Crosshair IV Extreme

Motherboard

E6071

Second Edition
August 2010

Contents

Contents

Contents

Contents

Contents

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.

FCC Radio Frequency (RF) Exposure Caution Statement

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. "The manufacture declares that this device is limited to Channels 1 through 11 in the 2.4GHz frequency by specified firmware controlled in the USA."

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To maintain compliance with FCC RF exposure compliance requirements, please avoid direct contact to the transmitting antenna during transmitting. End users must follow the specific operating instructions for satisfying RF exposure compliance.

RF exposure warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Declaration of Conformity (R&TTE directive 1999/5/EC)

The following items were completed and are considered relevant and sufficient:

- Essential requirements as in [Article 3]
- Protection requirements for health and safety as in [Article 3.1a]
- Testing for electric safety according to [EN 60950]
- Protection requirements for electromagnetic compatibility in [Article 3.1b]
- Testing for electromagnetic compatibility in [EN 301 489-1] & [EN 301 489-17]
- Effective use of the radio spectrum as in [Article 3.2]
- Radio test suites according to [EN 300 328-2]

CE Marking

CE

CE marking for devices without wireless LAN/Bluetooth

The shipped version of this device complies with the requirements of the EEC directives 2004/108/EC “Electromagnetic compatibility” and 2006/95/EC “Low voltage directive”.

CE !

CE marking for devices with wireless LAN/ Bluetooth

This equipment complies with the requirements of Directive 1999/5/EC of the European Parliament and Commission from 9 March, 1999 governing Radio and Telecommunications Equipment and mutual recognition of conformity.

Wireless Operation Channel for Different Domains

N. America	2.412-2.462 GHz	Ch01 through CH11
Japan	2.412-2.484 GHz	Ch01 through Ch14
Europe ETSI	2.412-2.472 GHz	Ch01 through Ch13

France Restricted Wireless Frequency Bands

Some areas of France have a restricted frequency band. The worst case maximum authorized power indoors are:

- 10mW for the entire 2.4 GHz band (2400 MHz–2483.5 MHz)
- 100mW for frequencies between 2446.5 MHz and 2483.5 MHz

Channels 10 through 13 inclusive operate in the band 2446.6 MHz to 2483.5 MHz.

There are few possibilities for outdoor use: On private property or on the private property of public persons, use is subject to a preliminary authorization procedure by the Ministry of Defense, with maximum authorized power of 100mW in the 2446.5–2483.5 MHz band. Use outdoors on public property is not permitted.

In the departments listed below, for the entire 2.4 GHz band:

- Maximum authorized power indoors is 100mW
- Maximum authorized power outdoors is 10mW

Departments in which the use of the 2400–2483.5 MHz band is permitted with an EIRP of less than 100mW indoors and less than 10mW outdoors:

01 Ain	02 Aisne	03 Allier	05 Hautes Alpes
08 Ardennes	09 Ariège	11 Aude	12 Aveyron
16 Charente	24 Dordogne	25 Doubs	26 Drôme
32 Gers	36 Indre	37 Indre et Loire	41 Loir et Cher
45 Loiret	50 Manche	55 Meuse	58 Nièvre
59 Nord	60 Oise	61 Orne	63 Puy du Dôme
64 Pyrénées Atlantique		66 Pyrénées Orientales	
67 Bas Rhin	68 Haut Rhin	70 Haute Saône	71 Saône et Loire
75 Paris	82 Tarn et Garonne	84 Vaucluse	
88 Vosges	89 Yonne	90 Territoire de Belfort	
94 Val de Marne			

This requirement is likely to change over time, allowing you to use your wireless LAN card in more areas within France. Please check with ART for the latest information (www.art-telecom.fr)

Your WLAN Card transmits less than 100mW, but more than 10mW.

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.

Cet appareil numérique de la classe [B] est conforme à la norme NMB-003 du Canada.

IC Radiation Exposure Statement for Canada

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. To maintain compliance with IC RF exposure compliance requirements, please avoid direct contact to the transmitting antenna during transmitting. End users must follow the specific operating instructions for satisfying RF exposure compliance.

Operation is subject to the following two conditions:

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

To prevent radio interference to the licensed service (i.e. co-channel Mobile Satellite systems) this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

The user is cautioned that this device should be used only as specified within this manual to meet RF exposure requirements. Use of this device in a manner inconsistent with this manual could lead to excessive RF exposure conditions.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/ CANADA.

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Ensure 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.
- The optical S/PDIF is an optional component (may or may not be included in your motherboard) and is defined as a CLASS 1 LASER PRODUCT.

INVISIBLE LASER RADIATION, AVOID EXPOSURE TO BEAM.

- Never dispose of the battery in fire. It could explode and release harmful substances into the environment.
- Never dispose of the battery with your regular household waste. Take it to a hazardous material collection point.
- Never replace the battery with an incorrect battery type.

- RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
- DISPOSE OF USED BATTERIES ACCORDING TO THE ABOVE BATTERY-RELATED INSTRUCTIONS.

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, ensure 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.

This motherboard should only be used in environments with ambient temperatures between 5ºC (41ºF) and 40ºC (104ºF).

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

DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

About this guide

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

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**

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

- **Chapter 2: Hardware information**

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

- **Chapter 3: BIOS setup**

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

- **Chapter 4: Software support**

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

- **Appendix: Reference information**

  This appendix includes additional information that you may refer to when configuring the motherboard.

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

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

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

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

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

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1+Key2+Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: <Ctrl+Alt+D>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets. Example: At the DOS prompt, type the command line: `afudos /iC4E.ROM`

Crosshair IV Extreme specifications summary

CPU	AMD® socket AM3 Phenom™ II/Athlon™ II/ Sempron™ 100 Series Processors Supports 45nm CPU AMD® Cool 'n' Quiet™ Technology AMD® 140W CPU Support
Chipset	AMD® 890FX / SB850
System Bus	Up to 5200 MT/s HyperTransport™ 3.0
Memory	Dual channel memory architecture 4 x DIMM, max. 16GB, DDR3 2000(O.C.)/1866(O.C.)/1800(O.C.)/1600(O.C.) / 1333 / 1066 MHz, ECC and non-ECC, un-buffered memory *Refer to www.asus.com or user manual for the Memory QVL (Qualified Vendors Lists) **Due to OS limitation, when installing total memory of 4GB capacity or more, Windows® 32-bit operation system may only recognize less than 3GB. Hence, a total installed memory of less than 3GB is recommended.
Expansion Slots	*5 x PCIe2.0 x16 slots (dual @ x16, triple @x16, quad@x16 x16 x8 x8) 1 x PCI 2.2
Multi-GPU Technology	Support HYDRALOGIX / ATI CrossFire™X Technology
Storage	**SB850 South Bridge:** - 6 x SATA 6Gb/s ports with RAID 0, 1, 5, 10 (Red) **2 x JMicron® 363 controllers:** - 2 x SATA 3Gb/s ports (Gray) - 2 x External SATA 3Gb/s ports at rear (SATA On-the-Go) * Due to the Windows XP/ Vista limitation, the RAID array with the total capacity over 2TB cannot be set as a boot disk. A RAID array over 2TB can only be set as a data disk only.
LAN	Intel® Gigabit LAN
High Definition Audio	8-channel High Definition Audio CODEC - Supports Jack-Detection, Multi-streaming, Front Panel Jack-Retasking - Supports 1 Optical S/PDIF out port at back I/O
IEEE 1394a	2 x 1394a ports (1 port at back I/O, 1 port onboard)

***Refer to Chapter 2 for slot configurations.**

(continued on the next page)

Crosshair IV Extreme specifications summary

USB	NEC® USB 3.0 controller - 2 x USB 3.0/2.0 ports at rear AMD® SB850 chipset - 13 x USB 2.0 ports (6 ports at mid-board, 6 ports at rear, 1 port at rear is also for ROG connect)
ROG Exclusive Overclocking Features	ROG Connect RC Bluetooth ROG iDirect Power Design: - 8+2 phase CPU power design with ML Cap USB BIOS Flashback BIOS Flashback with onboard switch button Extreme Tweaker ProbeIt iROG PCIe x16 Lane Switch Loadline Calibration Intelligent overclocking tools: - ASUS TurboV Evo - O.C Profile Overclocking Protection: - COP EX (Component Overheat Protection - EX) - Voltiminder LED - ASUS C.P.R.(CPU Parameter Recall)
Other Special Features	CPU Level Up MemOK! Onboard Switches: Power / Reset / Core Unlocker / Clr CMOS (at rear) Q-Fan Plus ASUS Fan Xpert ASUS Q-LED (CPU, DRAM, VGA, Boot Device LED) ASUS Q-Connector ASUS Q-Shield ASUS Q-Fan 2 ASUS EZ Flash 2 ASUS CrashFree BIOS 3 ASUS MyLogo 3
BIOS Features	16Mb AMI BIOS, PnP, DMI2.0, WfM2.0, SM BIOS 2.4, ACPI2.0a Multi-Language BIOS

(continued on the next page)

Crosshair IV Extreme specifications summary

Manageability	WOL by PME, WOR by PME, PXE
Back Panel I/O Ports	1 x PS/2 Keyboard port (purple) 2 x External SATA ports 1 x LAN (RJ45) port 2 x USB 3.0/2.0 ports 7 x USB 2.0/1.1 ports (1 port is also for ROG Connect) 1 x IEEE1394a port 1 x S/PDIF Out (Optical) 8-channel Audio I/O 1 x ROG Connect On/Off switch 1 x RC Bluetooth switch 1 x Clr CMOS switch
Internal I/O Connectors	3 x USB 2.0 connectors supports additional 6 USB 2.0 ports 8 x SATA connectors: 6 x SATA 6Gb/s connectors (Red) & 2 x SATA 3Gb/s connectors (Gray) 8 x Fan connectors: 1 x CPU / 1 x PWR / 3 x Chassis / 3x Optional 7 x ProbeIt measurement points 3 x Thermal sensor connectors 1 x IEEE1394a connector 1 x SPDIF_out connector 1 x 24-pin ATX power connector 1 x 8-pin ATX 12V power connector 2 x EZ Plug connectors (4-pin Molex Power connectors) 1 x OC Station header 1 x RC Bluetooth header 1 x En/Dis-able Clr CMOS switch 1 x Core unlocker switch 1 x Power on switch 1 x Reset switch 1 x Go Button 1 x BIOS Switch button 1 x Thermal module fan connector 1 x ROG light connector 1 x Audio front panel connector System panel connector
Software	**Support DVD:** - Drivers and applications * ASUS AI Suite II * 3DMark Vantage * Kaspersky® Anti-Virus 1-year license
Form Factor	Extended ATX Form Factor, 12”x 10.6” (30.5cm x 26.9cm)

***Specifications are subject to change without notice.**

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

1 Product introduction

Chapter summary

1

1.1 Welcome!

Thank you for buying an ROG Crosshair IV Extreme motherboard!

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

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

1.2 Package contents

Check your motherboard package for the following items.

Motherboard	ROG Crosshair IV Extreme
Cables	1 x ROG Connect cable 1 x ProbeIt cable set 1 x CrossFire Cable 1 x Multi-functional module (1-port IEEE 1394a + 2-port USB 2.0) 1 x 2-in-1 SATA signal cables 3 x 2-in-1 SATA 6G cables
Accessories	1 x 2 in 1 ASUS Q-Connector Kit 1 x I/O Shield 1 x Thermal Sensor Cable Pack 1 x Cable Ties Pack 1 x ROG Theme Label 1 x 12-in-1 ROG Cable Label 1 x RC Bluetooth card
Application DVD	ROG motherboard support DVD
Documentation	User guide

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

1.3 Special features

1.3.1 Product highlights

Republic of Gamers

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

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.

Phenom™ II/Athlon™ II/ Sempron™ 100 Series Processors (AM3 CPU)

This motherboard supports AMD® Socket AM3 multi-core processors with unique L3 cache and delivers better overclocking capabilities with less power consumption. It features dual-channel DDR3 1333 memory support and accelerates data transfer rate up to 5200MT/s via HyperTransport™ 3.0 based system bus. This motherboard also supports AMD® CPUs in the new 45nm manufacturing process.

AMD 890FX Chipset

AMD 890FX Chipset is designed to support up to 5.2GT/s HyperTransport™ 3.0 (HT 3.0) interface speed and dual PCI Express™ 2.0 x16 graphics. It is optimized with AMD latest AM3 and multi-core CPUs to provide excellent system performance and overclocking capabilities.

ATI CrossFireX™ Technology

ATI's CrossFireX™ boosts image quality along with rendering speed, eliminating the need to scale down screen resolution to get high quality images. CrossFireX™ allows higher anti-aliasing, anisotropic filtering, shading, and texture settings. Adjust your display configurations, experiment with the advanced 3D settings, and check the effects with a real-time 3D-rendered previews within ATI Catalyst™ Control Center.

PCIe 2.0

Double Speed; Double Bandwidth
This motherboard supports the latest PCIe 2.0 devices for double speed and bandwidth which enhances system performance.

1.3.2 ROG Intelligent Performance & Overclocking features

CrossLinx 3 Technology

The onboard HYDRALOGIX controller adds the ability to support graphics cards from different vendors and generations in three dedicated PCI Express expansion slots, plus traditional CrossFireX multiple GPU configurations or a single graphics card are supported in the two native PCI Express slots, which have even lower latency with the 890FX+SB850 chipset to increase performance. The two architectures can be combined for amazing performance. This revolutionary five-slot design enables output enhancements with the ultimate flexibility of true graphics card choice, unleashing the full potential of the board under all configurations.

RC Bluetooth

Smashes all the barriers of conventional overclocking

Still overclocking in old-fashioned way? Let RC Bluetooth bring you the whole new idea of how to do! Just simply push the button from the Back IO on the RC Bluetooth card, overclockers can real-time monitor the desktop PC system status & tweak its parameters - such as voltages and frequency on the fly. When users want to use oridinary bluetooth functions, just simply push the button once again & enjoy all the wireless convenience brought from RC Bluetooth. Refer to page 2-33 for details.

ROG Connect

Plug and Overclock - Tweak it the hardcore way!

Monitor the status of your desktop PC and tweak its parameters in real-time via a notebook—just like a race car engineer—with ROG Connect. ROG Connect links your main system to a notebook through a USB cable, allowing you to view real-time POST code and hardware status readouts on your notebook, as well as make on-the-fly parameter adjustments at a purely hardware level. Diagram, power, reset button, flash BIOS through notebook. Refer to page 2-32 for details.

USB BIOS FlashBack

Refresh the BIOS can never be that easy

USB BIOS Flashback must be the most convenient way to flash BIOS ever! It allows overclockers to try their BIOS with the simplist way one can imagine. No need to enter the BIOS or the operating system, just plug the thumb drive into the ROG Connect port & push the ROG Connect button for 2 seconds, BIOS would be automatically flashed under standby power. It's no doubt that USB BIOS Flashback gives overclockers the ultimate convenience! Refer to page 2-32 for details.

MemOK!

Any memory is A-OK!

Memory compatibility is among the top concerns when it comes to computer upgrades. Worry no more, MemOK! is the fastest memory booting solution today. This remarkable memory rescue tool requires nothing but a push of a button to patch memory issues and get your system up and running in no time. The technology is able to determine failsafe settings that can dramatically improve system booting success.

iROG

Intelligent multiple control at hand

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

ProbeIt

Get all hands-on with hardware-based overclocking

ProbeIt takes the guesswork out of locating the motherboard's measurement points, identifying them clearly in the form of 8 sets of detection points so you'll know exactly where to get quick yet accurate readings using a multitester.

BIOS Flashback 

Two BIOS ROM. Two BIOS settings. Twice the overclocking flexibility.

Overclocker's prayer to have BIOS flexibility is answered! With the new BIOS Flashback, PC enthusiasts can overclock with even more confidence. BIOS Flashback gives overclockers the ability to save two versions of the BIOS simultaneously. Very much like the "SaveGame" function, one BIOS can be used for the overclocking adventure, while the other BIOS is to be stored with any previous version. BIOS Flashback brings the ultimate convenience to overclockers! By pushing BIOS button, overclockers can easily choose which BIOS ROM they want to save & boot from.

CPU Level Up 

A simple click for instant upgrade!
Ever wish that you could have a more expansive CPU? Upgrade your CPU at no additional cost with ROG's CPU Level Up! Simply pick the processor you wanted to OC to, and the motherboard will do the rest! See the new CPU speed and enjoy that performance instantly. Overclocking is never as easy as this.

Extreme Tweaker 

One stop performance tuning shop
Extreme Tweakers is the one stop shop to fine-tune your system to optimal performance. No matter if you're looking for frequency adjustment, over-voltage options, or memory timing settings, they're all here!

Voltiminder LED 

Friendly reminder on Voltage Settings
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, PCH, and Memory in a intuitive color-coded fashion. The voltiminder LED allows quick voltage monitoring for overclockers.

1.3.3 ROG unique features

COP EX 

Maximum OC with confidence with burn proof protection to chipsets and GPU!
The COP EX allows overclockers to increase chipset voltage without the worries of overheating. It can also be used to monitor and save an overheating GPU. The COP EX allows more freedom and less constraint for maximum performance achievement.

Loadline Calibration 

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

Onboard Switches 

No more shorting pins or moving jumpers
With an easy press during overclock, this exclusive onboard switch allows gamer to effortlessly fine-tune the performance without having to short the pins or moving jumpers!

ASUS Q-Connector 

Make connections quick and accurate

The 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.

1.3.4 ASUS special features

Core Unlocker 

Intelligently Unlocks True Core Performance

ASUS Core Unlocker simplifies the activation of a latent AMD CPU—with just a press of a button. Enjoy an instant performance boost by simply unlocking the extra cores, without performing complicated BIOS changes.

ASUS TurboV EVO 

The Ultimate O.C. Processor

The ultimate O.C. processor satisfies every level of overclockers—from die-hard enthusiasts to beginners. Auto tuning intelligently pushes the system to the fastest clock speeds while maintaining stability. Turbo Key boosts performance with just one touch; while TurboV offers more options to advanced overclockers to achieve world O.C. record. Moreover, upgrade your CPU at no additional cost with CPU Level UP!

USB 3.0 Support

10X Faster Date Rates!

Experience ultra-fast data transfers at 4.8Gbps with USB 3.0—the latest connectivity standard. Built to connect easily with next generation components and peripherals, USB 3.0 transfers data 10X faster and is also backward compatible with USB 2.0 components.

SATA 6Gb/s Support

Experience the Future of Storage!

Supporting next-generation Serial ATA (SATA) storage interface, this motherboard delivers up to 6.0Gb/s data transfer rates. Additionally, get enhanced scalability, faster data retrieval, double the bandwidth of current bus systems.

O.C. Profile

Conveniently store or load multiple BIOS settings

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

Q-Shield

Easy and Comfortable Installations

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).

EZ Flash2

Simply update BIOS from a USB flash disk before entering the OS

EZ Flash 2 is a user-friendly BIOS update utility. Simply launch this tool and update BIOS from a USB flash disk before entering the OS. You can update your BIOS only in a few clicks without preparing an additional floppy diskette or using an OS-based flash utility.

MyLogo3

Personalize your system with customizable boot logo

The ASUS MyLogo 3 is the new feature present in the motherboard that allows you to personalize and add style to your system with customizable and animated boot logos.

SATA on the Go

The motherboard supports the next-generation hard drives based on the Serial ATA (SATA) 3Gb/s storage specification, delivering enhanced scalability and doubling the bus bandwidth for high-speed data retrieval and saves. The external SATA port located at the back I/O provides smart setup and hot-plug functions. Easily backup photos, videos and other entertainment contents on external devices.

IEEE 1394a interface

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.

3DMark® Vantage Advanced Edition

The Gamers' Benchmark

3DMarkVantage is the new industry standard PC gaming performance benchmark from Futuremark, newly designed for Windows Vista and DirectX10. It includes two new graphics tests, two new CPU tests, several new feature tests, and support for the latest hardware. 3DMark® Vantage is based on a completely new rendering engine, developed specifically to take full advantage of DirectX10, the new graphics API from Microsoft

Kaspersky® Anti-Virus

The best protection from viruses and spyware

Kaspersky® Anti-Virus Personal offers premium antivirus protection for individual users and home offices. It is based on advanced antivirus technologies. The product incorporates the Kaspersky® Anti-Virus engine, which is renowned for malicious program detection rates that are among the industry's highest.

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.

2 Hardware information

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.
- Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, 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, or components.

Onboard LEDs

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

1. **CPU LED**

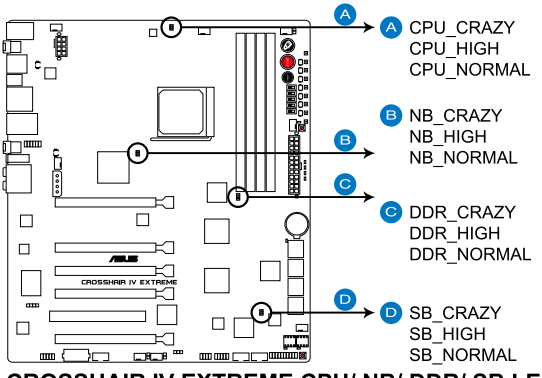
   The CPU LED has three voltage displays: CPU Voltage, VDDNB, and VDDA Voltage 2.5V; you can select the voltage to display in BIOS. Refer to the illustration below for the location of the CPU LED and the table below for LED definition.

2. **Memory LED**

   The Memory LED has two voltage displays: DRAM BUS 1.5V and VDDR 1.2V. Refer to the illustration below for the location of the memory LED and the table below for LED definition.

3. **Northbridge/Southbridge LEDs**

   Northbridge and southbridge LEDs each have two different voltage displays. The northbridge LED displays the NB 1.1V voltage, the NB 1.8V voltage or the VDDPCIE 1.1V. The southbridge LED shows either the SB 1.1V voltage or the HT 1.2V voltage. You can select the voltage to display in BIOS. Refer to the illustration below for the location of the northbridge/southbridge LEDs and the table below for LED definition.



CROSSHAIR IV EXTREME CPU/ NB/ DDR/ SB LED

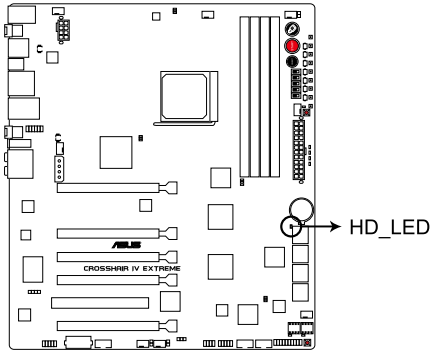
	Normal (green)	Normal (blue)	High (yellow)	Crazy (red)
CPU Voltage (default)	by CPU–0.796875	0.8000–1.3625	1.3750–1.4875	1.5–by CPU
VDDNB	by CPU–0.796875	0.8000–1.3625	1.3750–1.4875	1.5–by CPU
VDDA Voltage 2.5V	2.2–2.49375	2.5–2.75600	2.76925–3.00775	3.02100–3.20650

	Normal (green)	Normal (blue)	High (yellow)	Crazy (red)
DRAM BUS 1.5V (default)	1.2–1.493375	1.5–1.72250	1.73575–2.31875	2.33200–2.9000
VDDR 1.2V		1.2–1.39125	1.40450–1.65625	1.66950–1.8

	Normal (green)	Normal (blue)	High (yellow)	Crazy (red)
NB Voltage 1.1V (default)	0.8–1.19375	1.1–1.59000	1.60325–1.84175	1.85500–2.00075
NB 1.8 Voltage		1.80200–1.89475	1.90800–1.94775	1.961000–3.00775
VDD PCIE 1.1V		1.1–1.59000	1.60325–1.84175	1.85500–2.00075
SB Voltage 1.1V (default)		1.1–1.444250	1.450875–1.69600	1.702625–1.802
HT 1.2V	0.8–1.19375	1.2–1.39125	1.40450–1.65625	1.66950–2.0

4. Hard Disk LED

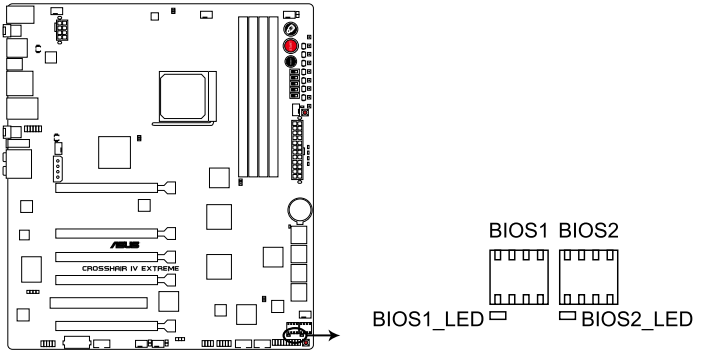
The hard disk LED is designed to indicate the hard disk activity. It blinks when data is being written into or read from the hard disk drive. The LED does not light up when there is no hard disk drive connected to the motherboard or when the hard disk drive does not function.



CROSSHAIR IV EXTREME Hard Disk LED

5. BIOS LED

The BIOS LEDs help indicate the BIOS activity. Press the BIOS button to switch between BIOS1 and BIOS2 and the LED lights up when the corresponding BIOS is in use.

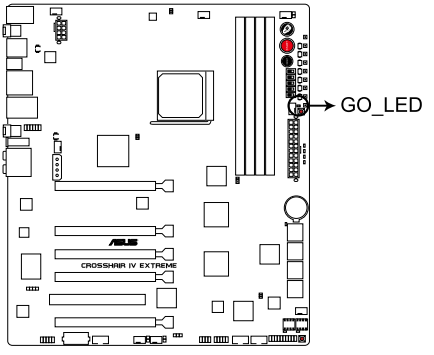


CROSSHAIR IV EXTREME BIOS_LED

6. GO LED

Blinking: Indicates that MemOK! is enabled before POST.

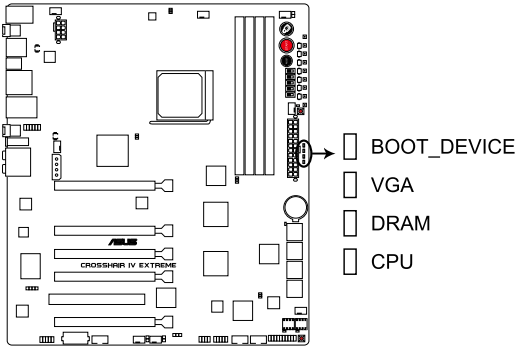
Lighting: Indicates that the system loads the preset profile (GO_Button file) for temporary overclocking when in OS.



CROSSHAIR IV EXTREME GO_LED

7. Q LED

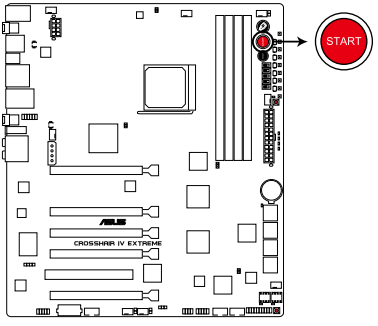
Q LEDs check key components (CPU, DRAM, VGA card, and booting devices) in sequence during motherboard booting process. If an error is found , the corresponding LED will continue lighting until the problem is solved. This user-friendly design provides an intuitional way to locate the root problem within a second.



