

Crosshair IV Formula



Motherboard

E5443

First Edition

March 2010

Copyright © 2010 ASUSTeK COMPUTER INC. All Rights Reserved.

No part of this manual, including the products and software described in it, may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form or by any means, except documentation kept by the purchaser for backup purposes, without the express written permission of ASUSTeK COMPUTER INC. ("ASUS").

Product warranty or service will not be extended if: (1) the product is repaired, modified or altered, unless such repair, modification or alteration is authorized in writing by ASUS; or (2) the serial number of the product is defaced or missing.

ASUS PROVIDES THIS MANUAL "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL ASUS, ITS DIRECTORS, OFFICERS, EMPLOYEES OR AGENTS BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGES FOR LOSS OF PROFITS, LOSS OF BUSINESS, LOSS OF USE OR DATA, INTERRUPTION OF BUSINESS AND THE LIKE), EVEN IF ASUS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES ARISING FROM ANY DEFECT OR ERROR IN THIS MANUAL OR PRODUCT.

SPECIFICATIONS AND INFORMATION CONTAINED IN THIS MANUAL ARE FURNISHED FOR INFORMATIONAL USE ONLY, AND ARE SUBJECT TO CHANGE AT ANY TIME WITHOUT NOTICE, AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY ASUS. ASUS ASSUMES NO RESPONSIBILITY OR LIABILITY FOR ANY ERRORS OR INACCURACIES THAT MAY APPEAR IN THIS MANUAL, INCLUDING THE PRODUCTS AND SOFTWARE DESCRIBED IN IT.

Products and corporate names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies, and are used only for identification or explanation and to the owners' benefit, without intent to infringe.

Offer to Provide Source Code of Certain Software

This product may contain copyrighted software that is licensed under the General Public License ("GPL") and under the Lesser General Public License Version ("LGPL"). The GPL and LGPL licensed code in this product is distributed without any warranty. Copies of these licenses are included in this product.

You may obtain the complete corresponding source code (as defined in the GPL) for the GPL Software, and/or the complete corresponding source code of the LGPL Software (with the complete machine-readable "work that uses the Library") for a period of three years after our last shipment of the product including the GPL Software and/or LGPL Software, which will be no earlier than December 1, 2011, either (1) for free by downloading it from <http://support.asus.com/download>;

or

(2) for the cost of reproduction and shipment, which is dependent on the preferred carrier and the location where you want to have it shipped to, by sending a request to:

ASUSTeK Computer Inc.
Legal Compliance Dept.
15 Li Te Rd.,
Beitou, Taipei 112
Taiwan

In your request please provide the name, model number and version, as stated in the About Box of the product for which you wish to obtain the corresponding source code and your contact details so that we can coordinate the terms and cost of shipment with you.

The source code will be distributed WITHOUT ANY WARRANTY and licensed under the same license as the corresponding binary/object code.

This offer is valid to anyone in receipt of this information.

ASUSTeK is eager to duly provide complete source code as required under various Free Open Source Software licenses. If however you encounter any problems in obtaining the full corresponding source code we would be much obliged if you give us a notification to the email address gpl@asus.com, stating the product and describing the problem (please do NOT send large attachments such as source code archives etc to this email address).

Contents

| | |
|---|------|
| Notices..... | viii |
| Safety information | ix |
| About this guide | x |
| Crosshair IV Formula specifications summary | xii |

Chapter 1: Product introduction

| | | |
|-------|---|-----|
| 1.1 | Welcome! | 1-1 |
| 1.2 | Package contents..... | 1-1 |
| 1.3 | Special features..... | 1-2 |
| 1.3.1 | Product highlights | 1-2 |
| 1.3.2 | ROG Intelligent Performance & Overclocking features... .. | 1-3 |
| 1.3.3 | ROG unique features | 1-5 |
| 1.3.4 | ASUS special features | 1-6 |

Chapter 2: Hardware information

| | | |
|-------|---------------------------------------|------|
| 2.1 | Before you proceed | 2-1 |
| 2.2 | Motherboard overview | 2-6 |
| 2.2.1 | Motherboard layout | 2-6 |
| 2.2.2 | Layout contents..... | 2-7 |
| 2.2.3 | Placement direction | 2-8 |
| 2.2.4 | Screw holes | 2-8 |
| 2.3 | Central Processing Unit (CPU) | 2-9 |
| 2.3.1 | Installing the CPU | 2-9 |
| 2.3.2 | Installing the heatsink and fan | 2-11 |
| 2.4 | System memory | 2-14 |
| 2.4.1 | Overview | 2-14 |
| 2.4.2 | Memory configurations..... | 2-15 |
| 2.4.3 | Installing a DIMM | 2-22 |
| 2.4.4 | Removing a DIMM | 2-22 |
| 2.5 | Expansion slots..... | 2-23 |
| 2.5.1 | Installing an expansion card | 2-23 |
| 2.5.2 | Configuring an expansion card | 2-23 |
| 2.5.3 | Interrupt assignments | 2-24 |
| 2.5.4 | PCI slot | 2-25 |
| 2.5.5 | PCI Express 2.0 x16 slots..... | 2-25 |
| 2.6 | Jumper | 2-26 |

Contents

| | | |
|----------------------------------|--|-------------|
| 2.7 | I/O shield Installation | 2-27 |
| 2.8 | Connectors | 2-28 |
| 2.8.1 | Rear panel connectors | 2-28 |
| 2.8.2 | Audio I/O connections | 2-29 |
| 2.8.3 | Internal connectors | 2-32 |
| 2.8.4 | ASUS Q-Connector (system panel) | 2-40 |
| 2.8.5 | Onboard switches | 2-41 |
| 2.8.6 | Probelt | 2-45 |
| 2.9 | Starting up for the first time | 2-46 |
| 2.10 | Turning off the computer | 2-47 |
| 2.10.1 | Using the OS shut down function | 2-47 |
| 2.10.2 | Using the dual function power switch | 2-47 |
| Chapter 3: BIOS setup | | |
| 3.1 | Managing and updating your BIOS | 3-1 |
| 3.1.1 | ASUS Update utility | 3-1 |
| 3.1.2 | ASUS EZ Flash 2 utility | 3-4 |
| 3.1.3 | ASUS CrashFree BIOS 3 utility | 3-5 |
| 3.2 | BIOS setup program | 3-6 |
| 3.2.1 | BIOS menu screen | 3-7 |
| 3.2.2 | Menu bar | 3-7 |
| 3.2.3 | Navigation keys | 3-7 |
| 3.2.4 | Menu items | 3-8 |
| 3.2.5 | Submenu items | 3-8 |
| 3.2.6 | Configuration fields | 3-8 |
| 3.2.7 | Pop-up window | 3-8 |
| 3.2.8 | Scroll bar | 3-8 |
| 3.2.9 | General help | 3-8 |
| 3.3 | Extreme Tweaker menu | 3-9 |
| 3.3.1 | CPU Level Up | 3-9 |
| 3.3.2 | OC Tuner Utility | 3-10 |
| 3.3.3 | Ai Overclock Tuner | 3-10 |
| 3.3.4 | CPU Ratio | 3-11 |
| 3.3.5 | DRAM Frequency | 3-11 |
| 3.3.6 | CPU/NB Frequency | 3-11 |

| | | |
|------------|------------------------------------|-------------|
| 3.3.7 | HT Link Speed | 3-11 |
| 3.3.8 | DRAM Timing Configuration | 3-11 |
| 3.3.9 | DRAM Driving Configuration | 3-13 |
| 3.3.10 | CPU & NB Voltage Mode | 3-13 |
| 3.3.11 | CPU VDDA Voltage | 3-14 |
| 3.3.12 | DRAM Voltage | 3-14 |
| 3.3.13 | HT Voltage | 3-14 |
| 3.3.14 | NB Voltage | 3-14 |
| 3.3.15 | NB 1.8V Voltage | 3-14 |
| 3.3.16 | SB Voltage | 3-14 |
| 3.3.17 | VDDR Voltage | 3-14 |
| 3.3.18 | VDDPCIE Voltage | 3-15 |
| 3.3.19 | DRAM CTRL REF Voltage | 3-15 |
| 3.3.20 | DRAM DATA REF Voltage | 3-15 |
| 3.3.21 | CPU Load-Line Calibration | 3-15 |
| 3.3.22 | CPU/NB Load-Line Calibration | 3-15 |
| 3.3.23 | CPU Spread Spectrum | 3-15 |
| 3.3.24 | PCIE Spread Spectrum | 3-15 |
| 3.4 | Main menu | 3-16 |
| 3.4.1 | System Time | 3-16 |
| 3.4.2 | System Date | 3-16 |
| 3.4.3 | Language | 3-16 |
| 3.4.4 | SATA 1–6 | 3-17 |
| 3.4.5 | Storage Configuration | 3-19 |
| 3.4.6 | System Information | 3-20 |
| 3.5 | Advanced menu | 3-21 |
| 3.5.1 | CPU Configuration | 3-21 |
| 3.5.2 | Chipset | 3-22 |
| 3.5.3 | Onboard Device Configuration | 3-25 |
| 3.5.4 | USB Configuration | 3-26 |
| 3.5.5 | PCIPnP | 3-27 |
| 3.5.6 | LED Control | 3-27 |
| 3.5.7 | iROG Configuration | 3-28 |
| 3.5.8 | EC Configuration | 3-28 |
| 3.5.9 | ROG Connect | 3-29 |

| | | |
|------------|-----------------------------------|-------------|
| 3.6 | Power menu | 3-30 |
| 3.6.1 | Suspend Mode | 3-30 |
| 3.6.2 | Repost Video on S3 Resume..... | 3-30 |
| 3.6.3 | ACPI 2.0 Support | 3-30 |
| 3.6.4 | ACPI APIC Support..... | 3-31 |
| 3.6.5 | APM Configuration..... | 3-31 |
| 3.6.6 | Hardware Monitor | 3-32 |
| 3.7 | Boot menu | 3-36 |
| 3.7.1 | Boot Device Priority | 3-36 |
| 3.7.2 | Boot Settings Configuration | 3-36 |
| 3.7.3 | Security | 3-38 |
| 3.8 | Tools menu | 3-40 |
| 3.8.1 | ASUS EZ Flash 2..... | 3-40 |
| 3.8.2 | ASUS O.C. Profile..... | 3-41 |
| 3.8.3 | Go Button File..... | 3-42 |
| 3.8.4 | AI NET 2..... | 3-43 |
| 3.9 | Exit menu | 3-44 |

Chapter 4: Software support

| | | |
|------------|---|------------|
| 4.1 | Installing an operating system | 4-1 |
| 4.2 | Support DVD information | 4-1 |
| 4.2.1 | Running the support DVD | 4-1 |
| 4.2.2 | Drivers menu..... | 4-2 |
| 4.2.3 | Utilities menu | 4-3 |
| 4.2.4 | Make disk menu..... | 4-4 |
| 4.2.5 | Manual menu | 4-4 |
| 4.2.6 | ASUS Contact information | 4-5 |
| 4.2.7 | Other information | 4-5 |
| 4.3 | Software information | 4-7 |
| 4.3.1 | ASUS MyLogo3™ | 4-7 |
| 4.3.2 | Sound Blaster X-Fi audio utility | 4-9 |
| 4.3.3 | ASUS PC Probe II..... | 4-13 |
| 4.3.4 | ASUS AI Suite..... | 4-19 |
| 4.3.5 | ASUS Fan Xpert | 4-20 |
| 4.3.6 | CPU Level Up | 4-21 |
| 4.3.7 | ASUS EPU..... | 4-22 |

| | | |
|--|---|-------------|
| 4.3.8 | ASUS Unique Overclocking Utility—TurboV EVO | 4-23 |
| 4.3.9 | ROG Connect | 4-26 |
| 4.4 | RAID configurations | 4-28 |
| 4.4.1 | RAID definitions | 4-28 |
| 4.4.2 | Installing Serial ATA hard disks | 4-29 |
| 4.4.3 | Setting the RAID item in BIOS | 4-29 |
| 4.4.4 | AMD® Option ROM Utility | 4-30 |
| 4.5 | Creating a RAID driver disk | 4-33 |
| 4.5.1 | Creating a RAID driver disk without entering the OS | 4-33 |
| 4.5.2 | Creating a RAID driver disk in Windows® | 4-33 |
| 4.5.3 | Installing the RAID driver during Windows® OS installation | 4-34 |
| 4.5.4 | Using a USB floppy disk drive | 4-34 |
| Chapter 5: ATI® CrossFireX™ technology support | | |
| 5.1 | ATI® CrossFireX™ technology | 5-1 |
| 5.1.1 | Requirements | 5-1 |
| 5.1.2 | Before you begin | 5-1 |
| 5.1.3 | Installing CrossFireX graphics cards | 5-2 |
| 5.1.4 | Installing the device drivers | 5-3 |
| 5.1.5 | Enabling the ATI® CrossFireX™ technology | 5-3 |
| Appendix: Debug code table | | |

Notices

Federal Communications Commission Statement

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

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

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

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



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

Canadian Department of Communications Statement

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

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

REACH

Complying with the REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulatory framework, we published the chemical substances in our products at ASUS website at <http://green.asus.com/english/REACH.htm>.

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.

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.
- 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.
- **Chapter 5: ATI® CrossFireX™ technology support**
This chapter describes how to install and configure multiple ATI® CrossFireX™ graphics cards.
- **Appendix: Debug code table**
The Appendix lists the debug code table for the LCD Poster.

Where to find more information

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

1. **ASUS websites**
The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.
2. **Optional documentation**
Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

To 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+Del>

Crosshair IV Formula specifications summary

| | |
|------------------------------|--|
| CPU | AMD® Socket AM3; Phenom™ II / Athlon™ II / Sempron™ 100 Series Processors AMD® 140W CPU Support AMD® Cool 'n' Quiet™ Technology Supports 45nm CPU |
| Chipset | AMD® 890FX / SB850 |
| System Bus | Up to 5200 MT/s HyperTransport™ 3.0 |
| Memory | 4 x DIMM, max. 16GB, DDR3 1866(O.C.) / 1800(O.C.) / 1600(O.C.) / 1333 / 1066 MHz,ECC and non-ECC, un-buffered memory Dual channel memory architecture * When you install a total memory of 4 GB capacity or more, Windows® 32-bit operating system may only recognize less than 3 GB. We recommend using a maximum of 3 GB system memory if you are using a Windows® 32-bit OS. ** Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lists) |
| Expansion Slots | 3 x PCIe 2.0 x16 slots (dual at x16 or triple at x16 / x8 / x8 mode) 1 x PCIe 2.0 x4 slot 2 x PCI 2.2 slots |
| Multi-GPU Technology | Support ATI CrossFire™X Technology graphics cards |
| Storage | AMD® SB850 chipset - 6 x SATA 6Gb/s ports with RAID 0, 1, 5, and 10 support JMicron® JMB363 controller - 1 x SATA 3Gb/s port (black) - 1 x eSATA 3Gb/s port (SATA-On-the-Go) * Due to the Windows OS 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 | Marvell® 8059 Gigabit LAN controller GameFirst |
| High Definition Audio | SupremeFX X-Fi built-in - 8-channel High Definition Audio CODEC - EAX® Advanced™ HD 4.0 - X-Fi CMSS®-3D - X-Fi Crystalizer™ - Creative ALchemy - Supports Blu-ray audio layer content protection - Supports 1 x S/PDIF out header - Supports 1 x Optical S/PDIF out port at back I/O - Supports Jack-detection, Multi-streaming, Front Panel Jack-retasking |

(continued on the next page)

Crosshair IV Formula specifications summary

| | |
|-------------------------------------|---|
| IEEE 1394 | 2 x 1394a ports (1 port at back I/O, 1 port onboard) |
| USB | NEC USB 3.0 controller: <ul style="list-style-type: none"> - 2 x USB 3.0 ports (blue at back panel) SB850 chipset: <ul style="list-style-type: none"> - 12 x USB 2.0 ports (5 ports at midboard; 7 ports at back I/O, 1 port at back I/O is also for ROG connect) |
| ROG Exclusive Overclocking Features | ROG Connect GameFirst Extreme Tweaker Power Design <ul style="list-style-type: none"> - 8+2 phase CPU power design CPU Level Up MemOK! iROG Loadline Calibration Intelligent overclocking tools <ul style="list-style-type: none"> - ASUS TurboV EVO - O.C Profile Overclocking Protection <ul style="list-style-type: none"> - COP EX (Component Overheat Protection - EX) - Voltminder LED - ASUS C.P.R.(CPU Parameter Recall) |
| Other Special Features | Turbo Key II Core Unlocker ASUS Q-Connector ASUS Q-Shield ASUS Q-Fan 2 ASUS EZ Flash 2 ASUS CrashFree BIOS 3 ASUS MyLogo 3 AMD® OverDrive Support* ASUS TurboV EVO |
| Back Panel I/O Ports | 1 x PS/2 Keyboard port(purple) 1 x External SATA port 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 Clr CMOS switch |

(continued on the next page)

Crosshair IV Formula specifications summary

| | |
|--------------------------------|---|
| Internal I/O Connectors | 3 x USB 2.0 connectors supports additional 5 USB 2.0 ports 6 x SATA 6Gb/s connectors (red) 1 x SATA 3Gb/s connector (black) 8 x Fan connectors: 1 x CPU / 1 x PWR / 3 x Chassis / 3 x Optional 7 x Probelit 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 1 x En/Dis-able Clr CMOS switch 1 x Core unlocker switch 1 x Turbo key II switch 1 x Power on switch 1 x Reset switch 1 x OC Station Header 1 x Go Button 1 x System panel connector |
| BIOS Features | 16Mb AMI BIOS, PnP, DMI2.0, WfM2.0, SM BIOS 2.4, ACPI2.0a Multi-Language BIOS |
| Manageability | WOL by PME, WOR by PME, PXE |
| Software | Support DVD: - Drivers and applications * ASUS PC Probe II * ASUS Update * ASUS AI Suite * AMD OverDrive Utility (AOD) * Sound Blaster X-Fi Utility * Kaspersky® Anti-Virus (1-year license) |
| Form Factor | ATX Form Factor, 12"x 9.6" (30.5cm x 24.5cm) |

*Specifications are subject to change without notice.

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

1 **Product introduction**

Chapter summary



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

1.1 Welcome!

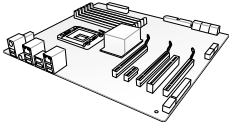
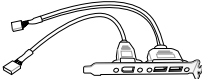


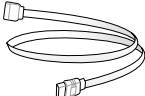
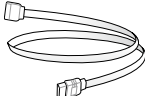
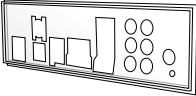
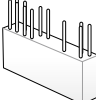

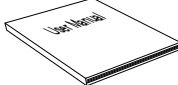
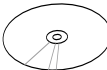
Thank you for buying an ROG Crosshair IV Formula motherboard!

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

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

1.2 Package contents

Check your motherboard package for the following items.

| | | | |
|---|---|---|--|
|  | |  | |
| ROG Crosshair IV Formula Motherboard | | 1 x Multi-functional module (2-port USB 2.0 and 1-port eSATA) | |
|  | |  | |
| 1 x ROG Connect cable | | 1 x CrossFire Cable | |
|  | |  | |
| 1 x 2-in-1 SATA 6.0Gb/s signal cables | | 2 x 2-in-1 SATA 3Gb/s signal cables | |
|  | |  | |
| 1 x ASUS Q-Shield (I/O shield) | | 1 x 2-in-1 ASUS Q-Connector Kit | |
|  |  |  | 1 x ROG theme label 1 x ROG SATA cable labels (12-in-1) |
| Cable ties | User Guide | ROG Support DVD | |



- If any of the above items is damaged or missing, contact your retailer.
- The item illustrations in above table are for reference only. Actual product specifications may vary with different models.

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.

AMD socket AM3 Phenom™ II / Athlon™ II / Sempron™ 100 Series processors support

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 5200MT/s HyperTransport™ 3.0 (HT 3.0) interface speed and PCI Express™ 2.0 x16 graphics. It is optimized with AMD®'s 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 antialiasing, 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.

DDR3 2000 (O.C.) support

This motherboard supports DDR3 2000(O.C.) that provides faster data transfer rate and more bandwidth to increase memory computing efficiency, enhancing system performance in 3D graphics and other memory demanding applications

PCIe 2.0

Double Speed; Double Bandwidth

This motherboard supports the latest PCIe 2.0 device for double speed and bandwidth which enhances system performance.

100% high-quality Japan-made conductive polymer capacitors (VRM 5000hrs lifespan at 105°C, 500,000hrs at 65°C)

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

USB 3.0 support

10X Faster Data 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 6Gb/s data transfer rates. Additionally, get enhanced scalability, faster data retrieval, double the bandwidth of current bus systems.

1.3.2 ROG Intelligent Performance & Overclocking features

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 you system up and running in no time. The technology is able to determine failsafe settings that can dramatically improve system booting success.

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 want to OC to, and the motherboard will do the rest for you. See the new CPU speed and enjoy the performance instantly! Overclocking is never as easy as this.

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.

GameFirst



The speed you need to pwn

Low Internet latency allows you to frag more, and get fragged less. That's why ROG has introduced GameFirst, a feature that manages the flow of traffic according to your needs so that you can still listen to online music, download and upload files, and engage in Internet chats without sacrificing the low ping times you need to pwn your opponents.

iROG



Intelligent multiple control at hand

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

Probelt



Get all hands-on with hardware-based overclocking

Probelt takes the guesswork out of locating the motherboard's measurement points, identifying them clearly in the form of 7 sets of detection points so you'll know exactly where to get quick yet accurate readings using a multimeter.

Extreme Tweaker



One stop performance tuning shop

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

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, NB, SB, and Memory in a intuitive color-coded fashion. The Voltiminder LED allows quick voltage monitoring for overclockers.

Component Overheat Protection-EX (COP EX)



Maximum OC with confidence with burn proof protection to chipsets and GPU!

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

Loadline Calibration



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.

1.3.3 ROG unique features

SupremeFX X-Fi features



Listen with absolute HD Play in extreme fidelity!

