          │
 │  ▶  LCD Poster and Onboard LED Control         │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 ├────────────────────────────────────────────────────────────────────────┤
 │  F1:Help        ↑↓ : Select Item    -/+: Change Value    F5: Setup Defaults │
 │  ESC: Exit      →←: Select Menu      Enter: Select SubMenu  F10: Save and Exit │
 └────────────────────────────────────────────────────────────────────────┘
```

## 4.5.1 AI NET2

```
                    Phoenix-AwardBIOS CMOS Setup Utility
                           Advanced
 ┌──────────────────────────────────────────────┬──────────────────────────┐
 │              AI NET 2                          │      Select Menu         │
 │  POST Check LAN Cable    [Disabled]            │   Item Specific Help▶    │
 │                                                │                          │
 │  Pair           Status       Length            │   Enable or Disable LAN  │
 │  LAN1(1-2)      Open         N/A               │   cable check during     │
 │  LAN1(3-6)      Open         N/A               │   POST.                  │
 │  LAN1(4-5)      Open         N/A               │                          │
 │  LAN1(7-8)      Open         N/A               │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 ├────────────────────────────────────────────────────────────────────────┤
 │  F1:Help        ↑↓ : Select Item    -/+: Change Value    F5: Setup Defaults │
 │  ESC: Exit      →←: Select Menu      Enter: Select SubMenu  F10: Save and Exit │
 └────────────────────────────────────────────────────────────────────────┘
```

## POST Check LAN Cable [Disabled]

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

## 4.5.2 PCIPnP

```
            Phoenix-AwardBIOS CMOS Setup Utility
                         Advanced
         PCIPnP                             Select Menu

   Plug & Play O/S          [No]       Item Specific Help▶

   Resources Controlled By  [Auto]     Select Yes if you are
 x IRQ Resources                       using a Plug and Play
                                       capable operating
   ** PCI Express relative items **    system. Select No if
   Maximum payload Size     [4096]     you need the BIOS to
                                       configure non-boot
                                       devices.
```

### Plug & Play O/S [No]

When set to [No], the 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]

### Resources Controlled By [Auto]

When set to [Auto], the BIOS automatically configures all the boot and Plug and Play compatible devices. Set to [Manual] if you want to assign the IRQ DMA and memory base address fields. Configuration options: [Auto] [Manual]

> The following item becomes configurable when you set **Resources Controlled By** to [Manual].

### IRQ Resources

```
            Phoenix-AwardBIOS CMOS Setup Utility
                         Advanced
         IRQ Resources                       Select Menu

   IRQ-5  assigned to      [PCI Device]    Item Specific Help▶
   IRQ-7  assigned to      [PCI Device]
   IRQ-9  assigned to      [PCI Device]    Legacy ISA for devices
   IRQ-10 assigned to      [PCI Device]    compliant with the
   IRQ-11 assigned to      [PCI Device]    original PC AT bus
   IRQ-14 assigned to      [PCI Device]    specification, PCI/ISA PnP
                                           for devices
                                           compliant with the Plug
                                           and Play standard whether
                                           designed for PCI or ISA
                                           bus architecture.
```

*IRQ-xx assigned to*
When set to [PCI Device], the specific IRQ is free for use of PCI/PnP devices. When set to [Reserved], the IRQ is reserved for legacy ISA devices.
Configuration options: [PCI Device] [Reserved]

### Maximum Payload Size [4096]

Sets maximum TLP payload size for the PCI Express devices.
Configuration options: [128] [256] [512] [1024] [2048] [4096]

## 4.5.3    Onboard Device Configuration

```
                 Phoenix-AwardBIOS CMOS Setup Utility
                              Advanced

            Onboard Device Configuration          │    Select Menu

       Hybrid Support              Disable        │ Item Specific Help▶
       iGPU Frame Buffer Control   [Auto]         │
    x  Frame Buffer Size           128M           │
       Onboard GPU                 [Auto]         │
       Primary Display Adapter     [PCI-E]        │
       HD Audio                    [Enabled]      │
       Front Panel Support Type    [HD Audio]     │
       HDMI Audio                  [Auto]         │
       Intergade HDA Codec         [HDMI]         │
       Onboard LAN Device          [Enabled]      │
       Onboard LAN2 Device         [Enabled]      │
       Onboard LAN Boot ROM        [Disabled]     │
       Onboard LAN2 Boot ROM       [Disabled]     │
       Onboard 1394                [Enabled]      │

    F1:Help      ↑↓ : Select Item    -/+: Change Value      F5: Setup Defaults
    ESC: Exit    →←: Select Menu      Enter: Select SubMenu   F10: Save and Exit
```

### Hybrid Support [Disable]

This item becomes configurable when you install an graphics card that supports Hybrid SLI™ mode. Configuration options: [Enabled] [Disabled]

### iGPU Frame Buffer Control [Auto]

Configuration options: [Auto] [Manual]

> 📝 The following item becomes configurable when you set **iGPU Frame Buffer Control** to [Manual].

*Frame Buffer Size [64M]*
Configuration options: [64M] [128M] [256M] [512M]

### Onboard GPU [Auto]

Set this item to [Auto] to disable onboard GPU and frame buffer if you install external graphics cards. Configuration options: [Auto] [Always Enable]

### Primary Display Adapter [PCI-E]

Allows you to select the graphics controller to use as the primary boot device. Configuration options: [PCI] [PCI-E]

### HD Audio [Enabled]

Allows you to enable or disable the High-Definition audio function. 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]

---

### HDMI Audio [Auto]

Allows you to enable or disable the HDMI audio function.
Configuration options: [Auto] [Disabled]

### Intergade HDA Codec [HDMI]

Configuration options: [HDMI] [SPDIF]

### Onboard LAN/LAN2 Device [Enabled]

Enables or disables the onboard NVIDIA® LAN controller.
Configuration options: [Disabled] [Enabled]

### Onboard LAN/LAN2 Boot ROM [Disabled]

Allows you to enable or disable the onboard LAN boot ROM.
Configuration options: [Enabled] [Disabled]

### Onboard 1394 [Enabled]

Allows you to disable or enable the onboard 1394 device support.
Configuration options: [Disabled] [Enabled]

## 4.5.4    USB Configuration

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

```
         Phoenix-AwardBIOS CMOS Setup Utility
                        Advanced
         USB Configuration                    Select Menu

   USB Controller          [Enabled]     Item Specific Help
   USB 2.0 Controller      [Enabled]
   USB Legacy support      [Enabled]     Enable or Disable USB
                                         1.1 and 2.0 Controller.
```

### USB Controller [Enabled]

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

### USB 2.0 Controller [Enabled]

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

### USB Legacy Support [Enabled]

Allows you to enable or disable support for USB devices on legacy operating
systems (OS). Configuration options: [Disabled] [Enabled]

## 4.5.5    IDE Function Setup

This sub-menu contains IDE function-related items. Select an item then press
<Enter> to edit.

```
                    Phoenix-AwardBIOS CMOS Setup Utility
                              Advanced
        IDE Function Setup                          Select Menu

    OnChip IDE Channel0      [Enabled]          Item Specific Help
    IDE DMA transfer access  [Enabled]
    SATA Controller          [Enabled]
    IDE Prefetch Mode        [Enabled]
```

### OnChip IDE Channel0 [Enabled]

Allows you to enable or disable the onchip IDE channel 0 controller.
Configuration options: [Disabled] [Enabled]

### IDE DMA transfer access [Enabled]

Allows you to enable or disable the IDE DMA transfer access.
Configuration options: [Disabled] [Enabled]

### SATA Controller [Enabled]

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

### IDE Prefetch Mode [Enabled]

Allows you to enable or disable the IDE PIO read prefetch mode.
Configuration options: [Disabled] [Enabled]

## 4.5.6    MCP Storage Config

This sub-menu allows you to change Serial ATA settings. Select an item then press
<Enter> to edit.

```
                    Phoenix-AwardBIOS CMOS Setup Utility
                              Advanced
        Serial-ATA Configuration                   Select Menu

    SATA Operation Mode               [IDE]        Item Specific Help
```

### SATA Operation Mode [IDE]

Sets the configuration for the Serial ATA connectors supported by the Southbridge
chip. Configuration options: [IDE] [RAID] [AHCI]

The AHCI allows the onboard storage driver to enable advanced Serial ATA
features that increases storage performance on random workloads by allowing the
drive to internally optimize the order of commands.

If you want to create a RAID 0, 1, 0+1, 5 or JBOD 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].

Use SATA 1–4 connectors for IDE mode. SATA 5–6 connectors support AHCI mode and RAID mode only. Make sure to install the AHCI driver or RAID driver in the bundled support DVD before connecting devices to SATA 5–6 connectors. Otherwise, the devices will not work.

## 4.5.7    LCD Poster and Onboard LED Control

```
         Phoenix-AwardBIOS CMOS Setup Utility
                     Advanced
      LCD Poster and Onboard LED Control          Select Menu

    ROG Logo                    [Enabled]       Item Specific Help▶

    Voltiminder LED             [ON]            Set ROG Logo Enabled/
    SB LED Selection            [SB Voltage]    Disabled
    LCD Poster Off              [Enabled]
    LCD Poster Backlight        [Disabled]
    LCD Poster Mode             [Current Time]
  x LCD Poster String




    F1:Help      ↑↓ : Select Item   -/+: Change Value      F5: Setup Defaults
    ESC: Exit    →←: Select Menu    Enter: Select SubMenu   F10: Save and Exit
```

### 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]

### Voltiminder LED [ON]

Allows you to turn on/off the onboard Voltiminder LED.
Configuration options: [ON] [OFF]

### LCD Poster Off [Enabled]

Allows you to enable or disable the LCD Poster.
Configuration options: [Disabled] [Enabled]

## LCD Poster Backlight [Disabled]

Allows you to enable or disable the LCD Poster backlight after POST.
Configuration options: [Disabled] [Enabled]

## LCD Poster Mode [Current Time]

Allows you to select the LCD Poster mode.
Configuration options: [Current Time] [User String]

> The following item becomes configurable when you set **LCD Poster Mode** to [User String].

*LCD Poster String*
Allows you to enter a string that will be displayed on the LCD Poster.
Highlight this item and press <Enter> to enter your string with the keypad.

# 4.6 Power menu

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

```
                    Phoenix-AwardBIOS CMOS Setup Utility
 Extreme Tweaker    Main    Advanced    Power    Boot    Tools    Exit

    ACPI Suspend Type       [S1&S3]                    Select Menu
    ACPI APIC support        Enabled
 ▶  APM Configuration                            Item Specific Help▶
 ▶  Hardware Monitor
                                                 Select the ACPI state
                                                 used for System
                                                 Suspend.




 F1:Help       ↑↓ : Select Item    -/+: Change Value      F5: Setup Defaults
 ESC: Exit     →←: Select Menu     Enter: Select SubMenu   F10: Save and Exit
```
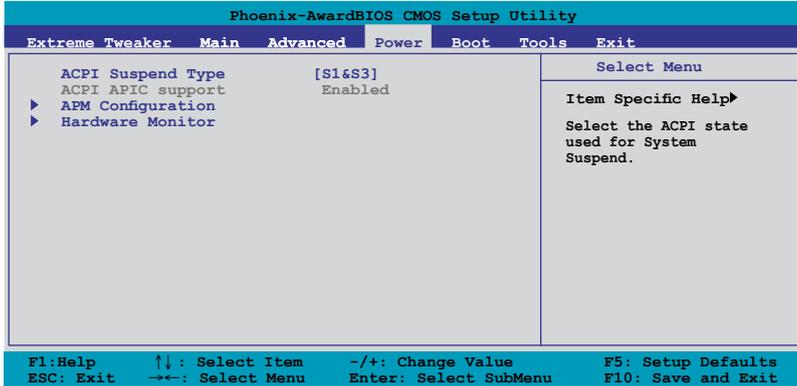
## 4.6.1 ACPI Suspend Type [S1&S3]

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

## 4.6.2 ACPI APIC support [Enabled]

This item is enabled by default. It enables the Advanced Configuration and Power Interface (ACPI) support in the Application-Specific Integrated Circuit (ASIC). The ACPI APIC table pointer is included in the RSDT pointer list.

## 4.6.3    APM Configuration

```
                    Phoenix-AwardBIOS CMOS Setup Utility
                                   Power
─────────────────────────────────────────────────────────────────────────
          APM Configuration                          Select Menu
─────────────────────────────────────────────────────────────────────────
   Restore on AC Power Loss         [Power-Off]    Item Specific Help▶
   PWR Button < 4 secs              [Instant-Off]
   Power Up On PCI/PCIE Devices     [Disabled]     Press [Enter] to
   Power On by RTC Alarm            [Disabled]     select whether or not
 x Date (of Month) Alarm             0             to restart the system
 x Alarm Time (hh:mm)                0 : 0 : 0     after AC power loss
   HPET Support                     [Enabled]
   Power Up By PS/2 Keyboard        [Disabled]