CROSSHAIR IV EXTREME CPU/ DRAM/ VGA/ BOOT_DEVICE LED

8. Power LED

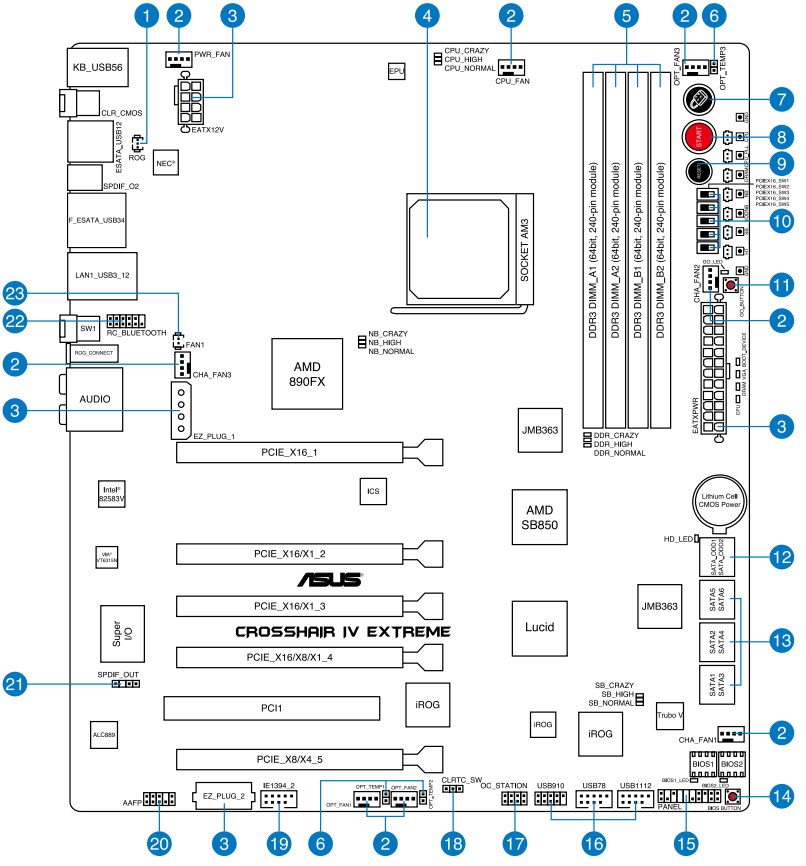
The motherboard comes with a power-on switch that lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows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



CROSSHAIR IV EXTREME Power on switch

2.2 Motherboard overview

2.2.1 Motherboard layout



2.2.2 Layout contents

Connectors/Jumpers/Switches/Slots		Page
1.	ROG connector (3-pin ROG)	2-41
2.	CPU, chassis, and optional fan connectors (4-pin CPU_FAN; 4-pin PWR_FAN; 4-pin CHA_FAN1–3; 4-pin OPT_FAN1–3)	2-44
3.	ATX power connectors (24-pin EATXPWR, 8-pin EATX12V, 4-pin EZ_PLUG1—2)	2-47
4.	AMD AM3 CPU Socket	2-47
5.	DDR3 DIMM slots	2-9
6.	Thermal sensor cable connectors (2-pin OPT_TEMP1–3)	2-45
7.	Core Unlocker Switch	2-52
8.	Power-on switch	2-50
9.	Reset switch	2-50
10.	PCIe x16 Lane switch	2-53
11.	GO button	2-51
12.	JMicron® JMB363 Serial ATA connector (7-pin SATA_ODD1/2 [grey])	2-41
13.	AMD SB850 Serial ATA connectors (7-pin SATA 1-6 [red])	2-40
14.	BIOS switch	2-51
15.	System panel connector (20-8 pin PANEL)	2-48
16.	USB connectors (10-1 pin USB78, USB910, USB1112)	2-42
17.	OC Station connector (8-pin OC_STATION)	2-43
18.	Clear RTC RAM (3-pin CLRTC_SW)	2-31
19.	IEEE 1394a port connector (10-1 pin IE1394_2)	2-43
20.	Front panel audio connector (10-1 pin AAFP)	2-46
21.	Digital audio connector (4-1 pin SPDIF_OUT)	2-46
22.	RC Bluetooth connector (12-1 pin RC_Bluetooth)	2-32
23.	Optional fan-thermal module connector (2-pin FAN1)	2-44

Refer to **2.9 Connectors** for more information about rear panel connectors and internal connectors.

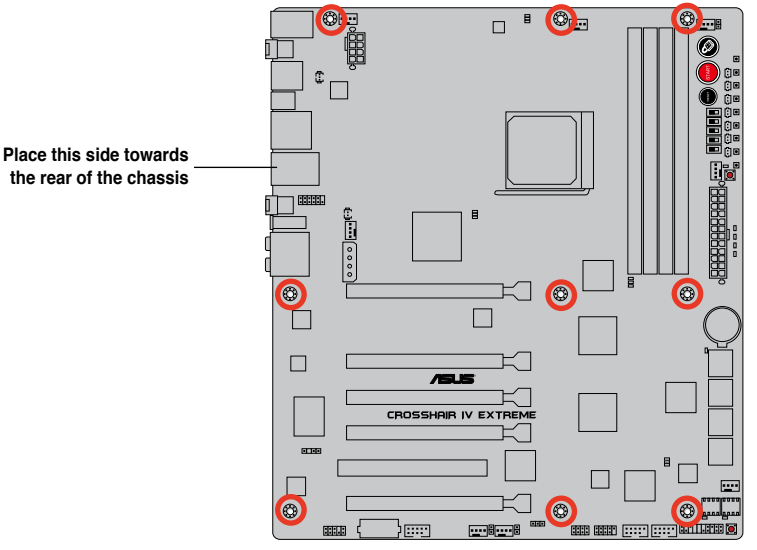
2.2.3 Placement direction

When installing the motherboard, ensure 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.

2.2.4 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.



2.3 Central Processing Unit (CPU)

The motherboard comes with an AM3 socket designed for AM3 Phenom™ II/Athlon™ II/ Sempron™ 100 Series Processors Series Processors.

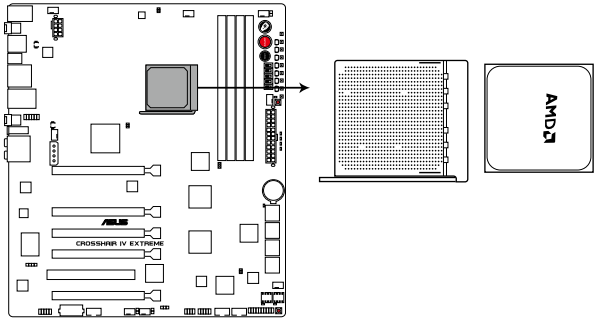
Ensure that all power cables are unplugged before installing the CPU.

The AM3 socket has a different pinout from the 940-pin socket designed for the AMD Opteron processor. Ensure that you use a CPU designed for the AM3 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:

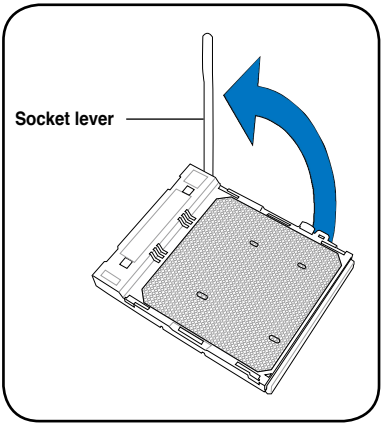
1. Locate the CPU socket on the motherboard.



CROSSHAIR IV EXTREME CPU socket AM3

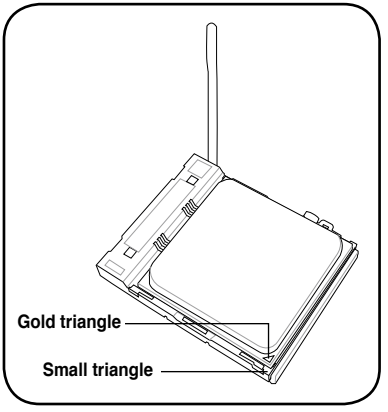
2. Unlock the socket by pressing the lever sideways, then lift it up to a 90º angle.

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

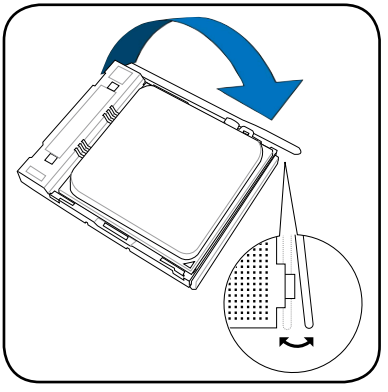


3. Position the CPU above the socket such that the CPU corner with the gold triangle matches the socket corner with a small triangle.

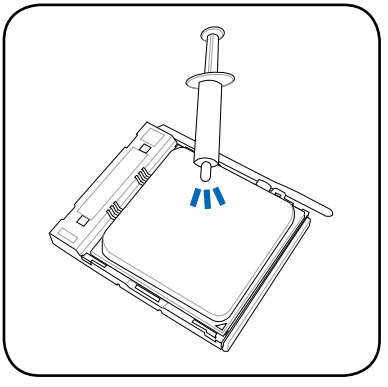
4. Carefully insert the CPU into the socket until it fits in place.



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. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.



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

The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately, and seek professional medical help.

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

2.3.2 Installing the CPU heatsink and fan

The AMD® AM3 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

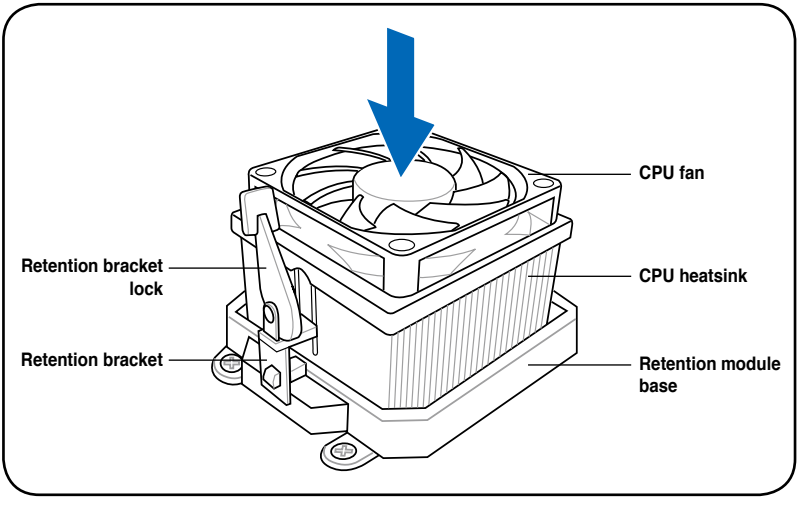
- The retention module base is already installed on the motherboard upon purchase.
- You do not have to remove the retention module base when installing the CPU or installing other motherboard components.
- Ensure that you use only AMD-certified heatsink and fan assembly.

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

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

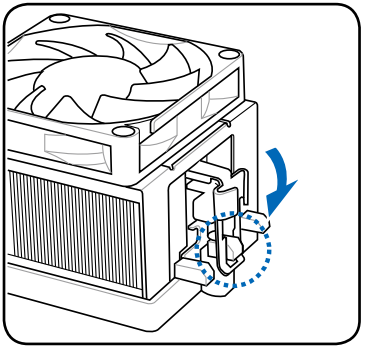
To install the CPU heatsink and fan

1. Place the heatsink on top of the installed CPU, ensuring that the heatsink fits properly on the retention module base.

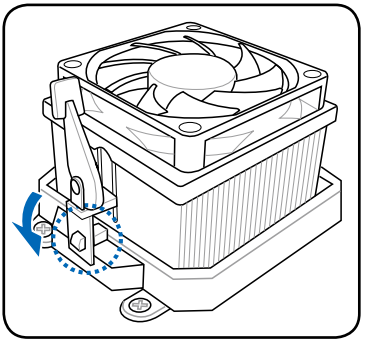


Your boxed CPU heatsink and fan assembly should come with installation instructions for the CPU, heatsink, and the retention mechanism. If the instructions in this section do not match the CPU documentation, follow the latter.

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

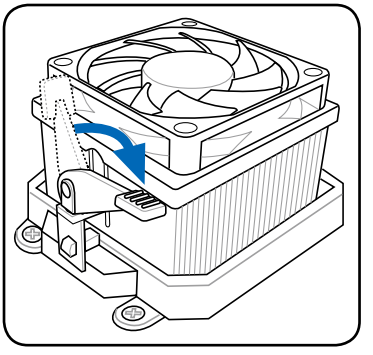


3. Align the other end of the retention bracket (near the retention bracket lock) to the retention module base. A clicking sound denotes that the retention bracket is in place.

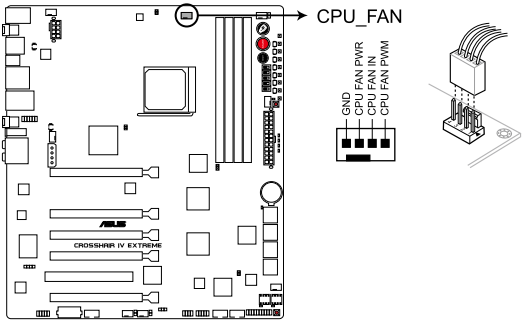


Ensure that the fan and heatsink assembly perfectly fits the retention mechanism module base, otherwise you cannot snap the retention bracket in place.

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



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



CROSSHAIR IV EXTREME CPU fan connector

- Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.
- This connector is backward compatible with old 3-pin CPU fan.

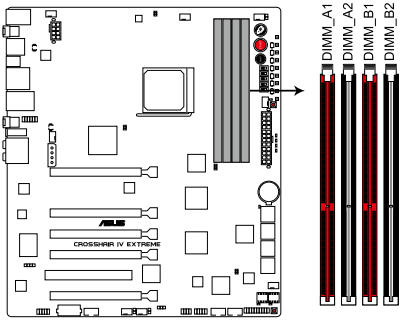
2.4 System memory

2.4.1 Overview

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

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

The figure illustrates the location of the DDR3 DIMM sockets:



CROSSHAIR IV EXTREME 240-pin DDR3 DIMM sockets

2.4.2 Memory configurations

You may install 512MB, 1GB, 2GB and 4GB unbuffered ECC and non-ECC DDR3 DIMMs into the DIMM sockets.

- 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.
- We recommend that you install the memory modules from the blue slots for better overclocking capability.
- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.
- AMD AM3 100 and 200 series CPU support up to DDR3 1066MHz.
- When overclocking, some AMD CPU models may not support DDR3 1600 or higher frequency DIMMs.
- Due to the memory address limitation on 32-bit Windows OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you do any of the following:
  - Use a maximum of 3GB system memory if you are using a 32-bit Windows OS.
  - Install a 64-bit Windows OS when you want to install 4GB or more on the motherboard.
  For more details, refer to the Microsoft® support site at http://support.microsoft.com/kb/929605/en-us.
- This motherboard does not support DIMMs made up of 512Mb (64MB) chips or less (Memory chip capacity counts in Megabit, 8 Megabit/Mb = 1 Megabyte/MB).

- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, refer to section **3.3 Extreme Tweaker** menu for manual memory frequency adjustment.
- For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.

Crosshair IV Extreme Motherboard
Qualified Vendors Lists (QVL) DDR3-2000MHz capability

Vendors	Part No.	Size	SS/DS	Timing	Voltage	DIMM socket support (Optional)		
						1 DIMM	2 DIMM	4 DIMM
Apacer	78.AAGD5.9KD(XMP)	6GB(3 x 2GB)	DS	9-9-9-27	-	•		•
Crucial	BL12864BE2009.8SFB3(EPP)	1GB	SS	9-9-9-28	2	•		
G.SKILL	F3-16000CL9D-4GBRH(XMP)	4GB(2 x 2GB)	DS	9-9-9-24	1.65	•		•
G.SKILL	F3-16000CL9D-4GBTD(XMP)	4GB(2 x 2GB)	DS	9-9-9-24	1.65	•		•
G.SKILL	F3-16000CL9T-6GBPS(XMP)	6GB(3 x 2GB)	DS	9-9-9-24	1.65	•		
G.SKILL	F3-16000CL9T-6GBTD(XMP)	6GB(3 x 2GB)	DS	9-9-9-24	1.6	•	•	•
G.SKILL	F3-16000CL7Q-8GBFLS(XMP)	8GB(4 x 2GB)	DS	7-9-7-24	1.65	•	•	•
GEIL	GU34GB2000C9DC(XMP)	4GB(2 x 2GB)	DS	9-9-9-28	2	•		
GEIL	GE38GB2000C9QC(XMP)	8GB(4 x 2GB)	DS	9-9-9-28	1.65	•		
OCZ	OCZ3P2000EB2GK	2GB(2 x 1GB)	SS	9-8-8	1.8	•		
OCZ	OCZ3B2000LV6GK	6GB(3 x 2GB)	DS	7-8-7	1.65			
Transcend	TX2000KLU-4GK(XMP)	4GB(2 x 2GB)	DS	9-9-9-24	1.65	•		•
Gingle	9CAASS37AZZ01D1	2GB	DS	9-9-9-24	-	•		

The motherboard supports DDR3-2000MHZ DIMMs only when you install a 6-Core CPU to the motherboard.

Crosshair IV Extreme Motherboard
Qualified Vendors Lists (QVL) DDR3-1866MHz capability

Vendors	Part No.	Size	SS/DS	Timing	Voltage	DIMM socket support (Optional)		
						1 DIMM	2 DIMM	4 DIMM
CORSAIR	TR3X6G1866C9DVer4.1(XMP)	6GB(3 x 2GB)	DS	9-9-9-24	1.65	•		
G.SKILL	F3-15000CL9D-4GBRH (XMP)	4GB(2 x 2GB)	DS	9-9-9-24	1.65	•		•
G.SKILL	F3-15000CL9D-4GBTD(XMP)	4GB(2 x 2GB)	DS	9-9-9-24	1.65	•		•
KINGSTON	KHX1866C9D3T1K3/6GX(XMP)	6GB(3 x 2GB)	DS	9	1.65	•		
OCZ	OCZ3RPR1866C9LV3GK	3GB(3 x 1GB)	SS	9-9-9	1.65	•		
OCZ	OCZ3P1866C9LV6GK	6GB(3 x 2GB)	DS	9-9-9	1.65	•		
OCZ	OCZ3RPR1866C9LV6GK	6GB(3 x 2GB)	DS	9-9-9	1.65	•		
Super Talent	W1866UX2G8(XMP)	2GB(2 x 1GB)	SS	8-8-8-24	-	•	•	•
Patriot	PVS32G1866LLK(XMP)	2GB(2 x 1GB)	SS	8-8-8-24	1.9	•		

Crosshair IV Extreme Motherboard
Qualified Vendors Lists (QVL) DDR3-1800MHz capability

Vendors	Part No.	Size	SS/DS	Timing	Voltage	DIMM socket support (Optional)		
						1 DIMM	2 DIMM	4 DIMM
G.SKILL	F3-14400CL9D-4GBRL(XMP)	4GB(2 x 2GB)	DS	9-9-9-24	1.6	•		•
KINGSTON	KHX1800C9D3T1K3/6GX(XMP)	6GB(3 x 2GB)	DS	-	1.65	•	•	•
OCZ	OCZ3P18002GK	2GB(2 x 1GB)	SS	8	-	•		
Patriot	PVS32G1800LLKN(EPP)	2GB(2 x 1GB)	SS	8-8-8-20	1.9	•		

Crosshair IV Extreme Motherboard
Qualified Vendors Lists (QVL) DDR3-1600MHz capability

Vendors	Part No.	Size	SS/DS	Timing	Voltage	DIMM socket support (Optional)		
						1 DIMM	2 DIMM	4 DIMM
CORSAIR	TR3X3G1600C8DVer2.1(XMP)	3GB(3 x 1GB)	SS	8-8-8-24	1.65	•	•	•
CORSAIR	TR3X3G1600C9Ver1.1(XMP)	3GB(3 x 1GB)	SS	9-9-9-24	1.65	•	•	
CORSAIR	CMD4GX3M2B1600C8	4GB(2x 2GB)	DS	8-8-8-24	1.65	•		•
CORSAIR	CMG4GX3M2A1600C6	4GB(2x 2GB)	DS	6-6-6-18	1.65	•	•	•
CORSAIR	CMX4GX3M2A1600C8(XMP)	4GB(2x 2GB)	DS	8-8-8-24	1.65	•	•	
CORSAIR	CMD4GX3M2A1600C8(XMP)	4GB(2 x 2GB)	DS	8-8-8-24	1.65	•	•	•
CORSAIR	CMG4GX3M2A1600C7(XMP)	4GB(2 x 2GB)	DS	7-7-7-20	1.65	•	•	
CORSAIR	TR3X6G1600C8D	6GB(3 x 2GB)	DS	8-8-8-24	1.65	•	•	
CORSAIR	TR3X6G1600C8DVer2.1(XMP)	6GB(3 x 2GB)	DS	8-8-8-24	1.65	•	•	•
CORSAIR	TR3X6G1600C9Ver2.1(XMP)	6GB(3 x 2GB)	DS	9-9-9-24	1.65	•	•	•
CORSAIR	CMD8GX3M4A1600C8(XMP)	8GB(4 x 2GB)	DS	8-8-8-24	1.65	•	•	•
CORSAIR	CMX8GX3M4A1600C9(XMP)	8GB(4 x 2GB)	DS	9-9-9-24	1.65	•	•	
Crucial	BL12864BN1608.8FF(XMP)	2GB(2x 1GB)	SS	8-8-8-24	1.65	•	•	•
Crucial	BL25664BN1608.16FF(XMP)	2GB	DS	8-8-8-24	1.65	•	•	•
Crucial	BL25664BN1608.16FF(XMP)	4GB(2x 2GB)	DS	8-8-8-24	1.65	•	•	•
G.SKILL	F3-12800CL9D-4GBNG	4GB(2x 2GB)	SS	-	1.6	•	•	•
G.SKILL	F3-12800CL9D-4GBRL	4GB(2 x 2GB)	SS	-	1.6	•	•	•
G.SKILL	F3-12800CL7D-4GBECO(XMP)	4GB(2 x 2GB)	DS	7-8-7-24	-	•	•	•
G.SKILL	F3-12800CL7D-4GBRH(XMP)	4GB(2 x 2GB)	DS	7-7-7-24	1.65	•	•	•
G.SKILL	F3-12800CL8D-4GBRM(XMP)	4GB(2 x 2GB)	DS	8-8-8-24	1.6	•	•	•
G.SKILL	F3-12800CL9D-4GBECO(XMP)	4GB(2 x 2GB)	DS	9-9-9-24	1.35	•	•	•
G.SKILL	F3-12800CL8T-6GBPI(XMP)	6GB(3 x 2GB)	DS	8-8-8-21	1.6~1.65	•	•	•
G.SKILL	F3-12800CL9T-6GBNQ	6GB(3 x 2GB)	DS	9-9-9-24	1.5-1.6	•	•	•
KINGMAX	FLGD45F-B8MF7(XMP)	1GB	SS		-	•	•	•
KINGSTON	KHX1600C9D3K3/12GX(XMP)	12GB(3 x 4GB)	DS	-	1.65	•	•	•
KINGSTON	KHX1600C9D3K3/12GX(XMP)	12GB(3 x 4GB)	DS	9	1.65	•	•	•
KINGSTON	KHX1600C9D3LK2/4GX(XMP)	4GB (2x 2GB)	DS	9	1.35	•	•	•
KINGSTON	KHX1600C8D3T1K2/4GX(XMP)	4GB(2 x 2GB)	DS	8	1.65	•	•	•
KINGSTON	KHX1600C9D3K3/6GX(XMP)	6GB(3 x 2GB)	DS	9	1.65	•	•	•
OCZ	OCZ3P1600EB1G	1GB	SS	7-6-6-24	-	•	•	
OCZ	OCZ3G1600LV3GK	3GB(3 x 1GB)	SS	8-8-8	1.65	•	•	•
OCZ	OCZ3P1600LV3GK	3GB(3 x 1GB)	SS	7-7-7	1.65	•	•	•
OCZ	OCZ3BE1600C8LV4GK	4GB(2x 2GB)	DS	8-8-8	1.65	•	•	
OCZ	OCZ3BE1600C8LV4GK	4GB(2x 2GB)	DS	8-8-8	1.65	•	•	•
OCZ	OCZ3P16004GK	4GB(2x 2GB)	DS	7-7-7	1.9	•	•	•
OCZ	OCZ3P1600EB4GK	4GB(2 x 2GB)	DS	7-7-6	1.8	•	•	•
OCZ	OCZ3P1600LV4GK	4GB(2 x 2GB)	DS	7-7-7	1.65	•		
OCZ	OCZ3X16004GK(XMP)	4GB(2 x 2GB)	DS	7-7-7	1.9	•	•	•
OCZ	OCZ3X1600LV4GK(XMP)	4GB(2 x 2GB)	DS	8-8-8	1.65	•	•	•

OCZ	OCZ3FXE1600C7LV6GK	6GB(3 x 2GB)	DS	7-7-7	1.65	•	•	
OCZ	OCZ3G1600LV6GK	6GB(3 x 2GB)	DS	8-8-8	1.65	•	•	•
OCZ	OCZ3X1600LV6GK(XMP)	6GB(3 x 2GB)	DS	8-8-8	1.65	•	•	•
OCZ	OCZ3X1600LV6GK(XMP)	6GB(3 x 2GB)	DS	8-8-8	1.65	•	•	•
Super Talent	WP160UX4G8(XMP)	4GB(2 x 2GB)	DS	8	-	•	•	
Super Talent	WB160UX6G8(XMP)	6GB(3 x 2GB)	DS	-	-	•	•	•
Super Talent	WB160UX6G8(XMP)	6GB(3 x 2GB)	DS	8	-	•	•	•
EK Memory	EKM324L28BP8-I16(XMP)	4GB(2x 2GB)	DS	9	-	•	•	•
EK Memory	EKM324L28BP8-I16(XMP)	4GB(2 x 2GB)	DS	9	-	•	•	•
Mushkin	996657	4GB(2 x 2GB)	DS	7-7-7-20	-	•	•	•
Mushkin	998659(XMP)	6GB(3 x 2GB)	DS	9-9-9-24	1.5-1.6	•	•	•
Patriot	PVT33G1600ELK	3GB(3 x 1GB)	SS	9-9-9-24	1.65	•	•	•
Patriot	PGS34G1600LLKA2	4GB (2x 2GB)	DS	8-8-8-24	1.7	•	•	•
Patriot	PGS34G1600LLKA	4GB(2x 2GB)	DS	7-7-7-20	1.7	•	•	•
PATRIOT	PGS34G1600LLKA	4GB(2 x 2GB)	DS	7-7-7-20	1.7	•	•	•
Patriot	PVS34G1600ELK	4GB(2 x 2GB)	DS	9-9-9-24	1.8	•	•	
Patriot	PVS34G1600LLK(XMP)	4GB(2 x 2GB)	DS	7-7-7-20	1.9	•	•	
Patriot	PVS34G1600LLKN	4GB(2 x 2GB)	DS	7-7-7-20	2.0	•	•	•
Patriot	PVT36G1600ELK	6GB(3 x 2GB)	DS	9-9-9-24	1.65	•	•	•
Patriot	PVT36G1600ELK	6GB(3 x 2GB)	DS	9-9-9-24	1.65	•	•	•
Patriot	PVT36G1600LLK(XMP)	6GB(3 x 2GB)	DS	8-8-8-24	1.65	•	•	•