SupremeFX X-Fi delivers an excellent high definition audio experience to the gamers of ROG. SupremeFX X-Fi features unique audio innovations for gamers to spot enemies in 3D environment during game play. SupremeFX X-Fi combines the technological quality design of SupremeFX and sound effect technology from Creative Labs® to offer games exceptional game sound with absolute quality.

Noise Filter

Eliminate background noise while recording

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

Onboard Switches



No more shorting pins or moving jumpers

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

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.

1.3.4 ASUS special features

ASUS Turbo Key II

Switch on the Potential, Turn up the Performance

Enjoy superb performance by auto-tuning your processor to an extreme yet stable state. Simply activate a dedicated switch on the motherboard to unleash extra processing capabilities.

ASUS 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 complicating 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.

ASUS EZ DIY

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

ASUS Q-Shield

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

ASUS Q-Connector

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

8 O.C. Profile

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.

ASUS CrashFree BIOS 3

The ASUS CrashFree BIOS 3 allows users to restore corrupted BIOS data from a USB flash disk containing the BIOS file.

ASUS EZ Flash 2

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

[illegible]

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 | 2-1 |
| 2.2 | Motherboard overview | 2-6 |
| 2.3 | Central Processing Unit (CPU) | 2-9 |
| 2.4 | System memory | 2-14 |
| 2.5 | Expansion slots..... | 2-23 |
| 2.6 | Jumper | 2-26 |
| 2.7 | I/O shield Installation | 2-27 |
| 2.8 | Connectors | 2-28 |
| 2.9 | Starting up for the first time..... | 2-46 |
| 2.10 | Turning off the computer..... | 2-47 |

2.1 Before you proceed

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



-
- Unplug the power cord from the wall socket before touching any component.
 - Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
 - Hold components by the edges to avoid touching the ICs on them.
 - Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
 - Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.
-

Onboard LEDs

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

1. CPU LED

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

| | Normal (green) | High (yellow) | Crazy (red) |
|-----------------------|-----------------|-----------------|-----------------|
| CPU Voltage (default) | By CPU-1.3625 | 1.3750-1.4875 | 1.5000-By CPU |
| VDD NB | By CPU-1.3625 | 1.3750-1.4875 | 1.5000-By CPU |
| VDDA 2.5 Voltage | 2.20000-2.76250 | 2.77500-3.00000 | 3.01250-3.18750 |

2. Northbridge/Southbridge LEDs

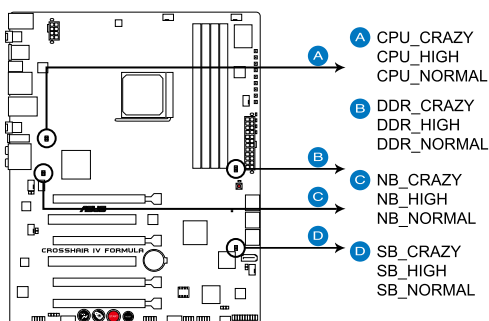
The northbridge and southbridge LEDs each have two different voltage displays. The northbridge LED displays either the NB Voltage or the NB 1.8 Voltage. The southbridge LED shows either the SB Voltage, SB 1.2V Voltage, or the HT. You can select the voltage to display in BIOS. Refer to the illustration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

| | Normal (green) | High (yellow) | Crazy (red) |
|-------------------|-----------------|-----------------|-----------------|
| NB 1.1 Voltage | 0.80000-1.58750 | 1.60000-1.83750 | 1.85000-2.00000 |
| NB 1.8 Voltage | 1.80200-1.89475 | 1.90800-1.94775 | 1.96100-3.00775 |
| VDDPCIE 1.1V | 1.11300-1.59000 | 1.60325-1.84175 | 1.85500-2.00075 |
| SB 1.1 Voltage | 1.11300-1.44250 | 1.45750-1.69600 | 1.70925-1.80200 |
| SB HT 1.2 Voltage | 0.80000-1.38750 | 1.40000-1.65000 | 1.66250-2.00000 |

3. Memory LED

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

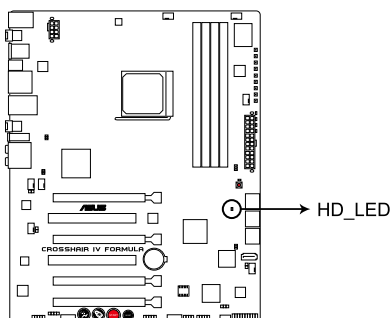
| | Normal (green) | High (yellow) | Crazy (red) |
|------------------|-----------------|-----------------|-----------------|
| DRAM Bus Voltage | 1.20000-1.72500 | 1.73750-2.32500 | 2.33750-2.90000 |
| VDDR 1.2 Voltage | 1.20575-1.39125 | 1.40450-1.65625 | 1.66950-1.80200 |



CROSSHAIR IV FORMULA CPU/ NB/ DDR/ SB LED

4. Hard Disk LED

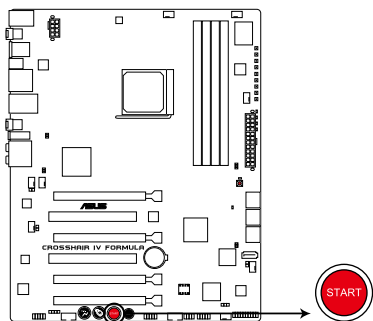
The hard disk LED is designed to indicate the hard disk activity. It blinks when data is being written into or read from the hard disk drive. The LED does not light up when there is no hard disk drive connected to the motherboard or when the hard disk drive does not function.



CROSSHAIR IV FORMULA Hard Disk LED

5. Power LED

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



CROSSHAIR IV FORMULA Power on switch

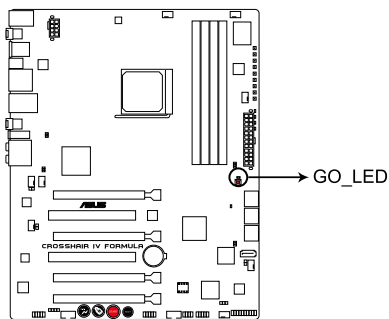


When you turn on the ATX power supply, the **Power LED** flashes three times to indicate that the system is ready to boot. Wait till the flash stops before you press the power-on switch.

6. GO LED

Blinking: Indicates that MemOK! is enabled before POST.

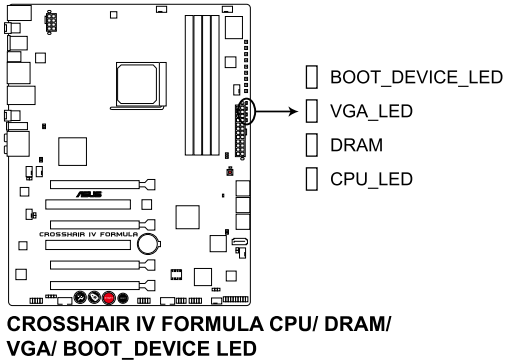
Lighting: Indicates that the system loads the preset profile for temporary overclocking when in OS.



CROSSHAIR IV FORMULA GO_LED

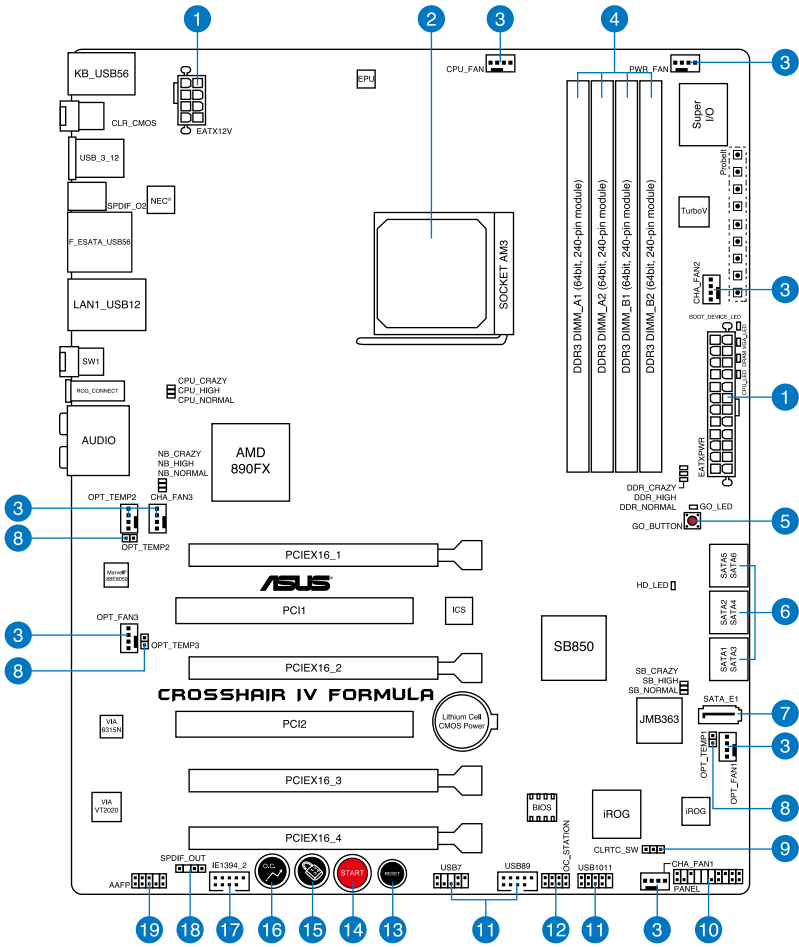
7. POST State LEDs

POST State LEDs check key components (CPU, DRAM, VGA card, and HDD) in sequence during motherboard booting process. If an error is found, the LED next to the error device will continue lighting until the problem is solved. This user-friendly design provides an intuitive way to locate the root problem within seconds.



2.2 Motherboard overview

2.2.1 Motherboard layout



2.2.2 Layout contents

| Connectors/Jumpers/Switches/Slots | | Page |
|-----------------------------------|---|------|
| 1. | ATX power connectors (24-pin EATXPWR, 8-pin EATX12V) | 2-38 |
| 2. | AMD® AM3 Socket | 2-9 |
| 3. | CPU, chassis, and optional fan connectors (4-pin CPU_FAN; 4-pin PWR_FAN; 4-pin CHA_FAN1-3; 4-pin OPT_FAN1-3) | 2-35 |
| 4. | DDR3 DIMM slots | 2-14 |
| 5. | Go Button | 2-42 |
| 6. | AMD® SB850 Serial ATA 6.0 Gb/s connectors (7-pin SATA1-6) [red] | 2-32 |
| 7. | JMicron® JMB363 Serial ATA connectors (7-pin SATA_E1) [black] | 2-33 |
| 8. | Thermal sensor cable connectors (2-pin OPT_TEMP1-3) | 2-36 |
| 9. | Clear RTC RAM (3-pin CLRTC_SW) | 2-26 |
| 10. | System panel connector (20-8 pin PANEL) | 2-39 |
| 11. | USB connectors (10-3 pin USB7; 10-1 pin USB89; USB1011) | 2-33 |
| 12. | OC Station connector (8-pin OC_STATION) | 2-37 |
| 13. | Reset switch | 2-41 |
| 14. | Power-on switch | 2-41 |
| 15. | Core Unlocker switch | 2-44 |
| 16. | Turbo Key II switch | 2-43 |
| 17. | IEEE 1394a port connector (10-1 pin IE1394_2) | 2-34 |
| 18. | Digital audio connector (4-1 pin SPDIF_OUT) | 2-37 |
| 19. | Front panel audio connector (10-1 pin AAFP) | 2-34 |



Refer to **2.8 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.

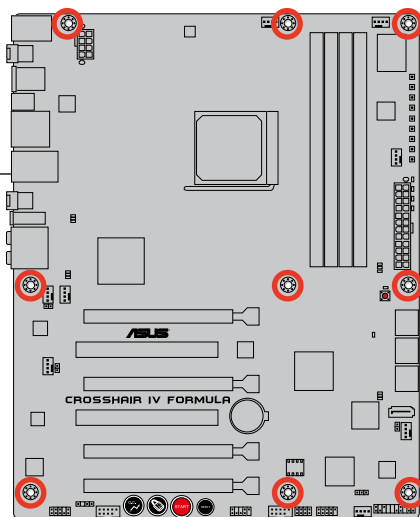
2.2.4 Screw holes

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.

Place this side towards
the rear of the chassis



2.3 Central Processing Unit (CPU)

The motherboard comes with an AMD® AM3 Socket for AMD socket AM3 Phenom™ II / Athlon™ II / Sempron™ 100 Series processors.

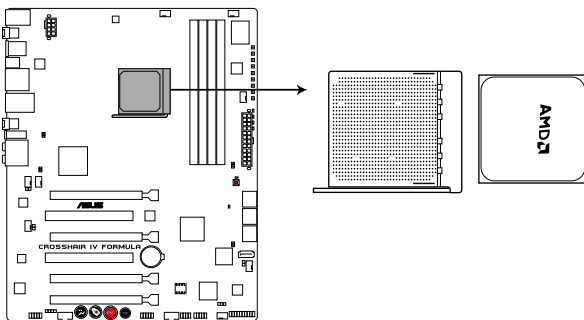


The AM3 socket has a different pinout from the AM2+/AM2 socket. Ensure you use a CPU designed for the AM3 socket. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

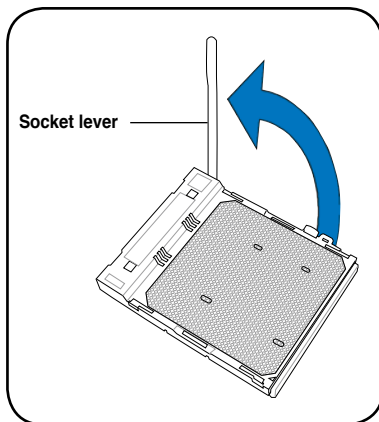


CROSSHAIR IV FORMULA CPU Socket AM3

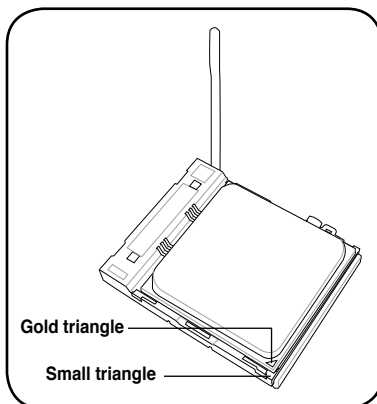
2. Press the lever sideways to unlock the socket, then lift it up to a 90° angle.



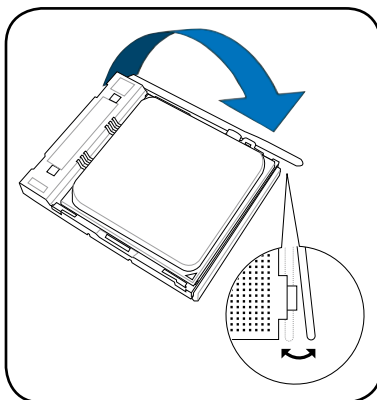
Ensure that the socket lever is lifted up to a 90° angle. Otherwise, the CPU will not fit in completely.



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 several drops of 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.



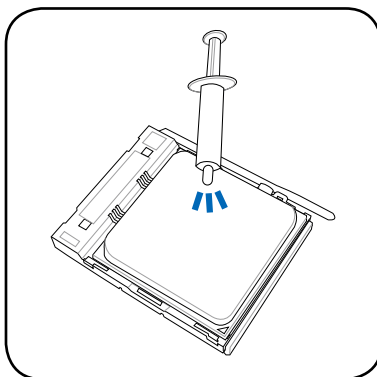
Some heatsinks come with pre-applied thermal interface material. If so, skip this step.



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 thermal interface material, DO NOT spread the thermal interface material with your finger.



2.3.2 Installing the heatsink and fan

The AMD socket AM3 Phenom™ II / Athlon™ II / Sempron™ 100 Series processors requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.



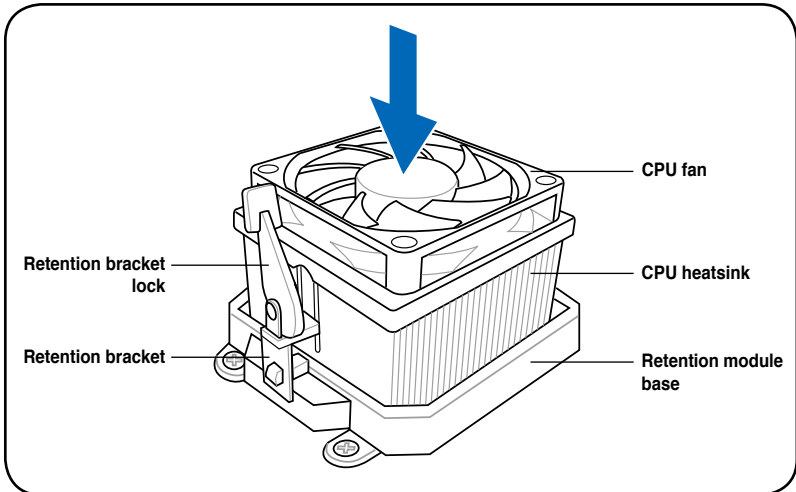
Ensure that you use only AMD-certified heatsink and fan assembly.

To install the CPU heatsink and fan:

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

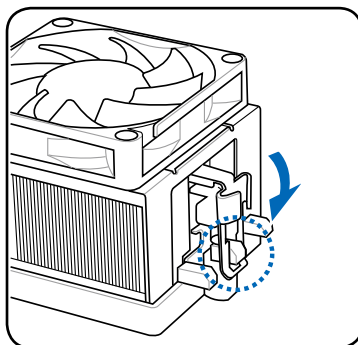


- The retention module base is already installed on the motherboard upon purchase.
- You do not have to remove the retention module base when installing the CPU or installing other motherboard components.
- If you purchased a separate CPU heatsink and fan assembly, ensure that a Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.



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.

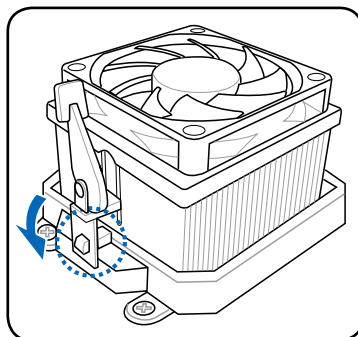
2. Attach one end of the retention bracket to the retention module base.



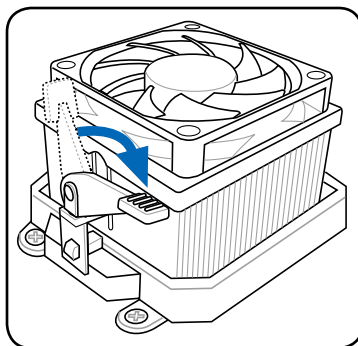
3. Align the other end of the retention bracket to the retention module base. A clicking sound denotes that the retention bracket is in place.



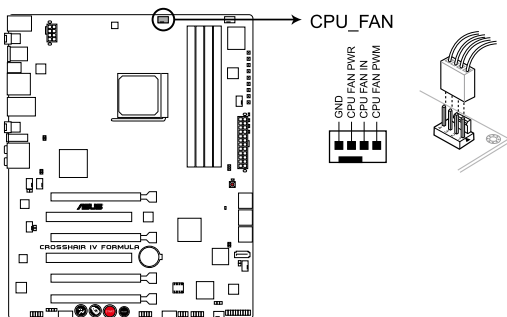
Ensure that the fan and heatsink assembly perfectly fits the retention mechanism module base, otherwise you cannot snap the retention bracket in place.



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



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



CROSSHAIR IV FORMULA 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.

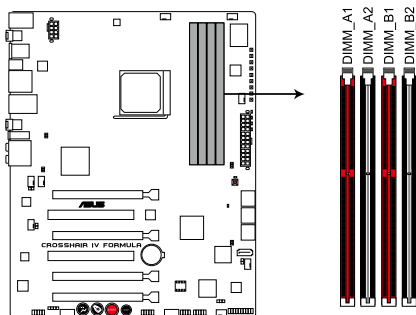
2.4 System memory

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:



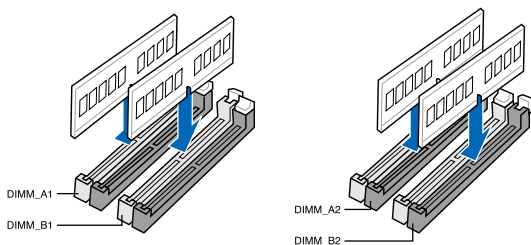
CROSSHAIR IV FORMULA 240-pin DDR3 DIMM sockets

Recommended memory configurations

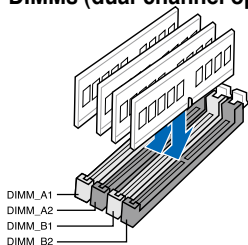
One DIMM:

Install one memory module in any slot as a single-channel operation.