─────────────────────────────────────────────────────────────────────────
  F1:Help       ↑↓ : Select Item    -/+: Change Value     F5: Setup Defaults
  ESC: Exit     →←: Select Menu      Enter: Select SubMenu  F10: Save and Exit
```

### Restore on AC Power Loss [Power-Off]

Allows you to enable or disable the Restore on AC Power Loss function.
Configuration options: [Power-Off] [Power-On] [Last State]

### PWR Button < 4 secs [Instant-Off]

Allows you to set the event after the power button is pressed for more than 4
seconds. Configuration options: [Suspend] [Instant-Off]

### Power Up On PCI/PCIE Devices [Disabled]

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

### 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 Date of Month Alarm and Time (hh:mm:ss) Alarm items
become user-configurable with set values.
Configuration options: [Disabled] [Enabled]

### Date (of Month) Alarm [XX]

To set the date of alarm, highlight this item and press <Enter> to display the Date
of Month Alarm pop-up menu. Key-in a value within the specified range then press
<Enter>. Value '0' means everyday. Configuration options: [Min=0] [Max=31]

### Alarm Time (hh:mm) [ X: X: X]

To set the time of alarm:

1. Highlight this item and press <Enter> to display a pop-up menu for the hour field.
2. Key-in a value (Min=0, Max=23), then press <Enter>.
3. Press <TAB> to move to the minutes field then press <Enter>.
4. Key-in a minute value (Min=0, Max=59), then press <Enter>.

### HPET Support [Enabled]

Configuration options: [Disabled] [Enabled]

### Power Up By PS/2 Keyboard [Disabled]

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

## 4.6.4    Hardware Monitor

The items in this sub-menu displays the hardware monitor values automatically detected by the BIOS. It also allows you to change CPU Q-Fan feature-related parameters. Select an item then press <Enter> to display the configuration options.

```
           Phoenix-AwardBIOS CMOS Setup Utility
                          Power
┌──────────────────────────────────────┬────────────────────────┐
│        Hardware Monitor               │      Select Menu       │
├──────────────────────────────────────┼────────────────────────┤
│  ▶  Voltage Monitor                   │  Item Specific Help▶    │
│  ▶  Temperature Monitor               │                        │
│  ▶  Fan Speed Monitor                 │  Press [Enter] to go   │
│  ▶  Fan Speed Control                 │  to the sub-menu.      │
│     CPU Fan Connector Type    [3-pin Fan] │                    │
│     CPU Fan Speed Warning     [ 800 RPM]  │                    │
│                                       │                        │
│                                       │                        │
│                                       │                        │
│                                       │                        │
│                                       │                        │
│                                       │                        │
├──────────────────────────────────────┴────────────────────────┤
│  F1:Help      ↑↓ : Select Item    -/+: Change Value    F5: Setup Defaults │
│  ESC: Exit    →←: Select Menu     Enter: Select SubMenu  F10: Save and Exit │
└────────────────────────────────────────────────────────────────┘
```
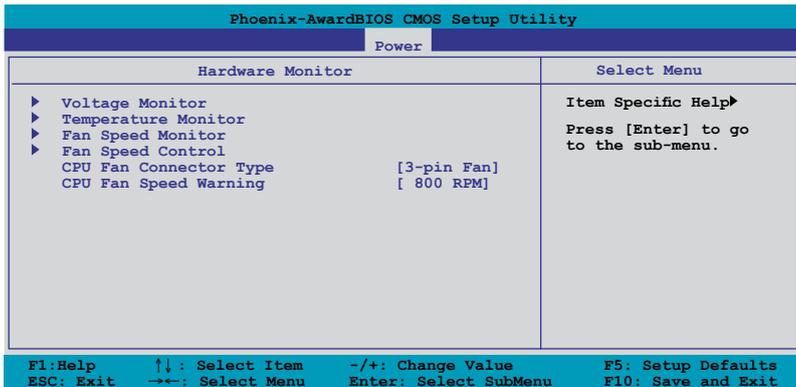
## Voltage Monitor

```
        Phoenix-AwardBIOS CMOS Setup Utility
                        Power
         Voltage Monitor                    Select Menu

   Vcore Voltage           [ 1.32V]       Item Specific Help▶
   VDDNB Voltage           [ 1.52V]
   DDR2 Voltage            [ 1.96V]       Press [Enter] to set.
   SB Voltage              [ 1.26V]
   HT Voltage              [ 1.50V]
   VDDA Voltage            [ 2.46V]
   BR Voltage              [ 1.21V]
   DDR Term Voltage        [ 0.99V]
   3.3V Voltage            [ 2.89V]
   5V Voltage              [ 4.66V]
   12V Voltage             [11.64V]




 F1:Help      ↑↓: Select Item    -/+: Change Value      F5: Setup Defaults
 ESC: Exit    →←: Select Menu     Enter: Select SubMenu  F10: Save and Exit
```

*Vcore, VDDNB, DDR2, SB, HT, VDDA, BR, DDR Term, 3.3V, 5V, 12V Voltage*
The onboard hardware monitor automatically detects the voltage output
through the onboard voltage regulators.

## Temperature Monitor

```
        Phoenix-AwardBIOS CMOS Setup Utility
                        Power
       Temperature Monitor                  Select Menu

   CPU Temperature              30°C        Item Specific Help▶
   SB Temperature               47°C
   BR Temperature               47°C        Set SB Over
   M/B Temperature              35°C        Temperature Warning
   OPT1 Temperature              0°C        Message
   OPT2 Temperature              0°C
   OPT3 Temperature              0°C
   SB Overheat Protection     [90]
   BR Overheat Protection     [90]
   OPT1 Cable Overheat Protection[90]
   OPT2 Cable Overheat Protection[90]
   OPT3 Cable Overheat Protection[90]



 F1:Help      ↑↓: Select Item    -/+: Change Value      F5: Setup Defaults
 ESC: Exit    →←: Select Menu     Enter: Select SubMenu  F10: Save and Exit
```

*CPU, SB, BR, M/B, OPT1/2/3 Temperature*
The onboard hardware monitor automatically detects and displays the CPU,
southbridge, PCIe bridge, motherboard, and OPT1/2/3 fan temperatures. These items
are not user-configurable.

*SB Overheat Protection; BR Overheat Protection [90]*
The system automatically shuts down when the southbridge or PCIe bridge
chipset is heated over the set temperature to protect it from damage.
Configuration optitons: [Disabled] [70] [80] [90]

### OPT1/2/3 Cable Overheat Protection [90]

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 optitons: [Disabled] [50] [60] [70] [80] [90]

## Fan Speed Monitor

```
                Phoenix-AwardBIOS CMOS Setup Utility
                              Power

           Fan Speed Monitor                     Select Menu

    CPU Fan Speed              4411 RPM      Item Specific Help
    CHA_FAN1 Speed                0 RPM
    CHA_FAN2 Speed                0 RPM
    OPT_FAN1 Speed                0 RPM
    OPT_FAN2 Speed                0 RPM
    OPT_FAN3 Speed                0 RPM
    PWR_FAN  Speed                0 RPM
    CHA_FAN3 Speed                0 RPM
```

### CPU FAN, CHA_FAN1/2/3, PWR FAN, OPT1/2/3 FAN Speed

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

```
                Phoenix-AwardBIOS CMOS Setup Utility
                              Power

           Fan Speed Control                      Select Menu

    CPU FAN Control           [Duty Cycle Mode]   Item Specific Help
    CPU FAN Duty Cycle        [100%]
    CHA_FAN3 Control          [Duty Cycle Mode]   Select Fan Control
    CHA_FAN3 Duty Cycle       [100%]              mode.
  x CHA_FAN3 Q-Fan Sense        CPU Temperature
    CHA_FAN1&2 Control        [Duty Cycle Mode]
    CHA_FAN1&2 Duty Cycle     [100%]
  x CHA_FAN1&2 Q-Fan Sense      CPU Temperature
    OPT_FAN1 Control          [Duty Cycle Mode]
    OPT_FAN1 Duty Cycle       [100%]
  x OPT_FAN1 Target Temperature  40°C/104°F
    OPT_FAN2 Control          [Duty Cycle Mode]
    OPT_FAN2 Duty Cycle       [100%]
  x OPT_FAN2 Target Temperature  40°C/104°F
    OPT_FAN3 Control          [Duty Cycle Mode]
    OPT_FAN3 Duty Cycle       [100%]
  x OPT_FAN3 Target Temperature  40°C/104°F
    PWR_FAN3 Duty Cycle       [100%]

  F1:Help      ↑↓ : Select Item    -/+: Change Value     F5: Setup Defaults
  ESC: Exit    →←: Select Menu     Enter: Select SubMenu  F10: Save and Exit
```

### CPU FAN Control [Duty Cycle Mode]

Allows you to select the fan control mode.

Configuration options: [Duty Cycle Mode] [Q-FAN Mode]

*CPU FAN Duty Cycle [100%]*
Allows you to set the fan duty cycle. This item becomes configurable when you set the **CPU FAN Control** item to [Duty Cycle Mode].
Configuration options: [60%] [70%] [80%] [90%] [100%]

*CHA_FAN3/1&2 Control [Duty Cycle Mode]*
Allows you to select the fan control mode.
Configuration options: [Duty Cycle Mode] [Q-FAN Mode]

*CHA_FAN3/1&2 Duty Cycle [100%]*
Allows you to set the fan duty cycle. This item becomes configurable when you set the **CHA_FAN3/1&2 Control** item to [Duty Cycle Mode].
Configuration options: [60%] [70%] [80%] [90%] [100%]

*CHA_FAN3/1&2 Q-Fan Sense [CPU Temperature]*
Allows the Q-Fan to sense the CPU/MB temperature and to adjust the fan speed. This item becomes configurable when you set the **CHA_FAN3/1&2 Control** item to [Q-FAN Mode].
Configuration options: [CPU Temperature] [MB Temperature]

*OPT FAN1/2/3 Control [Duty Cycle Mode]*
Allows you to select the fan control mode.
Configuration options: [Duty Cycle Mode] [Q-FAN Mode]

*OPT FAN1/2/3 Duty Cycle [100%]*
Allows you to set the fan duty cycle. This item becomes configurable when you set the **OPT FAN1/2/3 Control** item to [Duty Cycle Mode].
Configuration options: [60%] [70%] [80%] [90%] [100%]

*OPT Fan1/2/3 Target Temperature [40ºC/104ºF]*
Allows the Q-Fan to sense the temperature of fans connected to OPT Fan1/2/3 and to adjust the fan speed. These items become configurable when the **OPT FAN1/2/3 Control** items are set to [Q-FAN Mode].
Configuration options: [10ºC/50ºF] [15ºC/59ºF] [20ºC/68ºF] [25ºC/77ºF] [30ºC/86ºF] [35ºC/95ºF] [40ºC/104ºF] [45ºC/113ºF] [50ºC/122ºF] [55ºC/131ºF] [60ºC/140ºF] [65ºC/149ºF] [70ºC/158ºF] [75ºC/167ºF] [80ºC/176ºF] [85ºC/185ºF]

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

*PWR_FAN Duty Cycle [100%]*
Allows you to set the fan duty cycle.
Configuration options: [60%] [70%] [80%] [90%] [100%]

## CPU Fan Connector Type [3-pin Fan]

Allows you to select the CPU fan connector type.
Configuration options: [4-pin Fan] [3-pin Fan]

## CPU Fan Speed warning [800 RPM]

Allows you to set the CPU fan warning speed function, which gives off a warning when the CPU fan speed is too low. If you set this item to [Disabled], the system will not warn you even if no fan is installed or if the fan is not functioning properly. Configuration options: [Disabled] [800 RPM] [1200 RPM] [1600 RPM]

# 4.7    Boot menu

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

```
               Phoenix-AwardBIOS CMOS Setup Utility
  Extreme Tweaker    Main    Advanced    Power    Boot    Tools    Exit

 ►  Boot Device Priority                          Select Menu
 ►  Removable Drives
 ►  Hard Disk Drives                         Item Specific Help►
 ►  CDROM Drives
 ►  Boot Settings Configuration              Select Boot Device
 ►  Security                                 Priority




 F1:Help       ↑↓ : Select Item      -/+: Change Value      F5: Setup Defaults
 ESC: Exit     →←: Select Menu       Enter: Select SubMenu   F10: Save and Exit
```

## 4.7.1    Boot Device Priority