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

Vendors	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
Apacer	78.01GC6.9L0	1GB	SS	Apacer	AM5D5808DEJSBG	9	-	•	•	•
CORSAIR	TR3X3G1333C9 (Ver2.1)	3GB(3 x 1GB)	SS	-	-	9-9-9-24	1.5	•	•	•
CORSAIR	CM3X1024-1333C9DHX	1GB	DS	-	-	-	1.1	•	•	
CORSAIR	BoxP/N:TWIN3X2048-1333C9 (CM3X1024-1333C9)Ver1.1	2GB(2 x 1GB)	DS	-	-	9-9-9-24	1.70	•	•	•
CORSAIR	CM3X2G1333C9	2GB	DS	-	-	9-9-9-24	1.5	•	•	•
CORSAIR	BoxP/N:TW3X4G1333C9DHX (CM3X2048-1333C9DHX)Ver3.2	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.70	•		
CORSAIR	TR3X6G1333C9 (Ver2.1)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.5	•	•	•
CORSAIR	CMX8GX3M4A1333C9	8GB(4 x 2GB)	DS	-	-	9-9-9-24	1.5	•	•	•
Crucial	CT12864BA1339.8FF	1GB	SS	MICRON	D9KPT	9	-	•	•	•
Crucial	CT12864BA1339.8SFD	1GB	SS	MICRON	MT8JF12864AY-1G4D1	-	-	•	•	•
Crucial	CT12872BA1339.9FF	1GB	SS	MICRON	D9KPT(ECC)	9	-	•	•	•
Crucial	BL25664BN1337.16FF(XMP)	2GB	DS	-	-	7-7-7-24	1.65	•	•	•
Crucial	CT25664BA1339.16FF	2GB	DS	MICRON	D9KPT	9	-	•	•	•
Crucial	CT25664BA1339.16SFD	2GB	DS	MICRON	D9JNM	-	-	•	•	•
Crucial	CT25672BA1339.18FF	2GB	DS	MICRON	D9KPT(ECC)	9	-	•	•	•
ELPIDA	EBJ10UE8BAW0-DJ-E	1GB	SS	ELPIDA	J1108BABG-DJ-E	9	-	•	•	•
ELPIDA	EBJ10UE8BDF0-DJ-F	1GB	SS	ELPIDA	J1108BDSE-DJ-F	-	-	•	•	•
ELPIDA	EBJ10UE8EDF0-DJ-F	1GB	SS	ELPIDA	J1108EDSE-DJ-F	-	-	•	•	•
ELPIDA	EBJ21UE8BAW0-DJ-E	2GB	DS	ELPIDA	J1108BABG-DJ-E	9	-	•	•	•
ELPIDA	EBJ21UE8BDF0-DJ-F	2GB	DS	ELPIDA	J1108BDSE-DJ-F	-	-	•	•	•
G.SKILL	F3-10600CL7D-2GBPI	2GB(2 x 1GB)	SS	-	-	-	1.65	•	•	
G.SKILL	F3-10600CL8D-2GBHK	2GB(2 x 1GB)	SS	-	-	-	1.65	•	•	•
G.SKILL	F3-10666CL7T-6GBPK(XMP)	2GB	DS	-	-	7-7-7-18	1.5-1.6	•	•	•
G.SKILL	F3-10666CL8D-4GBECO(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.35	•	•	•
G.SKILL	F3-10666CL8D-4GBHK(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-21	1.5-1.6	•	•	•
G.SKILL	F3-10666CL9T-6GBNQ	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.5	•	•	•
GEIL	GB34GB1333C7DC	4GB(2 x 2GB)	DS	GEIL	GL1L128M88BA15FW	7-7-7-24	1.5			•
GEIL	GG34GB1333C9DC	4GB(2 x 2GB)	DS	GEIL	GL1L128M88BA12N	9-9-9-24	1.3	•	•	•
GEIL	GV34GB1333C7DC	4GB(2 x 2GB)	DS	-	-	7-7-7-24	1.5	•	•	•
Hynix	HMT112U6BFR8C-H9	1GB	SS	Hynix	H5TQ1G83BFR	9	-	•	•	•
Hynix	HMT112U6TFR8A-H9	1GB	SS	Hynix	H5TC1G83TFR	-	-	•	•	•
Hynix	HMT125U6BFR8C-H9	2GB	DS	Hynix	H5TQ1G83BFRH9C	9	-	•	•	•
Hynix	HMT125U6TFR8A-H9	2GB	DS	Hynix	H5TC1G83TFR	-	-	•	•	•
MICRON	MT8JTF12864AZ-1G4F1	1GB	SS	MICRON	9FF22 D9KPT	9	-	•	•	•
MICRON	MT16JTF25664AZ-1G4F1	2GB	DS	MICRON	9FF22 D9KPT	9	-	•	•	•
OCZ	OCZ3RPX1333EB2GK	1GB	SS	-	-	-	-	•	•	

OCZ	OCZ3RPX1333EB2GK	2GB(2 x 1GB)	SS	NANYA	-	6-5-5	1.85	•	•	
OCZ	OCZ3G1333LV3GK	3GB(3 x 1GB)	SS	-	-	9-9-9	1.65	•	•	
OCZ	OCZ3P1333LV3GK	3GB(3 x 1GB)	SS	-	-	7-7-7	1.65	•	•	•
OCZ	OCZ3G1333ULV4GK	4GB(2 x 2GB)	DS	-	-	8-8-8	1.65	•	•	
OCZ	OCZ3P13334GK	4GB(2 x 2GB)	DS	-	-	7	1.8	•	•	•
OCZ	OCZ3P1333LV4GK	4GB(2 x 2GB)	DS	-	-	7-7-7	1.65	•	•	•
OCZ	OCZ3RPX1333EB4GK	4GB(2 x 2GB)	DS	-	-	-	1.85	•	•	
OCZ	OCZ3P1333LV6GK	6GB(3 x 2GB)	DS	-	-	7-7-7	1.65	•	•	•
OCZ	OCZX1333LV6GK(XMP)	6GB(3 x 2GB)	DS	NA	-	8-8-8	1.6	•	•	•
PSC	AL7F8G73D-DG1	1GB	SS	PSC	A3P1GF3DGF	-	-	•	•	•
PSC	AL8F8G73D-DG1	2GB	DS	PSC	A3P1GF3DGF	-	-	•	•	•
SAMSUNG	M378B2873DZ1-CH9	1GB	SS	SAMSUNG	K4B1G0846D	9	-	•	•	•
SAMSUNG	M378B2873EH1-CH9	1GB	SS	SAMSUNG	K4B1G0846E	-	-	•	•	•
SAMSUNG	M378B2873FHS-CH9	1GB	SS	SAMSUNG	K4B1G0846F	-	-	•	•	•
SAMSUNG	M391B2873DZ1-CH9	1GB	SS	SAMSUNG	K4B1G0846D(ECC)	9	-	•	•	•
SAMSUNG	M378B5673DZ1-CH9	2GB	DS	SAMSUNG	K4B1G0846D	9	-	•	•	•
SAMSUNG	M378B5673FH0-CH9	2GB	DS	SAMSUNG	K4B1G0846F	-	-	•	•	•
SAMSUNG	M391B5673DZ1-CH9	2GB	DS	SAMSUNG	K4B1G0846D(ECC)	9	-	•	•	•
SAMSUNG	M378B5273BH1-CH9	4GB	DS	SAMSUNG	K4B2G0846B-HCH9	9	-	•	•	•
SAMSUNG	M378B5273CH0-CH9	4GB	DS	SAMSUNG	K4B2G0846C	K4B2G0846C	-	•	•	•
Transcend	JM1333KLU-1G	1GB	SS	Transcend	TK243EDF3	9	-	•	•	•
ASUS	N/A	1GB	DS	-	-	-	-	•		•
ATP	AQ28M64A8BJH9S	1GB	SS	SAMSUNG	K4B1G0846E	-	-	•	•	•
ATP	AQ28M72D8BJH9S	1GB	SS	SAMSUNG	K4B1G0846D(ECC)	-	-	•	•	•
ATP	AQ56M64B8BJH9S	2GB	DS	SAMSUNG	K4B1G0846D	-	-	•	•	•
ATP	AQ56M72E8BJH9S	2GB	DS	SAMSUNG	K4B1G0846D(ECC)	-	-	•	•	•
BUFFALO	FSX1333D3G-1G	1GB	SS	-	-	-	-	•	•	•
BUFFALO	FSH1333D3G-T3G(XMP)	3GB(3 x 1GB)	SS	-	-	7-7-7-20	-	•	•	•
BUFFALO	FSX1333D3G-2G	2GB	DS	-	-	-	-	•	•	
EK Memory	EKM324L28BP8-I13	4GB(2 x 2GB)	DS	-	-	9	-	•	•	•
Elixir	M2Y2G64CB8HA9N-CG	2GB	DS	-	-	-	-	•	•	
Elixir	M2Y2G64CB8HC9N-CG	2GB	DS	-	-	-	-	•	•	•
Patriot	PDC32G1333LLK	1GB	SS	PATRIOT	-	7	1.7	•	•	•
Patriot	PVT33G1333ELK	3GB(3 x 1GB)	SS	-	-	9-9-9-24	1.65	•	•	•
Patriot	PGS34G1333LLKA	4GB(2 x 2GB)	DS	-	-	7-7-7-20	1.7	•	•	•
Patriot	PVS34G1333ELK	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.5	•	•	
Patriot	PVS34G1333LLK	4GB(2 x 2GB)	DS	-	-	7-7-7-20	1.7	•	•	
Patriot	PVT36G1333ELK	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.65	•	•	•
PQI	MFACR423PA0105	2GB	DS	PQI	PQC32808E15R	-	-	•	•	•
Silicon Power	SP001GBLTU1333S01	1GB	SS	NANYA	NT5CB128M8AN-CG	-	-	•	•	
Silicon Power	SP001GBLTU133S02	1GB	SS	S-POWER	I0YT3E0	9	-	•		•
Silicon Power	SP002GBLTU133S02	2GB	DS	S-POWER	I0YT3E0	9	-	•	•	•

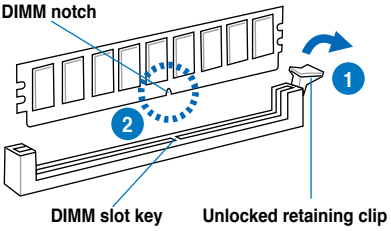
Crosshair IV Extreme Motherboard
Qualified Vendors Lists (QVL) DDR3-1067MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing Lable (Bios)	Voltage	DIMM socket support		
								1 DIMM	2 DIMM	4 DIMM
Crucial	CT12864BA1067.8FF	1GB	SS	MICRON	D9KPT	7	-	•	•	•
Crucial	CT12864BA1067.8SFD	1GB	SS	MICRON	D9JNL	7	-	•	•	•
Crucial	CT12872BA1067.9FF	1GB	SS	MICRON	D9KPT(ECC)	7	-	•	•	•
Crucial	CT25664BA1067.16FF	2GB	DS	MICRON	D9KPT	7	-	•	•	•
Crucial	CT25664BA1067.16SFD	2GB	DS	MICRON	D9JNL	7	-	•	•	•
Crucial	CT25672BA1067.18FF	2GB	DS	MICRON	D9KPT(ECC)	7	-	•	•	•
ELPIDA	EBJ10UE8BAW0-AE-E	1GB	SS	ELPIDA	J1108BABG-DJ-E	7	-	•	•	•
ELPIDA	EBJ10UE8EDF0-AE-F	1GB	SS	ELPIDA	J1108EDSE-DJ-F	-	-	•	•	•
ELPIDA	EBJ21UE8BAW0-AE-E	2GB	DS	ELPIDA	J1108BABG-DJ-E	7	-	•	•	•
ELPIDA	EBJ21UE8EDF0-AE-F	2GB	DS	ELPIDA	J1108EDSE-DJ-F	-	-	•	•	•
GEIL	GG34GB1066C8DC	4GB (2x 2GB)	DS	GEIL	GL1L128M88BA115FW	8-8-8-20	1.3	•	•	
Hynix	HMT112U6AFP8C-G7N0	1GB	SS	HYNIX	H5TQ1G83AFPG7C	7	-	•	•	•
Hynix	HYMT112U64ZNF8-G7	1GB	SS	HYNIX	HY5TQ1G831ZNFP-G7	7	-	•	•	
Hynix	HMT125U6AFP8C-G7N0	2GB	DS	HYNIX	H5TQ1G83AFPG7C	7	-	•	•	•
Hynix	HYMT125U64ZNF8-G7	2GB	DS	HYNIX	HY5TQ1G831ZNFP-G7	7	-	•	•	•
Kingston	KVR1066D3N7/1G	1GB	SS	Kingston	D1288JPNDPLD9U	7	1.5	•	•	•
Kingston	KVR1066D3N7/2G	2GB	DS	Elpida	J1108BDSE-DJ-F	7	1.5	•	•	•
MICRON	MT8JTF12864AZ-1G1F1	1GB	SS	MICRON	8ZF22 D9KPV	7	-	•	•	
MICRON	MT8JTF12864AZ-1G1F1	1GB	SS	MICRON	D9KPT	7	-	•	•	•
MICRON	MT9JSF12872AZ-1G1F1	1GB	SS	MICRON	D9KPT(ECC)	7	-	•	•	•
MICRON	MT16JTF25664AZ-1G1F1	2GB	DS	MICRON	8ZF22 D9KPV	7	-	•	•	•
MICRON	MT16JTF25664AZ-1G1F1	2GB	DS	MICRON	D9KPT	7	-	•	•	•
MICRON	MT18JSF25672AZ-1G1F1	2GB	DS	MICRON	D9KPT(ECC)	7	-	•	•	•
SAMSUNG	M378B5273BH1-CF8	4GB	DS	SAMSUNG	K4B2G0846B-HCF8	8	1.5	•	•	•
Transcend	TS128MLK64V1U	1GB	SS	ELPIDA	J1108BASE-AE-E	7	-	•	•	•
Elixir	M2Y2G64CB8HA9N-BE	2GB	DS	-	-	-	-	•	•	•
Elixir	M2Y2G64CB8HC5N-BE	2GB	DS	Elixir	N2CB1G80CN-BE	-	-	•	•	•
Elixir	M2Y2G64CB8HC9N-BE	2GB	DS	-	-	-	-	•	•	•
WINTEC	3DU3191A-10	1GB	DS	Qimonda	IDSH51-03A1F1C-10F	7	-	•	•	

2.4.3 Installing a DIMM

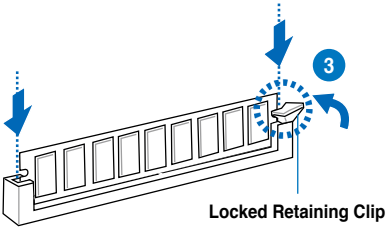
Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

1. Unlock a DIMM socket by pressing the retaining clip outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

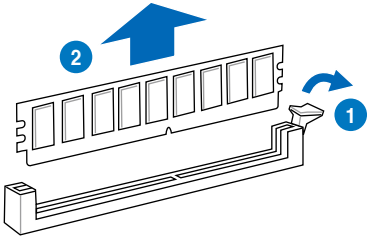
3. Hold the DIMM by both of its ends, then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place, and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.



Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

2.4.4 Removing a DIMM

1. Press the retaining clip outward to unlock the DIMM.
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.

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

2.5.1 Installing an expansion card

To install an expansion card:

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

2.5.2 Configuring an expansion card

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

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

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

2.5.3 Interrupt assignments

Standard interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	–	Redirect to IRQ#9
4	12	Communications Port (COM1)*
5	13	IRQ Holder for PCI Steering*
6	14	Reserved
7	15	Reserved
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

*** These IRQs are usually available for PCI devices.**

IRQ assignments for this motherboard

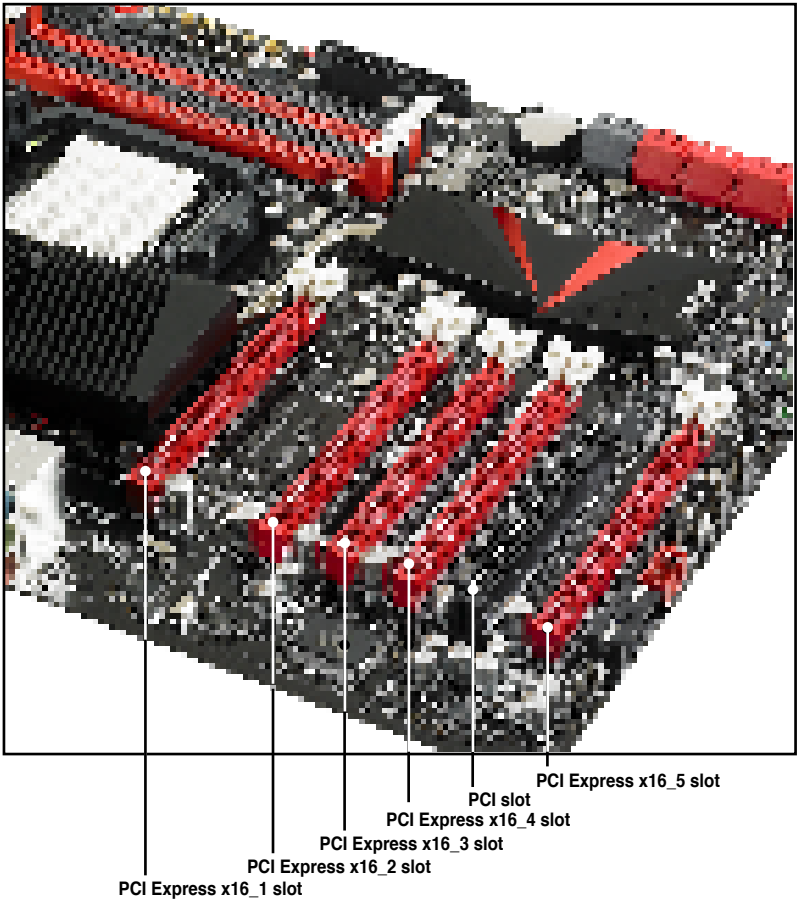
	A	B	C	D	E	F	G	H
PCIEX16/X8_1	shared	–	–	–	–	–	–	–
PCIEX8_2	shared	–	–	–	–	–	–	–
PCIEX16/X8_3	shared	–	–	–	–	–	–	–
PCIEX8_4	shared	–	–	–	–	–	–	–
PCIEX4_1	shared	–	–	–	–	–	–	–
USB 1.0#1	–	–	–	–	–	–	–	shared
USB 1.0#2	–	–	–	shared	–	–	–	–
USB 1.0#3	–	–	shared	–	–	–	–	–
USB 1.0#4	shared	–	–	–	–	–	–	–
USB 1.0#5	–	–	–	–	–	shared	–	–
USB 1.0#6	shared	–	–	–	–	–	–	–
USB 1.0#7	–	–	–	shared	–	–	–	–
USB 2.0#1	–	–	–	–	–	–	–	shared
USB 2.0#2	–	–	shared	–	–	–	–	–
SATA_1	–	–	shared	–	–	–	–	–
SATA_2	–	–	–	–	shared	–	–	–
MVL9128	shared	–	–	–	–	–	–	–
JMB36X	shared	–	–	–	–	–	–	–
HD Audio	–	–		–	–	–	shared	–
IEEE 1394	–	–	shared	–	–	–	–	–
PCI1	shared	–	–	–	–	–	–	–

2.5.4 PCI slot

The PCI slot supports 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 slot.

2.5.5 PCI Express x16 slots

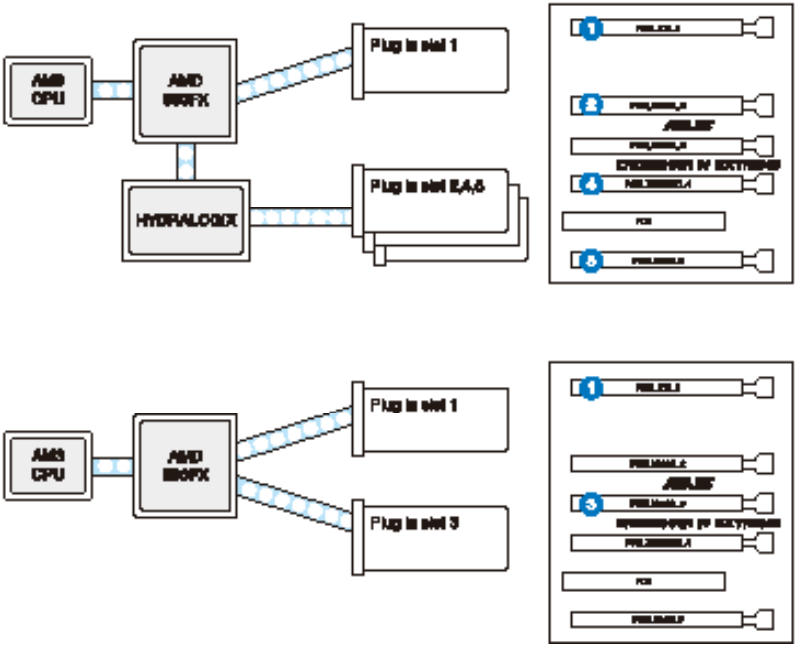
This motherboard has five PCI Express x16 slots that support PCI Express x16 cards complying with the PCI Express specifications. Refer to the figure below for the location of the slot.



CrossLinx 3 Technology

With CrossLinx 3 technology, Crosshair IV Extreme users gain the ability to mix and match multiple graphics cards from both NVIDIA and ATI, including models of different GPU generations. This technology uses the HYDRALOGIX engine, which bridges various graphics cards to enable their simultaneous usage. By removing compatibility hurdles, CrossLinx 3 makes it possible to experiment with different configurations of graphics cards for maximum performance.

On Crosshair IV Extreme, a unique layout design features a total of five PCI Express expansion slots. Two provide dedicated native graphics card support for either a single GPU or traditional CrossFire. The additional three feature HYDRALOGIX CrossLinx 3 technology, which enables a mixture of graphics cards from different vendors and generations. Users keen on tuning their system gain greater freedom to do so, and the technology maintains optimized performance whether in single or multiple-GPU arrangements.



Single VGA configurations

	VGA slot	Bandwidth	with HYDRALOGIX	without HYDRALOGIX
Single VGA	PCIE_X16_1	X16 mode	N/A	N/A
Other cards	PCIE_X16/X1_3	X16 mode		

Dual VGA configurations

	VGA slot	Bandwidth	with HYDRALOGIX	without HYDRALOGIX
1st VGA	PCIE_X16_1	X16 mode	N/A	Native CrossFireX
2nd VGA	PCIE_X16/X1_3	X16 mode		
Other cards	PCIE_X8/X4_5	x4 mode		

	VGA slot	Bandwidth	with HYDRALOGIX	without HYDRALOGIX
1st VGA	PCIE_X16_1	X16 mode	A / N / X multi-GPU mode	CrossFireX
2nd VGA	PCIE_X16/X8/ X1_4	X16 mode		
Other cards	PCIE_X16/X1_2	X16 mode		

Triple VGA configurations

	VGA slot	Bandwidth	with HYDRALOGIX	without HYDRALOGIX
1st VGA	PCIE_X16_1	X16 mode	A / N / X multi-GPU mode	CrossFireX
2nd VGA	PCIE_X16/X1_2	X16 mode		
3rd VGA	PCIE_X16/X8/ X1_4	X16 mode		
Other cards	PCIE_X16/X1_3	X1 mode		

	VGA slot	Bandwidth	with HYDRALOGIX	without HYDRALOGIX
1st VGA	PCIE_X16_1	X16 mode	A / N / X multi-GPU mode	CrossFireX
2nd VGA	PCIE_X16/X1_2	X16 mode		
3rd VGA	PCIE_X16/X8/ X1_4	X8 mode		
Other cards	PCIE_X8/X4_5	X8 mode		

Quad VGA configurations

	VGA slot	Bandwidth	with HYDRALOGIX	without HYDRALOGIX
1st VGA	PCIE_X16_1	X16 mode	N/A	CrossFireX
2nd VGA	PCIE_X16/X1_2	X16 mode		
3rd VGA	PCIE_X16/X8/ X1_4	X8 mode		
4th VGA	PCIE_X8/X4_5	X8 mode		
Other cards	PCIE_X16/X1_3	X1 mode		

- The PCIE slots 1 and 3 are supported by AMD890FX (for ATI CrossFireX only) and slots 2, 4, and 5 by HYDRALOGIX (for both ATI CrossFireX and nVIDIA SLI). Refer to page 2-27 for the slot location.
- Ensure to install VGA driver first and then the HYDRALOGIX driver from the support DVD.
- If you would like to reorder your two or more installed VGA cards from different vendors, ensure to remove HYDRALOGIX driver first and then remove the VGA driver. Follow the previous driver installation sequence to reinstall the drivers after reordering your VGA cards.
- Ensure to remove the HYDRALOGIX driver when you install four VGA cards to your motherboard.
- The HYDRALOGIX provides A-mode for ATI cards, N-mode for nVIDIA cards and X-mode for ATI + nVIDIA cards. The chipset automatically detects and switches modes when you install VGA cards on PCIE slots 2, 4, and 5.
- When you use HYDRALOGIX, we only recommend you install three VGA cards. Install at least one VGA card on the Slot 2, 4 or 5 when you use HYDRALOGIX.
- The HYDRALOGIX does not support dual GPUs.
- Install the higher-level graphics card to the Slot 1 when you install two or more graphics cards to your motherboard.

Notes for Enabling CrossFireX:

- Under dual card CrossFireX configuration, it is highly recommended to install the cards into the PCIE_X16_1 and PCIEX_16/X1_3 if the application used is not supported by HYDRALOGIX to eliminate the latency introduced by HYDRALOGIX controller.
- For best results, please enable CrossFireX instead of HYDRALOGIX for 3DMark 2006 benchmark tests using multiple ATI GPU based graphics cards.

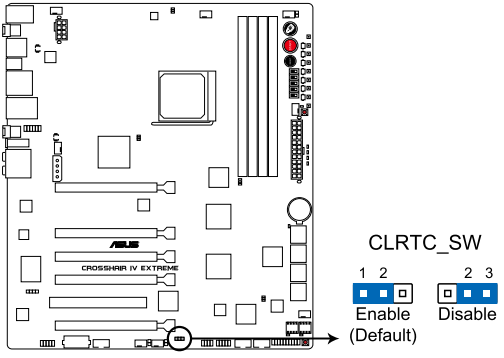
Notes for enabling HYDRALOGIX

- HYDRALOGIX should only be enabled when using :
  i. Supported graphic cards.
  ii. Supported graphic driver revisions
  iii. Supported applications / games
- No bridge is required to enable HYDRALOGIX.
- HYDRALOGIX support is only available under Windows VISTA SP2 or later and Windows 7 operating system.
- It is highly recommended to use three identical cards when testing tri-GPU configuration with HYDRALOGIX.
- HYDRALOGIX only support for Full Screen Mode.
- Please install the card with the fastest performance onto the 1st slot as recommended above, and connected the display to the output on that card for best result.
- All GPU native unique features outside what has been defined in DirectX such as CUDA, Open CL, and HD Hardware Acceleration are not affected by the enabling of HYDRALOGIX.
- PhysX support is only available under auxiliary GPU mode when enabling HYDRALOGIX.
- The maximum process ability of the combination will be limited to the maximum capability of the card with the lower capability when mixed match multiple cards of different graphical processing capabilities.
- It is highly advised to test with Anti-Aliasing enabled with the highest possible resolution with all special effects enabled when comparing the performance gain before and after enabling HYDRALOGIX.
- Performance may vary based on the final system configuration, save points, memory type and GPUs used in the combination.
- Mixed match support of HYDRALOGIX is only supported under Windows 7 operating system.
- For mixed match combinations, the performance of the fastest card should not exceed two times the performance of the slowest.
- ALT + Tab hotkey will be temporarily disabled when enabling HYDRALOGIX.
- For the latest support list and HYDRALOGIX driver revisions, please refer to http://www.lucidlogix.com/driverdownloads-driver3.html

2.6 Jumpers

1. Clear RTC RAM (3-pin CLRTC)

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



CROSSHAIR IV EXTREME Clear RTC RAM

To erase the RTC RAM

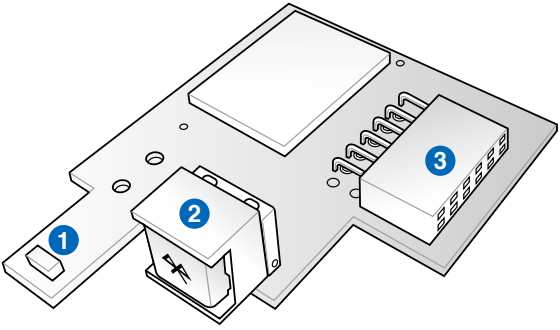
1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5–10 seconds, then move the cap back to pins 1-2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

- If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.
- You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.
- Due to the chipset behavior, AC power off is required to enable C.P.R. function. You must turn off and on the power supply or unplug and plug the power cord before rebooting the system.