Two DIMMs (dual-channel operation):



Four DIMMs (dual-channel operation):



2.4.2 Memory configurations

You may install 512 MB, 1 GB, 2 GB and 4 GB 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 red 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.
- Due to different CPU margins, not all of AMD CPU can support up to DDR3 1600 and 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 SPD. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, see section **3.5 Advanced 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 Formula Motherboard Qualified Vendors Lists (QVL) DDR3-1866MHz capability

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | 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 | • | • | |
| OCZ | OCZ3P1866LV4GK | 4GB(2 x 2GB) | DS | - | - | 9-9-9 | 1.65 | • | | |
| Patriot | PVS32G1866LLK(XMP) | 2GB(2 x 1GB) | SS | - | - | 8-8-8-24 | 1.9 | • | | |
| Team | Box/P/N: TXD34096M1866HC7DC-L (TXD32048M1866HC7-L)(XMP) | 4GB(2 x 2GB) | DS | - | - | 7-7-7-21 | 1.65 | • | • | • |

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

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|----------|------------------------------|--------------|-----------|---------------|-------------|----------|---------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| KINGSTON | KHX1800C9D3T1K3/ 6GX(XMP) | 6GB(3 x 2GB) | DS | - | - | - | 1.65 | • | • | • |
| Patriot | PVS32G1800LLKN(EPP) | 2GB(2 x 1GB) | SS | - | - | 8-8-8-20 | 1.9 | • | | |

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

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|---------|--------------------------|---------------|-----------|---------------|-------------|----------|-----------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| A-DATA | AD31600G001GMU | 1GB | SS | - | - | 9-9-9-24 | 1.65~1.85 | • | • | |
| A-DATA | AX3U1600GB1G9-AG | 2GB(2 x 1GB) | SS | - | - | 9-9-9-24 | 1.65~1.85 | • | • | |
| A-DATA | AX3U1600PB1G8-2P | 2GB(2 x 1GB) | SS | - | - | 8-8-8-24 | 1.65-1.85 | • | • | • |
| A-DATA | AD31600E001GMU | 3GB(3 x 1GB) | SS | - | - | 8-8-8-24 | 1.65-1.85 | • | • | • |
| A-DATA | AX3U1600GB1G9-3G | 3GB(3 x 1GB) | SS | - | - | 9-9-9-24 | 1.65~1.85 | • | • | |
| A-DATA | AX3U1600PB1G8-3P | 3GB(3 x 1GB) | SS | - | - | 8-8-8-24 | 1.65-1.85 | • | • | • |
| A-DATA | AX3U1600GB2G9-AG(XMP) | 4GB(2 x 2GB) | DS | - | - | 9-9-9-24 | 1.65~1.85 | • | • | • |
| A-DATA | AX3U1600XB2G7-EF(XMP) | 4GB(2 x 2GB) | DS | - | - | 7-7-7-20 | 1.75-1.85 | • | • | • |
| A-DATA | AD31600F002GMU(XMP) | 6GB(3 x 2GB) | DS | - | - | 7-7-7-20 | 1.75-1.85 | • | • | • |
| A-DATA | AX3U1600GB2G9-3G(XMP) | 6GB(3 x 2GB) | DS | - | - | 9-9-9-24 | 1.65~1.85 | • | • | • |
| A-DATA | AX3U1600GB2G9-3G(XMP) | 6GB(3 x 2GB) | DS | - | - | 9-9-9-24 | 1.65~1.85 | • | • | • |
| A-DATA | AX3U1600GB2G9-3G | 6GB(3 x 2GB) | DS | - | - | 9-9-9-24 | 1.65~1.85 | • | • | • |
| A-DATA | AX3U1600XB2G7-FF(XMP) | 6GB(3 x 2GB) | DS | - | - | 7-7-7-20 | 1.75-1.85 | • | • | • |
| 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 | CMG4GX3M2A1600C6 | 4GB(2x 2GB) | DS | - | - | 6-6-6-18 | 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 | CMX4GX3M2A1600C9(XMP) | 4GB(2 x 2GB) | DS | - | - | 9-9-9-24 | 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 | • | • | • |

Crosshair IV Formula Motherboard Qualified Vendors Lists (QVL)

DDR3-1600MHz capability (continued)

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|--------------|--------------------------|---------------|-----------|---------------|-------------|----------|----------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| 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 | BL12864BA1608.8SFB(XMP) | 1GB | SS | - | - | - | 1.8 | * | * | * |
| Crucial | BL25664BN1608.16FF(XMP) | 2GB | DS | - | - | 8-8-8-24 | 1.65 | * | * | * |
| G.SKILL | F3-12800CL9D-2GBNQ | 2GB(2 x 1GB) | SS | - | - | - | 1.6 | * | * | |
| G.SKILL | F3-12800CL9D-4GBRL | 2GB(2 x 1GB) | 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 | - | - | - | - | * | * | * |
| KINGMAX | FLGE85F-B8MF7(XMP) | 2GB | DS | - | - | - | - | * | * | * |
| KINGSTON | KHX1600C9D3K3/12GX(XMP) | 12GB(3 x 4GB) | DS | - | - | - | 1.65 | * | * | * |
| KINGSTON | KHX1600C9D3K3/12GX(XMP) | 12GB(3 x 4GB) | DS | - | - | 9 | 1.65 | * | * | * |
| KINGSTON | KHX1600C8D3K2/4GX(XMP) | 4GB(2 x 2GB) | DS | - | - | 8 | 1.65 | * | * | * |
| KINGSTON | KHX1600C8D3K2/4GX(XMP) | 4GB(2 x 2GB) | DS | - | - | 8 | 1.65 | * | * | * |
| KINGSTON | KHX1600C8D3T1K2/4GX(XMP) | 4GB(2 x 2GB) | DS | - | - | 8 | 1.65 | * | * | * |
| KINGSTON | KHX1600C9D3K2/4G | 4GB(2 x 2GB) | DS | - | - | - | 1.7~1.9 | * | * | * |
| 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 | OCZ3P16004GK(XMP) | 4GB(2x 2GB) | DS | - | - | 7-7-7 | 1.9 | * | * | * |
| OCZ | OCZ3OB1600LV4GK | 4GB(2 x 2GB) | DS | - | - | 9-9-9 | 1.65 | * | * | * |
| 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 | 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 | WP160UX4G9(XMP) | 4GB(2 x 2GB) | DS | - | - | 9 | - | * | * | * |
| Super Talent | WB160UX6G8(XMP) | 6GB(3 x 2GB) | DS | - | - | - | - | * | * | * |
| Super Talent | WB160UX6G8(XMP) | 6GB(3 x 2GB) | DS | - | - | 8 | - | * | * | * |
| EK Memory | EKM324L28BP8-116(XMP) | 4GB(2 x 2GB) | DS | - | - | 9 | - | * | * | * |

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

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|---------|--|--------------|-----------|---------------|-------------|----------|---------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| Elixir | M2Y2G64CB8HA9N-DG(XMP) | 2GB | DS | - | - | - | - | * | * | |
| 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 | 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 | * | | |
| Team | BoxP/N: TXD34096M1600HC6DC-L (TXD32048M1600HC6-L)(XMP) | 4GB(2 x 2GB) | DS | - | - | 6-7-6-18 | 1.65 | | | * |

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

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|---------|---|--------------|-----------|---------------|--------------------|-------------|-----------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| A-DATA | AD3133301GOU | 1GB | SS | A-DATA | AD30908C8D-15IG | - | - | * | * | * |
| A-DATA | AD31333002GOU | 2GB | DS | A-DATA | AD30908C8D-15IG | - | - | * | * | * |
| A-DATA | AD3U1333B2G9-2 | 2GB | DS | A-DATA | AD30908C8D-15IG | - | - | * | * | * |
| A-DATA | AX3U1333PB2G7-2P | 4GB(2 x 2GB) | DS | - | - | 7-7-7-20 | 1.65-1.85 | * | * | * |
| A-DATA | AD3U1333C4G9-B | 4GB | DS | Hynix | H5TQ2G83AFRH9C | 1333-9-9-24 | - | * | * | * |
| A-DATA | AD31333E002G0U | 6GB(3 x 2GB) | DS | - | - | 7-7-7-20 | 1.65-1.85 | * | * | * |
| A-DATA | AX3U1333PB2G7-3P | 6GB(3 x 2GB) | DS | - | - | 7-7-7-20 | 1.65-1.85 | * | * | * |
| Apacer | 78.A1GC6.9L1 | 2GB | DS | Apacer | AM5D5808DEWSBG | 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 | MT&JF12864AY-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 | - | * | * | * |
| Crucial | BL25664BA1336.16SFB1 | 4GB(2 x 2GB) | DS | NA | - | 6-6-6-20 | 1.8 | * | * | * |
| 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 | - | - | * | * | * |

Crosshair IV Formula Motherboard Qualified Vendors Lists (QVL)

DDR3-1333MHz capability (continued)

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|--------------|--------------------------|--------------|-----------|---------------|--------------------|----------|---------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| ELPIDA | EBJ21UE8EDF0-DJ-F | 2GB | DS | ELPIDA | J1108EDSE-DJ-F | - | - | * | * | * |
| 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 | F3-10666CL7D-4GBPI(XMP) | 4GB(2 x 2GB) | DS | - | - | 7-7-7-21 | 1.5 | * | * | * |
| G.SKILL | F3-10666CL7D-4GBRH(XMP) | 4GB(2 x 2GB) | DS | - | - | 7-7-7-21 | 1.5 | * | * | * |
| 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 | F3-10666CL8D-4GBRM(XMP) | 4GB(2 x 2GB) | DS | - | - | 8-8-8-21 | 1.5-1.6 | * | * | * |
| G.SKILL | F3-10666CL9T-6GBN9 | 6GB(3 x 2GB) | DS | - | - | 9-9-9-24 | 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 | HMT125U6BFR8C-H9 | 2GB | DS | Hynix | H5TQ1G83BFR | 9 | - | * | * | * |
| Hynix | HMT125U6BFR8C-H9 | 2GB | DS | Hynix | H5TQ1G83BFRH9C | 9 | - | * | * | * |
| KINGMAX | FLFD45F-B8KG9 | 1GB | SS | KingMax | KFB8FNGBF-ANX-15A | - | - | * | * | * |
| KINGMAX | FLFE85F-B8KG9 | 2GB | DS | KingMax | KFB8FNGBF-ANX-15A | - | - | * | * | * |
| KINGSTON | KVR1333D3N9/2G | 2GB | DS | Qimonda | IDSH1G-03A1F1C-13H | 9 | 1.5 | * | * | * |
| KINGSTON | KVR1333D3E9S4G | 4GB | DS | SAMSUNG | K4B2G0846B-HCH9 | - | 1.5 | * | * | * |
| KINGSTON | KVR1333D3N9/4G | 4GB | DS | SAMSUNG | K4B2G0846B-HCH9 | 9 | 1.5 | * | * | * |
| MICRON | MT8JTF12864AZ-1G4F1 | 1GB | SS | MICRON | 9FF22 D9KPT | 9 | - | * | * | * |
| MICRON | MT8JTF12864AZ-1G4F1 | 1GB | SS | MICRON | D9KPT | 9 | - | * | * | * |
| MICRON | MT9JSF12872AZ-1G4F1 | 1GB | SS | MICRON | D9KPT(ECC) | 9 | - | * | * | * |
| MICRON | MT16JF25664AZ-1G4F1 | 2GB | DS | MICRON | D9KPT | 9 | - | * | * | * |
| MICRON | MT16JTF25664AZ-1G4F1 | 2GB | DS | MICRON | 9FF22 D9KPT | 9 | - | * | * | * |
| MICRON | MT18JSF25672AZ-1G4F1 | 2GB | DS | MICRON | D9KPT(ECC) | 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 | OCZ3G1333LV4GK | 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 | OCZ3G1333LV6GK | 6GB(3 x 2GB) | DS | - | - | 9-9-9 | 1.65 | * | * | * |
| 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 | M391B2873DZ1-CH9 | 1GB | SS | SAMSUNG | K4B1G0846D(ECC) | 9 | - | * | * | * |
| SAMSUNG | M378B5673DZ1-CH9 | 2GB | DS | SAMSUNG | K4B1G0846D | 9 | - | * | * | * |
| SAMSUNG | M378B5673EH1-CH9 | 2GB | DS | SAMSUNG | K4B1G0846E | - | - | * | * | * |
| SAMSUNG | M391B5673DZ1-CH9 | 2GB | DS | SAMSUNG | K4B1G0846D(ECC) | 9 | - | * | * | * |
| SAMSUNG | M378B5273BH1-CH9 | 4GB | DS | SAMSUNG | K4B2G0846B-HCH9 | 9 | - | * | * | * |
| Super Talent | W1333UX2G8(XMP) | 2GB(2 x 1GB) | SS | - | - | 8 | 1.8 | * | * | * |
| Asint | SLY3128M8-EDJE | 1GB | SS | ELPIDA | J1108BASE-DJ-E | - | - | * | * | * |
| ASUS | N/A | 1GB | DS | - | - | - | - | * | * | * |
| ATP | AQ28M64A8BJH9S | 1GB | SS | SAMSUNG | K4B1G0846E | - | - | * | * | * |
| ATP | AQ28M72DBJH9S | 1GB | SS | SAMSUNG | K4B1G0846D(ECC) | - | - | * | * | * |
| ATP | AQ56M64B8BJH9S | 2GB | DS | SAMSUNG | K4B1G0846D | - | - | * | * | * |
| ATP | AQ56M72EBBJH9S | 2GB | DS | SAMSUNG | K4B1G0846D(ECC) | - | - | * | * | * |
| BUFFALO | FSX1333D3G-1G | 1GB | SS | - | - | - | - | * | * | * |

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

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|---------------|---------------------|--------------|-----------|---------------|-----------------|----------|---------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| BUFFALO | FSH1333D3G-T3G(XMP) | 3GB(3 x 1GB) | SS | - | - | 7-7-7-20 | - | * | * | * |
| BUFFALO | FSX1333D3G-2G | 2GB | DS | - | - | - | - | * | * | * |
| EK Memory | EKM324L28BP8-113 | 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 | 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 | * | * | * |
| Silicon Power | SP001GBLTU1333S01 | 1GB | SS | NANYA | NT5CB128M8AN-CG | - | - | * | * | * |
| Silicon Power | SP002GBLTU1333S02 | 2GB | DS | S-POWER | I0YT3E0 | 9 | - | * | * | * |
| UMAX | E41302GP0-73BDB | 2GB | DS | UMAX | U2S24D30TP-13 | - | - | * | * | * |

Crosshair IV Formula Motherboard Qualified Vendors Lists (QVL) DDR3-1066MHz capability

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|----------|----------------------|------|-----------|---------------|-------------------|--------|---------|-----------------------------------|--------|--------|
| | | | | | | | | 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 | - | - | * | * | * |
| 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 | D1288JEKAPA7U | 7 | 1.5 | * | * | * |
| KINGSTON | KVR1066D3N7/2G | 2GB | DS | KINGSTON | D1288JEKAPGA7U | 7 | 1.5 | * | * | * |
| KINGSTON | KVR1066D3N7/2G | 2GB | DS | ELPIDA | J1108BABG-DJ-E | - | 1.5 | * | * | * |
| KINGSTON | KVR1066D3N7/4G | 4GB | DS | SAMSUNG | K4B2G0846B-HCF8 | - | 1.5 | * | * | * |
| MICRON | MT8JTF12864AZ-1G1D1 | 1GB | SS | MICRON | 7VD22 | 7 | - | * | * | * |
| 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 | MT16JTF25664AY-1G1D1 | 2GB | DS | MICRON | 7VD22 | 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 | * | * | * |
| Asint | SLY3128M8-EAE | 1GB | SS | Asint | DDRIII1208-AE | - | - | * | * | * |

Crosshair IV Formula Motherboard Qualified Vendors Lists (QVL) DDR3-1066MHz capability (continued)

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|--------|-------------------|------|-----------|------------|--------------------|--------|---------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| Asint | SLZ3128M8-EAE | 2GB | DS | Asint | DDRIII1208-AE | - | - | • | • | |
| 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 | - | • | • | |



Due to different CPU margins, not all of AMD CPU can support up to DDR3 1600 and higher frequency DIMMs.



Side(s): SS - Single-sided DS - Double-sided
DIMM support:

- **1 DIMM:** Supports one (1) module inserted into any slot as Single-channel memory configuration.
- **2 DIMMs:** Supports two (2) modules inserted into either the blue slots or the black slots as one pair of Dual-channel memory configuration.
- **4 DIMMs:** Supports four (4) modules inserted into both the blue and the black slots as two pairs of Dual-channel memory configuration.



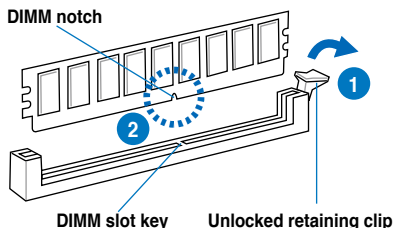
Visit the ASUS website for the latest QVL.

2.4.3 Installing a DIMM



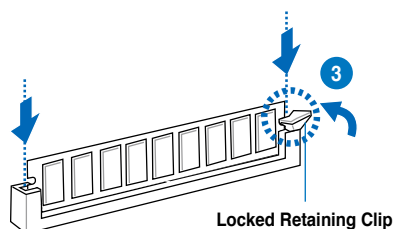
Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

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.

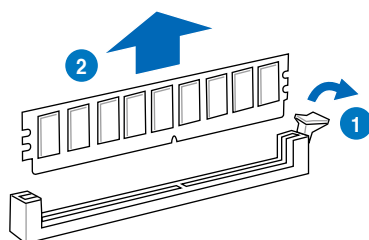
3. Hold the DIMM by both of its ends, then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place, and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.



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

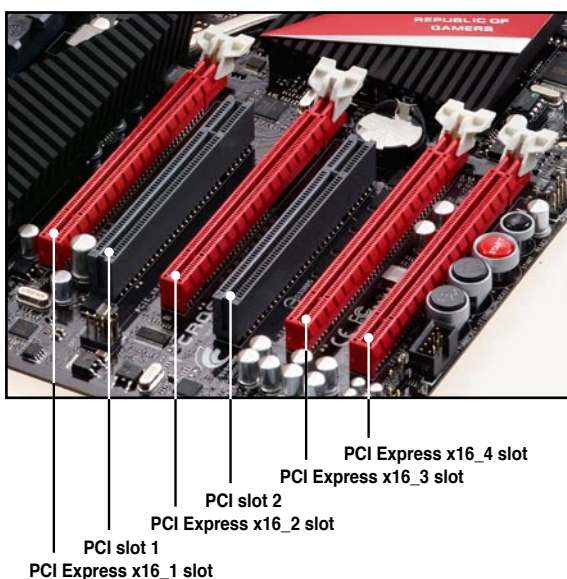
| | A | B | C | D | E | F | G | H |
|-------------------------|-----------------|--------|--------|--------|-------------|--------|--------|-------------|
| PCIE_X16_1 | shared | – | – | – | – | – | – | – |
| PCI_1 | – | – | – | – | shared | – | – | – |
| PCIE_X8 / X1_2 | – | – | – | – | shared (X8) | – | – | shared (X1) |
| PCI_2 | – | – | – | – | – | shared | – | – |
| PCIE_X16 / X8_3 | shared (X16/X8) | – | – | – | – | – | – | – |
| PCIE_X4_4 | shared | – | – | – | – | – | – | – |
| USB1 OHCI Controller | – | – | shared | – | – | – | – | – |
| USB1 EHCI Controller | – | shared | – | – | – | – | – | – |
| USB2 OHCI Controller | – | – | shared | – | – | – | – | – |
| USB2 EHCI Controller | – | shared | – | – | – | – | – | – |
| USB3 OHCI Controller | – | – | shared | – | – | – | – | – |
| USB3 EHCI Controller | – | shared | – | – | – | – | – | – |
| SB SATA/AHCI Controller | – | – | – | shared | – | – | – | – |
| LAN | – | – | – | shared | – | – | – | – |
| 1394 | – | – | – | – | – | – | shared | – |
| Audio | shared | – | – | – | – | – | – | – |
| JMicron SATA Controller | – | – | – | – | shared | – | – | – |
| USB 3.0 | – | – | – | 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 2.0 x16 slots

This motherboard has four PCI Express 2.0 x16 slots that support PCI Express x16 2.0 graphic cards complying with the PCI Express specifications. Refer to the figure below for the location of the slots.



- In single VGA card mode, use first the PCIe 2.0 x16_1 slot for a PCI Express x16 graphics card to get better performance.
- In CrossFireX™ mode, use the PCIe 2.0 x16_1 (red) and PCIe 2.0 x16_3 (red) slots for PCI Express x16 graphics cards to get better performance.
- We recommend that you provide sufficient power when running CrossFireX™ mode. See page 2-38 for details.
- Connect a chassis fan to the motherboard connector labeled CHA_FAN1/2/3 when using multiple graphics cards for better thermal environment.

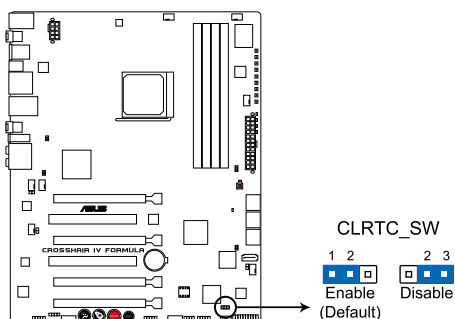
2.6 Jumper

Clear RTC RAM (3-pin CLRTC_SW)

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

To erase the RTC RAM:

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



CROSSHAIR IV FORMULA Clear RTC RAM



- The clr CMOS switch will not function if the CLRTC_SW jumper is moved to the Disable position.
- Ensure to re-enter your previous BIOS settings after you clear the CMOS.
- You do not need to clear the RTC when the system hangs due to CPU overlocking. With the C.P.R. (CPU Parameter Recall) feature, shut down and reboot the system so the BIOS can automatically reset CPU parameter settings to default values.

2.7 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. Make sure that the motherboard external ports fit the I/O openings.



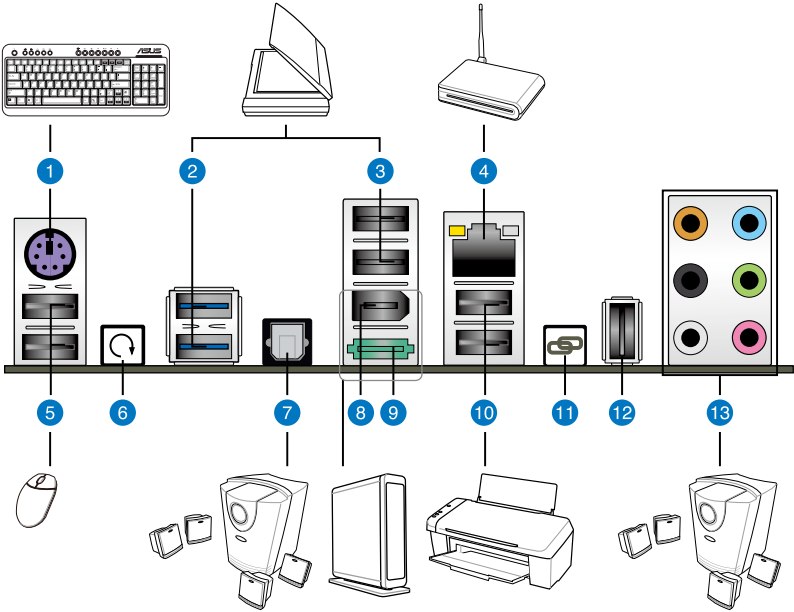
Be cautious when installing the motherboard. The I/O shield edge springs may damage the I/O ports.