```
               Phoenix-AwardBIOS CMOS Setup Utility
                                  Boot

         Boot Device Priority                     Select Menu

   1st Boot Device       [Removable]       Item Specific Help►
   2nd Boot Device       [Hard Disk]
   3rd Boot Device       [CDROM]           Select Your Boot
   4th Boot Device       [Disabled]        Device Priority
```

## 1st ~ 4th Boot Device [Removable]

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: [Removable] [Hard Disk] [CDROM] [Disabled]

### 4.7.2    Removable Drives

```
            Phoenix-AwardBIOS CMOS Setup Utility
                            Boot

        Removable Drives                        Select Menu

   1. Floppy Disks                           Item Specific Help

                                             Use <↑> or <↓> to
                                             select a device, then
                                             press <+> to move it
                                             up, or <-> to move it
                                             down the list. Press
                                             <ESC> to exit this
                                             menu.
```

**1. Floppy Disks**

Allows you to assign a removable drive attached to the system.

### 4.7.3    Hard Disk Drives

```
            Phoenix-AwardBIOS CMOS Setup Utility
                            Boot

        Hard Disk Drives                        Select Menu

  1. SATA 1: XXXXXXXXX                        Item Specific Help

                                             Use <↑> or <↓> to
                                             select a device, then
                                             press <+> to move it
                                             up, or <-> to move it
                                             down the list. Press
                                             <ESC> to exit this
                                             menu.
```

**1. SATA 1: XXXXXXXXX**

Allows you to assign hard disk drives attached to the system.

### 4.7.4    CDROM Drives

```
            Phoenix-AwardBIOS CMOS Setup Utility
                            Boot

        CDROM Drives                            Select Menu

  1. SATA 2: XXXXXXXXX                        Item Specific Help

                                             Use <↑> or <↓> to
                                             select a device, then
                                             press <+> to move it
                                             up, or <-> to move it
                                             down the list. Press
                                             <ESC> to exit this
                                             menu.
```

**1. SATA 2: XXXXXXXXX**

Allows you to assign optical drives attached to the system.

## 4.7.5    Boot Settings Configuration

```
                    Phoenix-AwardBIOS CMOS Setup Utility
                                     Boot
─────────────────────────────────────────────────────────────────────
          Boot Settings Configuration              Select Menu
                                               │
    Case Open Warning         [Enabled]        │ Item Specific Help▶
    Quick Boot                [Enabled]        │
    Boot Up Floppy Seek       [Disabled]       │ Press [Enter] to
    Bootup Num-Lock           [On]             │ enable or disable.
    Typematic Rate Setting    [Disabled]       │
  x Typematic Rate (Chars/Sec) 6               │
  x Typematic Delay (Msec)    250              │
    OS Select For DRAM > 64MB [Non-OS2]        │
    Full Screen LOGO          [Enabled]        │
    BIOS Wallpaper            [00%]            │
    Halt On                   [All Errors]     │
                                               │
                                               │
─────────────────────────────────────────────────────────────────────
  F1:Help      ↑↓ : Select Item    -/+: Change Value    F5: Setup Defaults
  ESC: Exit    →←: Select Menu    Enter: Select SubMenu  F10: Save and Exit
```

### Case Open Warning [Enabled]

Enables or disables the chassis open status feature. Setting to Enabled, clears the chassis open status. Refer to section "2.8.2 Internal connectors" for setting details. Configuration options: [Disabled] [Enabled]

### Quick Boot [Enabled]

Allows you to enable or disable the system quick boot feature. When Enabled, the system skips certain tests while booting.
Configuration options: [Disabled] [Enabled]

### Boot Up Floppy Seek [Disabled]

Enables or disables the chassis open status feature. Setting to Enabled, clears the chassis open status. Configuration options: [Disabled] [Enabled]

### Bootup Num-Lock [On]

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

### Typematic Rate Setting [Disabled]

Allows you to set the keystroke rate. Enable this item to configure the Typematic Rate (Chars/Sec) and the Typematic Delay (Msec).
Configuration options: [Disabled] [Enabled]

> The following two items **Typematic Rate (Chars/Sec)** and **Typematic Delay (Msec)** become configurable when the **Typematic Rate Setting** is enabled.

### Typematic Rate (Chars/Sec) [6]

Allows you to select the rate at which a character repeats when you hold a key.
Configuration options: [6] [8] [10] [12] [15] [20] [24] [30]

### Typematic Delay (Msec) [250]

Allows you to set the delay before keystrokes begin to repeat.
Configuration options: [250] [500] [750] [1000]

### OS Select for DRAM > 64MB [Non-OS2]

Set this item to OS2 only when you are running on an OS/2 operating system with an installed RAM of greater than 64 MB. Configuration options: [Non-OS2] [OS2]

### Full Screen LOGO [Enabled]

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

> Make sure that the above item is set to [Enabled] if you want to use the ASUS MyLogo 3™ feature.

### BIOS Wallpaper [00%]

Allows you to select the transparency of the BIOS wallpaper.
Configuration options: [00%] [25%] [50%] [75%]

### Halt On [All Errors]

Allows you to set the error report type.
Configuration options: [All Errors] [No Errors] [All, But Keyboard] [All, But Diskette] [All, But Disk/Key]

## 4.7.6    Security

```
              Phoenix-AwardBIOS CMOS Setup Utility
                                  Boot

                  Security                        Select Menu

      Supervisor Password    Clear           Item Specific Help
      User Password          Clear
      Password Check        [Setup]          Supervisor password
                                             controls full access,
                                             <Enter> to change
                                             password.
```

**Supervisor Password**
**User Password**

These fields allow you to set passwords:

To set a password:

1.    Select an item then press <Enter>.
2.    Type in a password using a combination of a maximum of eight (8) alpha-numeric characters, then press <Enter>.
3.    When prompted, confirm the password by typing the exact characters again, then press <Enter>. The password field setting is changed to Set.

To clear the password:

1.    Select the password field and press <Enter> twice. The following message appears:

```
PASSWORD DISABLED !!!
Press any key to continue...
```

2.    Press any key to continue. The password field setting is changed to Clear.

**A note about passwords**

The Supervisor password is required to enter the BIOS Setup program preventing unauthorized access. The User password is required to boot the system preventing unauthorized use.
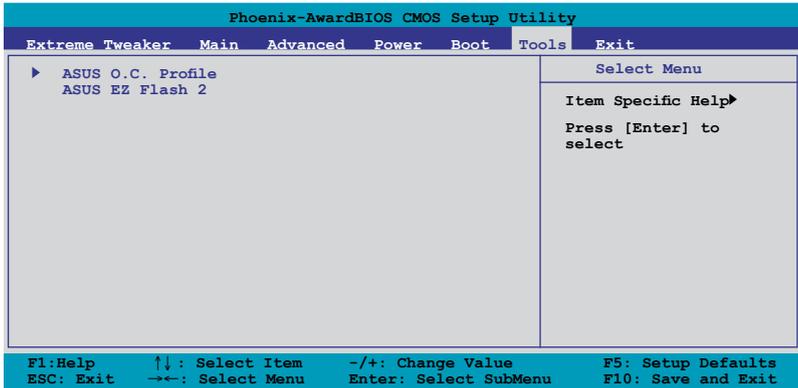
Forgot your password?

If you forget your password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. The RAM data containing the password information is powered by the onboard button cell battery. If you need to erase the CMOS RAM, refer to section "2.6 Jumper" for instructions.
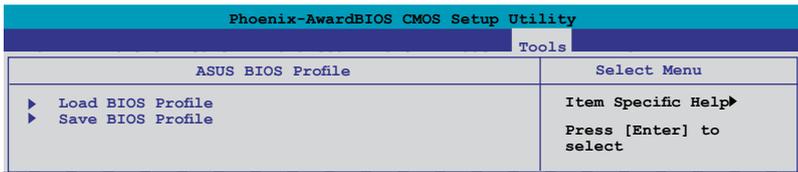
**Password Check**

This field requires you to enter the password before entering the BIOS setup or the system. Select [Setup] to require the password before entering the BIOS Setup. Select [System] to require the password before entering the system.
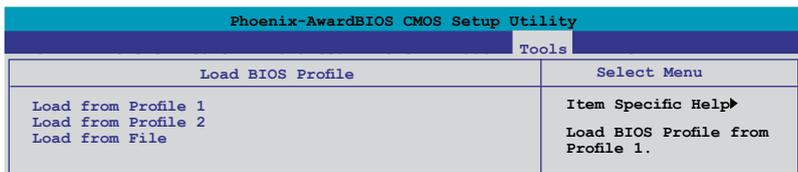Configuration options: [Setup] [System]

# 4.8 Tools menu

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

```
                    Phoenix-AwardBIOS CMOS Setup Utility
   Extreme Tweaker   Main   Advanced   Power   Boot   Tools   Exit
 ┌──────────────────────────────────────────────┬──────────────────────┐
 │ ▶  ASUS O.C. Profile                          │    Select Menu       │
 │    ASUS EZ Flash 2                            │                      │
 │                                               │  Item Specific Help▶ │
 │                                               │                      │
 │                                               │  Press [Enter] to    │
 │                                               │  select              │
 │                                               │                      │
 │                                               │                      │
 │                                               │                      │
 │                                               │                      │
 │                                               │                      │
 │                                               │                      │
 │                                               │                      │
 │                                               │                      │
 └──────────────────────────────────────────────┴──────────────────────┘
   F1:Help      ↑↓ : Select Item     -/+: Change Value      F5: Setup Defaults
   ESC: Exit    →←: Select Menu      Enter: Select SubMenu   F10: Save and Exit
```

## 4.8.1 ASUS O.C. Profile

```
                    Phoenix-AwardBIOS CMOS Setup Utility
                                              Tools
 ┌──────────────────────────────────────────────┬──────────────────────┐
 │              ASUS BIOS Profile                │    Select Menu       │
 │ ▶  Load BIOS Profile                          │  Item Specific Help▶ │
 │ ▶  Save BIOS Profile                          │                      │
 │                                               │  Press [Enter] to    │
 │                                               │  select              │
 └──────────────────────────────────────────────┴──────────────────────┘
```

### Load BIOS Profile

```
                    Phoenix-AwardBIOS CMOS Setup Utility
                                              Tools
 ┌──────────────────────────────────────────────┬──────────────────────┐
 │              Load BIOS Profile                │    Select Menu       │
 │  Load from Profile 1                          │  Item Specific Help▶ │
 │  Load from Profile 2                          │                      │
 │  Load from File                               │  Load BIOS Profile from│
 │                                               │  Profile 1.          │
 └──────────────────────────────────────────────┴──────────────────────┘
```

*Load from Profile 1/2*
Allows you to load the previous BIOS settings saved in the BIOS Flash.
Press <Enter> to load the file.

*Load from File*
Allows you to load the previous BIOS file saved in the hard disk/floppy disk/ USB flash disk with the FAT32/16/12 format. Follow the instructions below to load the BIOS file.
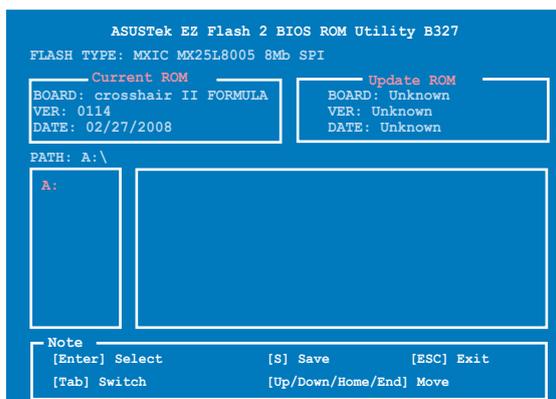
1. Insert the storage devices that contains the "xxx.CMO" file.
2. Turn on the system.
3. Enter BIOS setup program. Go to the "Tools" menu to select "Load from File." Press <Enter> then the setup screen will appear.
4. Press <Tab> to switch between drives before the correct "xxx.CMO" file is found. Then press <Enter> to load the file.
5. A pop-up message will inform you when the loading process finishes.

> • Suggest only to update the BIOS file coming from the same memory/CPU configuration and BIOS version.
>
> • Only the "xxx.CMO" file can be loaded.

## Save BIOS Profile

```
            Phoenix-AwardBIOS CMOS Setup Utility
                                        Tools

            Save BIOS Profile                       Select Menu

  Save to Profile 1                        Item Specific Help▶
  Save to Profile 2
  Save to File                             Save current BIOS
                                           Profile to Profile 1.
```

*Save to Profle 1/2*
Allows you to save the current BIOS file to the BIOS Flash. Press <Enter> to save the file.

*Save to File*
Allows you to save the current BIOS file to the hard disk/floppy disk/USB flash disk with FAT32/16/12 format. Follow the instructions below to save the BIOS file.

1. Insert the storage devices with enough space.
2. Turn on the system.
3. Enter the BIOS setup program. Go to the "Tools" menu to select "Save to File." Press <Enter> then the setup screen will appear.
4. Press <Tab> to switch between the drives. Press hot-key <S> to save the file.
5. Key in the file name. Then press <Enter>.
6. A pop-up message will inform you when the saving process finishes.