2.7 RC Bluetooth card

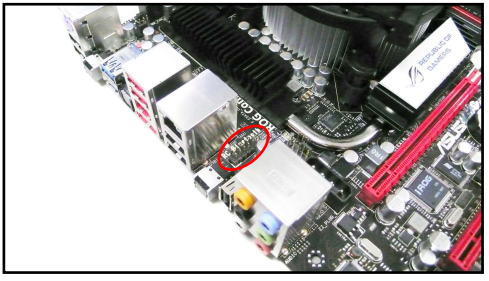
RC Bluetooth card layout



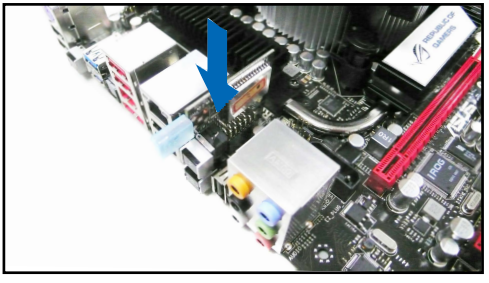
1. **Antenna:** Receives the Bluetooth signal. The plastic cap on the antenna protects it from possible damage.
2. **Bluetooth Switch:** Toggles the RC Bluetooth function ON and OFF. When the RC Bluetooth is OFF, the normal Bluetooth connection is still available.
3. **Bluetooth Connector:** Connects the RC_BLUETOOTH connector on the motherboard.

RC Bluetooth card installation

1. Locate the RC_Bluetooth connector on the motherboard.



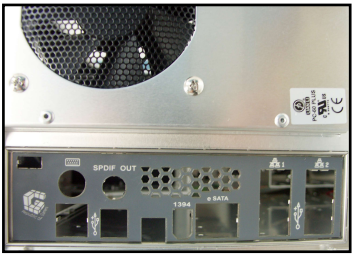
2. Orient the RC_Bluetooth card and firmly install it to the connector.



The photos above are for reference only, the actual motherboard layout may differ by models.

2.8 I/O shield Installation

1. Install the I/O shield to the chassis by snapping it in place from inside.



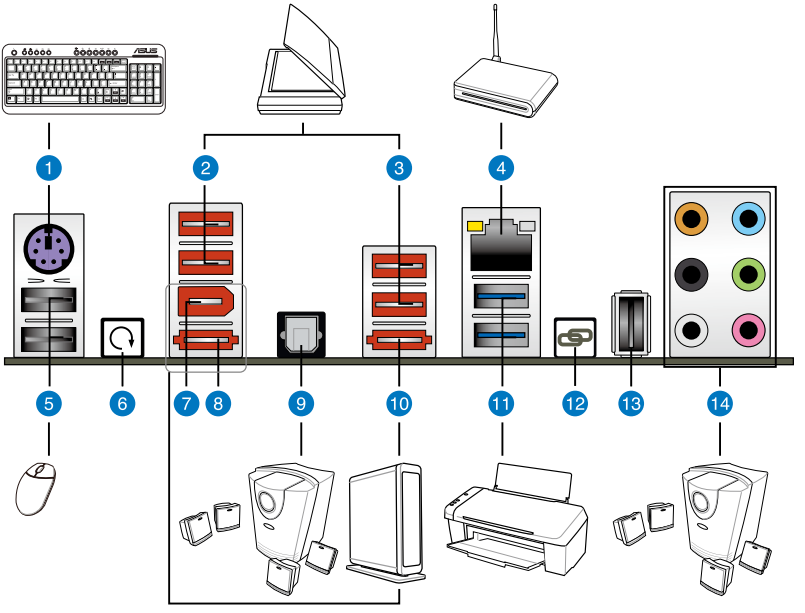
2. Orient the motherboard and install it to the chassis. Ensure that the motherboard external ports fit the I/O openings.

Be cautious when installing the motherboard. The I/O shield edge springs may damage the I/O ports.

The photos above are for reference only, the actual I/O shield may differ by models.

2.9 Connectors

2.9.1 Rear panel connectors

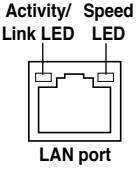


Rear panel connectors			
1.	PS/2 keyboard port (purple)	8.	External SATA port
2.	USB 2.0 ports 1 and 2	9.	Optical S/PDIF Out port
3.	USB 2.0 ports 3 and 4	10.	External SATA port
4.	LAN (RJ-45) port*	11.	USB 3.0 ports 1 and 2
5.	USB 2.0 ports 5 and 6	12.	ROG Connect switch
6.	Clear CMOS switch	13.	ROG Connect port
7.	IEEE 1394a port	14.	Audio ports

To use hot-plug, set the **Controller Mode** in the BIOS settings to [AHCI] mode. See section **3.5.3 Onboard Devices Configuration** for details.

*** LAN port LED indications**

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



2.9.2 ROG Connect switch and RC Bluetooth switch

ROG Connect switch

The ROG Connect function allows you to monitor and control remotely with the other computer through the provided ROG Connect cable.This switch also features USB BIOS FlashBack, which enables you to flash the BIOS in standby power.

To use ROG Connect:

1. Connect one end of the ROG Connect cable to the ROG Connect port and the other to your notebook or netbook.
2. Press the switch to start to connection.

To use USB BIOS FlashBack:

1. Download the latest BIOS from ASUS support website. Rename it **C4E.ROM**, save it to a USB flash drive and place it in the root directory.
2. Connect the USB flash drive to the ROG Connect port.
3. Press and hold the ROG Connect switch until it starts blinking (with standby power).
4. When the blinking stops, the BIOS flash completes.

RC Bluetooth switch

The RC Bluetooth function allows you to control your system wirelessly through your mobile smartphone.

To use RC Bluetooth

1. Install the application from the motherboard support DVD to your mobile phone.
2. Ensure that the Bluetooth function of your mobile phone is activated.
3. Press the RC Bluetooth switch.
4. Search the available Bluetooth-enabled devices nearby and add **RC_ Bluetooth**.
5. Pair your mobile phone and the system and start using RC Bluetooth function.

- Refer to the Appendix for the qualified vendor list for the mobile phone before using the RC Bluetooth function.
- The RC Bluetooth is designed for the following mobile phone operating systems. Visit the ASUS website at www.asus.com for the latest supported operating system list.

Mobile phone OS	Version
Windows Mobile	6.5/ 6.1/ 6.0 Professional (at display resolution 480*800)
Symbian	S60 3rd edition, feature pack 2/ feature pack 1
Android	Google Android 2.0 or later version

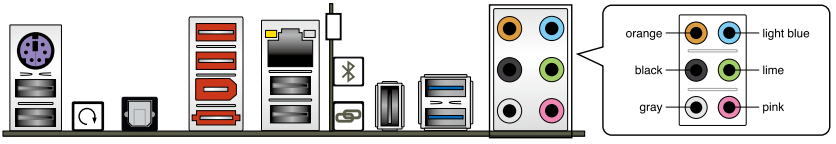
- For mobile phone with Symbian OS, RC Bluetooth supports keypad control only. RC Bluetooth is not available for phones with touch screen control.
- For mobile phone with Windows Mobile OS, you need to click the **COM Port** tab and add RC_Bluetooth.
- The default pairing code for RC Bluetooth is 0000.
- When you use RC Bluetooth, we recommend you stop running applications, including ASUS PC Probe II and Ai Suite.

2.9.3 Audio I/O connections

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

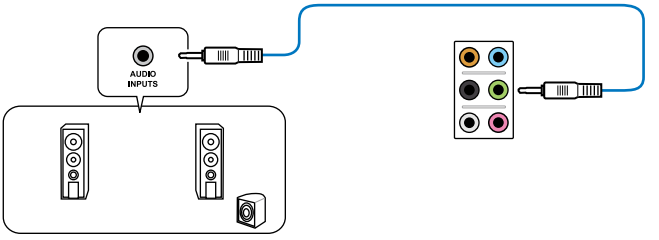
Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Line In
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	–	–	Center/ Subwoofer	Center/ Subwoofer
Black	–	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out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

Audio I/O ports

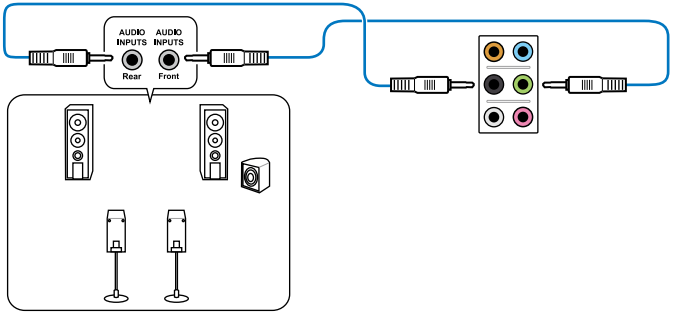


Connect to Headphone and Mic

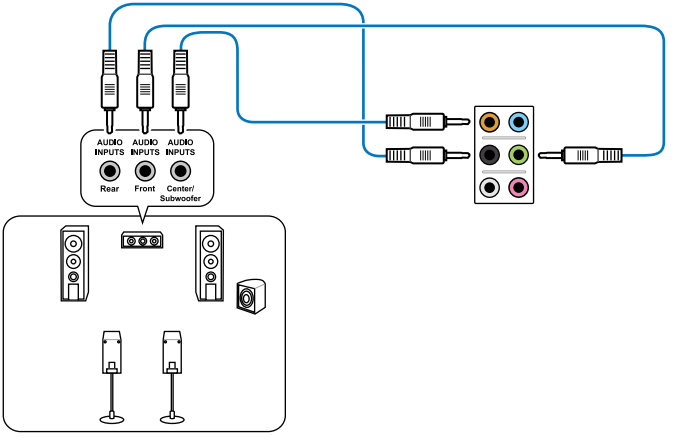
Connect to Stereo / 2.1-channel Speakers



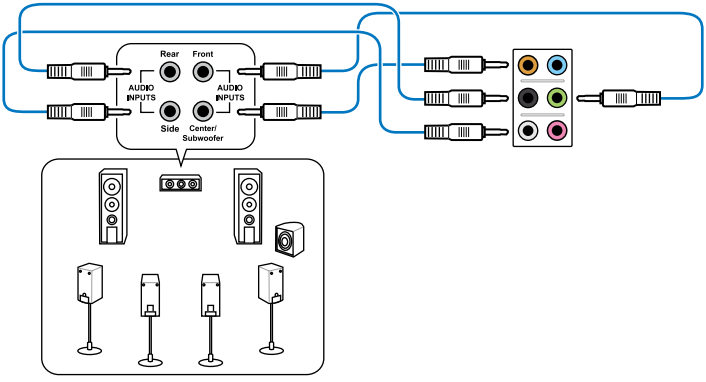
Connect to 4.1-channel Speakers



Connect to 5.1-channel Speakers



Connect to 7.1-channel Speakers

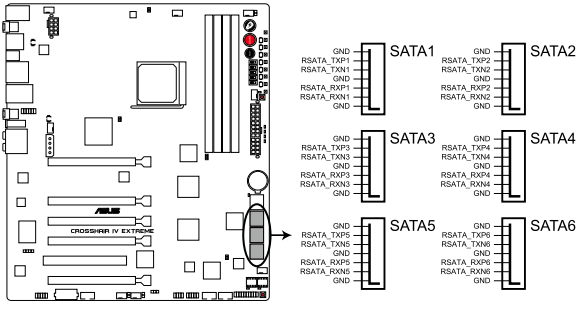


2.9.4 Internal connectors

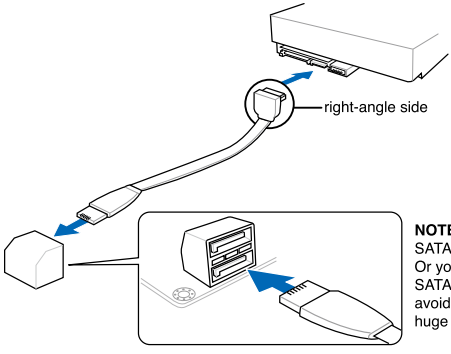
1. AMD SB850 Serial ATA connectors (7-pin SATA 1-6 [red])

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

If you installed Serial ATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the onboard AMD® SB850 RAID controllers.



CROSSHAIR IV EXTREME SATA connectors

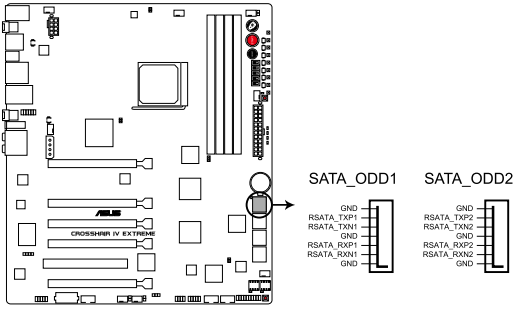


NOTE: Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

- These connectors are set to Standard IDE mode by default. In Standard IDE mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the **SATA Port1-4** item in the BIOS to [RAID]. See section **3.4.5 Storage Configuration** for details.
- Before creating a RAID set, refer to section **4.4 RAID configurations** or the manual bundled in the motherboard support DVD.
- You must install Windows® XP Service Pack 2 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP2 or later versions.
- When using hot-plug and NCQ, set the **SATA Port1-4** in the BIOS to [AHCI]. See section **3.4.5 Storage Configuration** for details.

2. JMicron® JMB363 Serial ATA connectors (7-pin SATA_ODD1, SATA_ODD2 [grey])

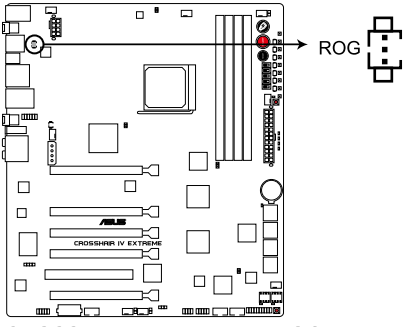
These connectors are for the Serial ATA signal cables for Serial ATA optical disk drives.



CROSSHAIR IV EXTREME SATA_ODD1/2 connectors

3. ROG connector (3-pin ROG)

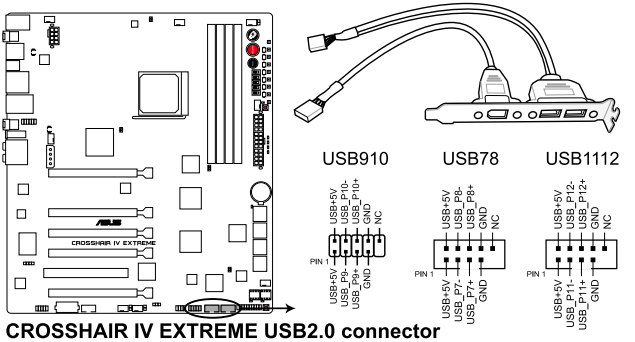
This connector is for the box (labeled as Republic of Gamers) on the heatpipe assembly. Connect the cable of the box and it lights when the system is on.



CROSSHAIR IV EXTREME ROG connector

4. USB connectors (10-1 pin USB78, USB910, USB1112)

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



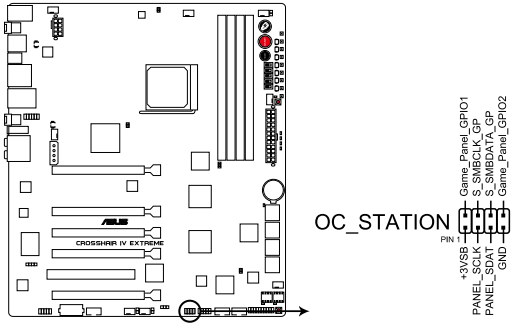
CROSSHAIR IV EXTREME USB2.0 connector

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. OC station connector (8-pin OC_Station)

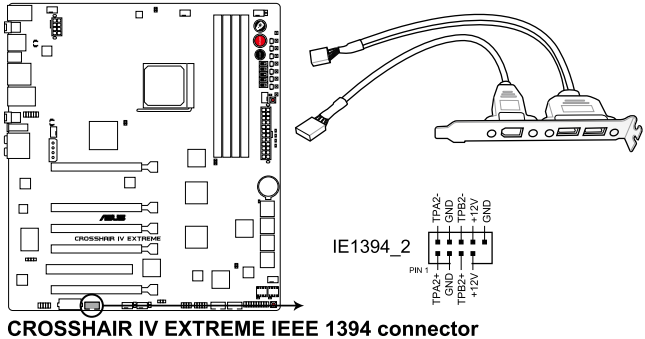
This connector is for ASUS OC Station connection only. Connect one end of the supplied data cable to the GP connector on the OC Station and the other end to this connector and USB910 on the motherboard to enjoy easier overclocking.



CROSSHAIR IV EXTREME OC_STATION connector

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

This connector is for an 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.



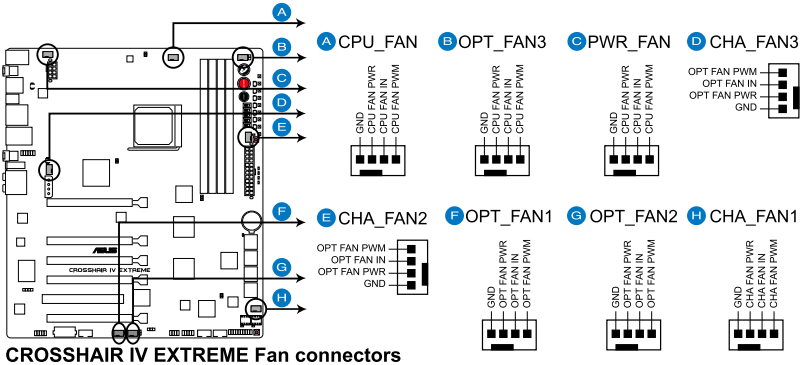
CROSSHAIR IV EXTREME IEEE 1394 connector

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

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

The fan connectors support cooling fans of 350 mA–2000 mA (24 W max.) or a total of 1 A–7 A (84 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, ensuring 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!

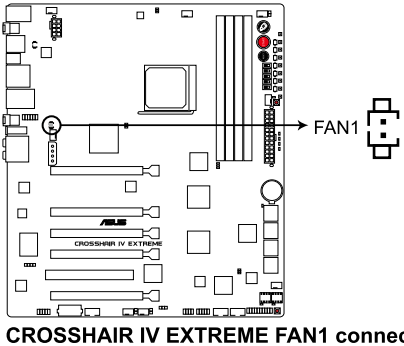


CROSSHAIR IV EXTREME Fan connectors

If you install two VGA cards, we recommend that you plug the chassis fan cable to the motherboard connector labeled OPT_FAN1/2/3 for better thermal environment.

8. Option Fan-Thermal module connector (2-pin FAN1)

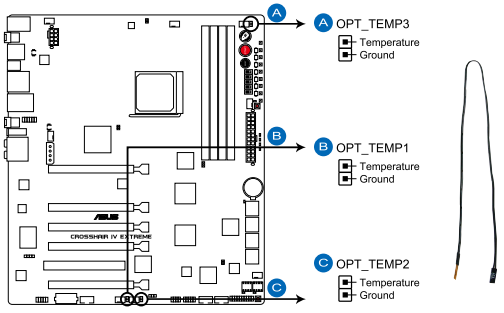
This connector is for the supplied Fan-Thermal Module.



CROSSHAIR IV EXTREME FAN1 connector

9. 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.

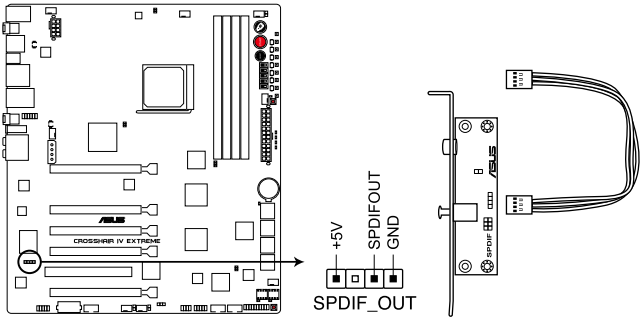


CROSSHAIR IV EXTREME Thermal sensor cable connectors

Enable **OPT FAN1/2/3 overheat protection** in BIOS if you connect thermal sensor cables to these connectors.

10. Digital audio connector (4-1 pin SPDIF_OUT)

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port(s). Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis.

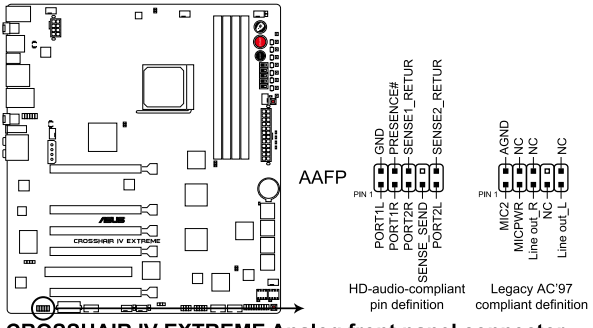


CROSSHAIR IV EXTREME Digital audio connector

The S/PDIF module is purchased separately.

11. Front panel audio connector (10-1 pin AAFP)

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

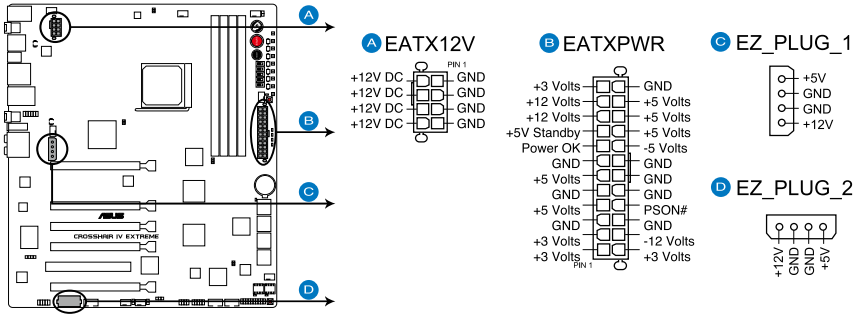


CROSSHAIR IV EXTREME Analog front panel connector

- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this connector, set the **Front Panel Type** item in the BIOS setup to **[HD Audio];** if you want to connect an AC'97 front panel audio module to this connector, set the item to **[AC97]**. By default, this connector is set to **[HD Audio]**.

12. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V, 4-pin EZ_PLUG_1/2)

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.

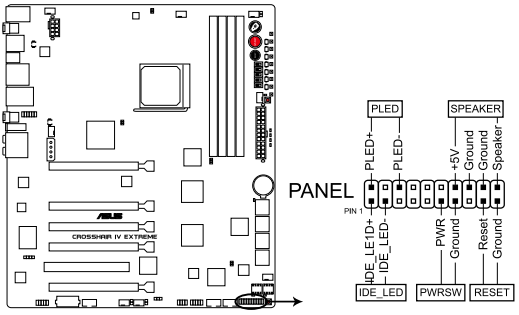


CROSSHAIR IV EXTREME ATX power connectors

- 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 600 W.
- Do not forget to connect the 8-pin EATX12V power plug; otherwise, the system will not boot.
- Connect the 4-pin EZ_PLUG power plugs to ensure sufficient power supply when you install multiple graphics cards.
- 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. Refer to the Appendix for the certified 500W power supply or above.
- 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.

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

This connector supports several chassis-mounted functions.



CROSSHAIR IV EXTREME 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.

14. ASUS Q-Connector (system panel)

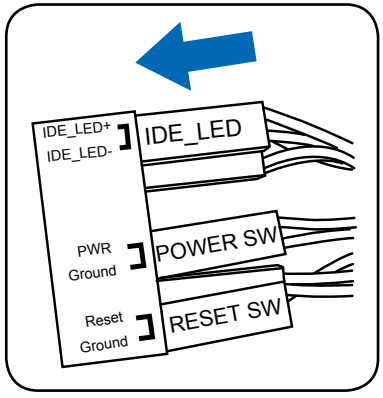
Use the ASUS Q-Connector to connect/disconnect the chassis front panel cables.

To install the ASUS Q-Connector:

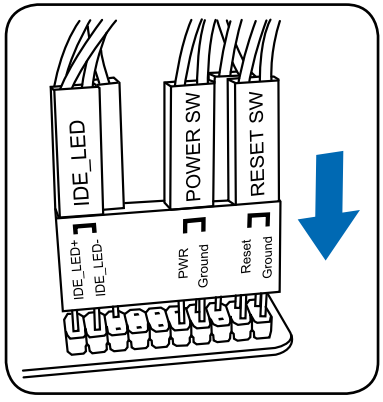
1. Connect the front panel cables to the ASUS Q-Connector.

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

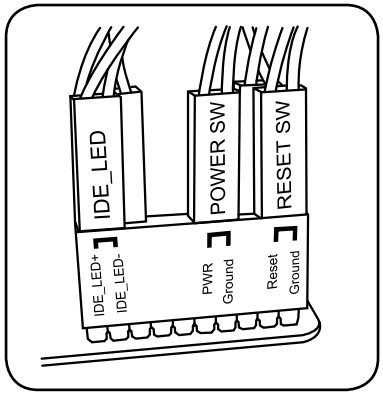
The labels on the front panel cables may vary depending on the chassis model.



2. Install the ASUS Q-Connector to the system panel connector, ensuring the orientation matches the labels on the motherboard.



3. The front panel functions are now enabled. The figure shows the Q-Connector is properly installed on the motherboard.

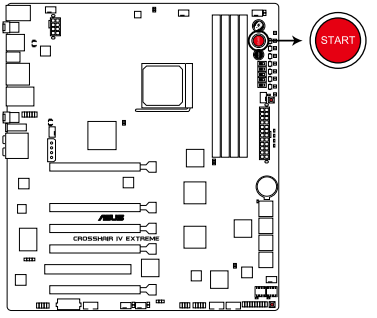


2.9.5 Onboard switches

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

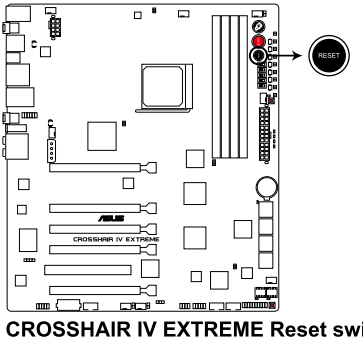
Press the power-on switch to wake/power up the system.



CROSSHAIR IV EXTREME Power on swit

2. Reset switch

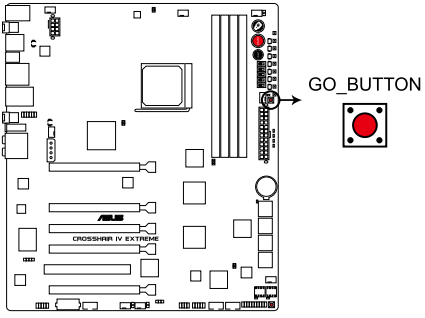
Press the reset switch to reboot the system.