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

2.8 Connectors

2.8.1 Rear panel connectors



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

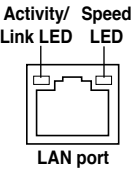
*and **: Refer to the tables on the next page for LAN port and audio port definitions.



- Press the Clear CMOS switch to clear BIOS setup information only when the system hangs due to overclocking.
- DO NOT insert a different connector to the external SATA port.

*** 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 |

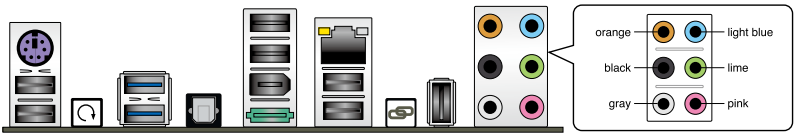


****Audio 2, 4, 6, or 8-channel configuration**

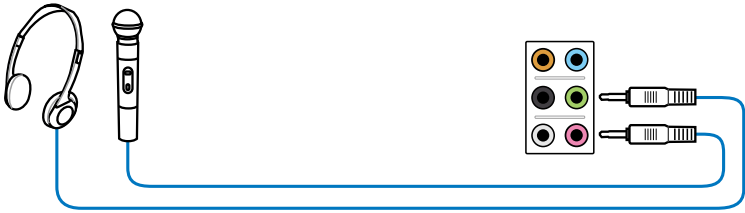
| Port | Headset 2-channel | 4-channel | 6-channel | 8-channel |
|------------|-------------------|-------------------|-------------------|-------------------|
| Light Blue | Line In | Line In | Line In | Line In |
| Lime | Line Out | Front Speaker Out | Front Speaker Out | Front Speaker Out |
| Pink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

2.8.2 Audio I/O connections

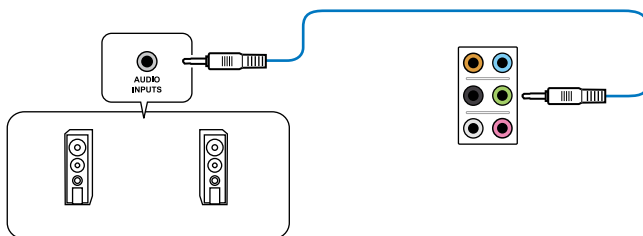
Audio I/O ports



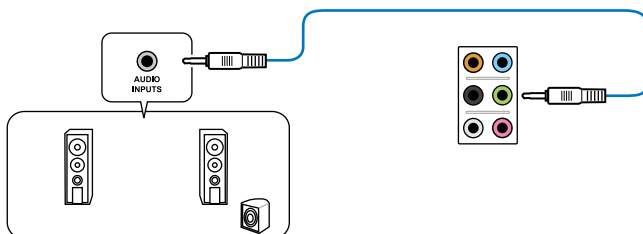
Connect to Headphone and Mic



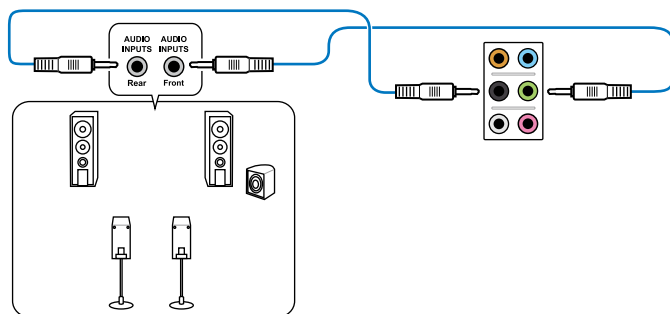
Connect to Stereo Speakers



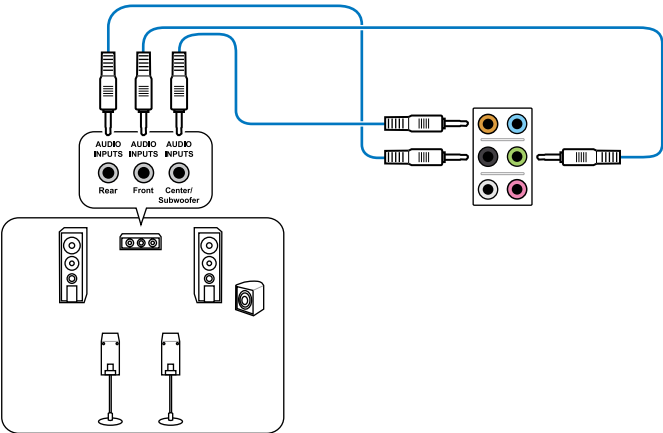
Connect to 2.1 channel Speakers



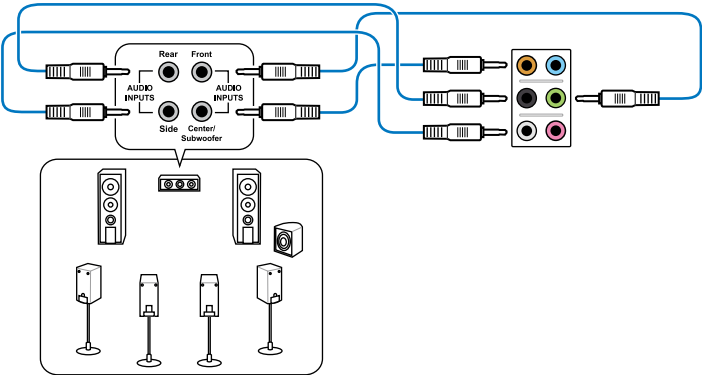
Connect to 4.1 channel Speakers



Connect to 5.1 channel Speakers



Connect to 7.1 channel Speakers



2.8.3 Internal connectors

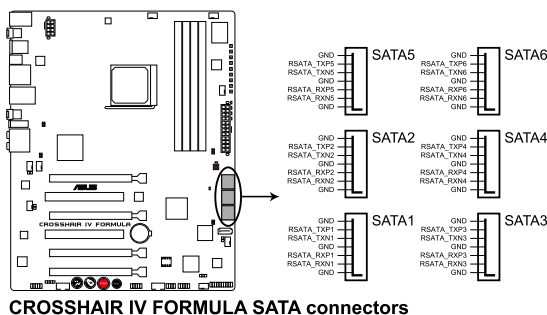
1. AMD® SB850 Serial ATA 6.0 Gb/s connectors (7-pin SATA 1-6)

These connectors are for the Serial ATA 6.0 Gb/s signal cables for Serial ATA hard disk drives and optical disc drives.

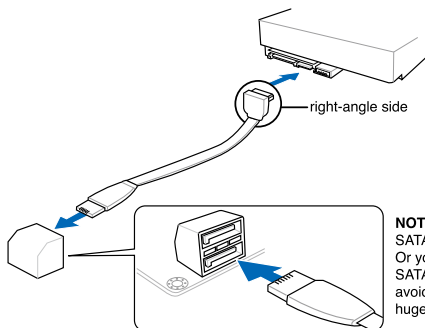
If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 5, or RAID 10 configuration through the onboard AMD® SB850 controller.



These connectors are set to [IDE] by default. If you intend to create a Serial ATA RAID set using these connectors, set the Onchip SATA Type item in the BIOS to [RAID].



CROSSHAIR IV FORMULA SATA connectors



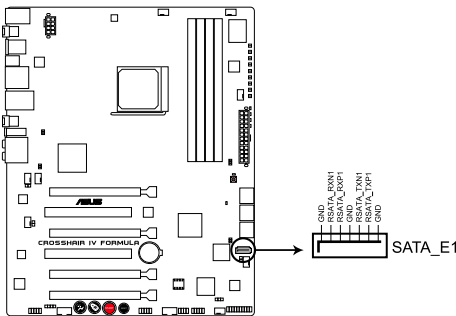
NOTE: Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.



- These connectors are set to IDE mode by default. In 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 OnChip SATA Type item in the BIOS to [RAID].
- You must install Windows® XP Service Pack 2 or later version before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP2 or later version.
- When using hot-plug and NCQ, set the OnChip SATA Type in the BIOS to [AHCI].

2. JMicron® JMB363 Serial ATA connectors (7-pin SATA_E1 [black])

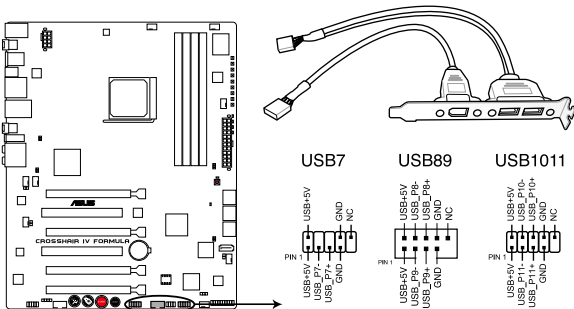
This connectors is for the Serial ATA signal cables for Serial ATA optical disk drives.



CROSSHAIR IV FORMULA SATA_E1 connector

3. USB connectors (10-3 pin USB7; 10-1 pin USB89; USB1011)

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



CROSSHAIR IV FORMULA USB2.0 connectors



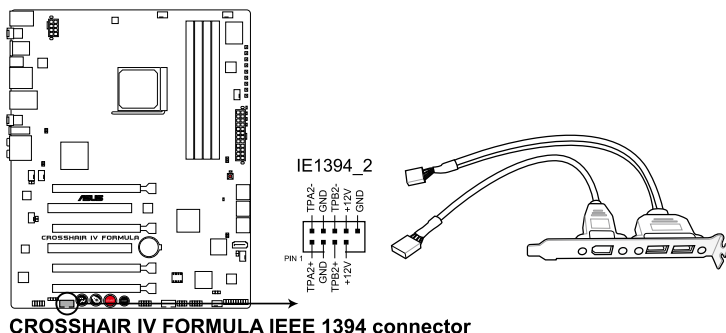
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



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

4. 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 FORMULA IEEE 1394 connector



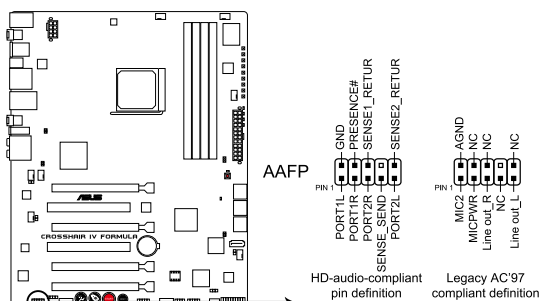
Never connect a USB cable to the IEEE 1394a connector. Doing so will damage the motherboard!



The IEEE 1394 cable is purchased separately.

5. 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 FORMULA Analog front panel connector



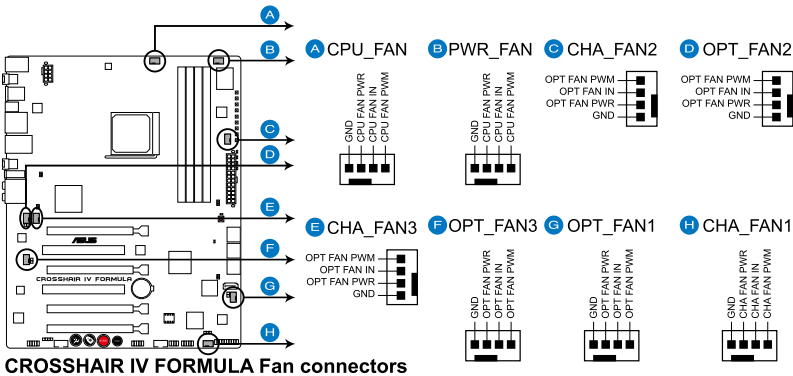
- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this connector, set the **Front Panel Type** item in the BIOS setup to [HD];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

6. 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.



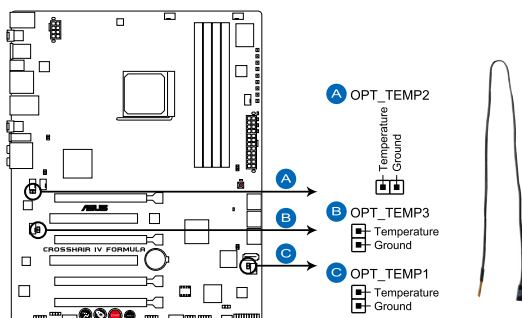
DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors!



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.

7. 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 FORMULA Thermal sensor cable connectors



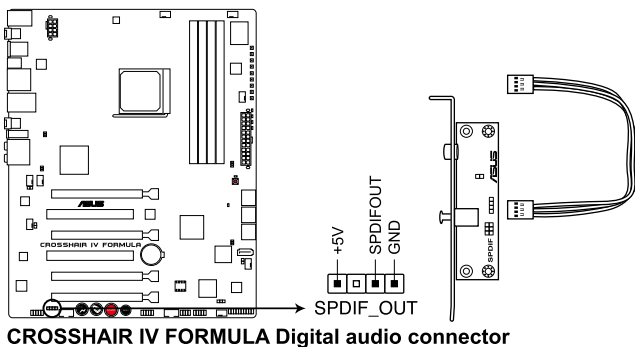
Enable **OPT FAN1/2/3 overheat protection** in BIOS if you connect thermal sensor cables to these connectors.



The thermal sensor cable is purchased separately.

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

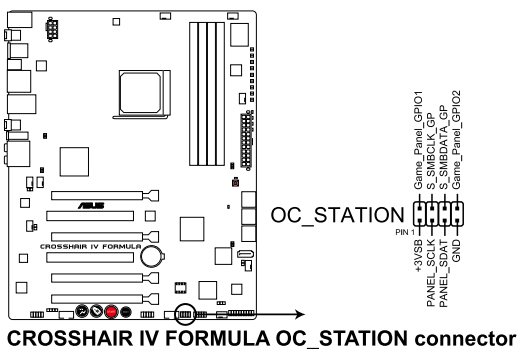
This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port(s). Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis.



The S/PDIF module is purchased separately.

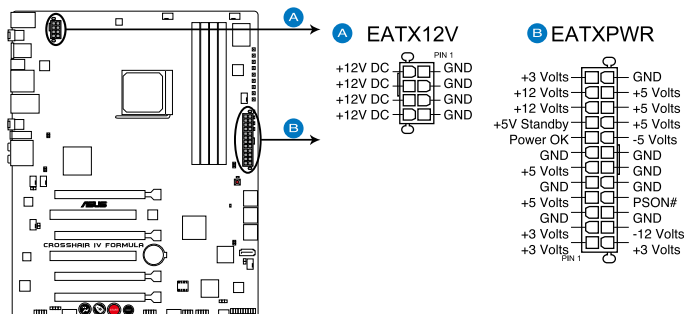
9. OC Station connector (8-pin OC_STATION)

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 USB13 on the motherboard to enjoy easier overclocking.



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

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



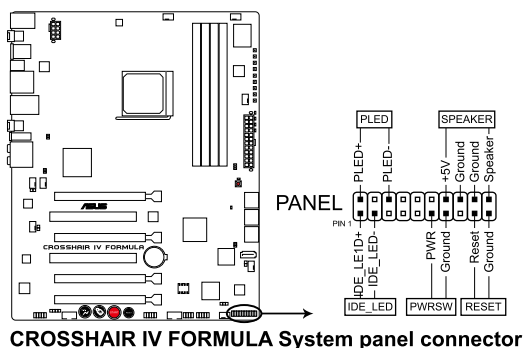
CROSSHAIR IV FORMULA ATX power connectors



- Ensure to remove the cap on the EATX12V connector before connecting an 8-pin EPS +12V power plug.
- Use only an 8-pin EPS +12V power plug for the EATX12V connector.
- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 600 W.
- Do not forget to connect the 8-pin EATX12 V power plug; otherwise, the system will not boot.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- If you are uncertain about the minimum power supply requirement for your system, refer to the Recommended Power Supply Wattage Calculator at <http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us> for details.

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

This connector supports several chassis-mounted functions.



- **System power LED (2-pin PLED)**

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

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

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

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

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

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

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

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

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

2.8.4 ASUS Q-Connector (system panel)

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

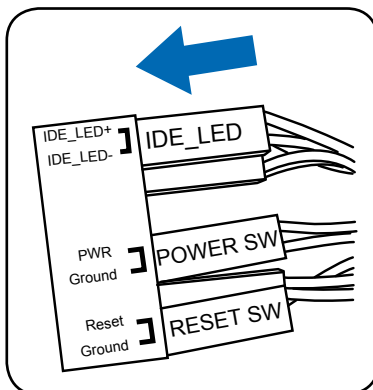
To install the ASUS Q-Connector:

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

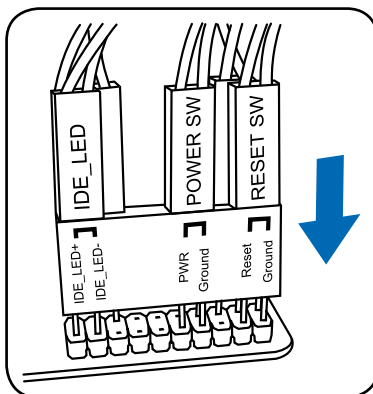
Refer to the labels on the Q-Connector to know the detailed pin definitions, and then match them to their respective front panel cable labels.



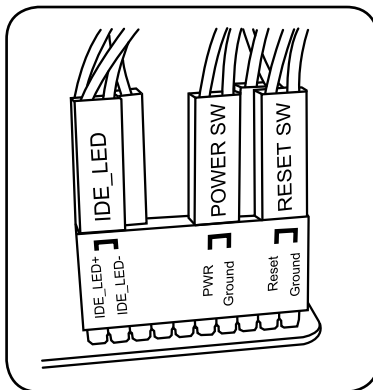
The labels on the front panel cables may vary depending on the chassis model.



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.

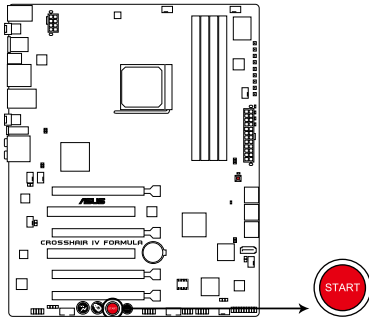


2.8.5 Onboard switches

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

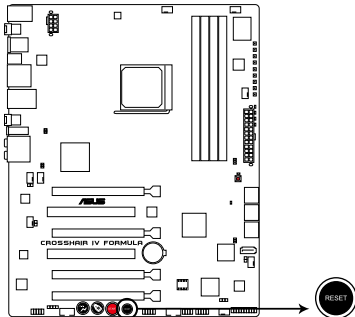
Press the power-on switch to wake/power up the system.



CROSSHAIR IV FORMULA Power on switch

2. Reset switch

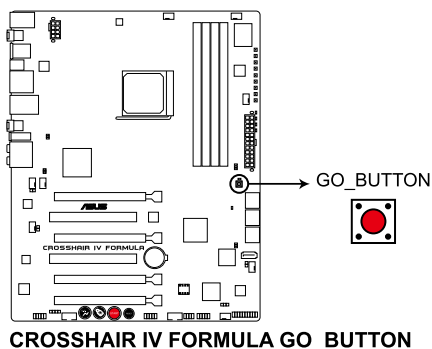
Press the reset switch to reboot the system.



CROSSHAIR IV FORMULA Reset switch

3. GO button

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

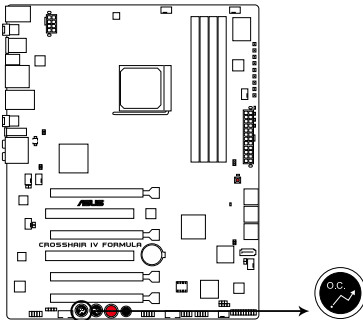


4. Turbo Key II switch

This switch allows you to auto-tune your CPU to enhance the system performance.



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



CROSSHAIR IV FORMULA TURBO KEY II switch



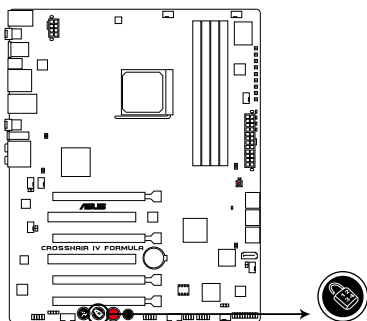
- If you clear the CMOS or load the BIOS setup defaults, the related overclocking items in the BIOS menu follow the current setting of the Turbo Key II switch.
- If you change the switch setting to Enable under the OS environment, the Turbo Key II function will be activated after the next system bootup.
- You may use the TurboV Auto Tuning, overclock in the BIOS setup program, and enable the Turbo Key II function at the same time. However, the system will use the last setting you have made.

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 FORMULA Core Unlocker switch

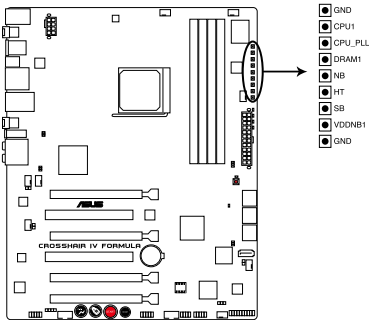


- You may also press <4> during the Power-On-Self-Test (POST) or enable the **ASUS Core Unlocker** item in the BIOS menu to activate the Core Unlocker function.
- The system will use the last setting you have made.
- If you clear the CMOS or load the BIOS setup defaults, the **ASUS Core Unlocker** item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

2.8.6 Probelts

The ROG Probelts 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 multimeter is employed for more accurate measurements during your busy overclocking work.