```
           ASUSTek O.C. Profile Utility B327

     ┌──── Current CMOS ────┐    ┌──── Update CMOS ────┐
     │BOARD: CROSSHAIR II FORMULA  BOARD: Unknown       │
     │VER: 0114                    VER: Unknown         │
     │DATE: 02/27/2008             DATE: Unknown        │
     └──────────────────────┘    └─────────────────────┘
     PATH: A:\

     ┌───┬─────────────────────────────────────────────┐
     │ A: │  CMOS backup is done! Press any key to Exit.│
     │    └─────────────────────────────────────────────┘
     │                        │                          │
     │                        │                          │
     │                        │                          │
     │                        │                          │
     │                        │                          │
     └────────────────────────┴──────────────────────────┘

     ┌─ Note ──────────────────────────────────────────┐
     │[Enter] Select        [S] Save        [ESC]: Exit │
     │[Tab] Switch          [Up/Down/Home/End]  Move    │
     └──────────────────────────────────────────────────┘
```
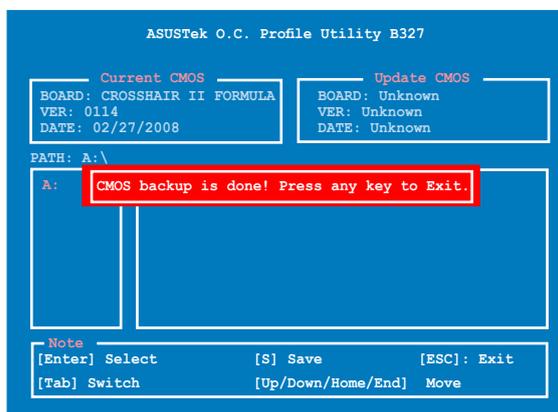
The BIOS file will be saved as "xxx.CMO".

### 4.8.3    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.

```
         ASUSTek EZ Flash 2 BIOS ROM Utility B327
     FLASH TYPE: MXIC MX25L8005 8Mb SPI
     ┌──── Current ROM ─────┐    ┌──── Update ROM ─────┐
     │BOARD: crosshair II FORMULA  BOARD: Unknown       │
     │VER: 0114                    VER: Unknown         │
     │DATE: 02/27/2008             DATE: Unknown        │
     └──────────────────────┘    └─────────────────────┘
     PATH: A:\

     ┌─────────┬──────────────────────────────────────┐
     │ A:      │                                        │
     │         │                                        │
     │         │                                        │
     │         │                                        │
     │         │                                        │
     │         │                                        │
     └─────────┴────────────────────────────────────────┘

     ┌─ Note ──────────────────────────────────────────┐
     │ [Enter] Select       [S] Save        [ESC] Exit  │
     │ [Tab] Switch         [Up/Down/Home/End] Move     │
     └──────────────────────────────────────────────────┘
```

# 4.9    Exit menu

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

```
              Phoenix-AwardBIOS CMOS Setup Utility
  Extreme Tweaker   Main   Advanced   Power   Boot   Tools   Exit