CROSSHAIR IV EXTREME Reset switch

3. GO button

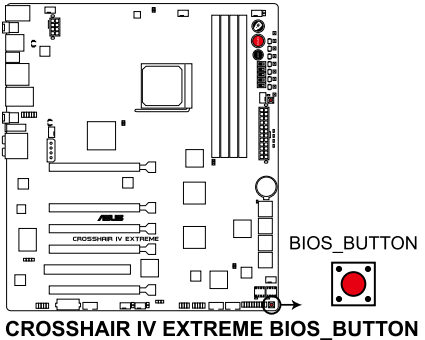
Press the GO button before POST to enable MemOK! or press it to quickly load the preset profile (GO_Button file) for temporary overclocking when in OS.



CROSSHAIR IV EXTREME GO_BUTTON

4. BIOS button

The motherboard comes with two BIOS. Press the BIOS button to switch BIOS and load different BIOS settings. The nearby BIOS LEDs indicate the BIOS you are using.

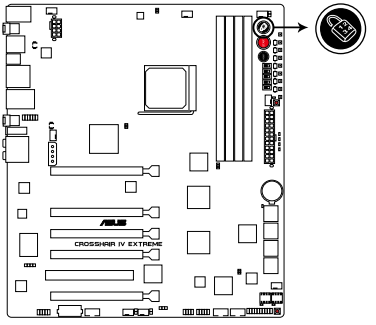


CROSSHAIR IV EXTREME BIOS_BUTTON

5. Core Unlocker switch

This switch allows you to unlock the extra cores of your CPU.

For ensuring the system performance, turn the switch setting to **Enable** when the system is powered off.

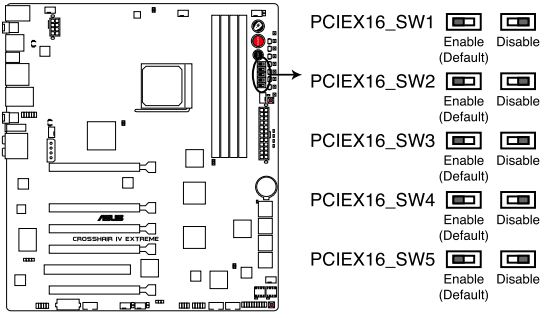


CROSSHAIR IV EXTREME CORE UNCLOCKER switch

- You may also press <4> during the Power-On-Self-Test (POST) or enable the ASUS Core Unlocker item in the BIOS menu to activate the Core Unlocker function.
- The system will use the last setting you have made.
- If you clear the CMOS or load the BIOS setup defaults, the ASUS Core Unlocker item in the BIOS menu follows the current setting of the Core Unlocker switch.

6. PCIe x16 Lane switch

These slide switches allows you to enable and disable the corresponding PCIe x16 slots. When one of the installed PCIe x16 cards is out of order, you can use the slide switch to find out the faulty one without removing the cards.

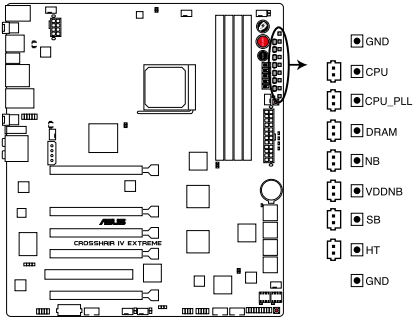


CROSSHAIR IV EXTREME SW

2.9.6 ProbeIt

The ROG ProbeIt feature provides a nice touch for your convenient and accurate OC settings. No time wasted fumbling around on the complicated motherboard layout, the clearly marked area gives you easier access to the measure points when a multitester is employed for more accurate measurements during your busy overclocking work.

Refer to the following illustration for ProbeIt location.



CROSSHAIR IV EXTREME ProbeIt

Using ProbeIt

You may connect the multitester to the motherboard as shown on Figure 1, or use the ProbeIt cable to connect to the motherboard as shown on Figure 2.

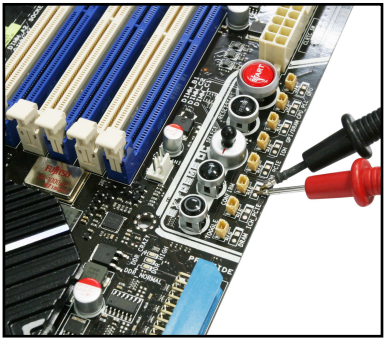


Figure 1

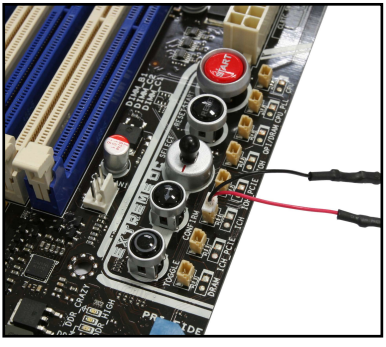


Figure 2

The photos above are for reference only, the actual motherboard layout and measure points location may differ by models.

2.10 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Be sure that all switches are off.
3. Connect the power cord to the power connector at the back of the system chassis.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. Turn on the devices in the following order:
   a. Monitor
   b. External SCSI devices (starting with the last device on the chain)
   c. System power
6. After applying power, the system power LED on the system front panel case lights up. For systems with ATX power supplies, the system LED lights up when you press the ATX power button. If your monitor complies with “green” standards or if it has a “power standby” feature, the monitor LED may light up or switch between orange and green after the system LED turns on.

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

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

7. At power on, hold down the <Delete> key to enter the BIOS Setup. Follow the instructions in Chapter 3.

2.11 Turning off the computer

2.11.1 Using the OS shut down function

If you are using Windows® Vista™/ Windows® 7:

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.

2.11.2 Using the dual function power switch

While the system is ON, pressing the power switch for less than four seconds puts the system to sleep mode or to soft-off mode, depending on the BIOS setting. Pressing the power switch for more than four seconds lets the system enter the soft-off mode regardless of the BIOS setting. Refer to section **3.6 Power Menu** in Chapter 3 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.

3 BIOS Setup

Chapter summary

3

3.1 Managing and updating your BIOS

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

1. **ASUS Update** (Updates the BIOS in Windows® environment.)
2. **ASUS EZ Flash 2** (Updates the BIOS using a USB flash disk.)
3. **ASUS CrashFree BIOS 3 utility:** Restores the BIOS using the motherboard support DVD or a USB flash drive 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 USB flash drive in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the **ASUS Update** utility.

3.1.1 ASUS Update utility

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

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

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

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

Installing ASUS Update

To install ASUS Update:

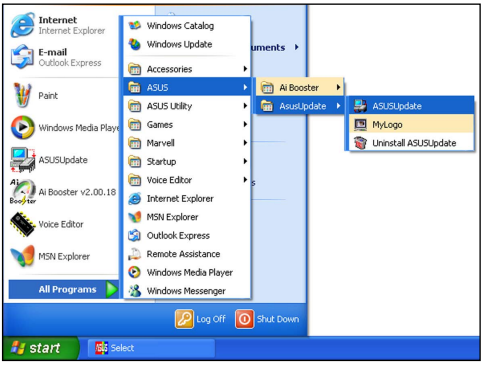
1. Place the support DVD in the optical drive. The Drivers menu appears.
2. Click the Utilities tab, then click Install ASUS Update VX.XX.XX.
3. The ASUS Update utility is copied to your system.

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

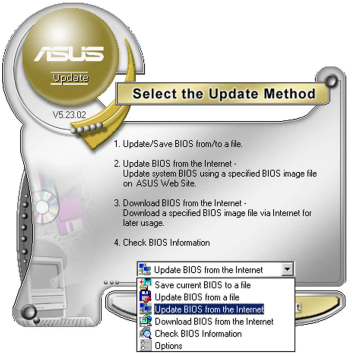
Updating the BIOS through the Internet

To update the BIOS through the Internet:

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

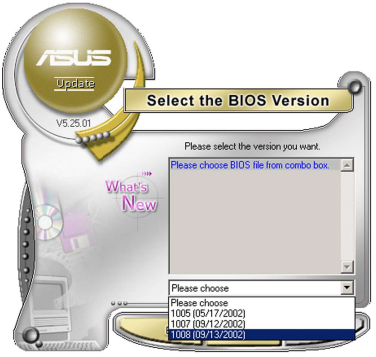


2. Select **Update BIOS** from the Internet option from the drop-down menu, then click **Next**.



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

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.

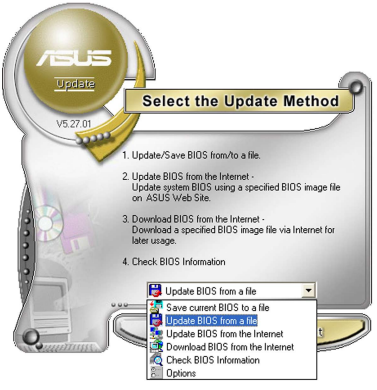


The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.

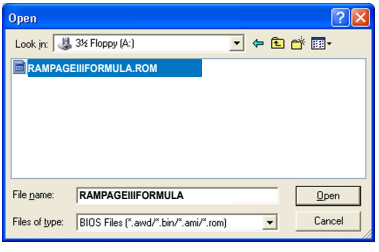
Updating the BIOS through a BIOS file

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.



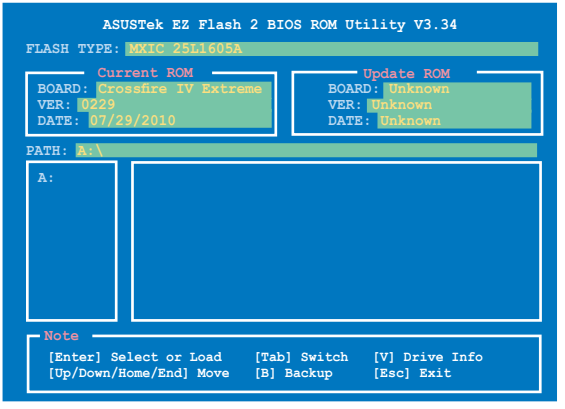
3.1.2 ASUS EZ Flash 2 utility

The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use 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).

Before you start using this utility, download the latest BIOS from the ASUS website at www.asus.com.

To update the BIOS using EZ Flash 2

1. Insert the USB flash disk that contains the latest BIOS file to the USB port, and then launch EZ Flash 2 in any of these two ways:
   - Press <Alt> + <F2> during POST to display the following.
   - Enter the BIOS Setup program. Go to the **Tools** menu to select **EZ Flash 2** and press <Enter> to enable it.



2. Press <Tab> to switch between drives until the correct BIOS file is found. When found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.

- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. See section **3.9 Exit Menu** for details.

3.1.3 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 utility 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 restore a corrupted BIOS file using the motherboard support DVD or a USB flash drive that contains the BIOS file.

The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at support.asus.com and save it to a USB flash drive.

Recovering the BIOS

To recover the BIOS

1. Turn on the system.
2. Insert the motherboard support DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.
3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.
4. Turn off the system after the utility completes the updating process and power on again.
5. The system requires you to enter BIOS Setup to recover BIOS setting. To ensure system compatibility and stability, we recommend that you press <F2> to load default BIOS values.

DO NOT shut down or reset the system while recovering the BIOS! Doing so can cause system boot failure!

3.2 BIOS Setup program

This motherboard supports two programmable firmware chips that you can update using the provided utility described in section **3.1 Managing and updating your BIOS**.

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

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

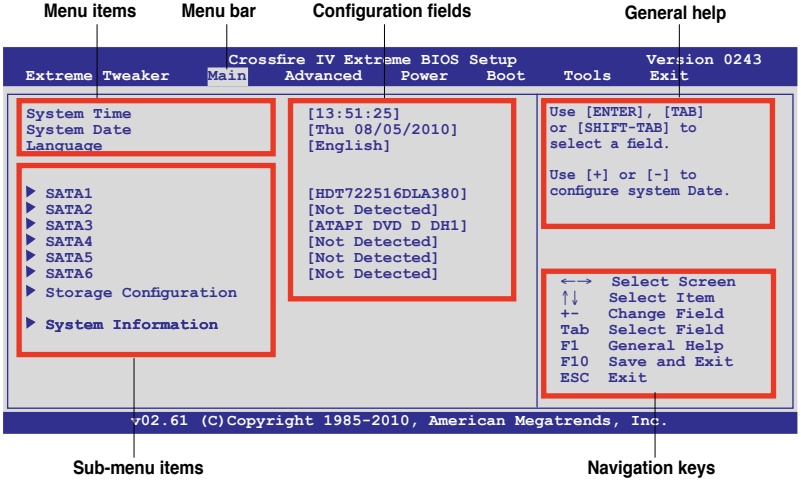
The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

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

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

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section **3.9 Exit Menu**.
- The BIOS Setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website at www.asus.com to download the latest BIOS file for this motherboard.

3.2.1 BIOS menu screen



3.2.2 Menu bar

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

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

3.2.3 Navigation keys

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

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

3.2.4 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.

3.2.5 Submenu items

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

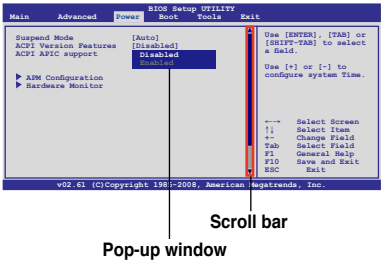
3.2.6 Configuration fields

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 **3.2.7 Pop-up window.**

3.2.7 Pop-up window

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



3.2.8 Scroll bar

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

3.2.9 General help

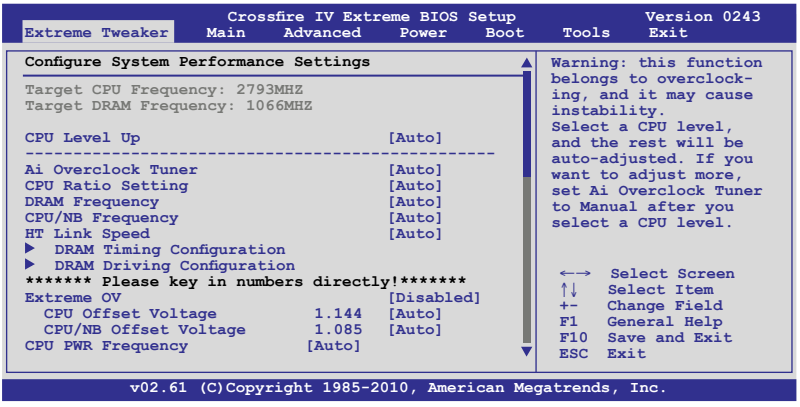
At the top right corner of the menu screen is a brief description of the selected item.

3.3 Extreme Tweaker menu

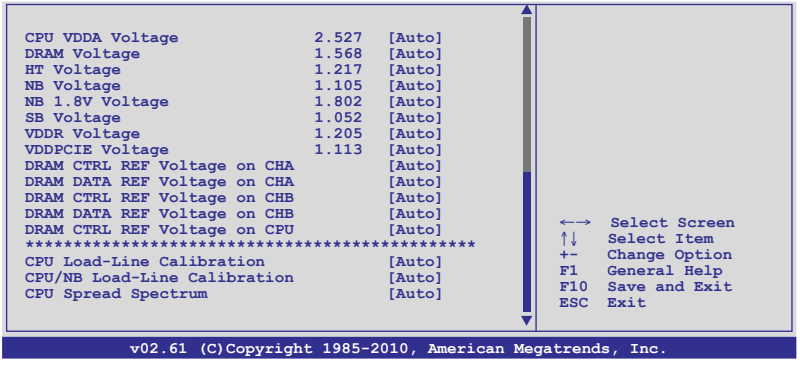
The Extreme Tweaker menu items allow you to configure overclocking-related items.

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

The default values of the following items vary depending on the CPU and memory modules you install on the motherboard.



Scroll down to display the following items:



3.3.1 CPU Level Up [Auto]

Allows you to select a CPU level, and the related parameters will be automatically adjusted according to the selected CPU level. If you want to manually configure the settings in detail, set **Ai Overclock Tuner** to [Manual] after selecting a CPU level.

3.3.2 Ai Overclock Tuner [Auto]

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

Manual	Allows you to individually set overclocking parameters.
Auto	Loads the optimal settings for the system.
D.O.C.P	Allows you to select a DRAM voltage.

DRAM O.C. Profile [DDR3-1600NHz]

This item appears only when you set the **Ai Overclock Tuner** item to [D.O.C.P] and allows you to select the DRAM overclocking profiles.
Configuration options: [DDR3-1600MHz] [DDR3-1800MHz] [DDR3-1866MHz] [DDR3-2000MHz]

3.3.3 CPU Ratio Setting [Auto]

Allows you to adjust the ratio between CPU Core Clock and FSB Frequency. Use the <+> and <-> keys to adjust the value. The valid value ranges differently according to your CPU model.

3.3.4 CPU Bus Frequency [XXX]

Allows you to adjust the CPU Bus Frequency. This item appears only when you set the **Ai Overclcok Tuner** to [Manual] and [D.O.C.P]. Use the <+> and <-> keys to adjust the value. You can also type the desired value using the numeric keypad. The values range from 100 to 600.

3.3.5 PCIE Frequency [XXX]

Allows you to adjust the PCI Express frequency. This item appears only when you set the **Ai Overclcok Tuner** to [Manual]. Use the <+> and <-> keys to adjust the value. You can also type the desired value using the numeric keypad. The values range from 100 to 150.

3.3.6 DRAM Frequency [Auto]

Allows you to set the DDR3 operating frequency.
Configuration options: [Auto] [800MHz] [1067MHz] [1333MHz] [1600MHz]

3.3.7 CPU/NB Frequency [Auto]

Allows you to set the ratio between NB clock and the CPU Bus frequency.
Configuration options: [Auto] [1400MHz] [1600MHz] [1800MHz] [2000MHz]

3.3.8 HT Link Speed [Auto]

Allows you to set the HyperTransport link speed.
Configuration options: [Auto] [200MHz] [400MHz] [600MHz] [800MHz] [1000MHz] [1200MHz] [1400MHz] [1600MHz] [1800MHz] [2000MHz]

3.3.9 DRAM Timing Configuration

The configuration options for some of the following items vary depending on the DIMMs you install on the motherboard.

DRAM 1st Information: 9-9-9-24-5-33-10-4

The values vary depending on your settings of the following sub-items:

DRAM CAS# Latency 9 [Auto]
Configuration options: [Auto] [4 DRAM Clock] [4 DRAM Clock] – [10 DRAM Clock] [12 DRAM Clock]

DRAM RAS# to CAS# Delay 9 [Auto]
Configuration options: [Auto] [5 DRAM Clock] – [12 DRAM Clock]

DRAM RAS# PRE Time 9 [Auto]
Configuration options: [Auto] [5 DRAM Clock] – [12 DRAM Clock]

DRAM RAS# ACT Time 24 [Auto]
Configuration options: [Auto] [15 DRAM Clock] [16 DRAM Clock] – [29 DRAM Clock] [30 DRAM Clock]

DRAM READ to PRE Time 5 [Auto]
Configuration options: [Auto] [4 DRAM Clock] – [7 DRAM Clock]

DRAM Row Cycle Time 33 [Auto]
Configuration options: [Auto] [11 DRAM Clock] – [41 DRAM Clock]

DRAM WRITE Recovery Time 10 [Auto]
Configuration options: [Auto] [5 DRAM Clock] [6 DRAM Clock] [7 DRAM Clock] [8 DRAM Clock] [10 DRAM Clock] [12 DRAM Clock]

DRAM RAS# to RAS# Delay 4 [Auto]
Configuration options: [Auto] [4 DRAM Clock] – [7 DRAM Clock]

FOUR ACT WIN Time 20 [Auto]
Configuration options: [Auto] [1 DRAM Clock] – [63 DRAM Clock]

DRAM 2nd Information: 7-2-5-4-3-110-7.8ms-IT

The values vary depending on your settings of the following sub-items:

DRAM READ to WRITE Delay 7 [Auto]
Configuration options: [Auto] [3 DRAM Clock] – [17 DRAM Clock]

DRAM WRITE to READ Delay(DD) 2 [Auto]
Configuration options: [Auto] [2 DRAM Clock] – [10 DRAM Clock]

DRAM WRITE to READ Delay(SD) 5 [Auto]
Configuration options: [Auto] [4 DRAM Clock] – [7 DRAM Clock]

DRAM WRITE to WRITE Timing 4 [Auto]
Configuration options: [Auto] [3 DRAM Clock] – [10 DRAM Clock]

DRAM READ to READ Timing 3 [Auto]
Configuration options: [Auto] [3 DRAM Clock] – [10 DRAM Clock]

DRAM REF Cycle Time 110 [Auto]
Configuration options: [Auto] [90ns] [110ns] [160ns] [300ns] [350ns]

DRAM Refresh Rate 7.8 [Auto]
Configuration options: [Auto] [Every 7.8ms] [Every 3.9ms]

DRAM Command Rate 1T [Auto]
Configuration options: [Auto] [1T] [2T]

3.3.10 DRAM Driving Configuration

DCT0 Information:

CKE drive strength 1.5x [Auto]

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

CS/ODT drive strength 1.5x [Auto]

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

ADDR/CMD drive strength 1.5x [Auto]

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

MEMCLK drive strength 1.5x [Auto]

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

Data drive strength 1x [Auto]

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

DQS drive strength 1x [Auto]

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

Processor ODT 60ohms [Auto]

Configuration options: [Auto] [240 ohms +/- 20%] [240 ohms +/- 20%]

DCT1 Information:

CKE drive strength 2x [Auto]

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

CS/ODT drive strength 2x [Auto]

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

ADDR/CMD drive strength 2x [Auto]

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

MEMCLK drive strength 1.5x [Auto]

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

Data drive strength 1.5x [Auto]

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

DQS drive strength 1.5x [Auto]

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

Processor ODT 240ohms [Auto]

Configuration options: [Auto] [240 ohms +/- 20%] [240 ohms +/- 20%]

3.3.11 Extreme OV [Disabled]

[Enabled] Enables the Extreme OV function.

[Disabled] Disables this function.

3.3.12 CPU/NB Voltage Mode [Offset]

[Offset] The CPU voltage is adjusted by an offset voltage.

[Disabled] The CPU voltage is set to a fixed voltage.

CPU Offset Voltage [Auto]

Allows you to set the CPU Offset voltage. This item appears only when you set **CPU/NB Voltage Mode** to [Offset]. The values range from 0.003125V to 0.4V with a 0.003125V interval.

CPU/NB Offset Voltage [Auto]

Allows you to set the CPU/NB Offset voltage. This item appears only when you set **CPU/NB Voltage Mode** to [Offset]. The values range from 0.003125V to 0.4V with a 0.003125V interval.

CPU Voltage [Auto]

Allows you to set the CPU voltage. This item appears only when you set **CPU/NB Voltage Mode** to [Manual]. The values range varies with CPU.

CPU/NB Voltage [Auto]

Allows you to set the CPU/NB voltage. This item appears only when you set **CPU/NB Voltage Mode** to [Manual]. The values range varies with CPU.

3.3.13 CPU PWR Frequency [Auto]

Configuration options: [Auto] [200KHz] [300KHz] [400KHz] [500KHz]

3.3.14 CPU VDDA Voltage [Auto]

Allows you to set the CPU VDDA voltage. The values range from 3.18750V to 2.20000V with a 0.01250V interval.

3.3.15 DRAM Voltage [Auto]

Allows you to set the DRAM voltage. The values range from 2.90000V to 1.20000V with a 0.01250V interval.

3.3.16 HT Voltage [Auto]

Allows you to set the HT voltage. The values range from 2.00000V to 0.80000V with a 0.01250V interval.

3.3.17 NB Voltage [Auto]

Allows you to set the NB voltage. The values range from 0.80000V to 2.00000V with a 0.01250V interval. The text color in the configuration field indicates voltage condition. When you set the **NB LED Selection** item to [NB], the onboard northbridge LED displays northbridge voltage condition.

3.3.18 NB 1.8V Voltage [Auto]

Allows you to set the NB 1.8 voltage. The values range from 1.180200V to 3.00775V with a 0.01325V interval. The text color in the configuration field indicates voltage condition.

3.3.19 SB Voltage [Auto]

Allows you to set the SB voltage. The values range from 1.11300V to 1.80200V with a 0.01325V interval. The text color in the configuration field indicates voltage condition.

3.3.20 VDDR Voltage [Auto]

Allows you to set the VDDR voltage. The values range from 1.20575V to 1.80200V with a 0.01325V interval. The text color in the configuration field indicates voltage condition.

3.3.21 VDDPCIE Voltage [Auto]

Allows you to set the VDDPCIE voltage. The values range from 1.113000V to 2.000750V with a 0.01325V interval. The text color in the configuration field indicates voltage condition.

3.3.22 DRAM CTRL REF Voltage on CHA/B [Auto]

Allows you to set the DRAM Control Reference Voltage on Channel A/B. The values range from 0.395x to 0.630x with a 0.005x interval. Different ratio might enhance DRAM overclocking ability.

3.3.23 DRAM DATA REF Voltage on CHA/B [Auto]

Allows you to set the DRAM DATA Reference Voltage on Channel A/B. The values range from 0.395x to 0.630x with a 0.005x interval. Different ratio might enhance DRAM overclocking ability.

3.3.24 DRAM CTRL REF Voltage on CPU [Auto]

Allows you to set the DRAM DATA Reference Voltage on CPU. The values range from 0.395x to 0.630x with a 0.005x interval. Different ratio might enhance DRAM overclocking ability.

3.3.25 CPU Load-Line Calibration [Auto]

Allows you to select the CPU Load-Line mode.
Configuration options: [Auto] [Disabled] [Enabled]

3.3.26 CPU/NB Load-Line Calibration [Auto]

Allows you to select the CPU/NB Load-Line mode.
Configuration options: [Auto] [Disabled] [Enabled]

3.3.27 CPU Spread Spectrum [Auto]

[Disabled] Enhances the BCLK overclocking ability.

[Auto] Sets to [Auto] for EMI control.

3.3.28 PCIE Spread Spectrum [Auto]

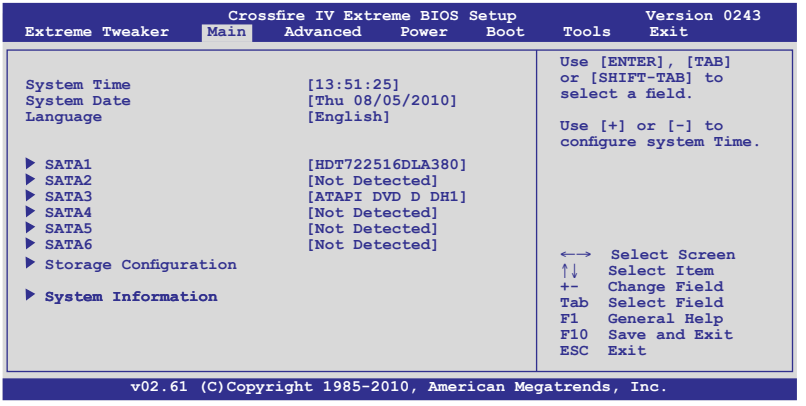
[Disabled] Enhances the PCIE overclocking ability

[Auto] Sets to [Auto] for EMI control.

3.4 Main menu

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

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



3.4.1 System Time [xx:xx:xx]

Allows you to set the system time.