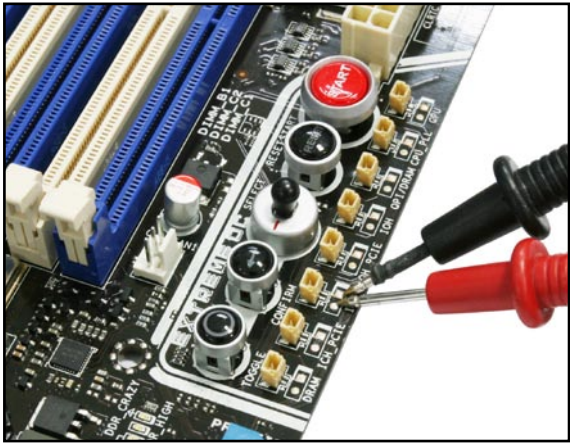
Refer to the following illustration for Probelts location.



CROSSHAIR IV FORMULA Probelts

Using Probelts

You may connect the multimeter to the motherboard as shown



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

2.9 Starting up for the first time

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

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

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

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

2.10 Turning off the computer

2.10.1 Using the OS shut down function

If you are using Windows® Vista™ / 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.

2.10.2 Using the dual function power switch

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

This image shows a full page of blank, lined paper. It features approximately 20 horizontal grey lines spaced evenly apart, typical of notebook paper. The lines extend across the entire width of the page, leaving small margins at the top and bottom. There are no vertical lines or other markings present.

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

BIOS setup 3

Chapter summary

3

| | | |
|-----|---------------------------------------|------|
| 3.1 | Managing and updating your BIOS | 3-1 |
| 3.2 | BIOS setup program | 3-6 |
| 3.3 | Extreme Tweaker menu | 3-9 |
| 3.4 | Main menu | 3-16 |
| 3.5 | Advanced menu | 3-21 |
| 3.6 | Power menu | 3-30 |
| 3.7 | Boot menu | 3-36 |
| 3.8 | Tools menu | 3-40 |
| 3.9 | Exit menu | 3-44 |

3.1 Managing and updating your BIOS

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

1. **ASUS Update** (Updates the BIOS in Windows® environment.)
2. **ASUS EZ Flash 2** (Updates the BIOS using a floppy disk or USB flash disk.)
3. **ASUS 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.

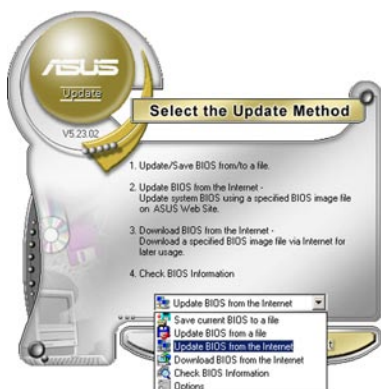
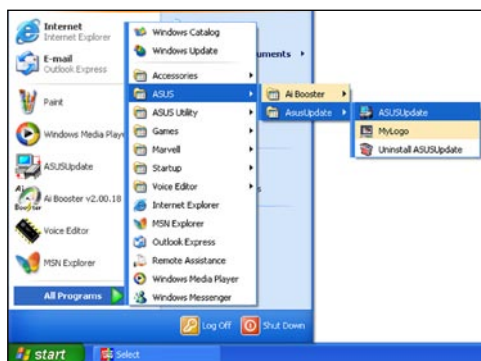


Quit all Windows® applications before you update the BIOS using this utility.

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**.

- From the FTP site, select the BIOS version that you wish to download. Click **Next**.
- Follow the screen instructions to complete the update process.



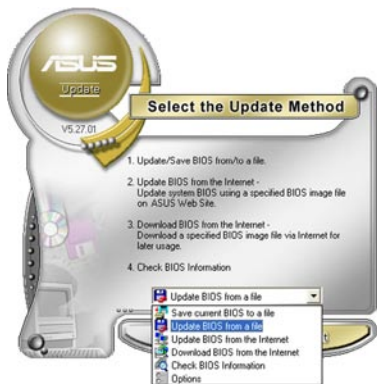
The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.



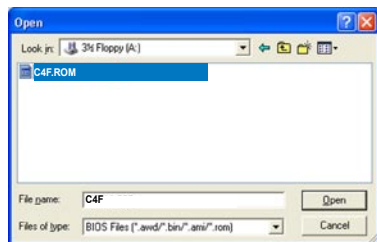
Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

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



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



3.1.2 ASUS EZ Flash 2 utility

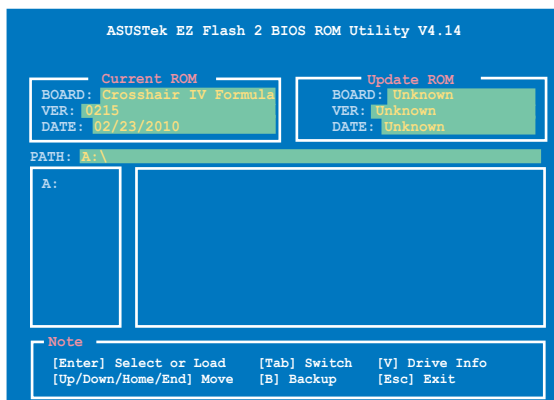
The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use a DOS-based utility. The EZ Flash 2 utility is built in the BIOS chip so it is accessible by pressing <Alt> + <F2> during the Power-On Self Tests (POST).



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 during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

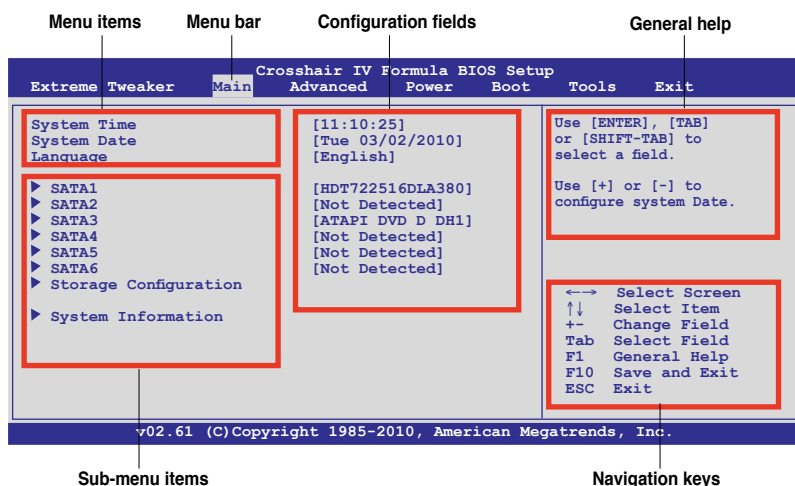
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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

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

3.2.3 Navigation keys

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



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

3.2.4 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 item has a submenu. To display the submenu, select the item and press <Enter>.

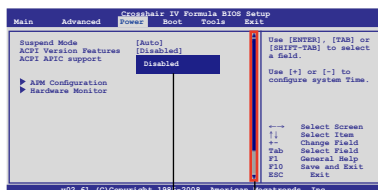
3.2.6 Configuration fields

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.

Scroll bar
Pop-up window

3.3 Extreme Tweaker menu

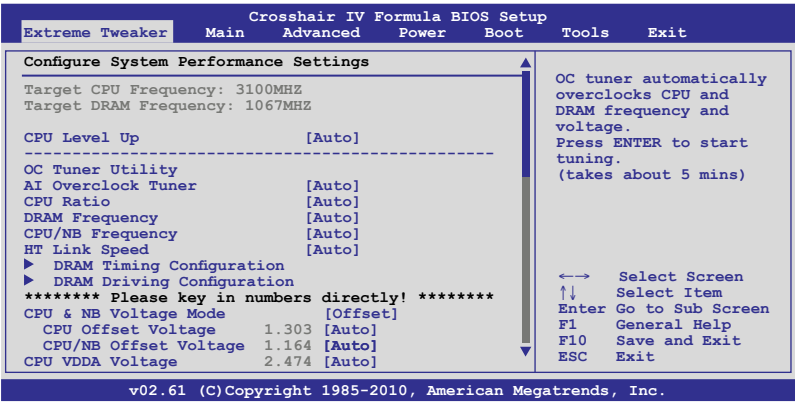
The Extreme Tweaker menu items allow you to configure overclocking-related items.



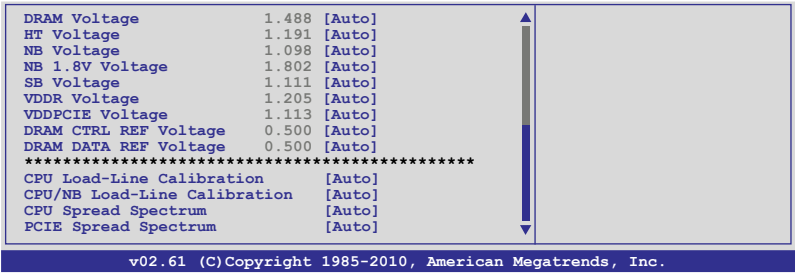
Take caution when changing the settings of the **Extreme Tweaker** menu items. Incorrect field values can cause the system to malfunction.



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.



- The configuration options vary depending on the CPU model you install on the motherboard.
- The CPU Level UP function support depends on CPU types.

3.3.2 OC Tuner Utility

OC Tuner utility automatically overclocks the frequency and voltage of the CPU and DRAM. Press <Enter> to start auto tuning. It takes around five minutes, and the system will reboot for several times until auto tuning is completed.

3.3.3 Ai Overclock Tuner [Auto]

Allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. Select any of these 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 O.C. profile, and the related parameters will be adjusted automatically. |
| CPU Level UP | Allows you to select a CPU level, and the related parameters will be adjusted automatically. |



The configuration options for the following sub-items vary depending on the CPU/DIMMs you install on the motherboard.

OC From CPU Level UP [Auto]

This item appears only when you set the **Ai Overclock Tuner** item to [Manual] and allows you to select a CPU level. The related parameters will be automatically adjusted according to the selected CPU level.

CPU Bus Frequency [XXX]

This item appears only when you set the **Ai Overclock Tuner** item to [Manual] and displays the frequency sent by the clock generator to the system bus and PCI bus. Use the <+> and <-> keys to adjust the CPU Bus frequency. You can also key in the desired frequency using the numeric keypad. The values range from 100 to 600.

PCIE Frequency [XXX]

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

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

This item appears only when you set the **Ai Overclock Tuner** item to [D.O.C.P.] and allows you to select a DRAM O.C. profile, which applies different settings to DRAM frequency, DRAM timing and DRAM voltage. Configuration options: [DDR3-1600MHz] [DDR3-1800MHz] [DDR3-1866MHz] [DDR3-2000MHz]

Profile Info : xxxxMHz-x-x-x-xx

This item appears only when you set the **Ai Overclock Tuner** item to [D.O.C.P.] and displays the current DRAM profile information. The profile information varies according to the **DRAM O.C. Profile** you've selected.

3.3.4 CPU Ratio [Auto]

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

3.3.5 DRAM Frequency [Auto]

Allows you to set the DDR3 operating frequency. The configuration options vary with the **CPU Bus Frequency** item settings.



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

3.3.6 CPU/NB Frequency [Auto]

Allows you to select the CPU/NB frequency.

Configuration options: [Auto] [1200MHz] [1400MHz] [1600MHz] [1800MHz] [2000MHz]

3.3.7 HT Link Speed [Auto]

Allows you to select the HyperTransport link speed.

Configuration options: [Auto] [200MHz] [400MHz] [600MHz] [800MHz] [1000MHz] [1200MHz] [1400MHz] [1600MHz] [1800MHz] [2000MHz]

3.3.8 DRAM Timing Configuration



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

DRAM CAS# Latency [Auto]

Configuration options: [Auto] [4 CLK] – [12 CLK]

DRAM RAS# to CAS# Delay [Auto]

Configuration options: [Auto] [5 CLK] – [12 CLK]

DRAM RAS# PRE Time [Auto]

Configuration options: [Auto] [5 CLK] – [12 CLK]

DRAM RAS# ACT Time [Auto]

Configuration options: [Auto] [15 CLK] – [30 CLK]

DRAM READ to PRE Time [Auto]

Configuration options: [Auto] [4 CLK] [5 CLK] [6 CLK] [7 CLK]

DRAM Row Cycle Time [Auto]

Configuration options: [Auto] [11 CLK] – [41 CLK]

DRAM WRITE Recovery Time [Auto]

Configuration options: [Auto] [5 CLK] [6 CLK] [7 CLK] [8 CLK] [10 CLK] [12 CLK]

DRAM RAS# to RAS# Delay [Auto]

Configuration options: [Auto] [4 CLK] [5 CLK] [6 CLK] [7 CLK]

DRAM READ to WRITE Delay [Auto]

Configuration options: [Auto] [3 CLK] – [17 CLK]

DRAM WRITE to READ Delay(DD) [Auto]

Configuration options: [Auto] [2 CLK] – [10 CLK]

DRAM WRITE to READ Delay(SD) [Auto]

Configuration options: [Auto] [4 CLK] [5 CLK] [6 CLK] [7 CLK]

DRAM WRITE to WRITE Timing [Auto]

Configuration options: [Auto] [3 CLK] – [10 CLK]

DRAM READ to READ Timing [Auto]

Configuration options: [Auto] [3 CLK] – [10 CLK]

DRAM REF Cycle Time [Auto]

Configuration options: [Auto] [90ns] [110ns] [160ns] [300ns] [350ns]

DRAM Refresh Rate [Auto]

Configuration options: [Auto] [Every 7.8ms] [Every 3.9ms]

DRAM Command Rate [Auto]

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

3.3.9 DRAM Driving Configuration



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

CKE drive strength [Auto]

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

CS/ODT drive strength [Auto]

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

ADDR/CMD drive strength [Auto]

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

MEMCLK drive strength [Auto]

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

Data drive strength [Auto]

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

DQS drive strength [Auto]

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

Processor ODT [Auto]

Configuration options: [Auto] [240 ohms +/- 20%] [120 ohms +/- 20%] [60 ohms +/- 20%]



Some of the following items are adjusted by typing the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

3.3.10 CPU & NB Voltage Mode [Offset]

Allows you to set the CPU & CPU/NB Voltage Mode. Different sub-items appear according to the **CPU & NB Voltage Mode** item setting. Configuration options: [Offset] [Manual]

CPU Offset Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Offset] and allows you to set the CPU Offset voltage. The values range from 0.006250V to 0.700000V with a 0.006250V interval.

CPU/NB Offset Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Offset] and allows you to set the CPU/NB Offset voltage. The values range from 0.006250V to 0.700000V with a 0.006250V interval.

CPU Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Manual] and allows you to set a fixed CPU voltage.

CPU/NB Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Manual] and allows you to set a fixed CPU/NB voltage.

3.3.11 CPU VDDA Voltage [Auto]

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

3.3.12 DRAM Voltage [Auto]

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

3.3.13 HT Voltage [Auto]

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

3.3.14 NB Voltage [Auto]

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

3.3.15 NB 1.8V Voltage [Auto]

Allows you to set the Northbridge 1.8V voltage. The values range from 1.802000V to 3.007750V with a 0.013250V interval.

3.3.16 SB Voltage [Auto]

Allows you to set the Southbridge voltage. The values range from 1.113000V to 1.802000V with a 0.013250V interval.

3.3.17 VDDR Voltage [Auto]

Allows you to set the VDDR voltage. The values range from 1.205750V to 1.802000V with a 0.013250V interval.

3.3.18 VDDPCIE Voltage [Auto]

Allows you to set the VDDPCIE voltage. The values range from 1.113000V to 2.000750V with a 0.013250V interval.



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

3.3.19 DRAM CTRL REF Voltage [Auto]

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

3.3.20 DRAM DATA REF Voltage [Auto]

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

3.3.21 CPU Load-Line Calibration [Auto]

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

3.3.22 CPU/NB Load-Line Calibration [Auto]

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

3.3.23 CPU Spread Spectrum [Auto]

| | |
|------------|--|
| [Auto] | Automatic configuration. |
| [Disabled] | Enhances the CPU overclocking ability. |
| [Enabled] | Sets to [Enabled] for EMI control. |

3.3.24 PCIE Spread Spectrum [Auto]

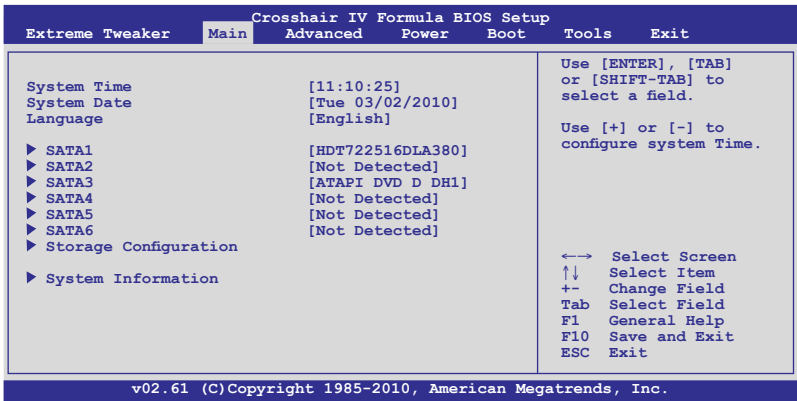
| | |
|------------|---|
| [Auto] | Automatic configuration. |
| [Disabled] | Enhances the PCIE overclocking ability. |
| [Enabled] | Sets to [Enabled] for EMI control. |

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.

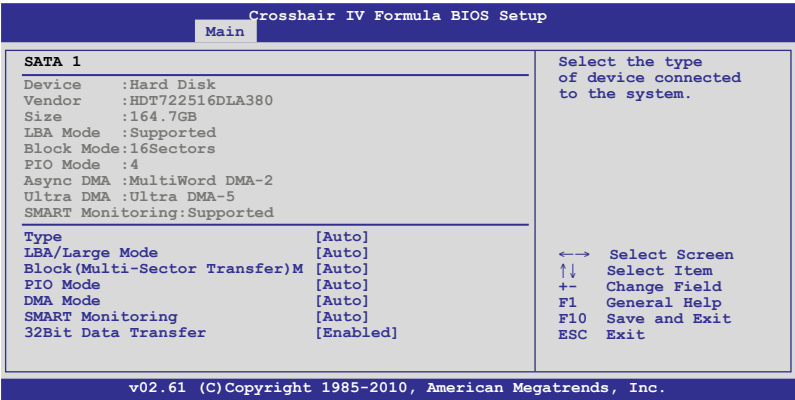
3.4.3 Language [English]

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

Configuration options: [繁體中文] [簡體中文] [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.

Type [Auto]

Allows you to select the type of device installed.

- [Not Installed] Select this option if no device is installed.
- [Auto] Allows automatic selection of the appropriate device type.
- [CDROM] Select this option if you are specifically configuring a CD-ROM drive.
- [ARMD] Select [ARMD] (ATAPI Removable Media Device) if your device is either a ZIP, LS-120, or MO drive.



This item appears in **SATA 5/SATA 6** only.

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.

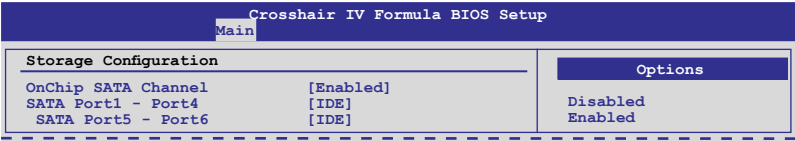
32Bit Data Transfer [Enabled]

[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 Channel [Enabled]

[Enabled] Enables the onboard channel SATA port.

[Disabled] Disables the onboard channel SATA port.



The following two items appear only when you set the **OnChip SATA Channel** item to [Enabled].

SATA Port1–Port4 [IDE]

Allows you to set the SATA configuration.

[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 (Advanced 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]

Setting this item to [IDE] instead of [RAID] or [AHCI] allows the system to recognize the optical drives connected to the SATA connectors 5 or 6 when installing OS.



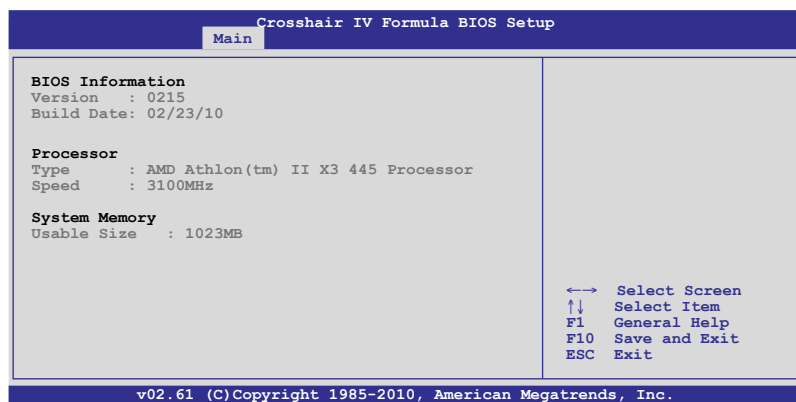
- When the **SATA Port1–Port 4** and the **SATA Port5–Port 6** items are set to [AHCI], the information of the SATA connectors 1–6 can be seen only under the OS environment or during POST.
- For Windows® XP OS, you have to install the AHCI driver, so that you could use the SATA connectors 1–6 in AHCI mode under the OS environment.



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

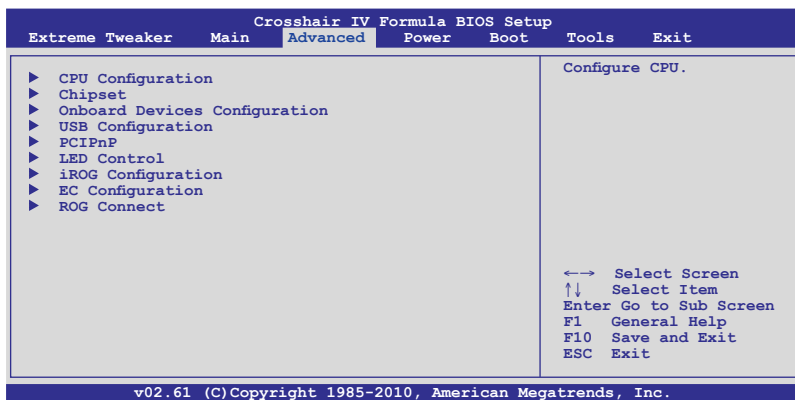
3.4.6 System Information

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.