     Exit & Save Changes                        Select Menu
     Exit & Discard Changes
     Load Setup Default                    Item Specific Help▶
     Discard Changes
                                          This option save data
                                          to CMOS and exiting
                                          the setup menu.
```
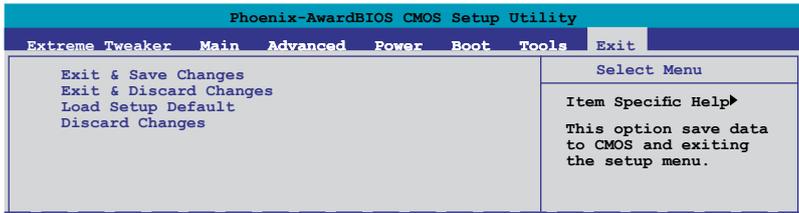
Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

## 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.

## Load Setup Default

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.

## 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.

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

# Software
# support

5

# Chapter summary

**5**

# 5.1 Installing an operating system

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

- Motherboard settings and hardware options vary. Use the setup procedures presented in this chapter for reference only. Refer to your OS documentation for detailed information.

- Make sure that you install Windows® 2000 Service Pack 4 or the Windows® XP Service Pack2 or later versions before installing the drivers for better compatibility and system stability.

# 5.2 Support DVD information

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

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

## 5.2.1 Running the support DVD

Place the support DVD to the optical drive. The DVD automatically displays the Drivers menu if Autorun is enabled in your computer.



**Click an icon to display support DVD/motherboard information**

**Click an item to install**

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

## 5.2.2    Drivers menu

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



### ASUS InstAll - Installation Wizard for Drivers

Launches the ASUS InstAll driver installation wizard.

### AMD Cool 'n' Quiet Driver

Installs the AMD Cool 'n' Quiet™ technology driver.

### NVIDIA Chipset Driver Program

Installs the NVIDIA® chipset drivers for the NVIDIA® nForce® 780a SLI™ chipset.

### SoundMAX ADI Audio Driver

Installs the SoundMAX® ADI audio driver and application.

### NVIDIA HDMI Audio Driver

Installs the NVIDIA® HDMI audio driver.

### Marvell Yukon Gigabit Ethernet Driver

Installs the Marvell® Yukon Gigabit Ethernet driver.

### USB 2.0 Driver

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

### 5.2.3 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.

### Marvell Yukon VCT Application

Installs the Marvell® Yukon VCT application.

### ASUS PC Probe II

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

### ASUS AI Suite

Installs the ASUS AI Suite.

### ASUS Update

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

### ASUS Cool 'n' Quiet Utility

Installs the ASUS Cool 'n' Quiet™ software.

### Adobe Acrobat Reader V7.0

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 you 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.

### WinDVD Copy5 Trial

Installs the WinDVD Copy5 Trial version.

### InterVideo MediaOne Gallary

Installs the InterVideo Media One Gallary software.

### Ulead PhotoImpact 12 SE

Installs the Ulead PhotoImpact 12 SE software.

### CyberLink PowerBackup

Installs the CyberLink Powerbackup software.

### Corel Snapfire Plus SE

Installs the Corel Snapfire Plus SE software.

### 5.2.4    Make Disk menu

The Make Disk menu contains items to create the NVIDIA® nForce® 780a SLI™ SATA/RAID/AHCI driver disk.



**Click to display the next screen**



**Click to display the previous screen**

### NVIDIA 32/64 bit XP/Vista SATA/RAID/AHCI Driver

Allows you to create a NVIDIA® 32/64 bit XP/Vista™ SATA/RAID/AHCI driver disk.

### 5.2.5　Manuals menu

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

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



### 5.2.6　Video menu

Click the Video tab to display a list of video clips. Click the Extreme OC Clip item to watch how an overclocking guru breaks 3DMark world record with an ROG motherboard.

## 5.2.7 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.
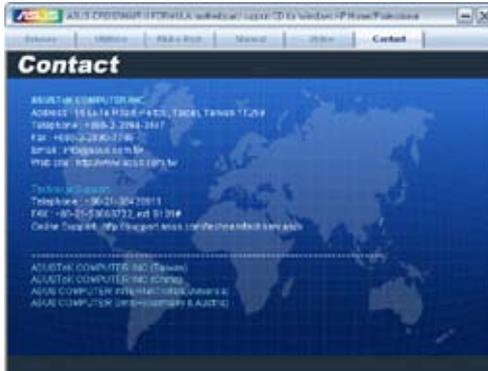


## 5.2.8 Other information

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.

**Browse this DVD**

Displays the support DVD contents in graphical format.



**Technical support form**

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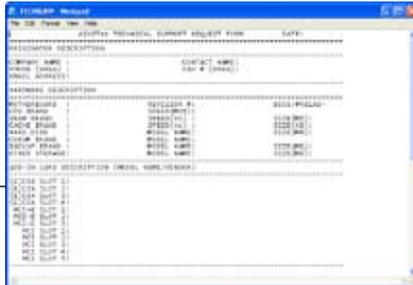


**Filelist**

Displays the contents of the support DVD and a brief description of each in text format.
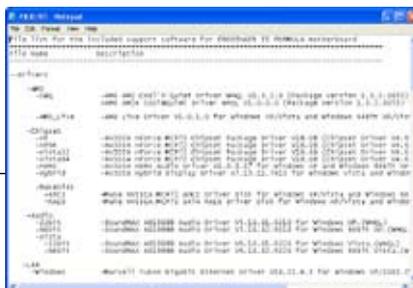
# 5.3 Software information

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

## 5.3.1 ASUS MyLogo3™

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

- Before using the ASUS MyLogo3™, use the AWARD BIOS Flash utility to make a copy of your original BIOS file, or obtain the latest BIOS version from the ASUS website. See section **4.1.3 Updating the BIOS**.

- Make sure that the BIOS item Full Screen Logo is set to [Enabled] if you wish to use ASUS MyLogo3™. See section **4.7.5 Boot Settings Configuration**.

- You can create your own boot logo image in GIF, or BMP file formats.

- The file size should be smaller than 150 K.

To launch the ASUS MyLogo3™:

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

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

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

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

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

6. From the left window pane, select the folder that contains the image you intend to use as your boot logo.
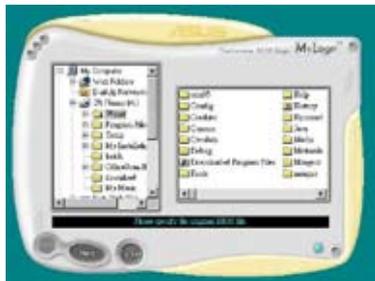
7. When the logo images appear on the right window pane, select an image to enlarge by clicking on it.
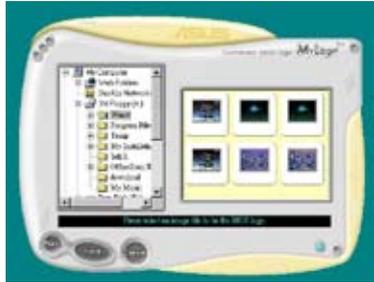


8. Adjust the boot image to your desired size by selecting a value on the Ratio box.



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

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

## 5.3.2 AI NET 2

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

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

### Using the Virtual Cable Tester™

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

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

2.  Click **Virtual Cable Tester** from the menu to display the screen below.
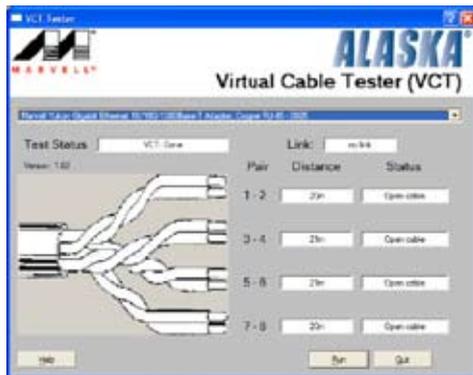


3.  Click the **Run** button to perform a cable test.

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

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

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

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

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

The ADI AD1988 High Definition Audio CODEC provides 8-channel audio capability through the SoundMAX® audio utility with AudioESP™ software to deliver the ultimate audio experience on your PC. The software implements high quality audio synthesis/rendering, 3D sound positioning, and advanced voice-input technologies.

Follow the installation wizard to install the ADI AD1988 Audio Driver from the support DVD that comes with the motherboard package to activate the SoundMAX® audio utility.

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

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

## A.        SoundMAX BlackHawk (AI Audio 2)

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



### _Enabling AI Audio 2_

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

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

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

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

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

*Playback Settings*

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

**Preset settings**

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

**Surround settings**

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

**Port settings**

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

*Recording Settings*

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

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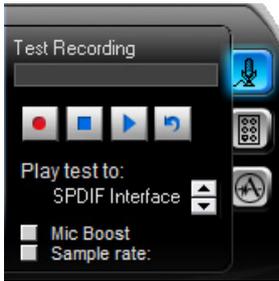
**Port settings**
Click the tab to display the rear panel ports for Microphone or Line In.





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



*More Settings*

Click [icon] for the further configurations.

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

**Speakers**

Allows you to adjust the **Speaker Trim** and **Speaker Delay**.



**Bass**

Allows you to do the Bass management.



**Preferences**

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

## B.      SoundMAX

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



*Audio Setup Wizard*

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

*Jack configuration*
This screen helps you configure your computer's audio ports, depending on the audio devices you have installed.



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



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

*Audio preferences*

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

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



*Listening Environment options*
Click the Listening Environment tab to set up your speaker, acoustic environment, and enable/disable the Virtual Theater Surround function.
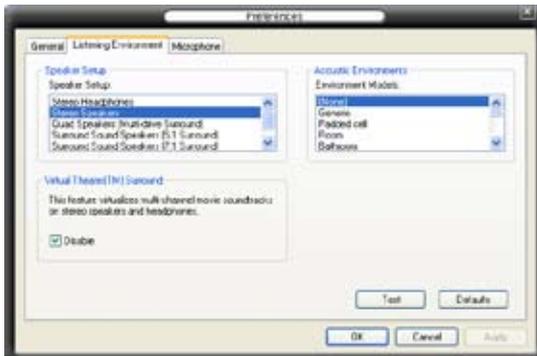
*Microphone options*
Click the Microphone tab allows you to optimize your microphone input settings.

### 5.3.4 ASUS PC Probe II

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

#### Installing PC Probe II

To install PC Probe II on your computer:

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

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

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

#### Launching PC Probe II

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

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

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

#### Using PC Probe II

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

**Click to close the Preference panel**

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

*Sensor alert*
When a system sensor detects a problem, the main window right handle turns red, as the illustrations below show.
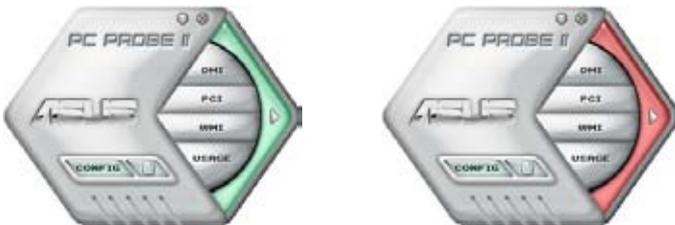
When displayed, the monitor panel for that sensor also turns red. Refer to the Monitor panels section for details.

## Preferences

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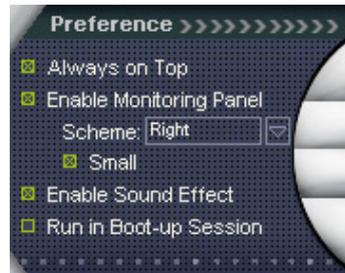
## Hardware monitor panels

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

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

**Large display**

**Small display**

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

*Moving the monitor panels*
All monitor panels move together using a magnetic effect. If you want to detach a monitor panel from the group, click the horseshoe magnet icon. You can now move or reposition the panel independently.

*Adjusting the sensor threshold value*
You can adjust the sensor threshold value in the monitor panel by clicking the  or  buttons. You can also adjust the threshold values using the Config window.

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

**Click to increase value**

**Click to decrease value**
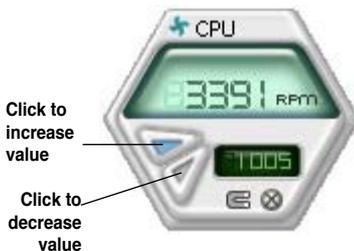
*Monitoring sensor alert*

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



**Large display**



**Small display**

## WMI browser

Click [WMI] to display the WMI (Windows Management Instrumentation) browser. This browser displays various Windows® management information. Click an item from the left panel to display on the right panel. Click the plus sign (+) before WMI Information to display the available information.



You can enlarge or reduce the browser size by dragging the bottom right corner of the browser.

## DMI browser

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

### PCI browser

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

### Usage

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

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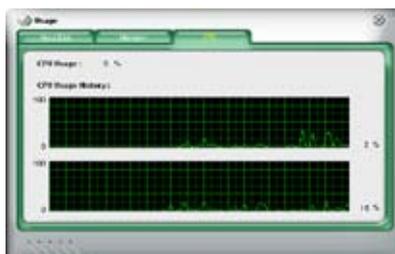
*Hard disk drive space usage*
The Hard Disk tab displays the
used and available hard disk
drive space. The left panel of the
tab lists all logical drives. Click
a hard disk drive to display the
information on the right panel.
The pie chart at the bottom of
the window represents the used
(blue) and the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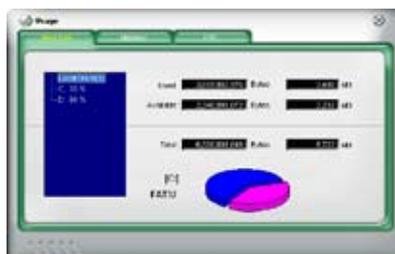
*Memory usage*
The Memory tab shows both used and available physical memory. The pie chart at the bottom of the window represents the used (blue) and the available physical memory.

## 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**

### 5.3.5    ASUS AI Suite

ASUS AI Suite allows you to launch AI Gear 2, AI Booster 2, CPU Level Up, Q-Fan Plus, AI N.O.S., 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 AI Gear 2, AI Booster 2, CPU Level Up, Q-Fan Plus, AI N.O.S., and AI Nap icon to launch the utility, or click the Normal icon to restore the system to normal state.

Press to restore to normal

Press to launch AI Nap

Press to launch AI Gear  2

Press to launch AI N.O.S.

Press to launch AI Booster 2

Press to launch Q-Fan Plus

Press to launch CPU Level Up
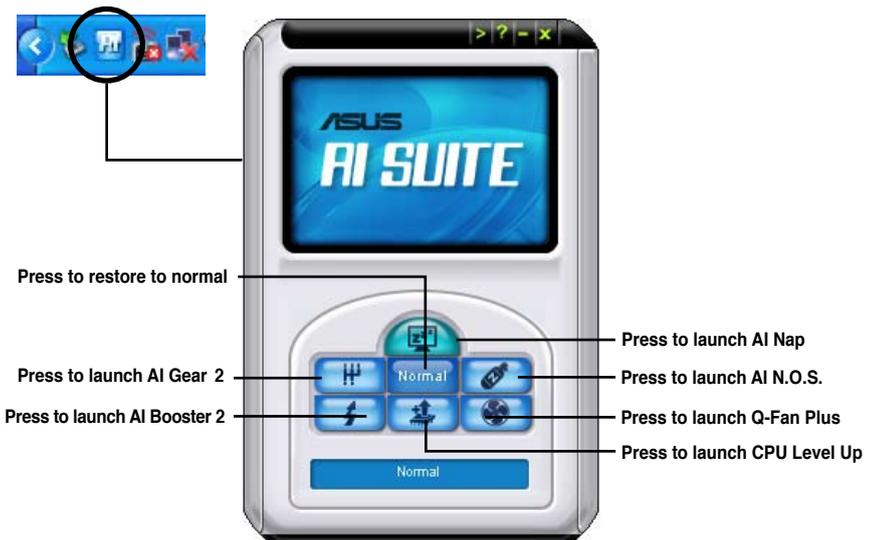
Other feature buttons

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



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

**Displays the FSB/CPU frequency**

Click [°C/°F] on right corner of the expanded window to switch the temperature from degrees Centigrade to degrees Fahrenheit.

### 5.3.6    ASUS AI Gear 2

ASUS AI Gear 2 provides four system performance options that allows you to select the best performance setting for your computing needs. This easy-to-use utility adjusts the processor frequency and vCore voltage to minimize system noise and power consumption.

After installing AI Suite from the bundled support DVD, you can launch AI Gear 2 by double-clicking the AI Suite icon on your Windows® taskbar and then click the AI Gear 2 button on the AI Suite main window.

Shift the gear to the performance setting that you like.

**Maximum Performance**

**Medium Performance**

**High Performance**

**Maximum Power Saving**
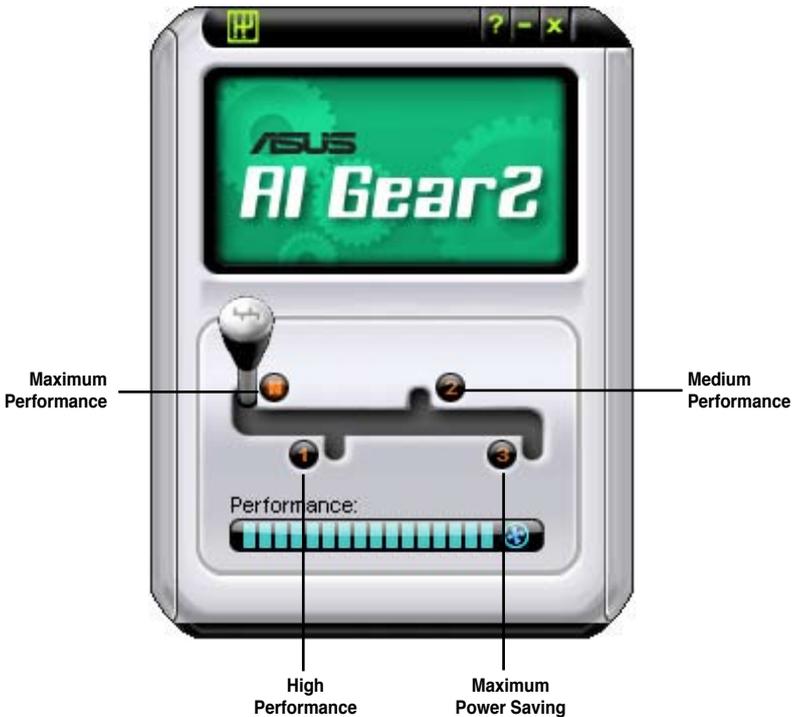
### 5.3.7    ASUS AI Nap

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

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

Click **Yes** on the confirmation screen.
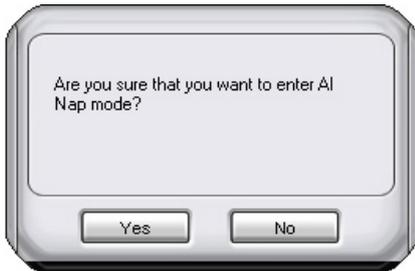


To exit AI Nap mode, press the system power or mouse button then click **Yes** on the confirmation screen.
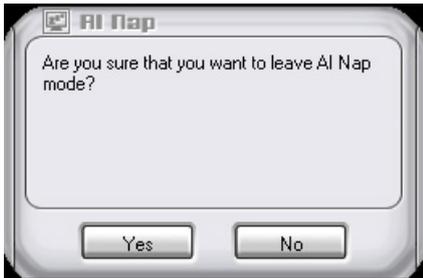


To switch the power button functions from AI Nap to shutting down, just right click the **AI Suite** icon on the OS taskbar, select **AI Nap** and click **Use power button**. Unclick the the item to switch the function back.

## 5.3.8    ASUS Q-Fan Plus

The ASUS Q-Fan Plus feature allows you to set the appropriate performance level of the CPU/chassis/optional/power fans for more efficient system operation.

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

Click the Fan Name drop-down list button to display the fans and select a fan from the list.



**Drop-down list button**

**Select a fan**

Click the Fan Control drop-down list button to select a fan control mode:

- **Duty-Cycle Mode:** You can determine the duty cycle percentage for each fan.
- **Q-FAN Mode:** The fans will automatically adjust their speeds according to component temperature.

Power fan is supported by Duty-Cycle Mode only.



**Select a fan control mode**

**Select a fan duty cycle**
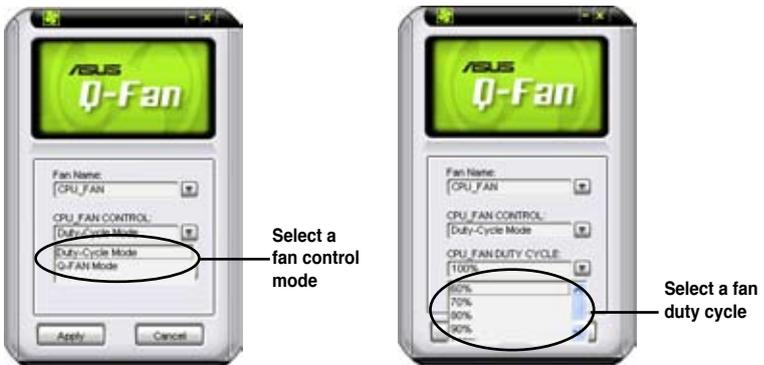
Click **Apply** at the bottom to save the setup.

### 5.3.9    ASUS AI Booster 2

The ASUS AI Booster 2 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, launch the utility by double-
clicking the AI Suite icon on the Windows® taskbar and click the AI Booster 2 button
on the AI Suite main window.
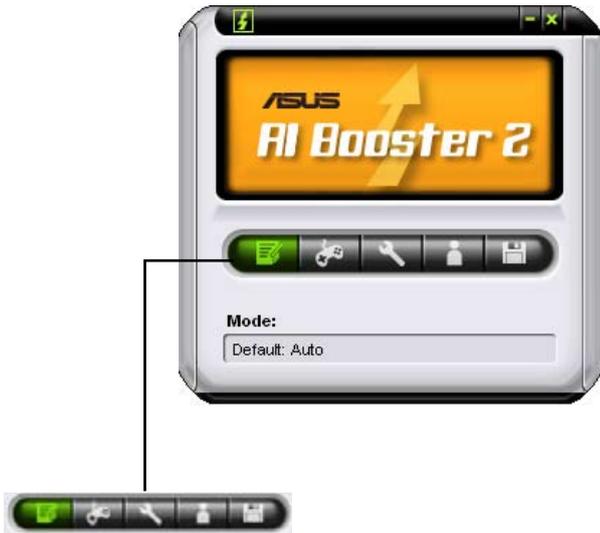


The options on the taskbar allow you to apply the default settings or adjust system
overclocking performance and CPU frequency/ratio. You can also create an
overclocking profile.

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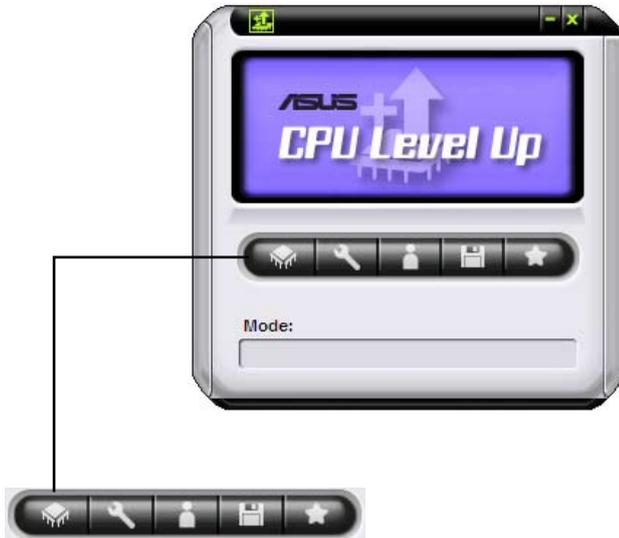
The options on the taskbar allow you to select the CPU level and adjust CPU frequency/ratio. You can also create an overclocking profile.

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

# 5.4 RAID configurations

The motherboard comes with the NVIDIA® nForce® 780a SLI™ Southbridge RAID controller that allows you to configure IDE and Serial ATA hard disk drives as RAID sets.

## 5.4.1 RAID definitions

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

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

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

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

**JBOD** *(Spanning)* stands for Just a Bunch of Disks and refers to hard disk drives that are not yet configured as a RAID set. This configuration stores the same data redundantly on multiple disks that appear as a single disk on the operating system. Spanning does not deliver any advantage over using separate disks independently and does not provide fault tolerance or other RAID performance benefits.

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

## 5.4.2    NVIDIA® RAID configurations

The motherboard includes a high performance SATA RAID controller integrated in the NVIDIA® southbridge chipset. It supports RAID 0, RAID 1, RAID 0+1, RAID 5 and JBOD for six independent Serial ATA channels.

### Installing Serial ATA (SATA) hard disks

The motherboard supports Ultra DMA 133/100/66 and 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.

> Refer to the RAID controllers user manual in the motherboard support DVD for detailed information on RAID configurations. See section **5.2.5 Manuals menu**.

### Setting the BIOS RAID items

After installing the hard disk drives, make sure to set the necessary RAID items in the BIOS before setting your RAID configuration.

To set the BIOS RAID items:

1.    Boot the system and press <Del> during the Power-On Self-Test (POST) to enter the BIOS Setup Utility.

2.    Go to **Advanced > MCP Storage Config**.

3.    Set the **SATA Operation Mode** item to [RAID]. See section "4.5.6 MCP Storage Config" for details.

4.    Save your changes and Exit Setup.

Make sure to re-enter your NVRAID settings after the CMOS is cleared; otherwise, the system will not recognize your RAID setup.

For detailed descriptions on the NVIDIA® RAID configuration, refer to the **NVIDIA RAID User Guide** found in your motherboard support DVD.

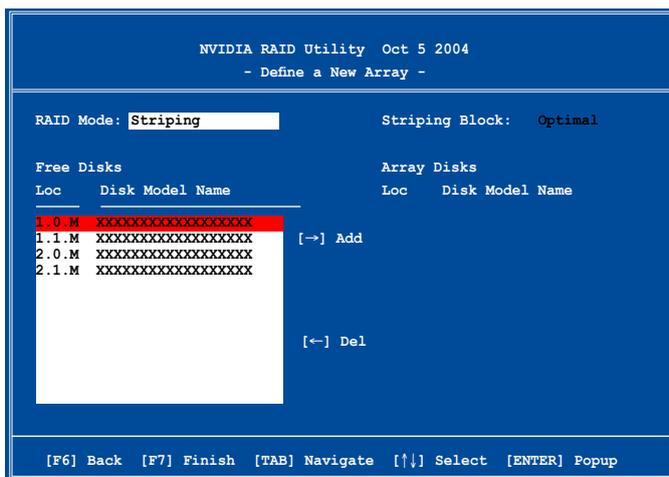### Entering the NVIDIA® RAID utility

To enter the NVIDIA® RAID utility:

1.    Boot up your computer.
2.    During POST, press <F10> to display the main menu of the utility.

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