3.4.2 System Date [Day xx/xx/xxxx]

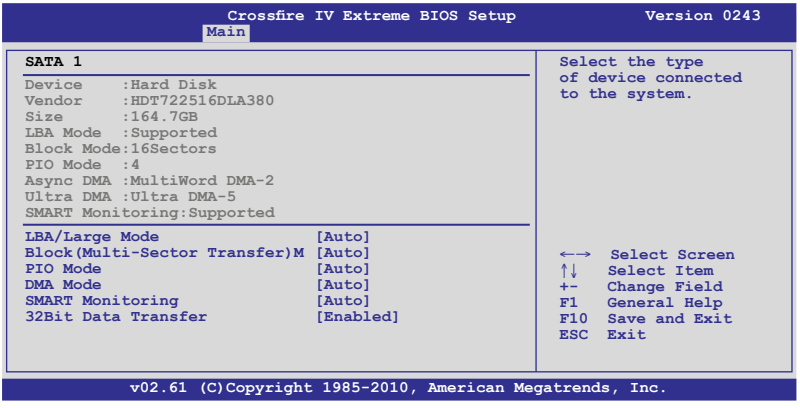
Allows you to set the system date.

3.4.3 Language [English]

Allows you to choose the BIOS language version from the options.
Configuration options: [繁體中文] [簡体中文] [日本語] [Français] [Deutsch] [English]

3.4.4 SATA 1–6

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



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

LBA/Large Mode [Auto]

Enables or disables the LBA (Logical Block Addressing) mode.

[Auto] Select [Auto] to enable the LBA mode (Logical Block Addressing mode) if the device supports this mode, and if the device was not previously formatted with LBA mode disabled.

[Disabled] Disable this function.

Block (Multi-Sector Transfer) M [Auto]

Enables or disables data multi-sectors transfers.

[Auto] When set to [Auto], the data transfer from and to the device occurs multiple sectors at a time if the device supports multi-sector transfer feature.

[Disabled] When set to [Disabled], the data transfer from and to the device occurs one sector at a time.

PIO Mode [Auto]

[Auto] Allows automatic selection of the PIO (Programmed input/output) modes, which correspond to different data transfer rates.

[0] [1] – [4] Set the PIO mode to Mode 0, 1, 2, 3, or 4.

DMA Mode [Auto]

DMA (Direct Memory Access) allows your computer to transfer data to and from the hardware devices installed with much less CPU overhead.

The DMA mode consists of SDMA (single-word DMA), MDMA (multi-word DMA), and UDMA (Ultra DMA). Setting to [Auto] allows automatic selection of the DMA mode, or you can select from the following options: [SWDMA1] [SWDMA2] [MWDMA0] [MWDMA1] [MWDMA2] [UDMA0] [UDMA1] [UDMA2] [UDMA3] [UDMA4] [UDMA5]

SMART Monitoring [Auto]

[Auto] Allows automatic selection of the S.M.A.R.T (Smart Monitoring, Analysis, and Reporting Technology).

[Enabled] Enable the S.M.A.R.T feature.

[Disabled] Disable the S.M.A.R.T feature.

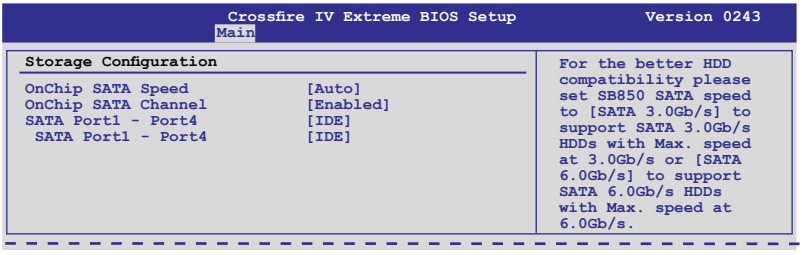
32Bit Data Transfer [Enabled]

[Enabled] Sets the IDE controller to combine two 16-bit reads from the hard disk into a single 32-bit double word transfer to the processor. This makes more efficient use of the PCI bus as fewer transactions are needed for the transfer of a particular amount of data.

[Disabled] Disable this function.

3.4.5 Storage Configuration

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



OnChip SATA Speed [Auto]

For the better HDD compatibility please set SB850 SATA speed to [SATA 3.0Gb/s] to support SATA 3.0Gb/s HDDs with maximum speed at 3.0Gb/s or [SATA 6.0Gb/s] to support SATA 6.0Gb/s HDDs with maximum speed at 6.0Gb/s.
Configuration options: [Auto] [SATA 3.0Gb/s] [STAT 6.0 Gb/s]

OnChip SATA Channel [Enabled]

Configuration options: [Disabled] [Enabled]

SATA Port1 - Port4 [IDE]

Allows you to set the SATA configuration. This item appears only when you set the **OnChip SATA Channel** item to [Enabled].

[IDE] Set to [IDE] when you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices.

[RAID] Set to [RAID] when you want to create a RAID configuration from the SATA hard disk drives.

[AHCI] Set to [AHCI] when you want the SATA hard disk drives to use the AHCI (Advabced Host Controller Interface). 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.

SATA Port5 - Port6 [IDE]

[IDE] Set to [IDE] when you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices.

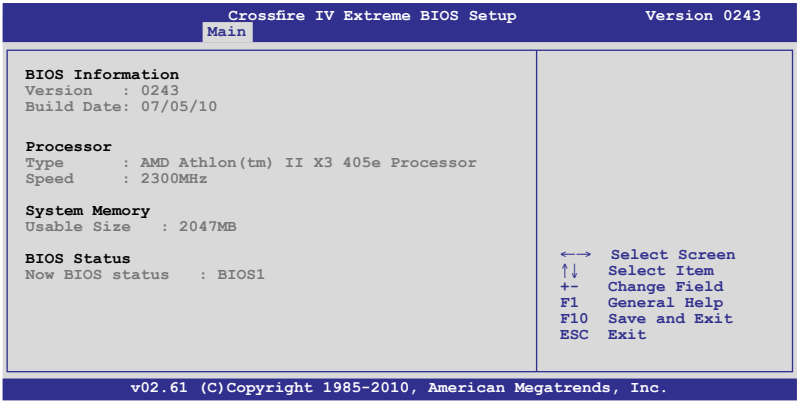
[RAID] Set to [RAID] when you want to create a RAID configuration from the SATA hard disk drives.

[AHCI] Set to [AHCI] when you want the SATA hard disk drives to use the AHCI (Advabced Host Controller Interface). 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.

You can only set **SATA Port5-Port6** to [IDE] if **Port1-Port4** is set to [IDE]

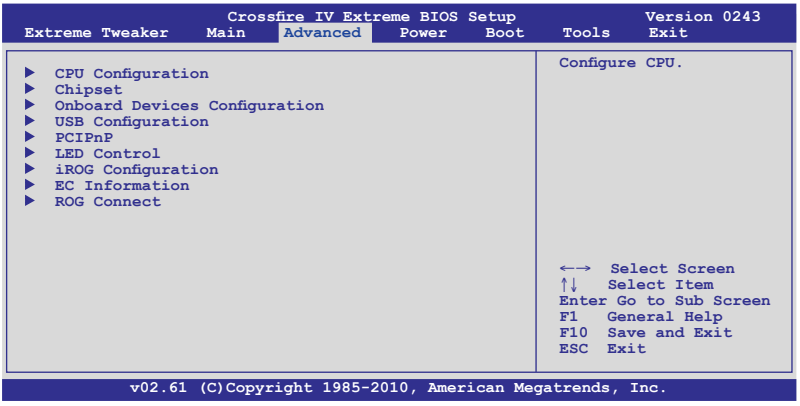
3.4.7 System Information

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



3.5 Advanced menu

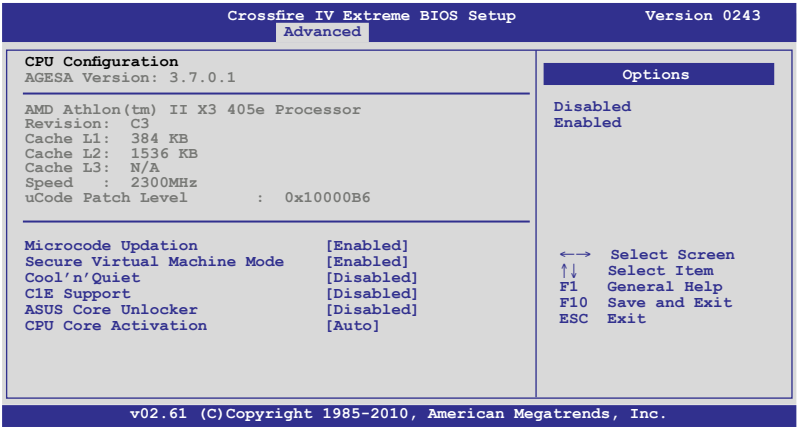
The Advanced menu items allow you to change the settings for the CPU and other system devices.



3.5.1 CPU Configuration

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

The items shown in this screen may be different due to the CPU you installed.



Microcode Updation [Enabled]

[Enabled] Allows the system to update the Microcode automatically, enhancing system performance.

[Disabled] Disables this function.

Secure Virtual Machine Mode [Enabled]

[Enabled] Enables the AMD Secure Virtual Machine mode.

[Disabled] Disables this function.

Cool'n'Quiet [Disabled]

[Enabled] Enables the AMD Cool'n'Quiet function.

[Disabled] Disables this function.

C1E Support [Disabled]

[Enabled] Enables the C1E support function. This item should be enabled in order to enable the Enhanced Halt Sate.

[Disabled] Disables this function.

ASUS Core Unlocker [Disabled]

Allows you to unlock the CPU core and get the full computing power.
Configuration options: [Disabled] [Enabled]

CPU Core Activation [Auto]

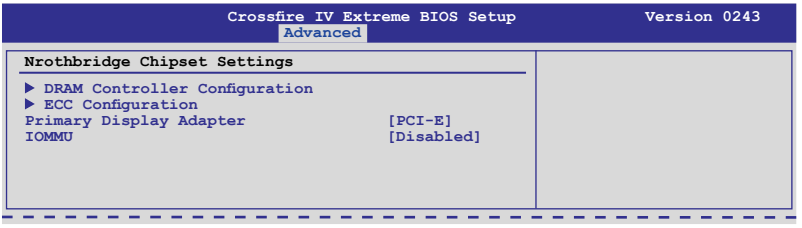
Allows you to manually turn off the second or the third core.
Configuration options: [Auto] [Manual]

2nd Core [On]
Configuration options: [On] [Off]

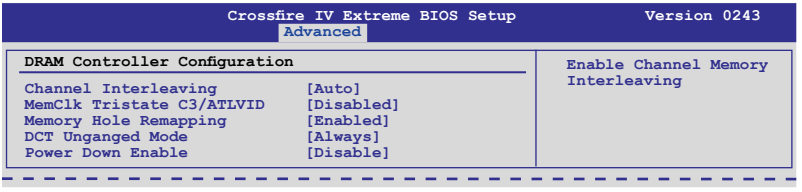
3rd Core [On]
Configuration options: [On] [Off]

3.5.2 Chipset

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



DRAM Controller Configuration



Channel Interleaving [Auto]
Enables or disables the Channel Memory Interleaving.
Configuration options: [Disabled] [Address bits 6] [Address bits 12] [Auto] [XOR of Address bits [120:16, 6]] [XOR of Address bits [120:16, 9]]

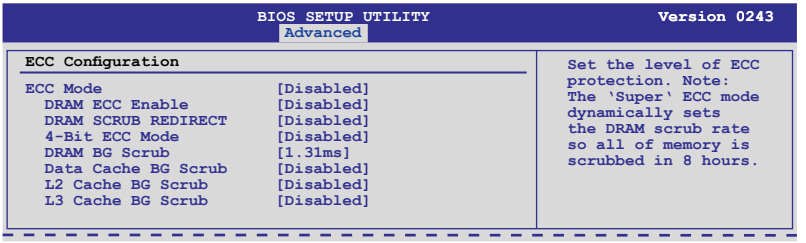
MemClK Tristate C3/ATLVID [Disabled]
Enables or disables MemClk Tristate during C3 and Alt VID.
Configuration options: [Disabled] [Enabled]

Memory Hole Remapping [Enabled]
Enables or disables the memory remapping around the memory hole.

DCT Unganged Mode [Always]
Allows you to select the unganged DRAM mode.
Configuration options: [Auto] [Always]

Power Down Enable [Disabled]
Allows you to enable for disable the DDR power down mode.
Configuration options: [Disabled] [Enabled]

ECC Configuration



ECC Mode [Disabled]

Allows you to set the level of ECC protection.

Configuration options: [Disabled] [Basic] [Good] [Super] [Max] [User]

The following items become user-configurable when you set **ECC Mode** to [User]

DRAM ECC Enable [Enabled]

[Enabled] Enables the DRAM ECC that allows the hardware to report and correct memory errors automatically.

[Disabled] Disables this function.

DRAM SCRUB REDIRECT [Disabled]

[Enabled] Allows the system to correct the DRAM ECC errors immediately when they occur.

[Disabled] Disables this function.

4-Bit ECC Mode [Disabled]

[Enabled] Enables ECC chip kill feature.

[Disabled] Disables this function.

DRAM BG Scrub [1.31ms]

Disables or sets the DRAM BG Scrub.

Configuration options: [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

Data Cache BG Scrub [Disabled]

Disables or sets the Data Cache BG Scrub. This item allows the data cache BG Scrub RAM to be corrected when idle.

Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

L2 Cache BG Scrub [Disabled]
Disables or sets the L2 Cache BG Scrub. This item allows the cache RAM to be corrected when idle.
Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

L3 Cache BG Scrub [Disabled]
Disables or sets the L3 Cache BG Scrub. This item allows the cache RAM to be corrected when idle.
Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

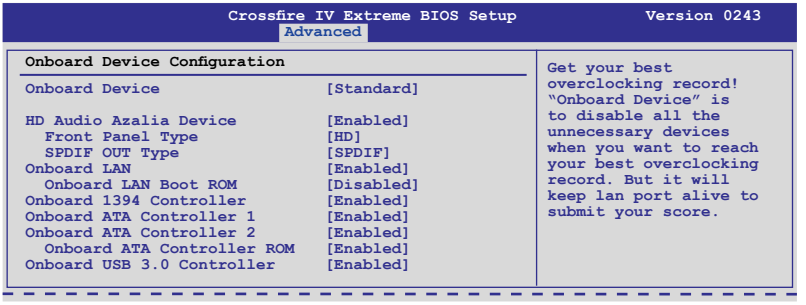
Primary Display Adapter [PCI-E]

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

IOMMU [Disabled]

Configuration options: [Disabled] [Enabled]

3.5.3 Onboard Devices Configuration



Onboard Device [Standard]

Allows you to disable the unnecessary devices to reach your best overclocking record. Configuration options: [Standard] [Disabled]

HD Audio Azalia Device [Enabled]

[Enabled] Enables the High Definition Audio Controller.

[Disabled] Disables the controller.

Front Panel Type [HD]

[AC97] Set the front panel audio connector (AAFP) mode to legacy AC'97

[HD] Set the front panel audio connector (AAFP) mode to high-definition audio.

SPDIF OUT Type [SPDIF]

[SPDIF] Set the SPDIF OUT mode to SPDIF.

[HDMI] Set the SPDIF OUT mode to HDMI.

Onboard LAN [Enabled]

[Enabled] Enables LAN Controller.

[Disabled] Disables LAN Controller.

Onboard LAN Boot ROM [Disabled]

This item appears only when you enable the previous item(s).

[Disabled] Disables onboard LAN Boot.

[Enabled] Enables onboard LAN Boot.

Onboard 1394 Controller [Enabled]

[Enabled] Enables the onboard 1394 Controller.

[Disabled] Disables the controller.

Onboard ATA Controller 1 [Enabled]

[Disabled] Disables the onboard ATA controller of ESATA and PESATA.

[Enabled] Enables the onboard ATA controller of ESATA and PESATA.

Onboard ATA Controller 2 [Enabled]

[Disabled] Disables the onboard ATA controller of SATA_ODD1/2.

[Enabled] Enables the onboard ATA controller of SATA_ODD1/2.

Onboard ATA Controller ROM [Enabled]

[Enabled] Enables the onboard ATA controller ROM.

[Disabled] Disables the onboard ATA controller ROM.

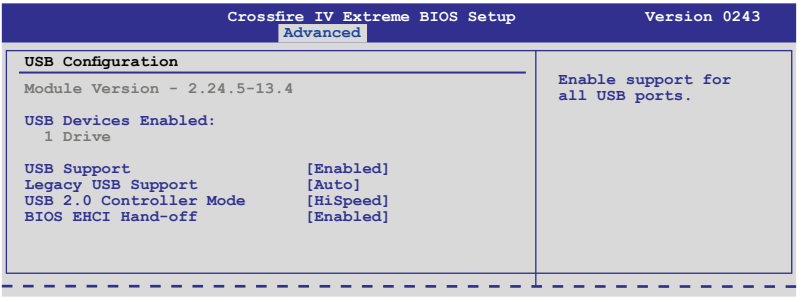
Onboard USB 3.0 Controller [Enabled]

[Enabled] Enables the onboard USB 3.0 Controller.

[Disabled] Disables the controller.

3.5.4 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.



The **USB Devices Enabled** item shows the auto-detected values. If no USB device is detected, the item shows None.

USB Support [Enabled]

[Enabled] Enables all the USB ports.

[Disabled] Disables all the USB ports.

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

Legacy USB Support [Auto]

[Auto] Allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled.

[Enabled] Enables the support for USB devices on legacy operating systems (OS).

[Disabled] Disables the function.

USB 2.0 Controller Mode [HiSpeed]

[FullSpeed] Sets the USB 2.0 Controller in full speed (12Mbps).

[HiSpeed] Sets the USB 2.0 Controller in high speed (480Mbps).

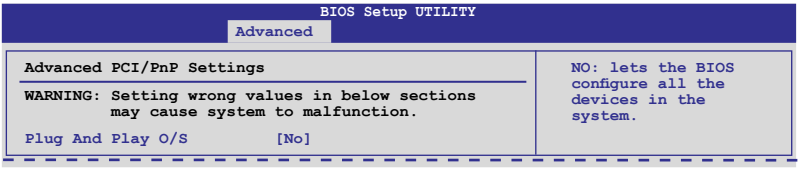
BIOS EHCI Hand-off [Enabled]

[Enabled] Enables the support for operating systems without an EHCI hand-off feature.

[Disabled] Disables the function.

3.5.5 PCIPnP

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



Plug And Play O/S [No]

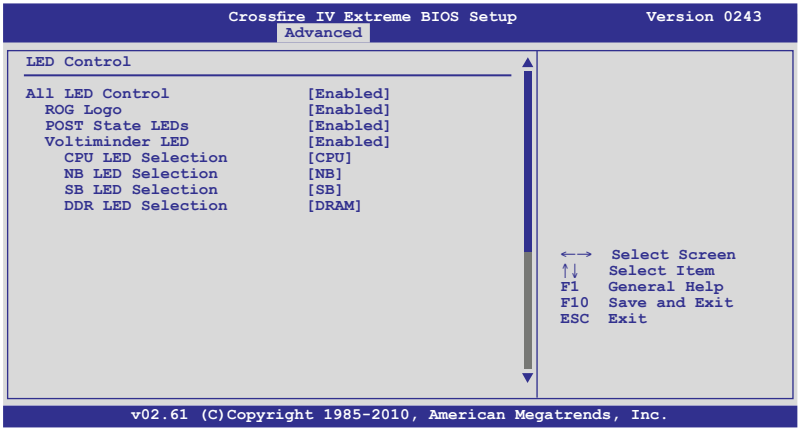
[Yes] When set to [Yes] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot.

[No] When set to [No], BIOS configures all the devices in the system.

3.5.6 LED Control

The LED Control menu items allow you to change the advanced settings for the onboard LEDs.

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



All LED Control [Enabled]

Allows you to enable or disable the onboard LEDs control.
Configuration options: [Enabled] [Disabled]

The following items appear only when you set **All LED Control** to [Enabled].

ROG Logo [Enabled]
Allows you to enable or disable the onboard ROG logo LED.
Configuration options: [Enabled] [Disabled]

POST State LEDs [Enabled]
Allows you to enable or disable the onboard POST State LEDs.
Configuration options: [Enabled] [Disabled]

Voltiminder LED [Enabled]
Allows you to enable or disable the onboard Voltiminder LED.
Configuration options: [Enabled] [Disabled]

The following items appear only when you set **Voltiminder LED** to [Enabled].

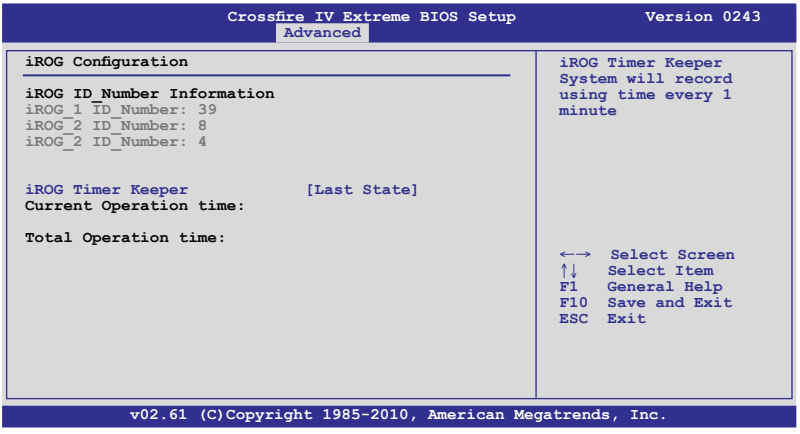
CPU LED Selection [CPU]
Allows you to switch the onboard CPU LED display between CPU voltage [CPU], CPU/NB voltage [CPU NB] and CPU VDDA voltage [CPU VDDA].
Configuration options: [CPU] [CPU/NB] [CPU VDDA]

NB LED Selection [NB]
Allows you to switch the onboard NB LED display between NB voltage [NB], NB 1.8V voltage [NB 1.8V], and VDDPCIE voltage [VDDPCIE].
Configuration options: [NB] [NB 1.8V] [VDDPCIE]

SB LED Selection [SB]
Allows you to switch the onboard SB LED display between SB voltage [SB], and HT voltage [HT]. Configuration options: [SB] [HT]

DDR LED Selection [DRAM]
Allows you to switch the onboard DDR LED display between DRAM voltage [DRAM], and VDDR voltage [VDDR]. Configuration options: [DRAM] [VDDR]

3.5.7 iROG Configuration



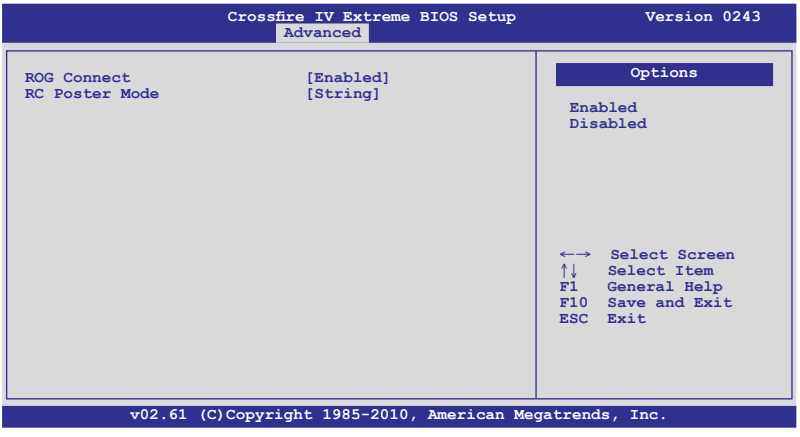
iROG Timer Keeper [Last State]

Allows you to set the iROG Time Keeper operation mode.
Configuration options: [Last State] [Disabled] [Enabled]

3.5.8 EC Information

Displays the EC version.

3.5.9 ROG Connect



ROG Connect [Enabled]

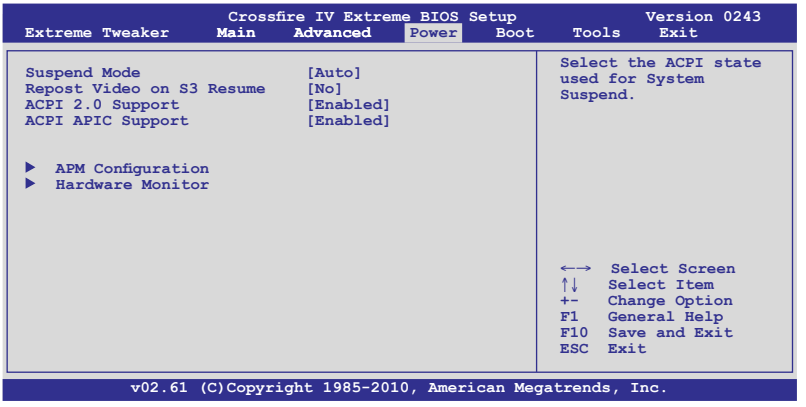
Allows you to enable or disable the ROG Connect function.
Configuration options: [Enabled] [Disabled]

RC Poster Mode [String]

RC Poster describes what occurs during the POST.
Configuration options: [String] [Code]

3.6 Power menu

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



3.6.1 Suspend Mode [Auto]

Allows you to select the Advanced Configuration and Power Interface (ACPI) state to be used for system suspend.

[S1 (POS) only] Sets the APCI suspend mode to S1/POS (Power On Suspend).

[S3 only] Sets the APCI suspend mode to S3/STR (Suspend To RAM).

[Auto] The system automatically configures the ACPI suspend mode.

3.6.2 Repost Video on S3 Resume [No]

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

[No] When set to [No], the system will not invoke VGA BIOS POST on S3/STR resume.

[Yes] When set to [Yes], the system invokes VGA BIOS POST on S3/STR resume.

3.6.3 ACPI 2.0 Support [Enabled]

[Disabled] When set to [Disabled], the system will not add additional tables as per ACPI 2.0 specifications.

[Enabled] When set to [Enabled], the system adds additional tables as per ACPI 2.0 specifications.

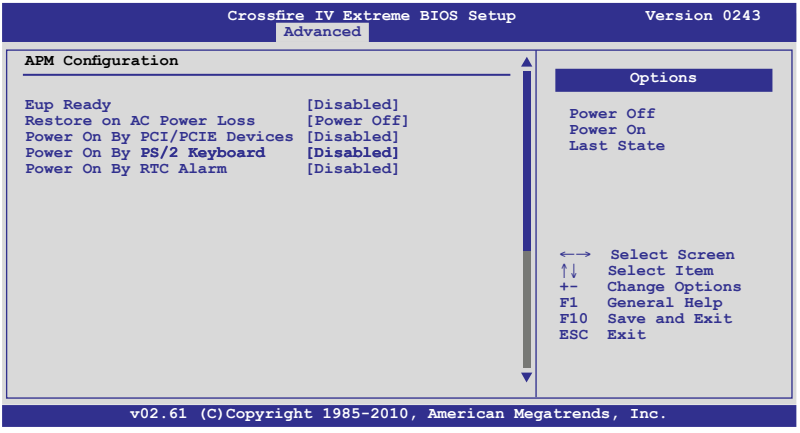
3.6.4 ACPI APIC Support [Enabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC).

[Disabled] When set to [Disabled], the system disable the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC).

[Enabled] When set to [Enabled], the ACPI APIC table pointer is included in the RSDT pointer list.

3.6.5 APM Configuration



EuP Ready [Disabled]

[Disabled] Disables the Energy Using Products (EuP) Ready function.

[Enabled] Allows BIOS to switch off some power at S5 state to get system ready for the EuP requirement. When set to [Enabled], power for WOL, WO_USB, audio and onboard LEDs will be switched off at S5 state.