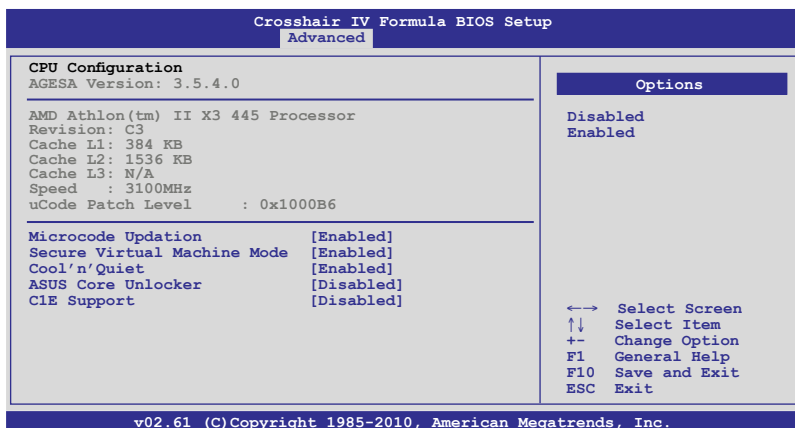


3.5.1 CPU Configuration

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] Enables the microcode updation.

[Disabled] Disables this function.

Secure Virtual Machine [Enabled]

[Enabled] Enables the AMD Secure Virtual Machine.

[Disabled] Disables this function.

Cool'n'Quiet [Enabled]

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

[Disabled] Disables this function.

ASUS Core Unlocker [Disabled]

[Enabled] Enables the ASUS Core Unlocker to get the full computing power of the processor.

[Disabled] Disables this function.

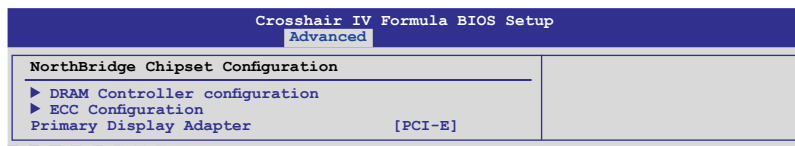
C1E Support [Disabled]

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

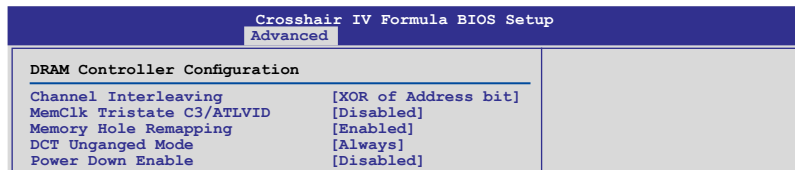
[Disabled] Disables this function.

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 [XOR of Address bit]

Configuration options: [Disabled] [Address bits 6] [Address bits 12]
[XOR of Address bits [20:16, 6]] [XOR of Address bits [20:16, 9]]

MemClk Tristate C3/ATLVID [Disabled]

Configuration options: [Disabled] [Enabled]

Memory Hole Remapping [Enabled]

Configuration options: [Disabled] [Enabled]

DCT Unganged Mode [Always]

Configuration options: [Auto] [Always]

Power Down Enable [Disabled]

Enables or disables the DDR power down mode.

Configuration options: [Disabled] [Enabled]

Power Down Mode [Channel]

This item appears only when you enable the previous item and allows you to set the DDR power down mode. Configuration options: [Channel] [Chip Select]

ECC Configuration

| Crosshair IV Formula BIOS Setup | |
|---|------------|
| Advanced | |
| ECC Configuration | |
| ECC Mode | [Disabled] |
| DRAM ECC Enable | [Disabled] |
| DRAM SCRUB REDIRECT | [Disabled] |
| 4-Bit ECC Mode | [Disabled] |
| DRAM BG Scrub | [Disabled] |
| Data Cache BG Scrub | [Disabled] |
| L2 Cache BG Scrub | [Disabled] |
| L3 Cache BG Scrub | [Disabled] |
| Set the level of ECC protection. Note: The 'Super' ECC mode dynamically sets the DRAM scrub rate so all of memory is scrubbed in 8 hours. | |

ECC Mode [Disabled]

Disables or sets the DRAM ECC mode that allows the hardware to report and correct memory errors.

[Disabled] Disables the DRAM ECC mode.

[Basic] Set to [Basic] to adjust ECC mode automatically.

[Good] Set to [Good] to adjust ECC mode automatically.

[Super] Set to [Super] to adjust the **DRAM BG Scrub** sub-item manually.

[Max] Set to [Max] to adjust ECC mode automatically.

[User] Set to [User] to adjust all the subitems manually.



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 [Disabled]

Disables or sets the DRAM BG Scrub.

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]

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 to use as the primary boot device.

Configuration options: [PCI-E] [PCI]

3.5.3 Onboard Device Configuration

| Crosshair IV Formula BIOS Setup | |
|---------------------------------|------------|
| Advanced | |
| Onboard Devices Configuration | |
| Onboard Device | [Standard] |
| HD Audio Azalia Device | [Enabled] |
| Front Panel Type | [HD] |
| SPDIF OUT Type | [SPDIF] |
| Onboard LAN | [Enabled] |
| Onboard LAN Boot ROM | [Disabled] |
| Onboard 1394 Controller | [Enabled] |
| Onboard ATA Controller | [Enabled] |
| Onboard ATA Controller ROM | [Enabled] |
| Onboard USB 3.0 Controller | [Enabled] |

Get your best overclocking record! "Onboard Device" is to disable all the unnecessary devices when you want to reach your best overclocking record. But it will keep 1 lan port alive to submit your score.

Onboard Devices [Standard]

[Standard] Enables standard onboard devices.

[Disabled] Disables all onboard devices except the LAN controller.

HD Audio Azalia Device [Enabled]

[Enabled] Enables the High Definition Audio Controller.

[Disabled] Disables the controller.

Front Panel Type [HD]

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

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

SPDIF OUT Type [SPDIF]

[SPDIF] Sets to [SPDIF Output] for SPDIF audio output.

[HDMI] Sets to [HDMI Output] for HDMI audio output.

Onboard Lan [Enabled]

Allows you to enable or disable the LAN controller.

Configuration options: [Enabled] [Disabled]

Onboard LAN Boot ROM [Disabled]

This item appears only when you enable the previous item.

[Enabled] Enables the onboard LAN Boot ROM.

[Disabled] Disables the onboard LAN Boot ROM.

Onboard 1394 Controller [Enabled]

[Enabled] Enables the onboard 1394 Controller.

[Disabled] Disables the controller.

Onboard ATA Controller [Enabled]

[Enabled] Enables the onboard ATA controller.

[Disabled] Disables the controller.

Onboard ATA Controller ROM [Enabled]

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

[Enabled] Enables the onboard ATA controller ROM.

[Disabled] Disables the onboard ATA controller ROM.

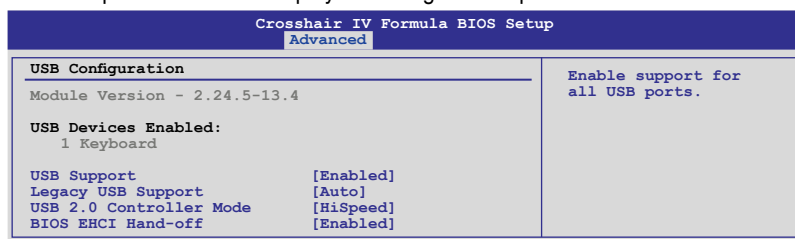
Onboard USB 3.0 Controller [Enabled]

[Enabled] Enables the 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 the USB Host Controllers.

[Disabled] Disables the controllers.



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

Legacy USB Support [Auto]

[Disabled] Disables the function.

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

[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.

USB 2.0 Controller Mode [HiSpeed]

[FullSpeed] Set the USB 2.0 controller mode to FullSpeed (12 Mbps).

[HiSpeed] Set the USB 2.0 controller mode to HiSpeed (480 Mbps).



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

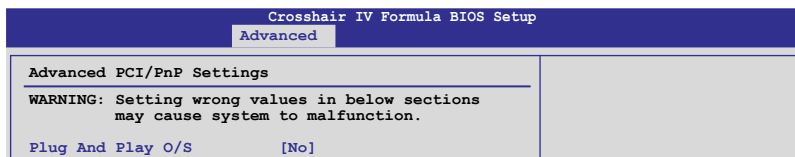
BIOS EHCI Hand-off [Enabled]

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

[Disabled] Disables the function.

3.5.5 PCIPnP

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

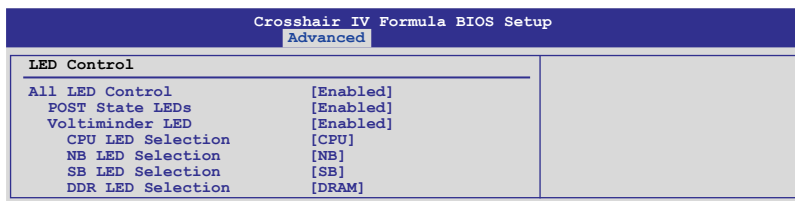


Plug And Play O/S [No]

[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



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].

POST State LEDs [Enabled]

[Enabled] Turn on onboard device LEDs in the order of the device POST sequence.

[Disabled] Disables this function.

Voltiminder LED [Enabled]

Allows you to enable or disable the onboard Voltiminder LED.

Configuration options: [Enabled] [Disabled]

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 northbridge LED display.

Configuration options: [NB] [NB 1.8V] [VDDPCIE]

SB LED Selection [SB]

Allows you to switch the onboard southbridge LED display.

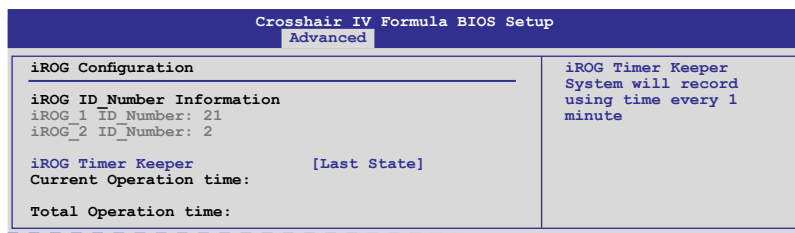
Configuration options: [SB] [HT]

DDR LED Selection [DRAM]

Allows you to switch the onboard DDR LED display.

Configuration options: [DRAM] [VDDR]

3.5.7 iROG Configuration



iROG Timer Keeper [Last State]

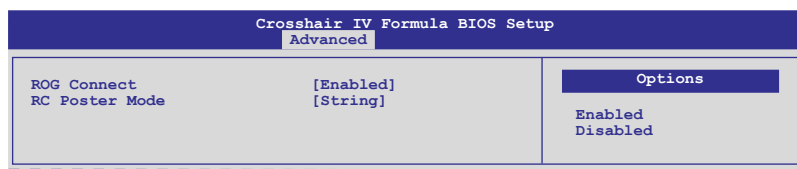
Allows you to set the iROG Time Keeper operation mode.

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

3.5.8 EC Configuration

Shows EC BIOS information. This item is not user-configurable.

3.5.9 ROG Connect



ROG Connect [Enabled]

Allows you to enable or disable the ROG Connect function.

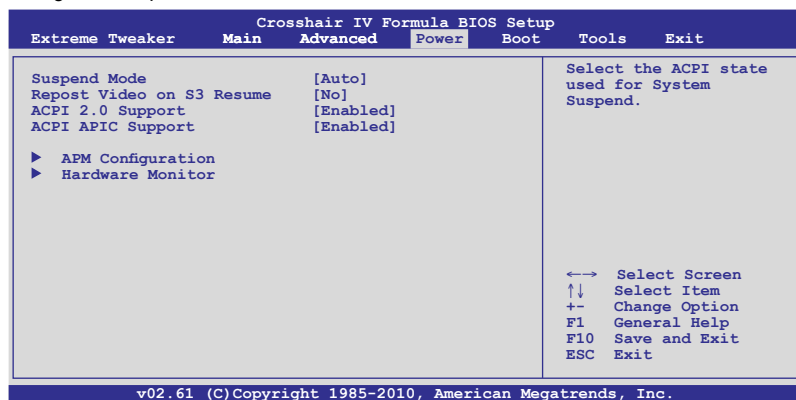
Configuration options: [Enabled] [Disabled]

RC Poster Mode [String]

Allows you to select the RC Poster mode. 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 ACPI suspend mode to S1/POS (Power On Suspend).

[S3 only] Sets the ACPI 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] The system will not invoke VGA BIOS POST on S3/STR resume.

[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

| Crosshair IV Formula BIOS Setup | | |
|---------------------------------|--|-------------|
| | | Power |
| APM Configuration | | |
| EuP Ready | | [Disabled] |
| Restore on AC Power Loss | | [Power Off] |
| Power On By PCI/PCIE Device | | [Disabled] |
| Power On By PS/2 Devices | | [Disabled] |
| Power On By Ring | | [Disabled] |
| Power On By RTC Alarm | | [Disabled] |

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 Device [Disabled]

[Disabled] Disables the PME to wake up from S5 by PCI/PCIE devices.

[Enabled] Allows you to turn on the system through a PCI/PCIE LAN or modem card. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Power On By PS/2 Devoces [Disabled]

[Disabled] Disables the Power On by a PS/2 devices.

[Enabled] Enables the Power On by a PS/2 devices. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Power On By Ring [Disabled]

[Disabled] Disables to power up the computer when the external modem receives a call while the computer is in Soft-off mode.

[Enabled] The computer could be powered up when the external modem receives a call while the computer is in Soft-off mode.



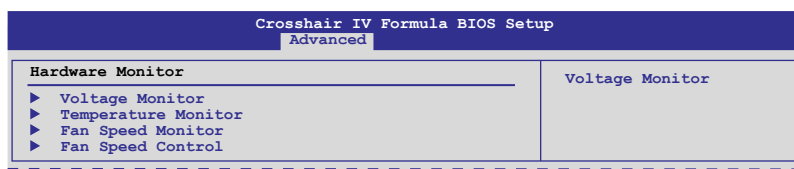
The computer cannot receive or transmit data until the computer and applications are fully running. Thus, connection cannot be made on the first try. Turning an external modem off and then back on while the computer is off causes an initialization string that turns the system power on.

Power On By RTC Alarm [Disabled]

[Disabled] Disables RTC to generate a wake event.

[Enabled] When set to [Enabled], the items **RTC Alarm Date (Days)** and **RTC Alarm Time (HH:MM:SS)** 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 Temperature [xxx°C/xxx°F]

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

MB overheat Protection [90°C]

SB overheat Protection; NB overheat protection [100°C]

The system automatically shuts down when the motherboard, northbridge or southbridge chipset is heated over the set temperature to protect it from damage. Configuration options: [Disabled] [70°C] [80°C] [90°C] [100°C]

OPT TEMP 1/2/3 Overheat Protection [90°C]

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

Configuration options: [Disabled] [70°C] [80°C] [90°C] [100°C]

Fan Speed Monitor

CPU Fan; Power Fan; Chassis Fan 1/2/3; OPT Fan 1/2/3 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

| Crosshair IV Formula BIOS Setup | | |
|---------------------------------|------------|---|
| Power | | |
| Fan Speed Control | | |
| CPU Q-Fan Function | [Disabled] | Disable/Enable Q-Fan functions of CPU fan |
| Chassis Q-Fan Function | [Disabled] | |
| Power Fan Control | [Disabled] | |
| OPT Fan 1 Control | [Disabled] | |
| OPT Fan 2 Control | [Disabled] | |
| OPT Fan 3 Control | [Disabled] | |

CPU 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 items appear only when you set **CPU Q-Fan Function** to [Enabled].

CPU Fan Speed Low Limit [200 RPM]

A warning message will appear to remind you that the CPU fan speed is lower than the selected value.

Configuration options: [500RPM] [400RPM] [300RPM] [200RPM] [100RPM] [Ignored]

Select Fan Type: [PWM Fan]

[PWM Fan] Sets to [PWM Fan] when using a 4-pin CPU fan.

[DC Fan] Sets to [DC Fan] when using a 3-pin CPU fan.

CPU Q-Fan Mode [Silent]

- [Performance] Sets to [Performance] to achieve maximum CPU fan speed.
[Optimal] Sets to [Optimal] to make the CPU 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 assign detailed fan speed control parameters.

Chassis Q-Fan Function [Disabled]

Allows you to enable or disable the Chassis fan controller.

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



The following items appear only when you set **Chassis Q-Fan Function** to [Enabled].

Chassis Fan Speed Low Limit [200 RPM]

A warning message will appear to remind you that the CPU fan speed is lower than the selected value.

Configuration options: [500RPM] [400RPM] [300RPM] [200RPM] [100RPM]
[Ignored]

Chassis Q-Fan Mode [Silent]

- [Performance] Sets to [Performance] to achieve maximum Chassis fan speed.
[Optimal] Sets to [Optimal] 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 assign detailed fan speed control parameters.

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.

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 Fan 1/2/3 Duty** item. If you set this item to [User Mode], you are allowed to configure the **OPT Fan 1/2/3 Low Speed Temp** and **OPT Fan 1/2/3 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 [50%]

Allows you to set the fan duty cycle. This item appears when the **OPT Fan 1/2/3 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 **OPT Fan 1/2/3 Control** item is set to [User Mode].

Configuration options: [25°C] [30°C] [35°C] [40°C]

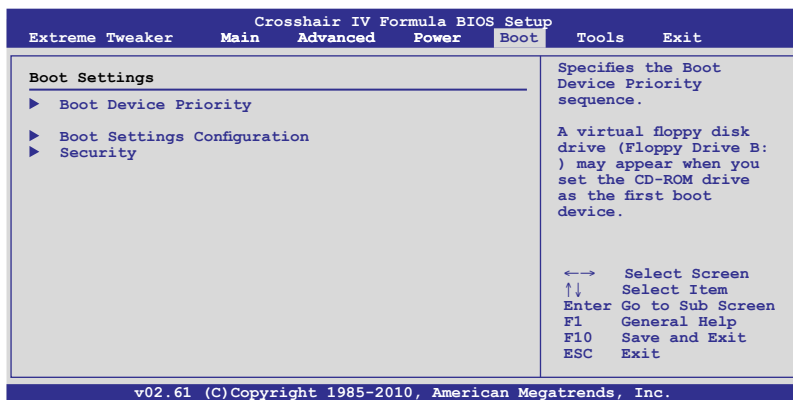
OPT Fan 1/2/3 Full Speed Temp [60°C]

Allows you to set the temperature at which the power fan rotates at full speed. This item appears when the **OPT Fan 1/2/3 Control** item is set to [User Mode].

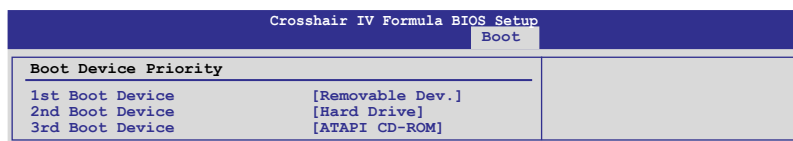
Configuration options: [60°C] [70°C] [80°C] [90°C]

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.



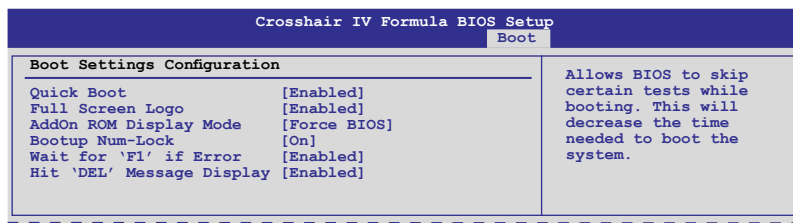
3.7.1 Boot Device Priority



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]

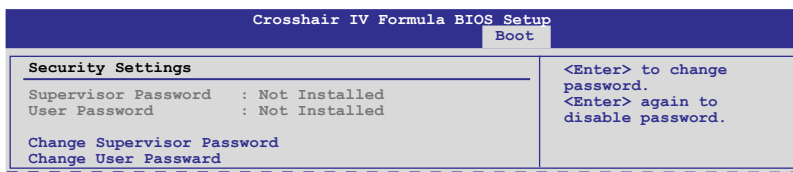
When set to [Enabled], the system waits for the <F1> key to be pressed when error occurs.

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, key in 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.

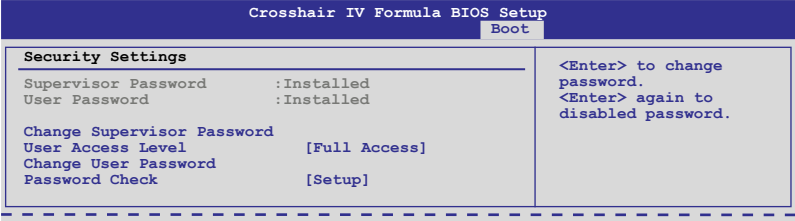
To clear the supervisor password, select the **Change Supervisor Password** then press <Enter>. The message **Password Uninstalled** appears.



If you have forgotten 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.

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.

- [No Access] Prevents user access to the Setup utility.
- [View Only] Allows access but does not allow change to any field.
- [Limited] Allows changes only to selected fields, such as Date and Time.
- [Full Access] Allows viewing and changing all the fields in the Setup utility.

Change User Password

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

To set a User Password:

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

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

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

Clear User Password

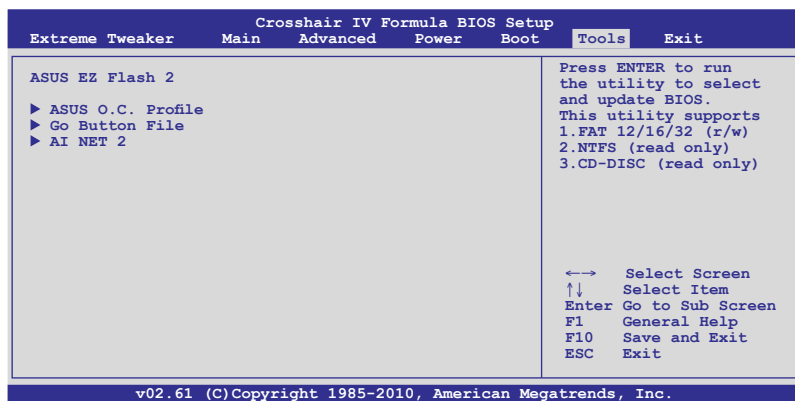
Select this item to clear the user password.