```
                    NVIDIA RAID Utility  Oct 5 2004
                       - Define a New Array -

 RAID Mode: Striping                 Striping Block:   Optimal

 Free Disks                          Array Disks
 Loc    Disk Model Name              Loc    Disk Model Name

 1.0.M  XXXXXXXXXXXXXXXXXX
 1.1.M  XXXXXXXXXXXXXXXXXX    [→] Add
 2.0.M  XXXXXXXXXXXXXXXXXX
 2.1.M  XXXXXXXXXXXXXXXXXX


                                     [←] Del



  [F6] Back  [F7] Finish  [TAB] Navigate  [↑↓] Select  [ENTER] Popup
```

At the bottom of the screen are the navigation keys. These keys allow you to move through and select menu options.

## Creating a RAID Volume

To create a RAID volume:

1. From the NVIDIA® RAID utility Define a New Array menu, select RAID Mode then press <Enter>. The following submenu appears.

   Use the up or down arrow keys to select a RAID mode then press <Enter>.

   ```
   Mirroring
   Striping
   Stripe Mirroring
   Spanning
   ```

2. Press <TAB> select the Striping Block then press <Enter>. The following submenu appears:

   ```
   8K    ↑
   16K
   32K
   64K
   128K
   Optim  ↓
   ```
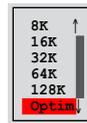
   If you selected Striping or Stripe Mirroring, use the up or down arrow keys to select the stripe size for your RAID 0 array then press <Enter>.The available values range from 8 KB to 128 KB. The default selection is 128 KB. The strip value should be chosen based on the planned drive usage.

   • 8 /16 KB - low disk usage

   • 64 KB - typical disk usage

   • 128 KB - performance disk usage

   > TIP: For server systems, we recommend using a lower array block size. For multimedia computer systems used mainly for audio and video editing, we recommend a higher array block size for optimum performance.

3.` Press <TAB> to select the Free Disks area. Use the left or right arrow keys to assign the array disks.

4. Press <F7> to create RAID set. The following message box appears.

   ```
   Clear disk data?


   [Y] YES     [N] NO
   ```

5. Press <Y> to clear the selected disks or <N> to proceed without clearing the disks. The following screen appears.

   > Take caution in using this option. All data on the RAID drives will be lost!

```
                    NVIDIA RAID Utility  Oct 5 2004
                          - Array List -

            Boot   Id  Status    Vendor   Array Model Name

            No     4   Healthy   NVIDIA   MIRROR   XXX.XXG
```

```
[Ctrl-X]Exit   [↑↓]Select   [B]Set Boot   [N]New Array   [ENTER]Detail
```

A new set of navigation keys is displayed on the bottom of the screen.

6.   Press <Ctrl+X> to save settings and exit.
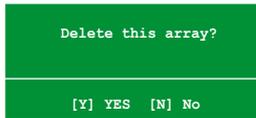
## Rebuilding a RAID array

To rebuild a RAID array:

1.   From the Array List menu, use the up or down arrow keys to select a RAID
     array then press <Enter>. The RAID Array details appear.

```
                    Array 1 : NVIDIA MIRROR  XXX.XXG
                          - Array Detail -

    RAID Mode: Mirroring
    Striping Width: 1              Striping Block: 64K

    Adapt  Channel  M/S     Index  Disk Model Name       Capacity

    2      1        Master  0      XXXXXXXXXXXXXXXXX      XXX.XXGB
    1      0        Master  1      XXXXXXXXXXXXXXXXX      XXX.XXGB
```

```
         [R] Rebuild  [D] Delete  [C] Clear Disk  [ENTER] Return
```

A new set of navigation keys is displayed on the bottom of the screen.

2.  Press <R> to rebuild a RAID array. The following screen appears.

```
                    Array 1 : NVIDIA MIRROR  XXX.XXG
                       - Select Disk Inside Array -

        RAID Mode: Mirroring
        Striping Width: 1              Striping Block: 64K

        Adapt  Channel  M/S     Index  Disk Model Name        Capacity

        2      1        Master  0      XXXXXXXXXXXXXXXXXX     XXX.XXGB
        1      0        Master  1      XXXXXXXXXXXXXXXXXX     XXX.XXGB




                    [↑↓] Select [F6] Back  [F7] Finish
```
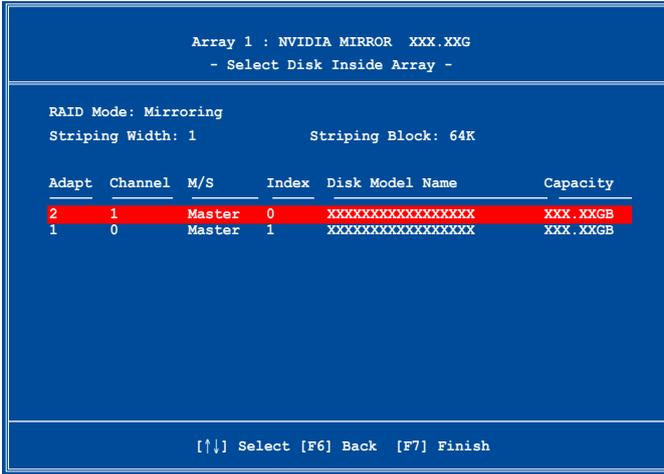
3.  Use the up or down arrow keys to select a RAID array to rebuild, then press
    <F7>. The following confirmation message appears.

```
                            Rebuild array?


                    [ENTER] OK  [ESC] Cancel
```

4.  Press <Enter> to start rebuilding array or press <Esc> to cancel.

5.  After the rebuild process, the Array list menu appears.

You will need to enter Window® XP and run the NVIDIA utility in order to
complete the rebuilt process.

## Deleting a RAID array

To delete a RAID array:

1.  From the Array List menu, use the up or down arrow keys to select a RAID array then press <Enter>. The RAID Array details appear.

```
              Array 1 : NVIDIA MIRROR  XXX.XXG
                       - Array Detail -

   RAID Mode: Mirroring
   Striping Width: 1            Striping Block: 64K

   Adapt  Channel  M/S     Index  Disk Model Name         Capacity
   2      1        Master  0      XXXXXXXXXXXXXXXXX        XXX.XXGB
   1      0        Master  1      XXXXXXXXXXXXXXXXX        XXX.XXGB




         [R] Rebuild  [D] Delete  [C] Clear Disk  [ENTER] Return
```
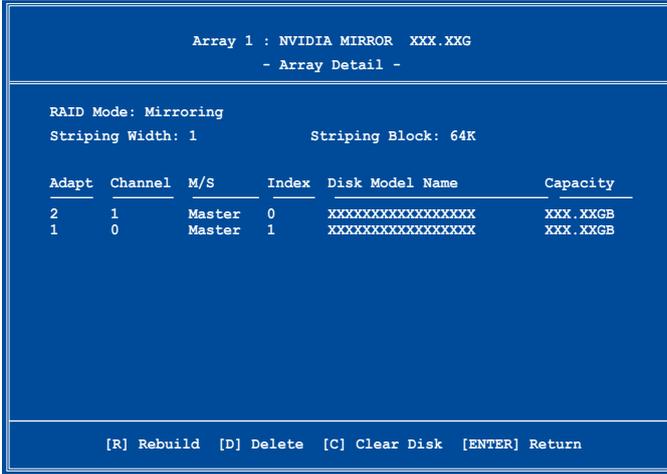
A new set of navigation keys is displayed on the bottom of the screen.

2.  Press <D> to delete a RAID array. The following confirmation message appears.