Restore On AC Power Loss [Power Off]

[Power Off] The system goes into off state after an AC power loss.

[Power On] The system goes into on state after an AC power loss.

[Last State] The system goes into either off or on state, whatever the system state was before the AC power loss.

Power On By PCI/PCIE Devices [Disabled]

Allows you to enable or disable the PCI/PCIE devices to generate a wake event.

[Disabled] Disables the PCI/PCIE devices to generate a wake event.

[Enabled] Enables the PCI/PCIE devices to generate a wake event.

Power On By PS/2 Keyboard [Disabled]

Allows you to disable or enable the Power On by PS/2 keyboard function.

[Disabled] Disables the Power On by PS/2 keyboard function.

[Enabled] Sets 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.

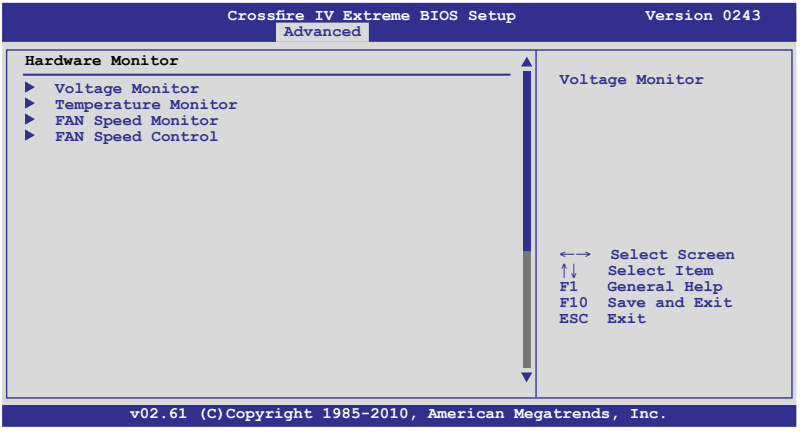
Power On By RTC Alarm [Disabled]

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

[Disabled] Disables RTC to generate a wake event.

[Enabled] When set to [Enabled], the items **RTC Alarm Date/ RTC Alarm Hour/ RTC Alarm/ RTC Alarm Second** will become user-configurable with set values.

3.6.6 Hardware Monitor



Voltage Monitor

CPU Voltage; CPU/NB Voltage; CPU VDDA Voltage; DRAM Voltage; HT Voltage; NB Voltage; SB Voltage; 3.3V Voltage; 5V Voltage; 12V Voltage

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

Temperature Monitor

CPU Temperature; MB Temperature; NB Temperature; SB Temperature; OPT TEMP 1/2/3 [xxxºC/xxxºF]

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

SB/NB Overheat Protection [100ºC]

The system automatically shuts down when the SB/NB is heated over the set temperature to protect it from damage.
Configuration options: [Disabled] [70ºC] [80ºC] [90ºC] **[100ºC]**

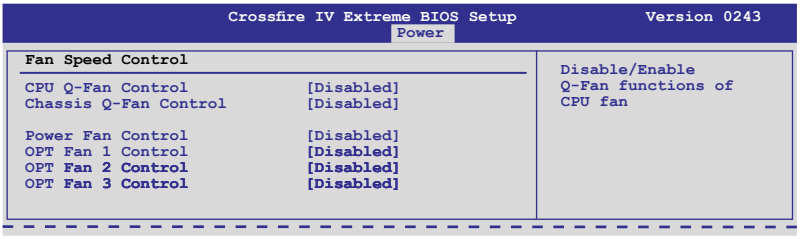
OPT TEMP1/2/3 Overheat Protection [90ºC]

Allows you to set the temperature over which the system automatically shuts down when any of the thermal sensor cables connected to the motherboard detects device overheat to protect the device from damage.
Configuration options: [Disabled] [70ºC] [80ºC] [90ºC] **[100ºC]**

Fan Speed Monitor

CPU FAN; Power FAN; Chassis FAN1/2/3 Speed
OPT FAN1/2/3 Speed [xxxxRPM] or [Ignored] / [N/A]
The onboard hardware monitor automatically detects and displays the CPU fan, chassis fan, power fan, and optional fan speed in rotations per minute (RPM). If any of the fans is not connected to the motherboard, the field shows [N/A]. These items are not user-configurable.

Fan Speed Control



CPU Q-Fan Control [Disabled]
Allows you to enable or disable the CPU fan controller.

[Disabled] Disables the CPU Q-fan controller.
[Enabled] Enables the CPU Q-fan controller.

The following three items appear when you enable the CPU Fan Control feature.

CPU Fan Speed Low Limit [200 RPM]
Allows you to set the low speed limit of the CPU fan and the system sends warning message when the fan speed drops below the set value.
Configuration options: [500 RPM] [400 RPM] [300 RPM] [200 RPM] [100 RPM] [Ignored]

Select Fan Type: [PWM Fan]
Allows you to select the fan type. Select [PWM Fan] when using a 4-pin fan and [DC Fan] for other fans. Configuration options: [PWM Fan] [DC Fan]

CPU Q-Fan Mode [Silent]
Allows you to set the appropriate performance level of the chassis fan.

[Turbo] Set to [Turbo] to achieve maximum CPU fan speed.
[Standard] Sets to [Standard] to make the chassis fan automatically adjust depending on the CPU temperature.
[Silent] Sets to [Silent] to minimize the fan speed for quiet CPU fan operation.
[Manual] Sets to [Manual] to display more items for you to manually adjust the CPU upper/lower temperature, and CPU fan upper/lower duty cycle.

Chassis Q-Fan Function [Disabled]

Allows you to enable or disable the CPU fan controller.

[Disabled] Disables the CPU Q-fan controller.

[Enabled] Enables the CPU Q-fan controller.

The following two items appear when you enable the CPU Fan Control feature.

Chassis Fan Speed Low Limit [200 RPM]

Allows you to set the low speed limit of the chassis fan and the system sends warning message when the fan speed drops below the set value.
Configuration options: [500 RPM] [400 RPM] [300 RPM] [200 RPM] [100 RPM] [Ignored]

Chassis Q-Fan Mode [Silent]

Allows you to set the appropriate performance level of the chassis fan.

[Turbo] Set to [Turbo] to achieve maximum chassis fan speed.

[Standard] Sets to [Standard] to make the chassis fan automatically adjust depending on the chassis temperature.

[Silent] Sets to [Silent] to minimize the fan speed for quiet chassis fan operation.

[Manual] Sets to [Manual] to display more items for you to manually adjust the CPU upper/lower temperature, and CHA fan upper/lower duty cycle.

Power Fan Control [Disabled]

Allows you to select the power fan control mode. When this item is set to [Duty Mode], you can configure the **Power Fan Duty** item.

Power Fan Duty [50%]

Allows you to set the fan duty cycle. This item appears when the **PWRFan Control** item is set to [Duty Mode].
Configuration options: [40%] [50%] [60%] [70%] [80%] [90%]

OPT Fan 1/2/3 Control [Disabled]

Allows you to select the optional fan control mode. When this item is set to [Duty Mode], you can configure the **OPT Fan1/2/3 Duty** item. If you set this item to [User Mode], you are allowed to configure the **OPT Fan1/2/3 Low Speed Temp** and **OPT Fan1/2/3 Full Speed Temp** item.
Configuration options: [Disabled] [Duty Mode] [User Mode]

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

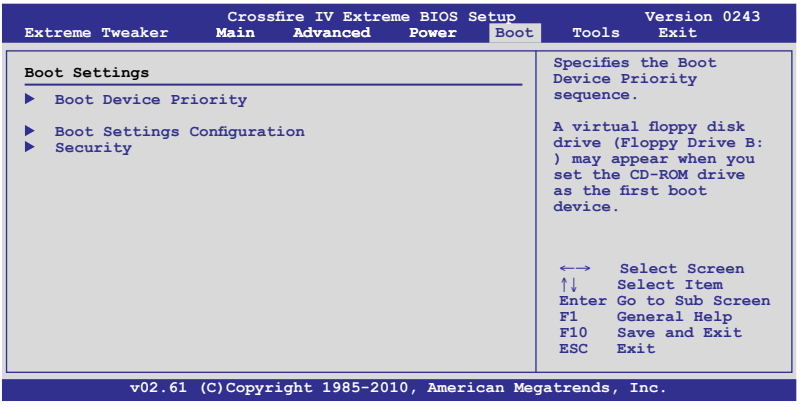
OPT Fan 1/2/3 Duty [60%]
Allows you to set the fan duty cycle. This item appears when the **OPTFan1/2 Control** item is set to [Duty Mode].
Configuration options: [40%] [50%] [60%] [70%] [80%] [90%]

OPT Fan 1/2/3 Low Speed Temp [25˚C]
Allows you to set the temperature at which the power fan rotates at low speed. This item appears when the **OPTFan1/2 Control** item is set to [User Mode].
Configuration options: [25˚C] [30˚C] [35˚C] [40˚C]

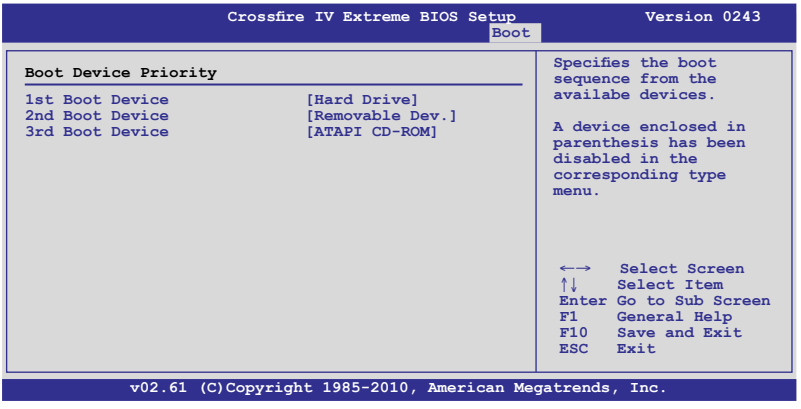
OPT Fan 1/2/3 Full Speed Temp [60˚C]
Allows you to set the temperature at which the power fan rotates at full speed. This item appears when the **OPTFan1/2 Control** item is set to [User Mode].
Configuration options: [60˚C] [70˚C] [80˚C] [90˚C]

3.7 Boot menu

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



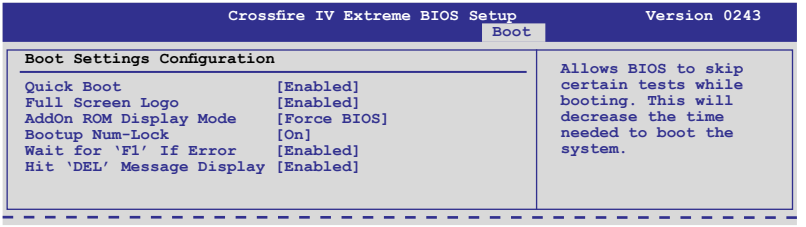
3.7.1 Boot Device Priority



1st–xxth Boot Device [xxx Drive]

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Configuration options: [xxx Drive] [Disabled]

3.7.2 Boot Settings Configuration



Quick Boot [Enabled]

Allows you to enable or disable the **Quick Boot** function.

[Disabled] When set to [Disabled], BIOS performs all the POST items.

[Enabled] When set to [Enabled], BIOS skips some power on self tests (POST) while booting to decrease the time needed to boot the system.

Full Screen Logo [Enabled]

This allows you to enable or disable the full screen logo display feature.

[Enabled] Enables the full screen logo display feature.

[Disabled] Disables the full screen logo display feature.

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

AddOn ROM Display Mode [Force BIOS]

Sets the display mode for option ROM.

[Force BIOS]

[Keep Current] .

Bootup Num-Lock [On]

Allows you to select the power-on state for the NumLock.

[On] Sets the power-on state of the NumLock to [On].

[Off] Sets the power-on state of the NumLock to [Off].

Wait for 'F1' If Error [Enabled]

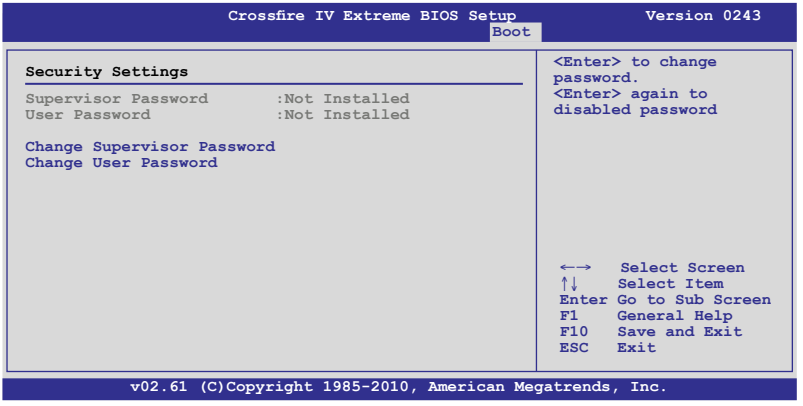
When set to [Enabled], the system waits for the <F1> key to be pressed when error occurs.

Hit 'DEL' Message Display [Enabled]

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

3.7.3 Security

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



Change Supervisor Password

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

To set a Supervisor Password:

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

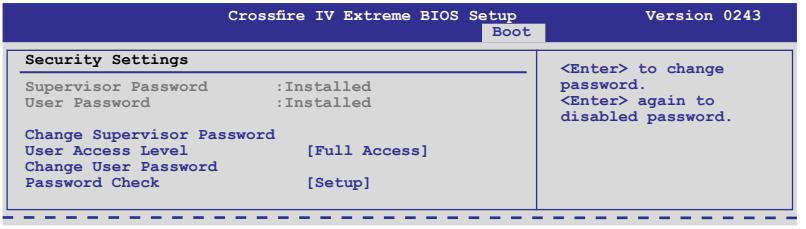
The message **Password Installed** appears after you successfully set your password.

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

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

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

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



User Access Level [Full Access]

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

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

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

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

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

Change User Password

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

To set a User Password:

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

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

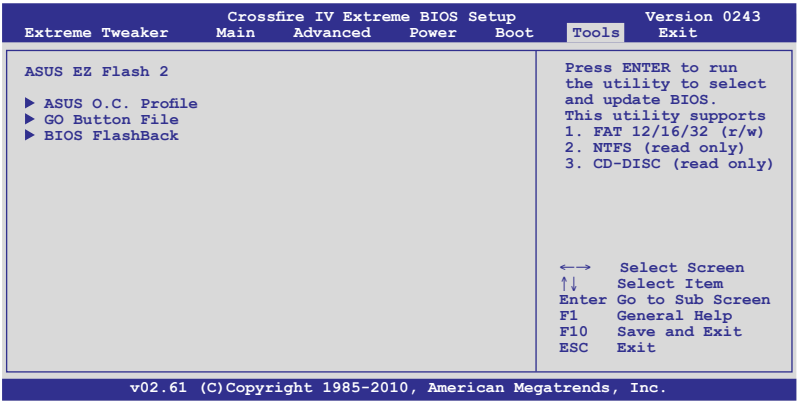
To change the user password, follow the same steps as in setting a user password.

Password Check [Setup]

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

3.8 Tools menu

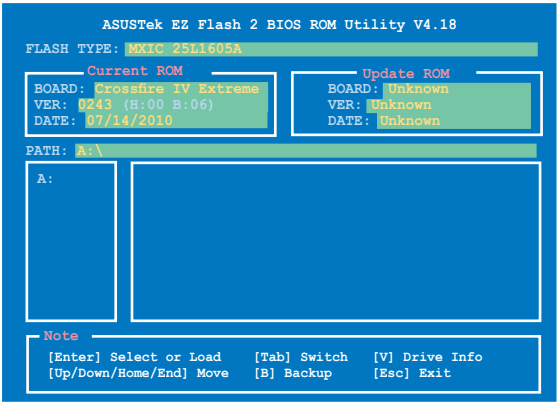
The Tools menu items allow you to configure options for special functions. Select an item then press <Enter> to display the sub-menu.



3.8.1 ASUS EZ Flash 2

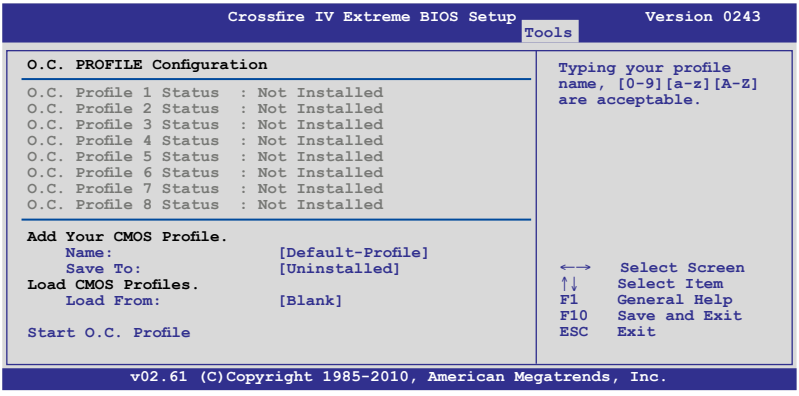
Allows you to run ASUS EZ Flash 2. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice.

For more details, refer to **section 3.1.2 ASUS EZ Flash 2 utility**.



3.8.2 ASUS O.C. Profile

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



Add Your CMOS Profile

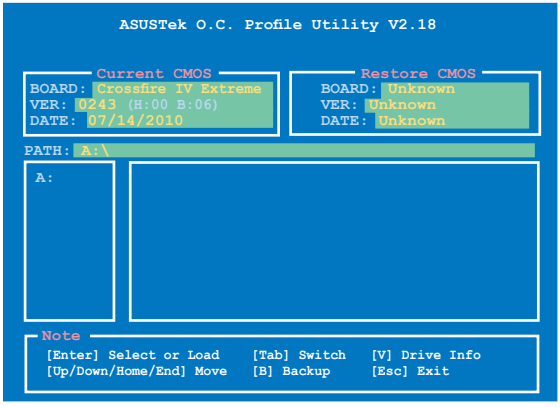
Allows you to save the current BIOS file to the BIOS Flash. In the Name sub-item, type your profile name and press <Enter>, and then choose a profile number to save your CMOS settings in the Save to sub-item.

Load CMOS Profiles

Allows you to load the previous BIOS settings saved in the BIOS Flash. Press <Enter>, and choose a profile to load.

Start O.C. Profile

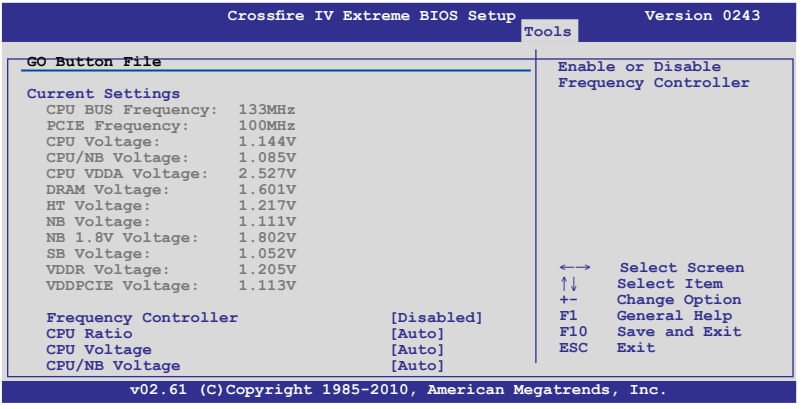
Allows you to run the utility to save and load CMOS. Press <Enter> to run the utility.



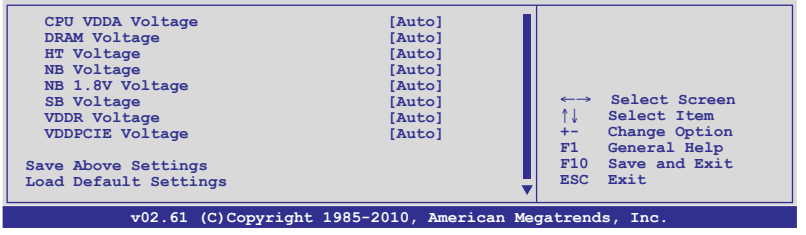
- This function supports devices such as a USB flash disk (FAT 32/16 format) or a floppy disk with single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent the system boot failure!
- We recommend that you update the BIOS file only coming from the same memory/CPU configuration and BIOS version.
- Only the CMO file can be loaded.

3.8.3 GO Button File

This menu allows you to set the GO Button files, and load the desired GO Button file.



Scroll down to display the following items:



Frequency Controller; CPU Ratio; CPU Voltage; CPU/NB Voltage; CPU VDDA Voltage; DRAM Voltage; HT Voltage; NB Voltage; SB Voltage; VDDR Voltage; VDDPCIE Voltage

Allows you to use the <+> and <-> keys to adjust the values for each item. Refer to **3.3 Extreme Tweaker** Menu for details.

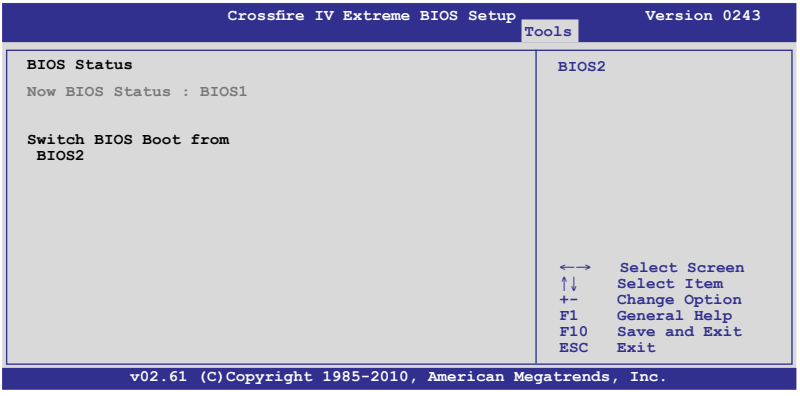
Save Above Settings

Allows you to save the adjusted values for specific items as a GO Button file.

Load Above Settings

Allows you to load the desired GO Button file.

3.8.4 BIOS FlashBack



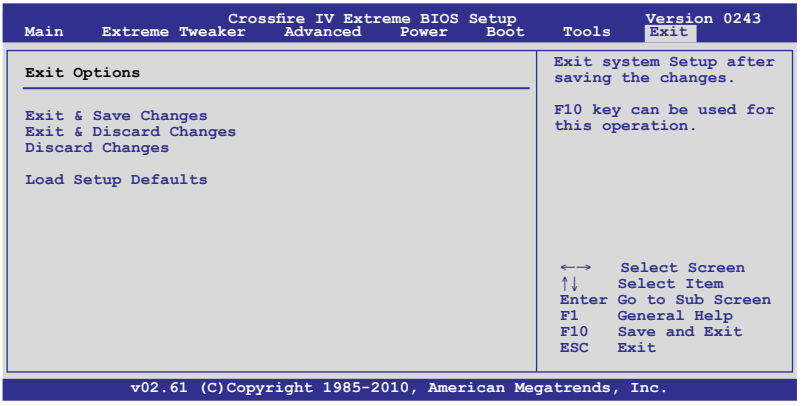
Switch BIOS Boot from

BIOS2

Press <Enter> to change the BIOS ROM for booting.

3.9 Exit menu

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



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

Exit & Save Changes

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

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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

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

4 Software support

Chapter summary

4

4.1 Installing an operating system

This motherboard supports Windows® XP/64-bit XP/Vista/7 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.
- Ensure that you install Windows® XP Service Pack 2 or later versions before installing the drivers for better compatibility and system stability.

4.2 Support DVD information

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

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

4.2.1 Running the support DVD

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

Click an icon to display support DVD/motherboard information

Click an item to install

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

4.2.2 Drivers menu

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

ASUS InstAll - Drivers Installation Wizard

Launches the ASUS InstAll driver installation wizard.

AMD Cool'n'Quiet Driver (only available in Windows XP OS)

Installs the AMD® Cool'n'Quiet driver.

AMD Chipset Driver

Installs the AMD® chipset driver.

Realtek Audio Driver

Installs the Realtek® audio driver and application.

JMicron JMB36X Controller Driver

Installs the JMicron® JMB36X driver.

USB 3.0 Driver

Installs the USB 3.0 driver.

Intel LAN Driver

Installs the Intel® LAN driver.

Bluetooth Driver

Installs the Bluetooth driver.

Browser Configuration Utility

Installs the browser configuration utility.

4.2.3 Utilities menu

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

ASUS InstAll - Installation Wizard for Utilities
Installs all of the utilities through the Installation Wizard.

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

Lucid Driver
Installs the Lucid driver.

ASUS AI Suite II
Installs the ASUS AI Suite II.

ASUS ROG Connect
Installs the ASUS ROG Connect utility.

ASUUS RC Bluetooth
Installs the ASUS RC Bluetooth utility.

AMD OverDrive Utility (AOD)
Installs the AMD OverDrive utility.

3DMark Vantage Software
Installs 3DMark Vantage Software.

Adobe Reader 9
Installs the Adobe® Reader that allows you to open, view, and print documents in Portable Document Format (PDF).

4.2.4 Make disk menu

The Make disk menu contains items to create the AMD AHCI/RAID 32/64bit driver disk.

AMD AHCI/RAID 32/64bit Driver

Allows you to create an Intel® AHCI/RAID driver disk.

4.2.5 Manual menu

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

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

4.2.6 Video menu

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

4.2.7 ASUS Contact information

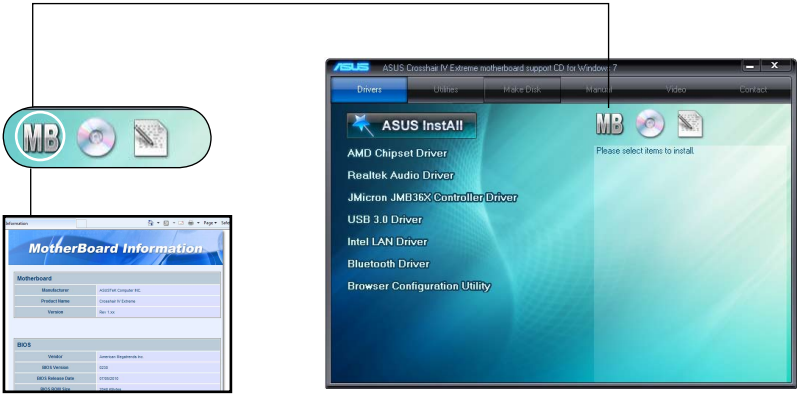
Click the Contact tab to display the ASUS contact information. You can also find this information on the inside front cover of this user guide.

4.2.8 Other information

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

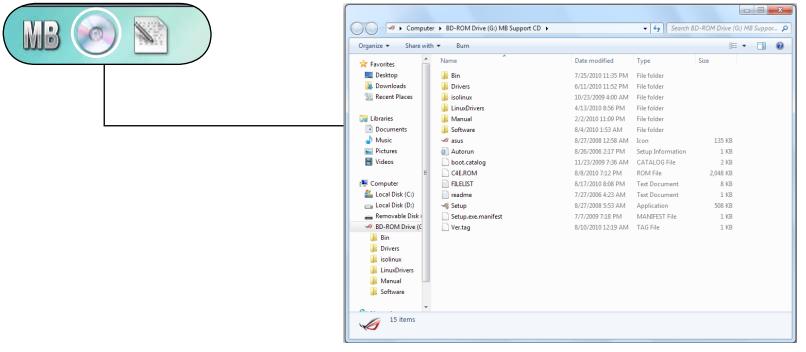
Motherboard Info

Displays the general specifications of the motherboard.