Password Check [Setup]

- [Setup] BIOS checks for user password when accessing the Setup utility.
- [Always] BIOS checks for user password both when accessing Setup and booting the system.

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.

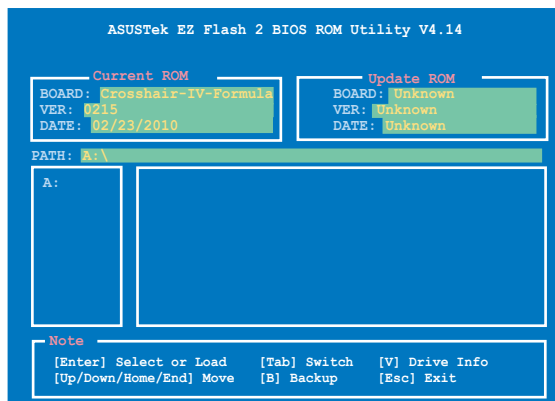


3.8.1 ASUS EZ Flash 2

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.

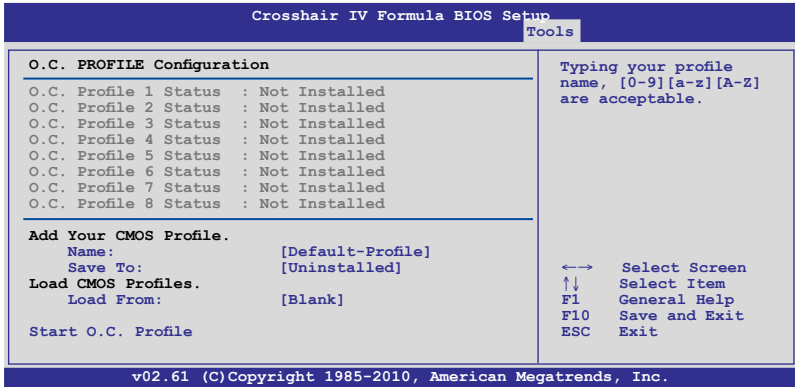


For more details, refer to **section 3.1.2 ASUS EZ Flash 2 utility**.



3.8.2 ASUS O.C. Profile

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



Add Your CMOS Profile

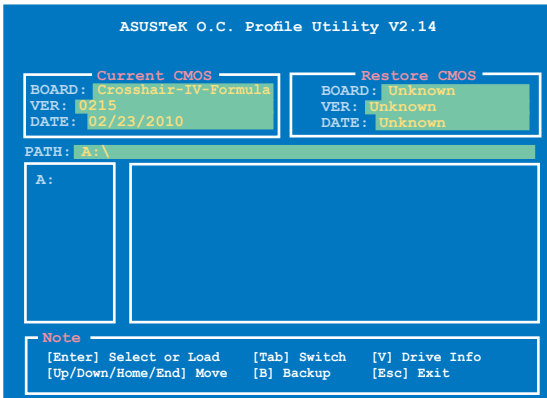
Allows you to save the current BIOS file to the BIOS Flash. In the Name sub-item, type your profile name and press <Enter>, and then choose a profile number to save your CMOS settings in the Save to sub-item.

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.

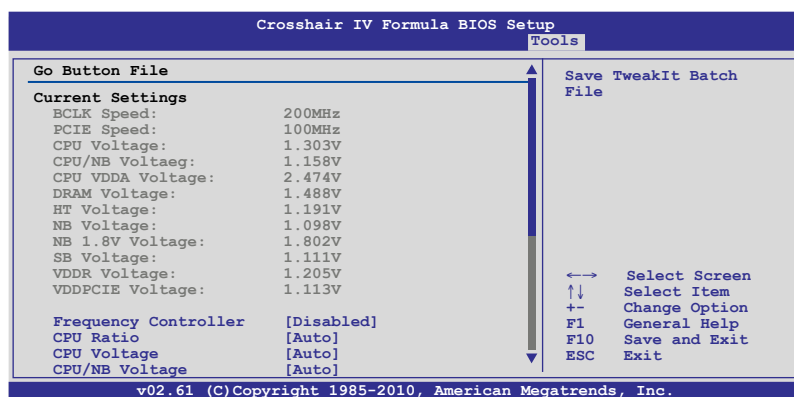




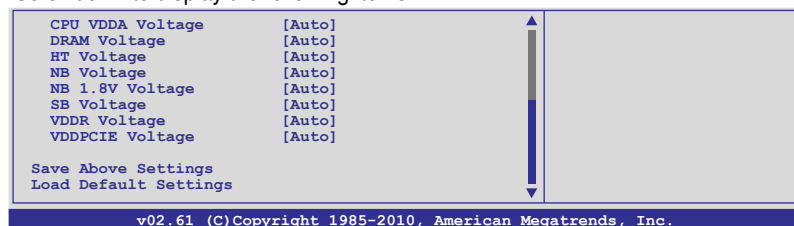
- This function supports devices such as a USB flash disk (FAT 32/16 format) or a floppy disk with single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent the system boot failure!
- We recommend that you update the BIOS file only coming from the same memory/CPU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

3.8.3 Go Button File

This menu allows you to set and save system parameters, which will be loaded when pressing the Go Button.



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; NB 1.8V 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.

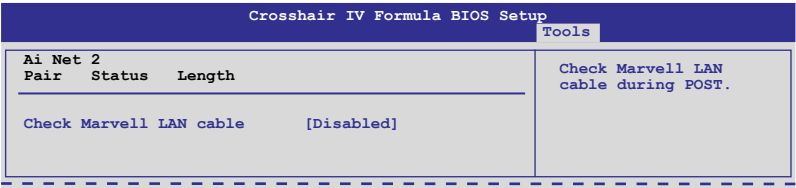
Save Above Settings

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

Load Default Settings

Allows you to load the default system settings.

3.8.4 AI NET 2

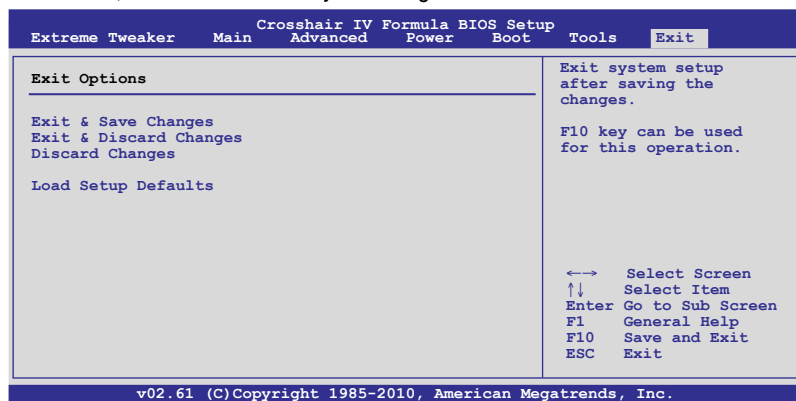


Check Marvell LAN cable [Disabled]

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

3.9 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 | 4-1 |
| 4.2 | Support DVD information | 4-1 |
| 4.3 | Software information | 4-7 |
| 4.4 | RAID configurations | 4-28 |
| 4.5 | Creating a RAID driver disk..... | 4-33 |

4.1 Installing an operating system

This motherboard supports Windows® XP/ 64-bit XP/ Vista / 64-bit Vista / 7 / 64-bit 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.

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

The Make Disk menu contains items to create the RAID/AHCI driver disk.

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


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

Click an item to install

Click to obtain the corresponding software manuals

Click the Contact tab to display the ASUS contact information.

Click an icon to display DVD/ motherboard information



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.



AMD Chipset Driver

Installs the AMD® chipset drivers.

VIA Audio Driver

Installs the VIA Audio driver.

Sound Blaster X-Fi

Installs the Sound Blaster X-Fi driver.

JMicron JMB36X Controller Driver

Installs the JMicron® controller driver.

Marvell Yukon Gigabit Ethernet Driver

Installs the Marvell® Yukon Gigabit Ethernet driver.

USB 3.0 Driver

Installs USB 3.0 driver.

ASUS EPU

Installs the ASUS EPU driver and utility.

ASUS TurboV EVO

Installs ASUS TurboV, the advanced overclocking tool for extreme O.C. record.

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.



AMD OverDrive Utility (AOD)

Installs AMD OverDrive utility.

ASUS Update

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

ASUS AI Suite

Installs the ASUS AI Suite.

Adobe Reader 9

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

ASUS PC Probe II

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

ASUS ROG Connect

You can use this software to control the performance of machine remotely, and to monitor its variation of each item immediately.

ASUS ROG GameFirst

You can use this software to adjust network flow speed between different applications.

4.2.4 Make disk menu

The Make disk menu contains items to create the AMD RAID driver disk.



AMD AHCI/RAID 32/64bit WinXP Driver

Allows you to create an AMD AHCI/RAID 32/64 bit WinXP 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.

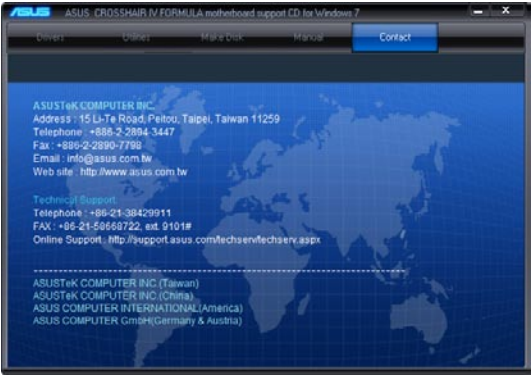


Most user manual files are in Portable Document Format (PDF). Install the Adobe® Acrobat® Reader from the Utilities menu before opening a user manual file.



4.2.6 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.

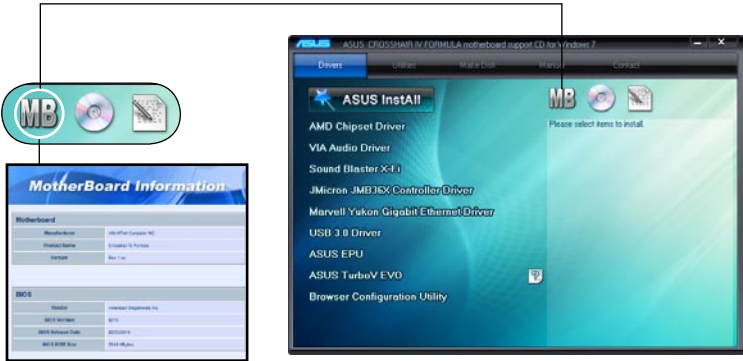


4.2.7 Other information

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

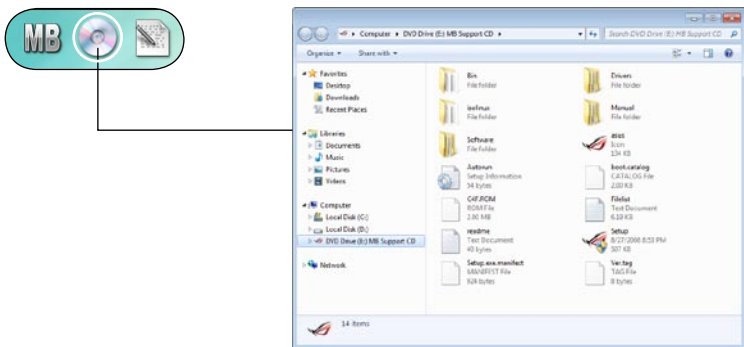
Motherboard Info

Displays the general specifications of the motherboard.



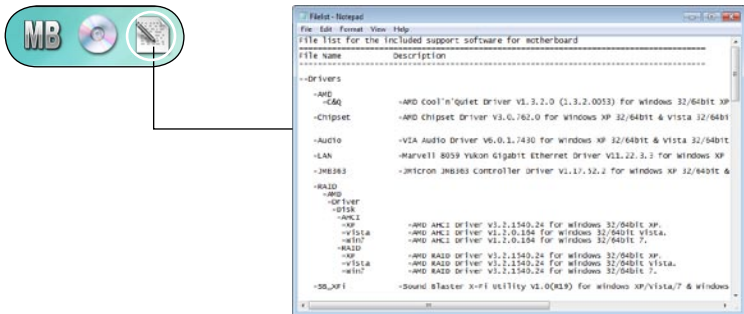
Browse this DVD

Displays the support DVD contents in graphical format.



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 MyLogo3™

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



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

To launch the ASUS MyLogo3™:

1. Launch the ASUS Update utility. Refer to section 3.1.1 **ASUS Update utility** for details.
2. Select **Options** from the drop down menu, then click **Next**.
3. Check the option **Launch MyLogo** to replace system boot logo before flashing BIOS, then click **Next**.
4. Select **Update BIOS** from a file from the drop down menu, then click **Next**.
5. When prompted, locate the new BIOS file, then click **Next**. The ASUS MyLogo window appears.
6. From the left window pane, select the folder that contains the image you intend to use as your boot logo.



7. When the logo images appear on the right window pane, select an image to enlarge by clicking on it.



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



9. When the screen returns to the ASUS Update utility, flash the original BIOS to load the new boot logo.
10. After flashing the BIOS, restart the computer to display the new boot logo during POST.

4.3.2 Sound Blaster X-Fi audio utility

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

To install Sound Blaster X-Fi:

1. Place the support DVD to the optical drive. The Drivers installation tab appears if your computer has an enabled Autorun feature.
2. Click the **Drivers** tab and click **VIA Audio Driver**.
3. Follow the screen instructions to complete installation.
4. Click the support DVD **Drivers** tab and click **Sound Blaster X-Fi**.
5. Follow the screen instructions to complete installation.



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

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



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



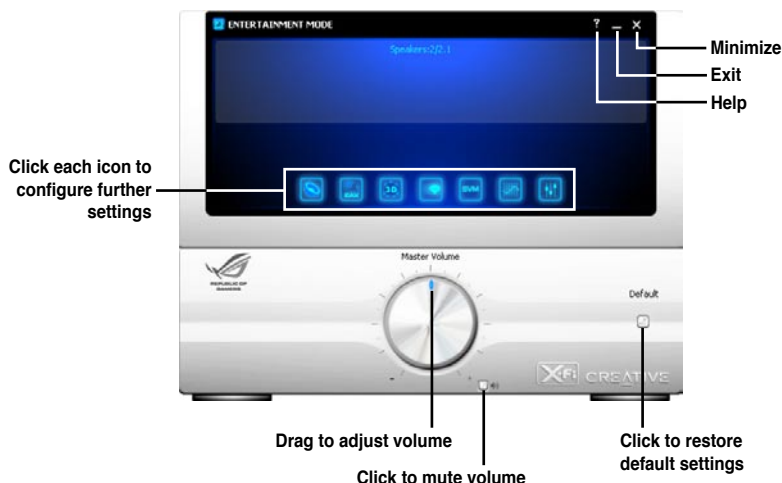
Double-click the Volume Panel icon to launch the Mixer control panel.

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



Main Panel

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



Speakers and Headphone Panel

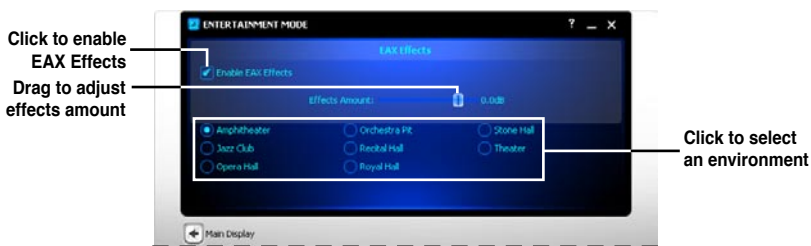


This panel allows you to configure speakers/headphone settings including bass management and speaker volume. You can also test each speaker channel.



EAX Effects Panel

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



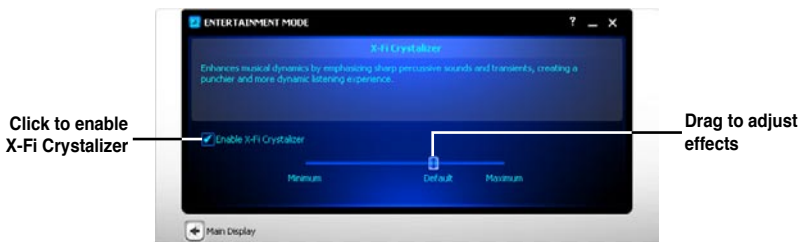
X-Fi CMSS-3D Panel

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



X-Fi Crystalizer Panel

Enable X-Fi Crystalizer to obtain more audio dynamics.



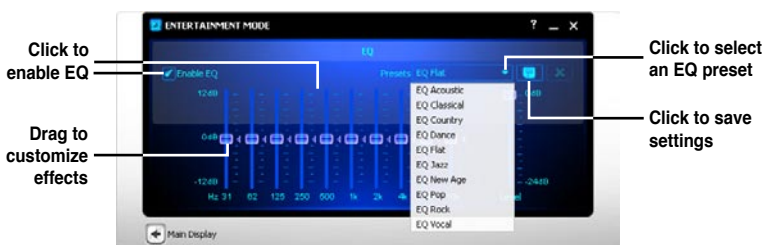
Smart Volume Management Panel

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



Graphic Equalizer Panel

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



Mixer Panel

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



4.3.3 ASUS PC Probe II

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

Installing PC Probe II

To install PC Probe II on your computer:

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



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

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

Launching PC Probe II

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

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

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










Using PC Probe II

Main window

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



Click to close the Preference panel

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

Sensor alert

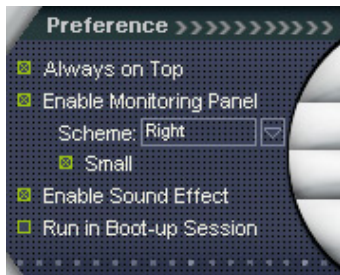
When a system sensor detects a problem, the main window right handle turns red, as the illustrations below show.



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

Preferences

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



Hardware monitor panels

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

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



Large display



Small display

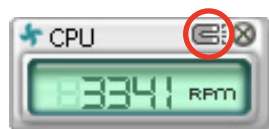
Changing the monitor panels position

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



Moving the monitor panels

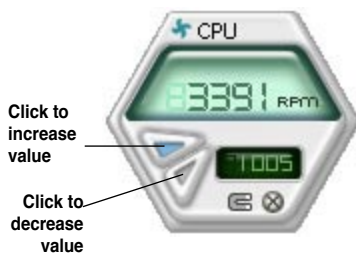
All monitor panels move together using a magnetic effect. If you want to detach a monitor panel from the group, click the horseshoe magnet icon. You can now move or reposition the panel independently.



Adjusting the sensor threshold value

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

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



Monitoring sensor alert

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



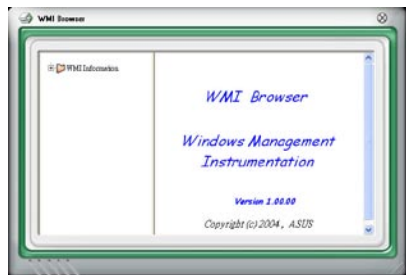
Large display



Small display

WMI browser

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



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

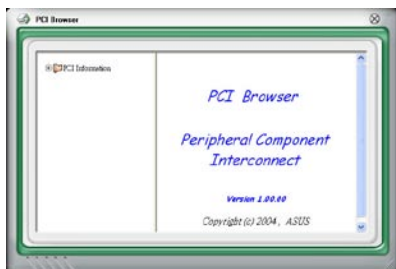
DMI browser

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



PCI browser

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

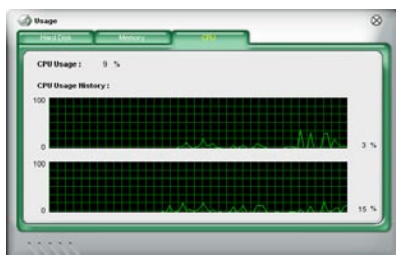


Usage

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

CPU usage

The CPU tab displays real-time CPU usage in line graph representation. If the CPU has an enabled Hyper-Threading, two separate line graphs display the operation of the two logical processors.



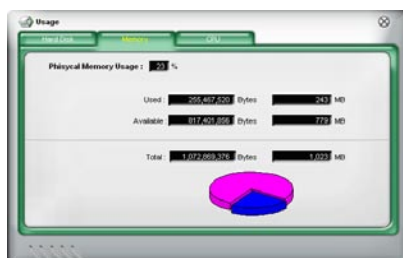
Hard disk drive space usage

The Hard Disk tab displays the used and available hard disk drive space. The left panel of the tab lists all logical drives. Click a hard disk drive to display the information on the right panel. The pie chart at the bottom of the window represents the used (blue) and the available HDD space.



Memory usage

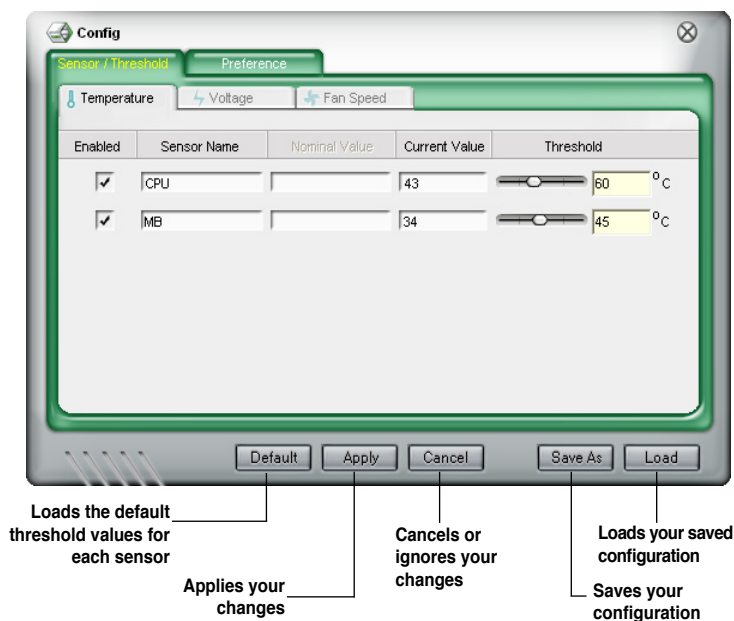
The Memory tab shows both used and available physical memory. The pie chart at the bottom of the window represents the used (blue) and the available physical memory.