```
                    Delete this array?


                    [Y] YES  [N] No
```

3.  Press <Y> to delete array or press <N> to cancel.

> Take caution in using this option. All data on the RAID drives will be lost!

4.  If you selected Yes, the Define a New Array menu appears.

## Clearing a disk data

To clear disk data:

1.    From the Array List menu, use the up or down arrow keys to select a RAID array then press <Enter>. The RAID Array details appear.

```
                    Array 1 : NVIDIA MIRROR  XXX.XXG
                          - Array Detail -

    RAID Mode: Mirroring
    Striping Width: 1              Striping Block: 64K

    Adapt  Channel  M/S     Index  Disk Model Name           Capacity

    2      1        Master  0      XXXXXXXXXXXXXXXXX         XXX.XXGB
    1      0        Master  1      XXXXXXXXXXXXXXXXX         XXX.XXGB




           [R] Rebuild  [D] Delete  [C] Clear Disk  [ENTER] Return
```
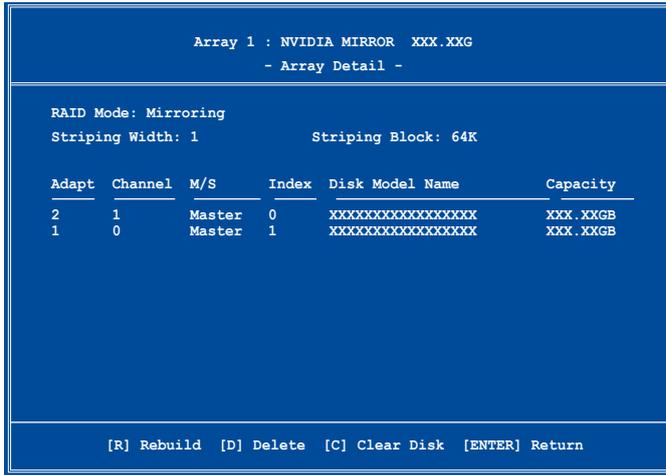
A new set of  navigation keys is displayed on the bottom of the screen.

2.    Press <C> to clear disk. The following confirmation message appears.

```
                    Clear disk data?


                    [Y] YES      [N]
```

5.    Press <Y> to clear the disk data or press <N> to cancel.

Take caution in using this option. All data on the RAID drives will be lost!

# 5.5    Creating a RAID driver disk

A floppy disk with the RAID driver is required when installing Windows® XP operating system on a hard disk drive that is included in a RAID set. For Windows® Vista™ operating system, use either a floppy disk or a USB device with the RAID driver.

### 5.5.1    Creating a RAID driver disk without entering the OS

To create a RAID/SATA driver disk without entering the OS:

1.    Boot your computer.
2.    Press <Del> during POST to enter the BIOS setup utility.
3.    Set the optical drive as the primary boot device.
4.    Insert the support DVD into the optical drive.
5.    Save changes and exit BIOS.
6.    Press any key when the system prompts "Press any key to boot from the optical drive."
7.    When the menu appears, press <1> to create a RAID driver disk.
8.    Insert a formatted floppy disk into the floppy drive then press <Enter>.
9.    Follow succeeding screen instructions to complete the process.

### 5.5.2    Creating a RAID/SATA driver disk in Windows®

To create a RAID driver disk in Windows®:

1.    Start Windows®.
2.    Place the motherboard support DVD into the optical drive.
3.    Go to the Make Disk menu, then click **NVIDIA 32/64 bit XP/Vista SATA RAID Driver** to create a NVIDIA® 32/64 bit XP/Vista™ SATA RAID driver disk.
4.    Insert a floppy disk/USB device into the floppy disk drive/USB port.
5.    Follow succeeding screen instructions to complete the process.

> Write-protect the floppy disk to avoid computer virus infection.

To install the RAID driver in Windows® XP:

1.    During the OS installation, the system prompts you to press the F6 key to install third-party SCSI or RAID driver.
2.    Press <F6> then insert the floppy disk with RAID driver into the floppy disk drive.
3.    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.    Follow the succeeding screen instructions to complete the installation.

Due to chipset limitation, the Serial ATA ports supported by the NVIDIA chipset does not support Serial Optical Disk Drives (Serial ODD) under DOS.

This chapter tells how to install SLI-ready
PCI Express graphics cards and how to use
the SLI™ and Hybrid SLI® features.

# NVIDIA®technology
# support

6

# Chapter summary

# 6.1 NVIDIA® SLI™ technology

The motherboard supports the NVIDIA® SLI™ (Scalable Link Interface) technology that allows you to install up to three identical PCI Express™ x16 graphics cards. Follow the installation procedures in this section.

## 6.1.1 Requirements

- In Dual SLI mode, you should have two identical SLI-ready graphics cards that are NVIDIA® certified.
- In 3-way SLI mode, you should have three identical SLI-ready graphics cards that are NVIDIA® certified.
- Make sure that your graphics card driver supports the NVIDIA SLI technology. Download the latest driver from the NVIDIA website (www.nvidia.com).
- Make sure that your power supply unit (PSU) can provide the minimum power required by your system. See page 2-35 for details.

- The NVIDIA 3-way SLI technology is supported by Windows® Vista™ operating system only.

- Visit the NVIDIA zone website (http://www.nzone.com) for the latest certified graphics card and the supported 3D application list.

## 6.1.2    Graphics card setup

**Installing three SLI-ready graphics cards**

✎ • Install only identical SLI-ready graphics cards that are NVIDIA®-certified. Different types of graphics cards will not work together properly.

• The following pictures are for reference only. The graphics cards and the motherboard layout may vary with models, but the installation steps remain the same.

To install the graphics cards:

1. Prepare three graphics cards. Each graphics card should have goldfingers for the 3-way SLI connector.
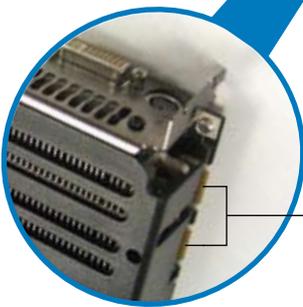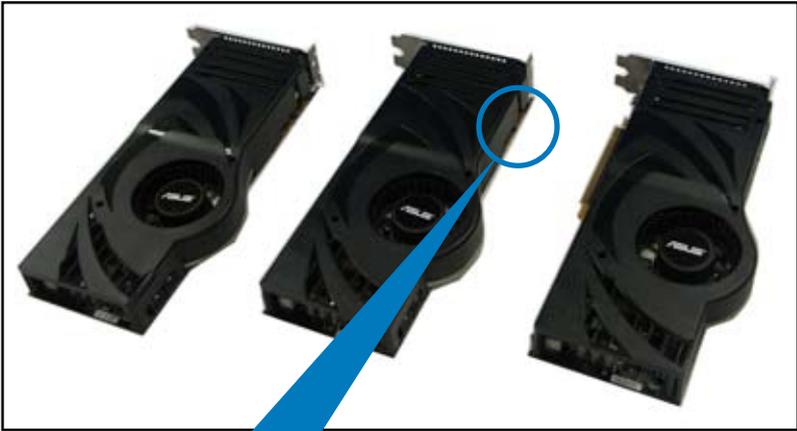


**Goldfingers**

2. Insert the first graphics card into the PCIEX16_1 slot (blue), the second into the PCIEX16_2 slot (white), and the third into the PCIEX16_3 slot (blue). Make sure that the cards are properly seated on the slots.
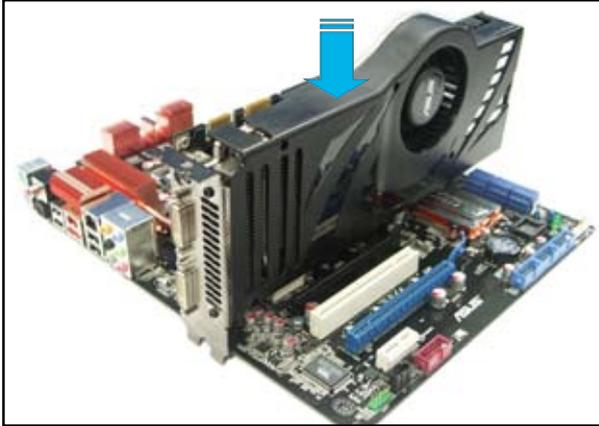


3. Align and firmly insert the 3-way SLI bridge connector to the goldfingers on each graphics card. Make sure that the connector is firmly in place.



**3-way SLI bridge connector**
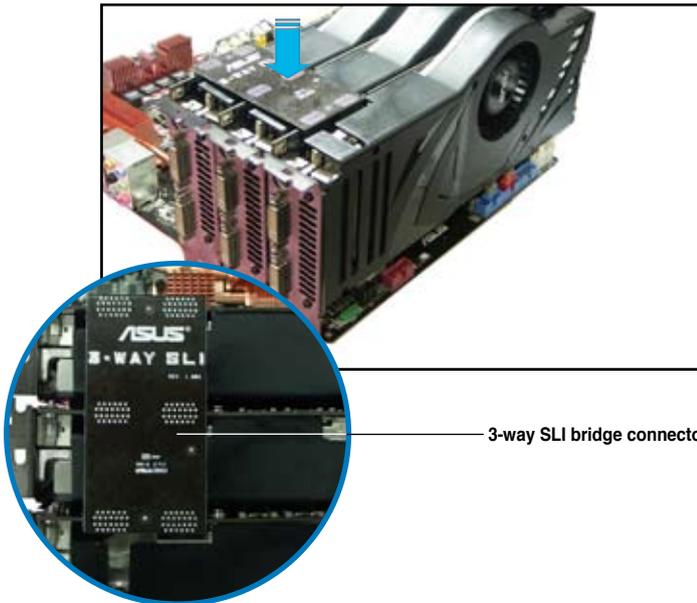
4.    Connect auxiliary power source from the power supply to the three graphics
      cards separately.
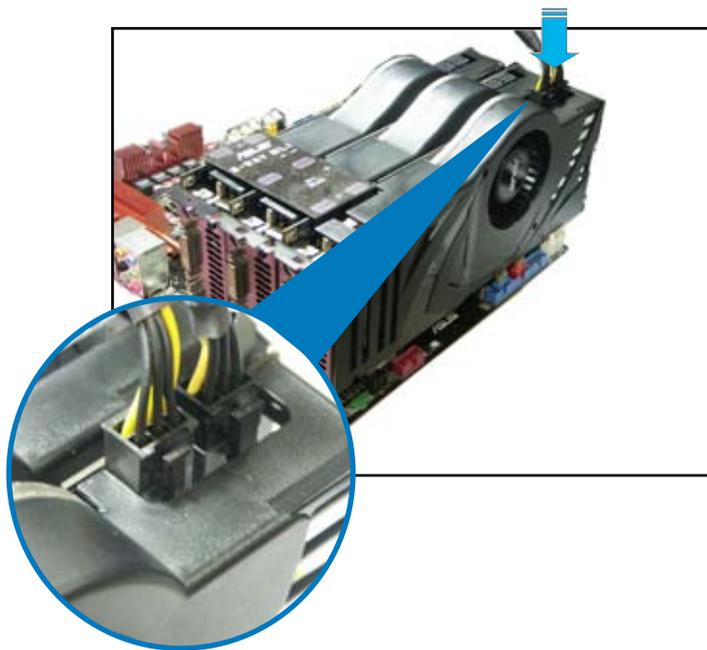


5.    Connect a VGA or a DVI cable to the graphics card/s.

> We recommend that you install an additional chassis fan for better thermal
> environment.

## Installing two SLI-ready graphics cards

1.  Insert one graphics card into the PCIEX16_1 slot (blue) and the other into the PCIEX16_3 slot (blue). Make sure that the cards are properly seated on the slots.

2.  Align and insert the SLI connector to the goldfingers on each graphics card. Make sure that the connector is firmly in place.

3.  Connect auxiliary power source from the power supply to the two graphics cards separately.

4.  Connect a VGA or a DVI cable to the graphics card/s.

> We recommend that you install an additional chassis fan for better thermal environment.
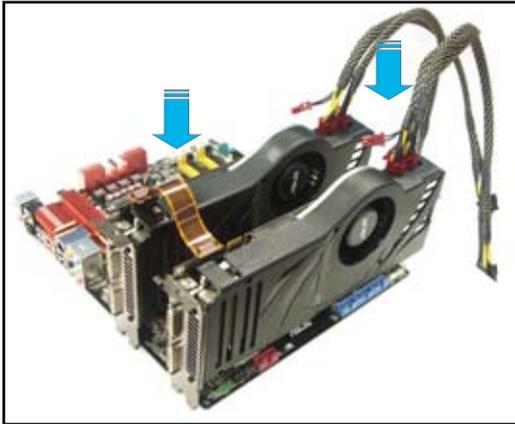
### 6.1.3    Installing the device drivers

Refer to the documentation that came with your graphics card package to install the device drivers.

- • Make sure that your PCI Express graphics card driver supports the NVIDIA® SLI™ technology. Download the latest driver from the NVIDIA website (www.nvidia.com).

- • If you want to create a 3-way SLI configuration, make sure you install the 3-way SLI driver under Windows® Vista OS. The NVIDIA 3-way SLI technology is supported by Windows® Vista only.

### 6.1.4    Enabling the NVIDIA® SLI™ technology in Windows®

After installing your graphics cards and the device drivers, enable the SLI feature through NVIDIA® Control Panel under the Windows® Vista™ operating system.

#### Launching the NVIDIA Control Panel

You can launch the NVIDIA Control Panel by the following two methods.

A.   Right click on the empty space of the Windows® desktop and select **NVIDIA Control Panel**.

The NVIDIA Control Panel window appears (see Step B5 on page 6-8).

B1.  If you do not see the NVIDIA Control Panel item in Step A, select **Personalize**.
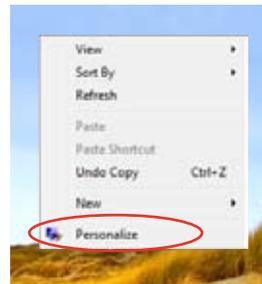
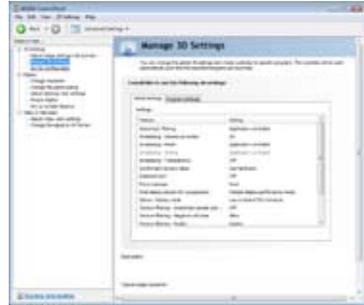B2. From the **Personalization** window, select **Display Settings**.
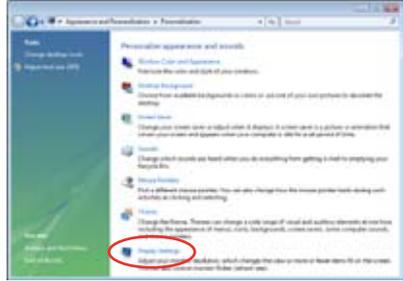
B3. From the Display Settings dialog box, click **Advanced Settings.**

B4. Select the NVIDIA GeForce tab, and then click **Start the NVIDIA Control Panel**.

B5.	The NVIDIA Control Panel window appears.

## Enabling SLI configuration

### When installing two graphics gards:

From the NVIDIA Control Panel window, select **Set SLI Configuration**. Click **Enable SLI** and set the display for viewing SLI rendered content. When done, click **Apply**.

### When installing three graphics gards:

1.	From the NVIDIA Control Panel window, select **Set SLI Configuration**, and then click **Enable 3-way NVIDIA SLI**. When done, click **Apply**.
2.	Click the **3D Settings** tab and enable the **Show SLI Visual Indicators** item.
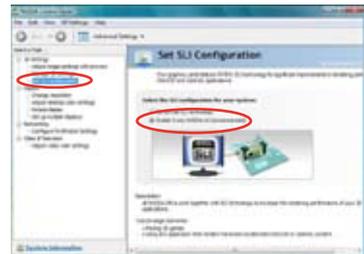
When you launch a 3D demonstration, a green bar will appear on the left of the screen to indicate the 3-way SLI status.

# 6.2 NVIDIA® Hybrid SLI® Technology

The motherboard supports the NVIDIA® Hybrid SLI® technology that includes two primary features: GeForce® Boost and HybridPower™. GeForce® Boost enhances the performance of NVIDIA discrete Graphics Process Units (dGPU) when they work with the onboard motherboard GPU (mGPU). HybridPower™ unleashes the graphics performance of the dGPU and enables low-power operation when the performance of the dGPU is not needed. You can switch from the dGPU(s) to the mGPU for a quiet, power-saving computer environment.

> • Hybrid SLI technology is supported by Windows® Vista™ only.
>
> • GeForce Boost supports up to two displays simultaneously (both connected to either the mGPU or the dGPU).
>
> • When two or more displays are connected to both the mGPU and the dGPU, the Hybrid SLI mode is disabled and the multi-display mode is enabled. In the multi-display mode, up to four displays can be connected (two displays driven by the mGPU and two displays by the dGPU).
>
> • HybridPower requires displays to be connected to the mGPU. HybridPower cannot be enabled when displays are driven through the dGPU.
>
> • HybridPower and GeForce Boost are supported by certain set of dGPUs. Go to www.nvidia.com/hybridsli to learn the supported GPUs.

## 6.2.1 System requirements

Before using Hybrid SLI, make sure if your system meets the following requirements:

**For best GeForce Boost performance**
• AMD Phenom 9600 CPU (operating at 1800Mhz or higher)
• 2 x 1024MB of DDR2-800 DRAM
• Discrete GPU recommended for GeForce Boost
• At least 256MB of Frame Buffer carve out for the motherboard GPU

**For best HybridPower benefits**
• AMD Athlon X2 3800+ CPU (operating at 1800Mhz or higher)
• 2 x 1024MB of DDR2-667 DRAM
• Discrete GPU recommended for HybridPower
• At least 256MB of Frame Buffer carve out for the motherboard GPU
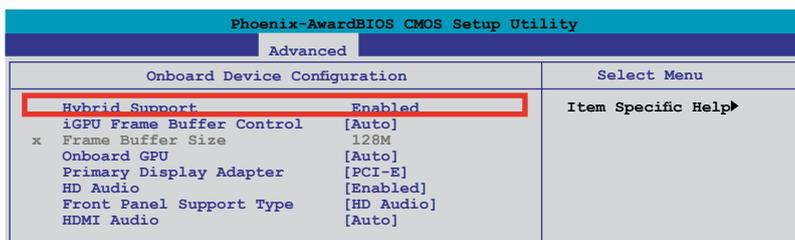
## 6.2.2 Enabling GeForce® Boost and HybridPower™

✎
- Before enabling GeForce Boost and HybridPower, make sure that you have installed a dGPU recommended for GeForce Boost on your motherboard.
- Make sure that you have connected your display to the dGPU. Otherwise, the motherboard cannot detect your display and no image appears.

**To enable GeForce Boost**

1. Turn on the system and press <Del> during the Power-On Self-Test (POST) to enter the BIOS Setup Utility.

2. Go to **Advanced > Onboard Device Configuration** and set the **Hybrid Support** item to [Enabled]. See section **4.5.3 Onboard Device Configuration** for details.

✎
- The **Hybrid Support** item appears only when a minimum of 2GB memory is detected.
- The **Hybrid Support** item becomes user-configurable only when a dGPU is detected. Make sure that your dGPU is properly installed.