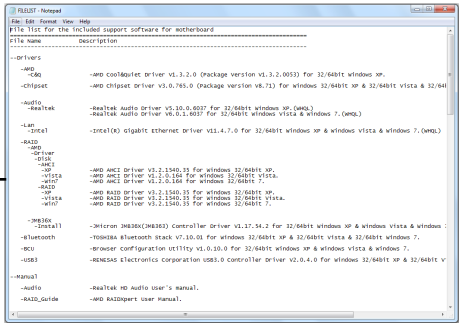
Browse this DVD

Displays the support DVD contents in graphical format.



Filelist

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



4.3 Software information

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

4.3.1 ASUS AI Suite II

ASUS AI Suite II allows you to launch several ASUS utilities easily.

Installing AI Suite II

To install AI Suite 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.
2. Click the Utilities tab, then click **AI Suite II**.
3. Follow the screen instructions to complete installation.

Launching AI Suite II

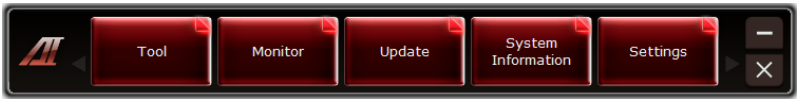
You can launch AI Suite II right after installation or anytime from the Windows® desktop.

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

After launching the application, the AI Suite II icon appears in the Windows® notification area. Click the icon to close or restore the application.

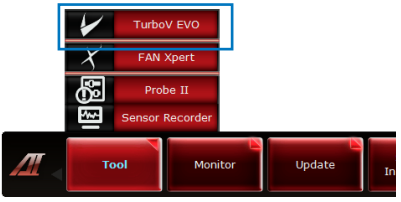
Using AI Suite II

Click each button to select and launch a desired utility, to monitor or update the system, to display the system information and to customize your settings.



4.3.2 TurboV EVO

ASUS TurboV EVO introduces **TurboV** that allows you to overclock your system effectively. **After installing AI** Suite II from the motherboard support DVD, launch TurboV EVO by clicking **Tool > TurboV EVO** on the AI Suite II main window.



Using Manual Mode

Manual Mode allow you to overclock the BCLK frequency, CPU voltage, IMC voltage, and DRAM Bus voltage in WIndows® environment and takes effect in real-time without exiting and rebooting the OS.

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

For system stability, all changes made in Manual Mode will not be saved to BIOS settings and will not be kept on the next system boot. Use the **Save Profile** function to save your customized overclocking settings and manually load the profile after Windows starts.

For advanced overclock ability, adjust first the BIOS items, and then proceed more detailed adjustments using **Manual Mode**.

Using CPU Level Up

The CPU Level Up allows you to overclock immediately with OC profile presets in WIndows® environment without the hassle of entering BIOS.

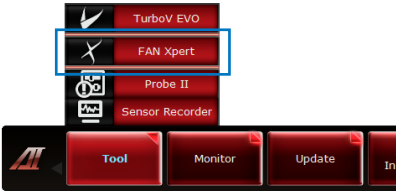
Move the pointer to level up your CPU and click **Apply** to use the new CPU frequency configuration.

4.3.3 FAN Xpert

FAN Xpert allows you to adjust both the CPU and chassis fan speeds according to different ambient temperatures and your PC's system loading. The various fan profiles offer flexible controls of fan speeds to achieve a quiet and cool system environment.

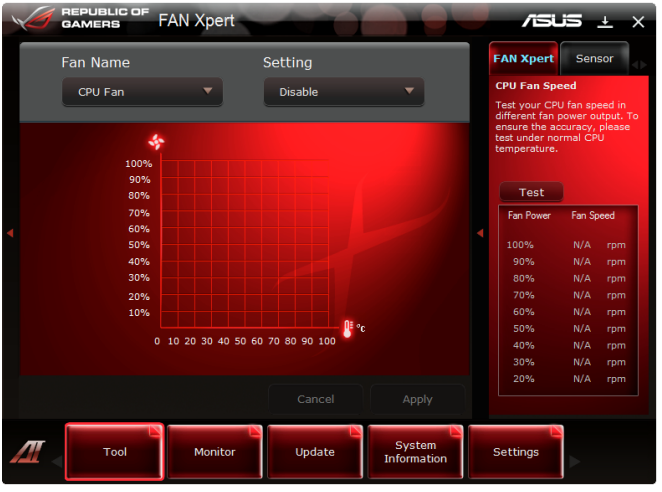
Launching FAN Xpert

After installing AI Suite II from the motherboard support DVD, launch FAN Xpert by clicking **Tool > Fan Xpert** on the AI Suite II main window.



Using FAN Xpert

Click **Fan Name** to select a fan to test the speed or click **Setting** to select a preset mode for your selected fan.



Setting

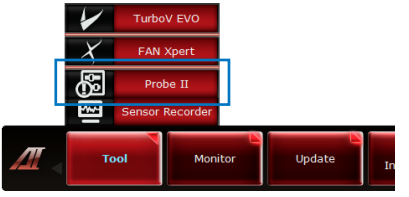
- **Disable:** disables the **Fan Xpert** function.
- **Standard:** adjusts fan speed in a moderate pattern.
- **Silent:** minimizes fan speed for quiet fan operation.
- **Turbo:** maximizes the fan speed for the best cooling effect.
- **Intelligent:** automatically adjusts the CPU fan speed according to the ambient temperature.
- **Stable:** fixes the CPU fan speed to avoid noise caused by the unsteady fan rotation. The fan will speed up when the temperature exceeds 70ºC.
- **User:** Allows you to configure the CPU fan profile under certain limitations.

4.3.4 Probe II

Probe II is a utility that monitors the computer's vital components, and detects and alerts you of any problem with these components. Probe II senses fan rotations, CPU temperature, and system voltages, among others. Because 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.

Launching Probe II

After installing AI Suite II from the motherboard support DVD, launch PC Probe II by clicking **Tool > Probe II** on the AI Suite II main window.

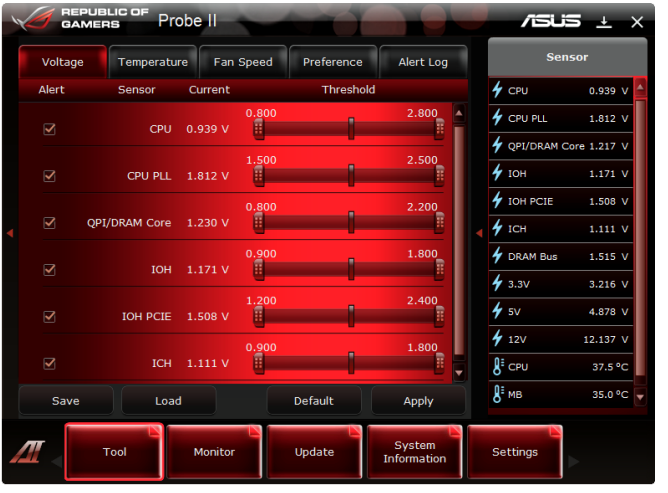


Monitoring hardware

The hardware monitor panels display the current value of a system sensor such as fan rotation, CPU temperature, and voltages. Click the tab on the top to switch display content. Click the box before each sensor to enable the alert function.

Adjusting the sensor threshold value

You can adjust the sensor threshold value in the monitor panel by moving the sliders.

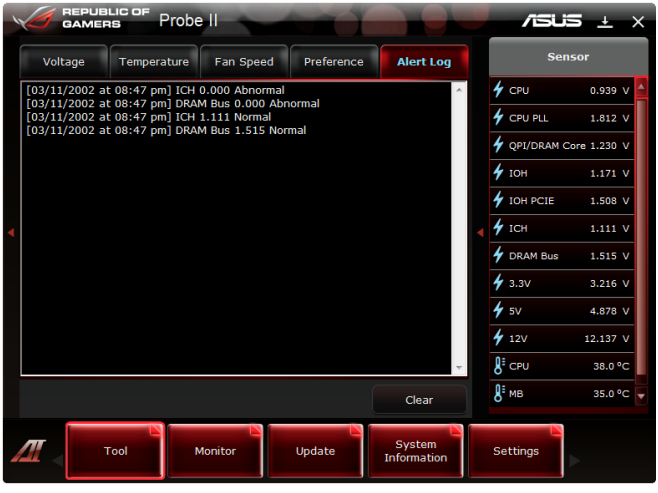


Setting preference

Click **Preference** on the top to customize **Probe II**, including detection cycle, and temperature display unit.

Checking Alert Log

Click **Alert Log** on the top to check the log. Click **Clear** to reset the log if needed.

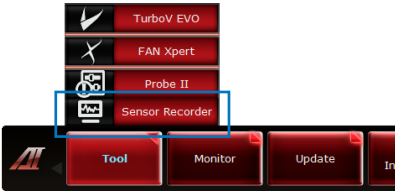


4.3.5 Sensor Recorder

Sensor Recorder allows you to monitor the change in your system including voltage, temperature and fan speed. You can also browse the history record.

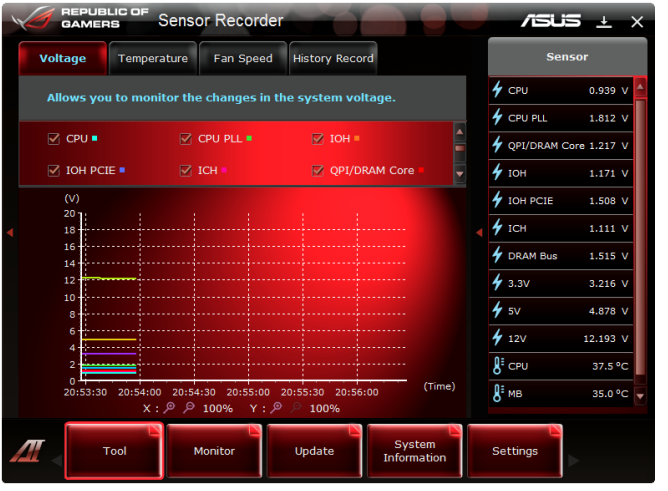
Launching Sensor Recorder

After installing AI Suite II from the motherboard support DVD, launch PC Probe II by clicking **Tool > Sensor Recorder** on the AI Suite II main window.



Using Sensor Recorder

Select and click the tabs on the top to switch to the monitor panel.



4.4 RAID configurations

The motherboard comes with the AMD® SB850 chipset that allows you to configure Serial ATA hard disk drives as RAID sets. The motherboard supports the following RAID configurations: RAID 0, RAID 1, RAID 5 and RAID 10.

- You must install Windows® XP Service Pack 2 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP2 or later versions.
- Due to Windows® XP / Vista limitation, a RAID array with the total capacity over 2TB cannot be set as a boot disk. A RAID array over 2TB can only be set as a data disk only.
- If you want to install a Windows® operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section **4.6 Creating a RAID driver disk** for details.

4.4.1 RAID definitions

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

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

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

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

4.4.2 Installing Serial ATA hard disks

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

To install the SATA hard disks for a RAID configuration:

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

4.4.3 Setting the RAID item in BIOS

You must enable the RAID function in the BIOS Setup before creating RAID volume(s) using SATA HDDs. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main** menu > **Storage Configuration**, and then press <Enter>.
3. Set the **OnChip SATA Type** item to [RAID].
4. Save your changes, and then exit the BIOS Setup.

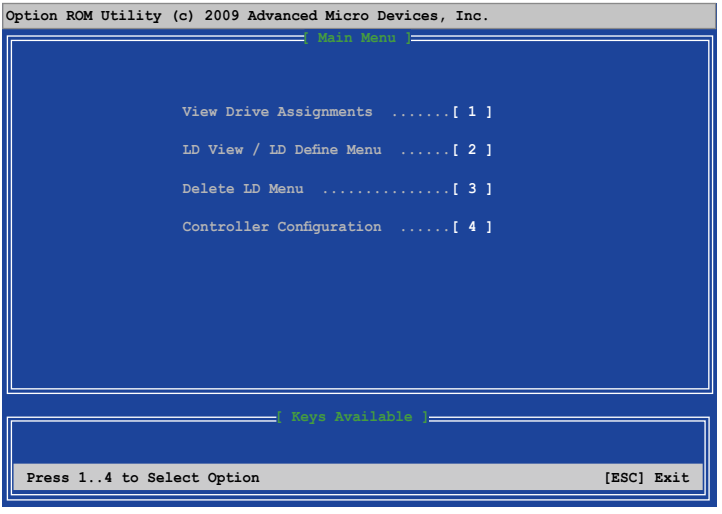
Refer to Chapter 3 for details on entering and navigating through the BIOS Setup.

When setting the **OnChip SATA Type** item to [RAID], all SATA ports run at RAID mode. However, you can set the SATA ports 5 and 6 to [Native IDE] or [AHCI] modes. See section **3.4.5 Storage Configuration** for details.

4.4.4 AMD® Option ROM Utility

To enter the AMD® Option ROM utility:

1. Boot up your computer.
2. During POST, press <Ctrl> + <F> to display the utility main menu.



The Main Menu allows you to select an operation to perform. The Main Menu options include:

- **View Drive Assignments:** shows the status of the hard disk drives.
- **LD View / LD Define Menu:** displays the existing RAID set information / creates a RAID 0, RAID 1, RAID 5 or RAID 10 configuration.
- **Delete LD Menu:** deletes a selected RAID set and partition.
- **Controller Configuration:** shows the system resources configuration.

Press <1>, <2>, <3>, or <4> to enter the option you need; press <ESC> to exit the utility.

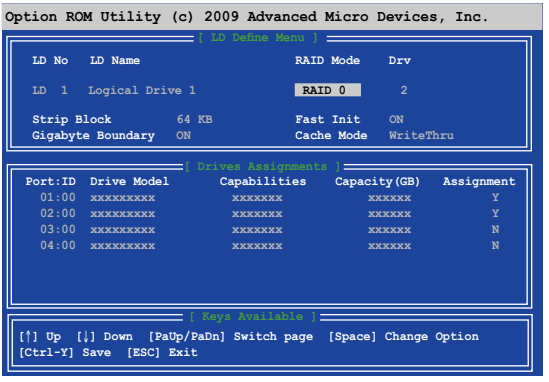
The RAID BIOS setup screens shown in this section are for reference only, and may not exactly match the items on your screen.

To create a RAID volume using more than four hard disk drives, ensure that the SATA connectors 5/6 are set to [RAID] mode.

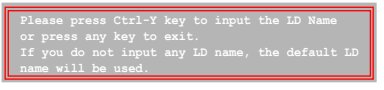
Creating a RAID volume

To create a RAID volume:

1. In the Main Menu, press <2> to enter the **LD View / LD Define Menu** function.
2. Press <Ctrl> + <C>, and the following screen appears.

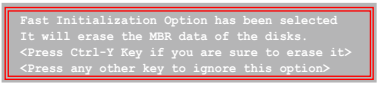


3. Move to the **RAID Mode** item and press <Space> to select a RAID mode to create.
4. Move to the **Assignment** item by using the down arrow key and set **Y** to select the hard disk drives you want to include in the RAID set.
5. Press <Ctrl> + <Y> to save the setting.
6. The utility prompts the following message. Press <Ctrl> + <Y> to input the LD name.



7. Eenter an LD name, and then press any key to continue.

8. Press <Ctrl> + <Y> to erase the MBR, or you may press any key to abort the settings.



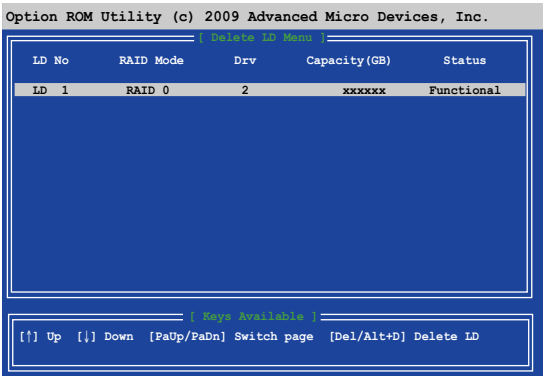
9. Press <Ctrl> + <Y> to enter the screen to modify the array capacity, or press any key to use the maximum capacity.

Deleting a RAID configuration

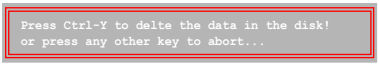
Take caution when deleting a RAID volume. You will lose all data on the hard disk drives when you delete a RAID volume.

To delete a RAID volume:

1. In the Main Menu, press <3> to enter the **Delete LD** function.
2. Select the RAID item you want to delete and press <Del> or <Alt> + <D>.



3. The utility prompts the following messages:

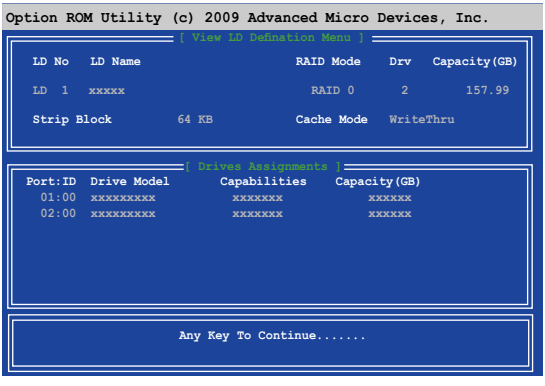


Press <Ctrl> + <Y> to delete the RAID volume.

Dispalying a RAID set information

To display a RAID set information:

1. In the Main Menu, press <2> to enter the “LD View / LD Define Menu” function.
2. Select a RAID item and press <Enter> to display its information.



4.5 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 or later operating systems, use either a USB flash drive with the RAID driver or the support DVD.

- **The motherboard does not provide a floppy drive connector**. You have to use a USB floppy disk drive when creating a SATA RAID driver disk.
- Windows® XP may not recognize the USB floppy disk drive due to Windows® XP limitation. To work around this OS limitation, refer to section **4.6.4 Using a USB floppy disk drive**.

4.5.1 Creating a RAID driver disk without entering the OS

To create a RAID driver disk without entering the OS

1. Boot your computer.
2. Press <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. When the **Make Disk** menu appears, press <1> to create a RAID driver disk.
7. Insert a formatted floppy disk into the USB floppy disk drive, then press <Enter>.
8. Follow the succeeding screen instructions to complete the process.

4.5.2 Creating a RAID driver disk in Windows®

To create a RAID driver disk in Windows®:

1. Start Windows®.
2. Plug the USB floppy disk drive and insert a floppy disk.
3. Place the motherboard support DVD into the optical drive.
4. Go to the **Make Disk** menu, and then click **AMD AHCI/RAID 32/64bit xxxx Driver** to create a RAID driver disk.
5. Select USB floppy disk drive as the destination disk.
6. Follow the succeeding screen instructions to complete the process.

Write-protect the floppy disk to avoid a computer virus infection.

4.5.3 Installing the RAID driver during Windows® OS installation

If you use a SATA optical drive to run the OS installation disk, we strongly recommend that you install the optical dirve to the SATA connectors 5/6 and set them to [Native IDE] mode.

To install the RAID driver for 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>, and then insert the floppy disk with RAID driver into the USB floppy disk drive.
3. When prompted to select the SCSI adapter to install, select the RAID driver for the corresponding OS version.
4. Follow the succeeding screen instructions to complete the installation.

To install the RAID driver for Windows® Vista or later OS

1. During the OS installation, click L**oad Driver** to allow you to select the installation media containing the RAID driver.
2. Insert the USB flash drive with RAID driver into the USB port or the support DVD into the optical drive, and then click **Browse**.
3. Click the name of the device you've inserted, go to **Drivers** > **RAID**, and then select the RAID driver for the corresponding OS version. Click **OK**.
4. Follow the succeeding screen instructions to complete the installation.

Before loading the RAID driver from a USB flash drive, you have to use another computer to copy the RAID driver from the support DVD to the USB flash drive.

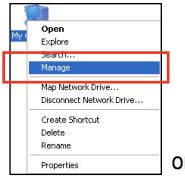
4.5.4 Using a USB floppy disk drive

Due to OS limitation, Windows® XP may not recognize the USB floppy disk drive when you install the RAID driver from a floppy disk during the OS installation.

To solve this issue, add the USB floppy disk drive's Vendor ID (VID) and Product ID (PID) to the floppy disk containing the RAID driver. Refer to the steps below:

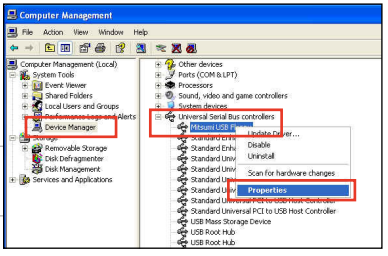
1. Using another computer, plug the USB floppy disk drive, and insert the floppy disk containing the RAID driver.

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



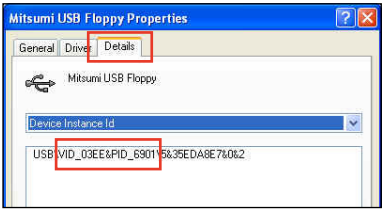
or

3. Select **Device Manager**. From the **Universal Serial Bus controllers**, right-click **xxxxxx USB Floppy**, and then select **Properties** from the pop-up window.



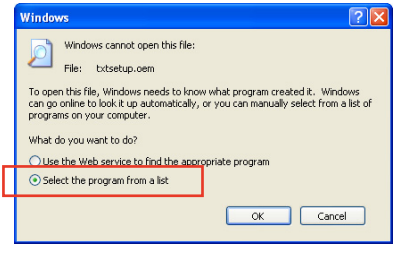
The name of the USB floppy disk drive varies with different vendors.

4. Click **Details** tab. The Vendor ID (VID) and Product ID (PID) are displayed.

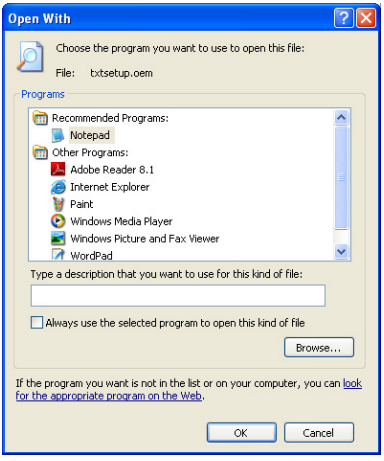


5. Browse the contents of the RAID driver disk to locate the file **txtsetup.oem**.

6. Double-click the file. A window appears, allowing you to select the program for opening the oem file.



7. Use Notepad to open the file.



8. Find the **[HardwareIds.SCSI.Napa_i386_ahci8086]** and **[HardwareIds.SCSI.Napa_amd64_ahci]** sections in the **txtsetup.oem** file.
9. Type the following line to the bottom of the two sections:
id = "USB\VID_xxxx&PID_xxxx", "usbstor"

```
[HardwareIds.SCSI.Napa_i386_ahci8086]
id= "PCI\VEN_1002&DEV_4392&CC_0104","ahcix86"
id= "PCI\VEN_1002&DEV_4391&CC_0106","ahcix86"
id= "PCI\VEN_1002&DEV_4393&CC_0104","ahcix86"
id= "USB\VID_03EE&PID_6901", "usbstor"

[HardwareIds.SCSI.Napa_amd64_ahci]
id= "PCI\VEN_1002&DEV_4392&CC_0104","ahcix64"
id= "PCI\VEN_1002&DEV_4391&CC_0106","ahcix64"
id= "PCI\VEN_1002&DEV_4393&CC_0104","ahcix64"
id= "USB\VID_03EE&PID_6901", "usbstor"
```

This appendix includes additional information that you may refer to when configuring the motherboard.

A Reference information

Chapter summary

A.1 HYDRALOGIX expected performance

N-Mode

Game	API		Settings	Single GTX480	HYDRA	HYDRA /Single
3DMark06	DX9	Benchmark	19x12 AAx8 AF16	15276	18885	124%
3DMark Vantage	DX10	Benchmark	Extreme Preset	9792	16878	172%
Heaven Benchmark 2.0: Unigine	DX11	Benchmark	19x12 NO AA Normal Tessellation	27.2	48.23	177%
Metro2033	DX11	In-game Save point	19x12 NO AA	23.83	39.53	137%
Aliens vs. Predator	DX11	Benchmark	19x12 NO AA	36	65.7	182%

System configuration

- Motherboard - Crosshair IV Extreme
- CPU -AMD Phenom-II X6 1090T
- Memory - 4GB RAM
- GPUs - Dual GeForce GTX480
- HYDRA driver - 1.6.108
- nVIDIA driver - 258.96

A-Mode

Game	API		Settings	Single HD 5870	CF	HYDRA	HYDRA / CF
3DMark06	DX9	Benchmark	19x12 AAx8 AF16	15631	19361	19068	99%
3DMark Vantage	DX10	Benchmark	Extreme Preset	9047	15120	15427	102%
Heaven Benchmark 2.0: Unigine	DX11	Benchmark	19x12 AAx8 Extreme Tessellation	15.13	27.25	27.44	101%
Street Fighter IV	DX9	Benchmark	19x12 AAx8	140.33	168.01	170.5	102%

System configuration

- Motherboard - Crosshair IV Extreme
- CPU - AMD Phenom-II X6 1090T
- Memory - 4GB RAM
- OS - Windows 7 64bit
- GPUs - Dual HD5870
- HYDRA driver - 1.6.108
- ATI driver - 10.7

X-Mode

Game	API		Settings	Single HD5870 card	Single GTX 480 card	HYDRA	HYDRA / Stronger GPU
3DMark06	DX9	Benchmark	19x12 NO AA AF16	18005	17848	18347	102%
3DMark Vantage	DX10	Benchmark	Extreme Preset	9047	9884	14211	144%
Heaven Benchmark 2.0: Unigine	DX11	Benchmark	19x12 NO AA Normal Tessellation	34.48	38.68	68.6	177%
Metro2033	DX11	In-game Save point	19x12 NO AA	24	28	40	143%
Aliens vs. Predator	DX11	In-game Save point	19x12 NO AA	49.9	50.6	87.7	173%

System configuration

- Motherboard - Crosshair IV Extreme
- CPU - AMD Phenom-II X6 1090T
- Memory - 4GB RAM
- OS - Windows 7 64bit
- GPUs - 1 x HD5870
  - 1 x GeForce GTX480
- HYDRA driver - 1.6.108
- ATI driver - 10.8
- nVIDIA driver - 258.96

A.2 HYDRALOGIX supported OS

The HYDRA 200 Release supports:

- Microsoft Windows® Vista (SP2) 32-bit and 64-bit
- Microsoft Windows® 7 32-bit and 64-bit

Microsoft Windows® Editions include:

- Windows Vista Home Basic
- Windows Vista Home Premium
- Windows Vista Business
- Windows Vista Enterprise Edition
- Windows Vista Ultimate
- Windows 7 Home Premium
- Windows 7 Professional
- Windows 7 Ultimate

The HYDRA 200 driver supports the following languages in the main driver control panel:

- English (USA)

A.3 HYDRALOGIX supported graphic libraries

The HYDRA 200 driver supports the following graphics libraries:

- DirectX 9
- DirectX 10/10.1
- DirectX 11

A.4 HYDRALOGIX supported graphic cards and display drivers

The HYDRA 200 driver supports the following graphics cards and drivers:

N-Mode:

- Graphics cards GF 9xxx/GF 2xx/GF 4xx series
- All nVIDIA display drivers

A-Mode:

- Graphics cards HD4xxx & HD5xxx series
- All ATI/AMD display drivers

X-Mode:

- Graphics cards
  - nVIDIA 9xxx/GF 2xx/GF 4xx series
  - ATI/AMD HD4xxx & HD5xxx series
- Display drivers:
  - All nVIDIA display drivers
  - All ATI/AMD display drivers

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