```
                 Phoenix-AwardBIOS CMOS Setup Utility
                           Advanced
        Onboard Device Configuration              Select Menu

     Hybrid Support             Enabled       Item Specific Help▶
     iGPU Frame Buffer Control  [Auto]
   x Frame Buffer Size           128M
     Onboard GPU                [Auto]
     Primary Display Adapter    [PCI-E]
     HD Audio                   [Enabled]
     Front Panel Support Type   [HD Audio]
     HDMI Audio                 [Auto]
```

3. Save your changes and Exit Setup.

4. Turn off the system, disconnect your display from the dGPU, and connect your display to the onboard VGA port at the rear panel.

5. Turn on the system. From the Windows® desktop, go to **Start > Control Panel > User Accounts and Family Safety** to turn off **User Account Control**.

6. Place the motherboard support DVD into the optical drive, and go to the **Drivers** menu to install the **NVIDIA Chipset Driver Program**.

7. Restart the system.

8. If the driver is correctly installed, you will find the Hybrid SLI icon on the taskbar.

   The Hybrid SLI icon indicates that the system is in Performance mode and that GeForce Boost is enabled. The onboard GPU will share the rendering load with the dGPU and boost the performance of the dGPU.

**To enable HybridPower**

1.  Follow Step 1 to 7 on the previous page to complete the hardware and driver installation.
2.  If the driver is correctly installed, you will find the Hybrid SLI icon on the taskbar.
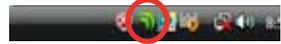
    The Hybrid SLI icon indicates that the system is in Performance mode and that rendering is being done by the dGPU. The mGPU is being used only to drive the display.
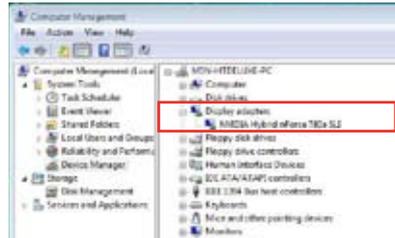3.  Click the Hybrid SLI icon and select **Save Power**.
4.  The icon will change state (from [icon] to [icon]) to indicate that the system is in Power Saving mode, which means that the dGPU is turned off and the mGPU is both rendering and displaying.
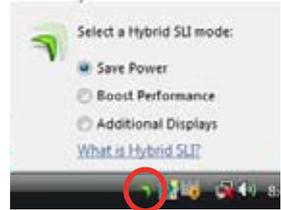
5.  When the Power Saving mode is enabled, the dGPU does not show in the Windows® Device Manager.
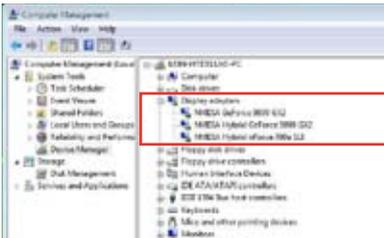
**Power Saving mode is disabled.**

**When the Power Saving mode is enabled, the dGPU is turned off and does not appear in the Device Manager.**

Chapter 6: NVIDIA® SLI™ technology support

The Appendix includes the debug code
table for the LCD Poster.

# Debug code
# table

A

# Chapter summary

A

# A.1　Debug code table

| Code | Description |
|------|-------------|
| CPU INIT | CPU Initiation |
| DET CPU | Test CMOS R/W functionality. |
| CHIPINIT | Early chipset initialization:<br>-Disable shadow RAM<br>-Disable L2 cache<br>-Program basic chipset registers |
| DET DRAM | Detect memory<br>-Auto-detection of DRAM size, type and ECC.<br>-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<br>2. Clear CMOS error flag |
| INIT8042 | 1. Clear 8042 interface<br>2. Initialize 8042 self-test |
| ENABLEKB | 1. Test special keyboard controller for Super I/O chips.<br>2. Enable keyboard interface. |
| DIS MS | 1. Disable PS/2 mouse interface (optional).<br>2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional).<br>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.<br>2. Initialize the APIC for Pentium class CPU.<br>3. Program early chipset according to CMOS setup. Example: onboard IDE controller.<br>4. Measure CPU speed.<br>5. Invoke video BIOS. |
| VGA BIOS | Initialize VGA BIOS |
| TESTVRAM | 1. Initialize multi-language<br>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** | 1. Program MTRR of M1 CPU<br>2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range.<br>3. Initialize the APIC for P6 class CPU.<br>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** | 1. Initialize floppy controller<br>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** | Clear EPA or customization logo.<br>1. Call chipset power management hook.<br>2. Recover the text fond used by EPA logo (not for full screen logo)<br>3. If password is set, ask for password. |

| | |
|---|---|
| **USB FINAL** | Initialize PnP boot devices<br>1. USB final Initialization<br>2. NET PC: Build SYSID structure<br>3. Switch screen back to text mode<br>4. Set up ACPI table at top of memory.<br>5. Invoke ISA adapter ROMs<br>6. Assign IRQs to PCI devices<br>7. Initialize APM<br>8. Clear noise of IRQs. |
| **INIT ROM** | Initialize device option ROMs. |
| **NUM LOCK** | 1. Program daylight saving<br>2. Update keyboard LED & typematic rate |
| **UPDT DMI** | 1. Build MP table<br>2. Build & update ESCD<br>3. Set CMOS century to 20h or 19h<br>4. Load CMOS time into DOS timer tick<br>5. Build MSIRQ routing table. |
| **INT 19H** | Boot attempt (INT 19h) |