Configuring PC Probe II

Click  to view and adjust the sensor threshold values.


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



4.3.4 ASUS AI Suite

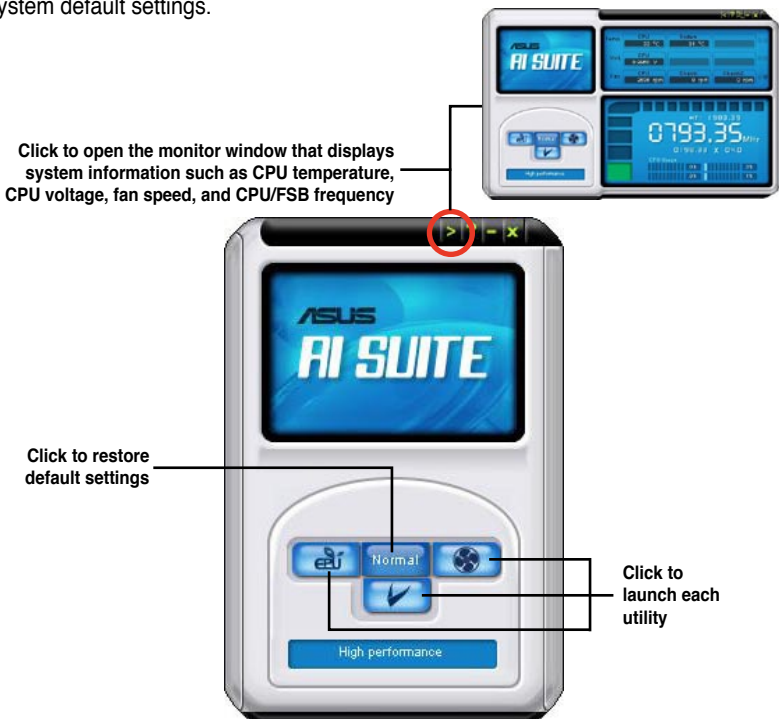
ASUS AI Suite allows you to launch several ASUS utilities easily.

Launching AI Suite

1. Install AI Suite from the motherboard support DVD.
2. Launch AI Suite by clicking **Start > All Programs > ASUS > AI Suite > AI Suite v1.xx.xx**. The AI Suite main window appears.
3. The AI Suite icon  appears in the Windows® notification area. If you minimize the application main window, click this icon to restore the window.

Using AI Suite

Click each utility button to launch the utility, or click the **Normal** button to restore system default settings.




- The screenshots in this section are for reference only. The actual utility buttons vary by models.
- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

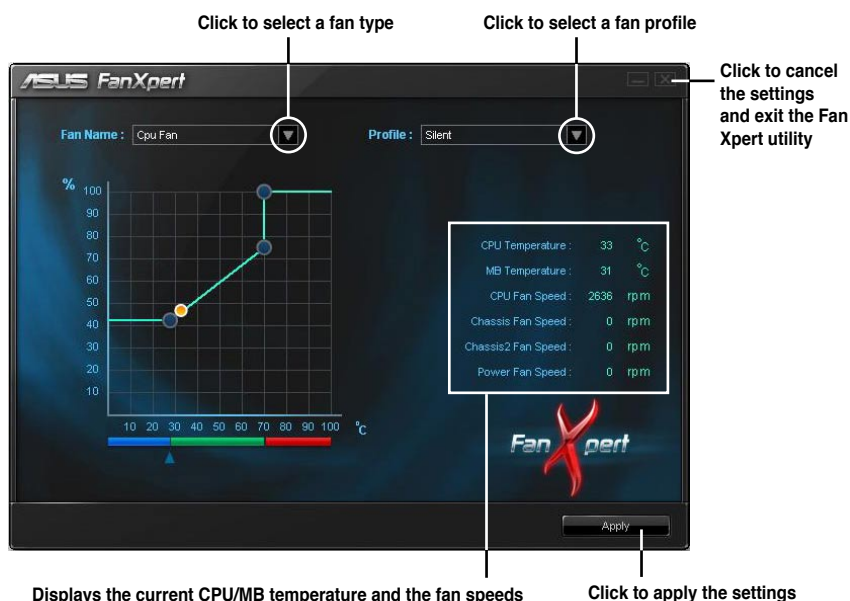
4.3.5 ASUS Fan Xpert

Asus 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 from the motherboard support DVD, launch Fan Xpert by double-clicking the **AI Suite** tray icon and then clicking the **Fan Xpert** button  on the AI Suite main window.

Using Fan Xpert



Fan profiles

- **Disable:** Select this mode to disable the **Fan Xpert** function.
- **Performance:** This mode boosts the fan to achieve maximal fan speed for the best cooling effect
- **Optimal:** This mode adjusts the CPU fan speed with the ambient temperature.
- **Silent:** This mode minimizes fan speed for quiet fan operation.
- **Manual:** This mode allows you to change the CPU fan profile under certain limitation.

4.3.6 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.




After installing AI Suite from the bundled Support DVD, launch the utility by double-clicking the AI Suite icon in the Windows® notification area and click the CPU Level Up button on the AI Suite main window.




4.3.7 ASUS EPU

ASUS EPU is an energy-efficient tool that provides you with a total system power-saving solution. It detects the current computer loading and intelligently adjusts the power in real-time. With auto phase switching for components, the EPU automatically provides the most appropriate power usage via intelligent acceleration and overclocking.

ASUS EPU provides you with these modes to choose from:

-  **Auto Mode**
-  **High Performance Mode**
-  **Max. Power Saving Mode**

When you select Auto Mode , the system shifts modes automatically according to the current system status. You can also configure advanced settings for each mode.

Launching EPU

After installing EPU from the motherboard support DVD, double-click the EPU tray icon to launch the program.



EPU main menu



Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.3.8 ASUS Unique Overclocking Utility—TurboV EVO

ASUS TurboV EVO introduces **TurboV** and **Turbo Key**—two powerful tools that allow you to overclock your system effectively. Install ASUS TurboV EVO from the support DVD that came with the motherboard package.

If the TurboV EVO is correctly installed, you will find the **TurboV EVO** icon on the Windows notification area. Click on the icon to display the TurboV EVO control panel.



Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

Using ASUS TurboV

ASUS TurboV 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 ASUS TurboV (except for **Auto Tuning**) 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.

The screenshot shows the ASUS TurboV EVO control panel. At the top, there are tabs for 'Easy Mode' and 'Auto Tuning Mode'. Below these, there are buttons for 'Manual', 'Easy Mode', and 'Auto Tuning'. The 'Manual' button is highlighted. The main area displays various settings with sliders and numerical values. Annotations with red lines point to specific features:

- Manual Mode**: Points to the 'Manual' button.
- Load profile**: Points to the 'Profile' dropdown menu.
- Target values**: Points to the 'BCLK Frequency' and 'CPU Voltage' sliders.
- Start-up values**: Points to the 'IMC Voltage' and 'DRAM Bus Voltage' sliders.
- Advanced CPU, chipset and DRAM voltage settings**: Points to the 'Advanced Mode' section, which includes settings for CPU PLL, CHA DATA, CHB DATA, PCH, CHA CTRL, and CHB CTRL.
- Save the current settings as a new profile**: Points to the 'Save Profile' button.
- Voltage Adjustment bars**: Points to the voltage sliders.
- Click to show / hide more settings**: Points to the 'More Setting' button.
- Click to restore all start-up settings**: Points to the 'OS Default' button.
- Undoes all changes without applying**: Points to the 'Reset' button.
- Applies all changes immediately**: Points to the 'Apply' button.



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

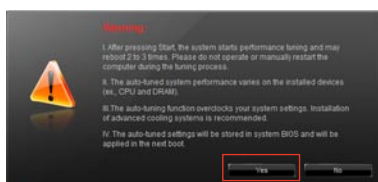
Using ASUS TurboV Auto Tuning Mode

The Auto Tuning Mode allows smart auto-overclocking. Follow the instructions below to let TurboV EVO detect and overclock your system.

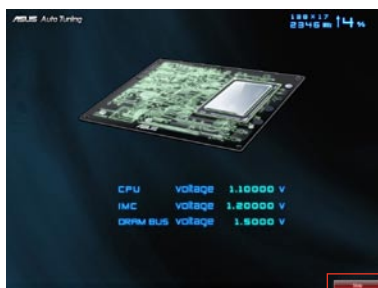
1. Click the **Auto Tuning** tab and then click **Start**. You can also click **More Setting** first to configure more overclocking parameters before starting auto-overclocking.



2. Read through the warning messages and click **Yes** to start auto-overclocking.



3. An animation appears indicating the overclocking process. Click **Stop** if you want to cancel the current Overclocking process.



- After pressing Start, the system starts performance tuning and may reboot 2 to 3 times. Please do not operate or manually restart the computer during the tuning process.
- After restarting OS, a message appears indicating the current overclocking result. You can click **Stop** to save the current overclocking setting, or wait for TurboV EVO to continue system tuning for higher system performance.
- The auto-tuned system performance varies on the installed device (ex., CPU and DRAM).
- The auto-tuning function overlocks your system settings. Installation of advanced cooling systems is recommended.
- The auto-tuned settings will be stored in system BIOS and will be applied in the next boot.

Using ASUS Turbo Key

ASUS Turbo Key allows the user to set a group of hot-keys into physical overclocking buttons. After the easy setup, Turbo Key can boost performances without interrupting ongoing work or games—with just one touch!

If the TurboV EVO is correctly installed, you will find the **TurboV EVO** icon on the Windows notification area. Click on the icon to display the TurboV EVO control panel. Click the **Turbo Key** tab to switch to the Turbo Key interface.



Configuring ASUS Turbo Key



1. Select your desired hotkey combination.
2. You can decide the performance boost level by selecting **Turbo Key Profile**. You can also load personal profiles saved in the ASUS TurboV utility.
3. Choose whether to show Turbo Key OSD and status.
4. Click **Apply** to save Turbo Key settings.



You have to press the assigned hotkeys to use the Turbo Key function.

4.3.9 ROG Connect

ROG Connect allows you to monitor and adjust your system through your another PC or laptop.

RC TweakIt

To use RC TweakIt:

1. Connect the provided ROG Connect cable to your system and your another PC or laptop.
2. Double-click the **RC TweakIt** shortcut on the desktop to activate the function.
3. Use the sliders and buttons to monitor or adjust your system.

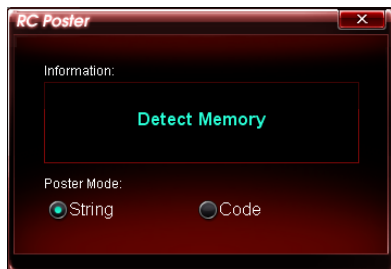


4. Click **Function** to display more options.



RC Poster

RC Poster shows status during the POST. You can switch the display mode between **String** and **Code**.



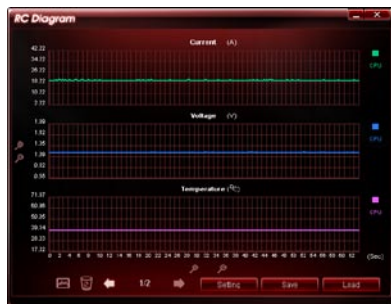
RC Remote

RC Remote allows you to operate your system through the ROG Connect cable.



RC Diagram

RC Diagram allows you to monitor and record your system status.



4.4 RAID configurations

The motherboard comes with the AMD SB850 chipset that allows you to configure Serial ATA hard disk drives as RAID volumes. 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 4.5 **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 0+1 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

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 Channel** 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.

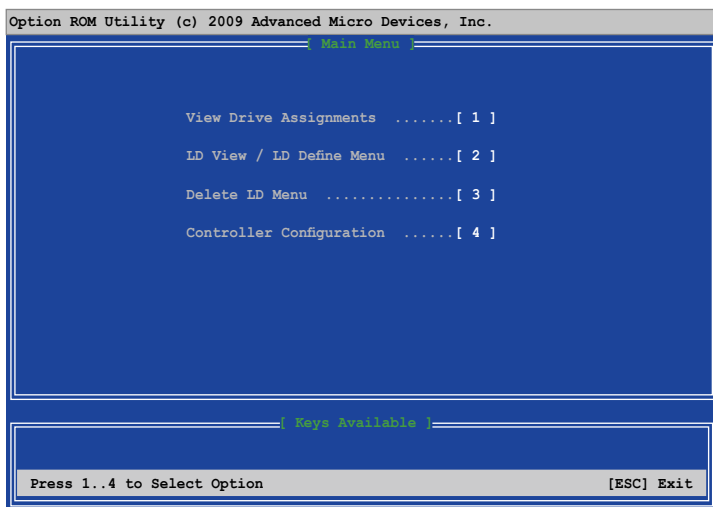


When setting the **OnChip SATA Channel** item to [RAID], all SATA ports run at RAID mode. However, you can set the SATA ports 5 and 6 to [IDE] mode. See section **3.4.5 Storage Configuration** for details.

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.

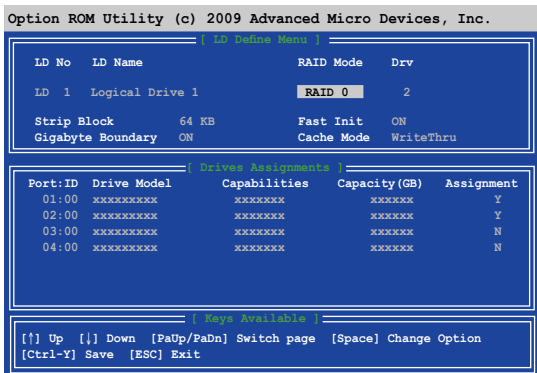


To create a RAID volume using more than four hard disk drives, ensure that the SATA connectors 5/6 are set to [RAID] mode.

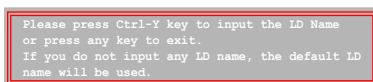
Creating a RAID volume

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.



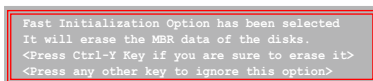
3. Move to the **RAID Mode** item and press <Space> to select a RAID mode to create.
4. Move to the **Assignment** item by using the down arrow key and set **Y** to select the hard disk drives you want to include in the RAID set.
5. Press <Ctrl> + <Y> to save the setting.
6. The utility prompts the following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



7. Enter 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.

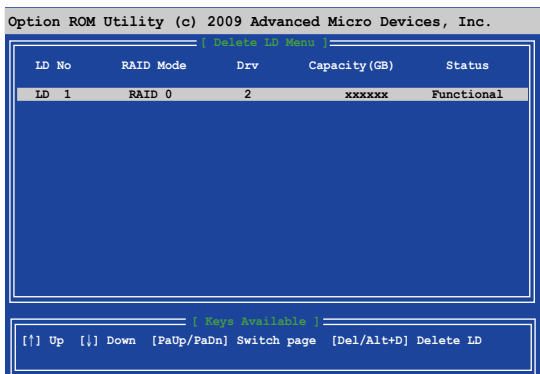
Deleting a RAID configuration



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 or <Alt> + <D>.



3. The utility prompts the following messages:

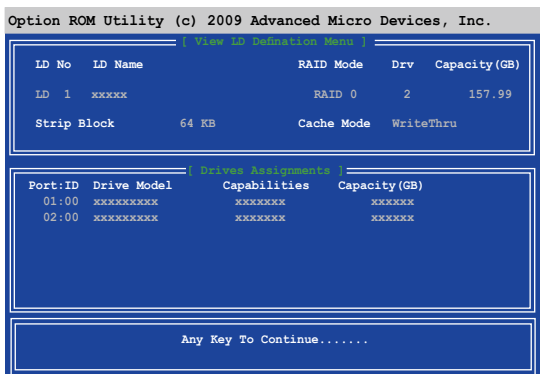
Press Ctrl-Y to delete the data in the disk!
or press any other key to abort...

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

Displaying 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 **4.5.4 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 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 drive to the SATA connectors 5/6 and set them to [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 **Load 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.



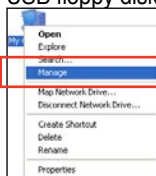
Before loading the RAID driver from a USB flash drive, you have to use another computer to copy the RAID driver from the support DVD to the USB flash drive.

4.5.4 Using a USB floppy disk drive

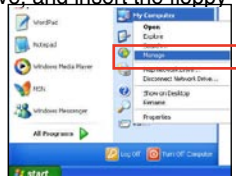
Due to OS limitation, Windows® XP may not recognize the USB floppy disk drive when you install the RAID driver from a floppy disk during the OS installation.

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.



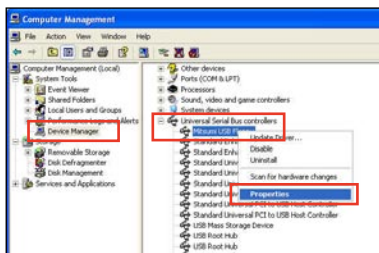
or



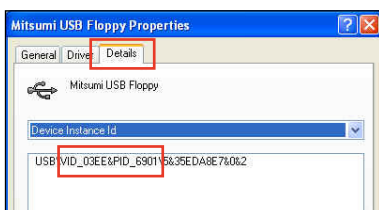
3. Select **Device Manager**. From the **Universal Serial Bus controllers**, right-click **xxxxxx USB Floppy**, and then select **Properties** from the pop-up window.



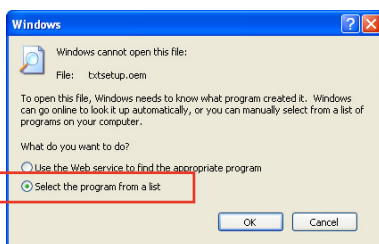
The name of the USB floppy disk drive varies with different vendors.



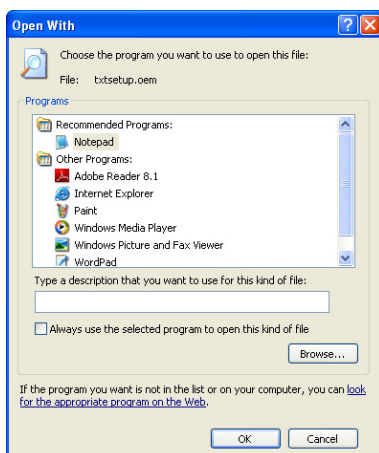
4. Click **Details** tab. The Vendor ID (VID) and Product ID (PID) are displayed.



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", "ahci86"
id= "PCI\VEN_1002&DEV_4391&CC_0106", "ahci86"
id= "PCI\VEN_1002&DEV_4393&CC_0104", "ahci86"
id= "USB\VID_03EE&PID_6901", "usbstor"

[HardwareIds.SCSI.Napa_amd64_ahci]
id= "PCI\VEN_1002&DEV_4392&CC_0104", "ahci64"
id= "PCI\VEN_1002&DEV_4391&CC_0106", "ahci64"
id= "PCI\VEN_1002&DEV_4393&CC_0104", "ahci64"
id= "USB\VID_03EE&PID_6901", "usbstor"
```



Add the same line to both sections.



The VID and PID vary with different vendors.

10. Save and exit the file.

This chapter describes how to install and
configure ATI® CrossFireX™ graphics
cards.

5 ATI® CrossFireX™ technology support

Chapter summary

5

5.1 **ATI® CrossFireX™ technology 5-1**

5.1 ATI® CrossFireX™ technology

The motherboard supports the ATI® CrossFireX™ technology that allows you to install multi-graphics processing units (GPU) graphics cards. Follow the installation procedures in this section.

5.1.1 Requirements

- You should have two identical CrossFireX-ready graphics cards or one CrossFireX-ready dual-GPU graphics card that are ATI® certified.
- Ensure that your graphics card driver supports the ATI CrossFireX technology. Download the latest driver from the AMD website at www.amd.com.
- Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system. See page 2-38 for details.



-
- We recommend that you install additional chassis fans for better thermal environment.
 - Visit the ATI Game website at <http://game.amd.com> for the latest certified graphics card and the supported 3D application list.
-

5.1.2 Before you begin

For ATI CrossFireX to work properly, you have to uninstall all existing graphics card drivers before installing ATI CrossFireX graphics cards to your system.

To uninstall existing graphics card drivers

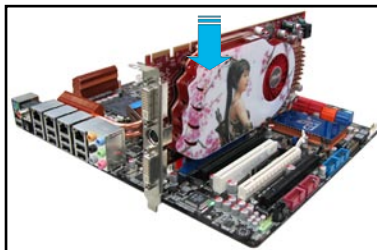
1. Close all current applications.
2. For Windows XP, go to **Control Panel > Add/Remove Programs**.
For Windows Vista, go to **Control Panel > Programs and Features**.
3. Select your current graphics card driver/s.
4. For Windows XP, select **Add/Remove**.
For Windows Vista, select **Uninstall**.
5. Turn off your computer.

5.1.3 Installing CrossFireX graphics cards

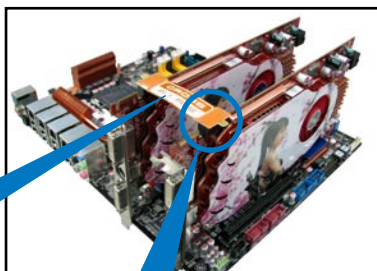


The following pictures are for reference only. The graphics cards and the motherboard layout may vary with models, but the installation steps remain the same.

1. Prepare two CrossFireX-ready graphics cards.
2. Insert the two graphics card into the PCIEX16 slots.
3. Ensure that the cards are properly seated on the slots.



4. Align and firmly insert the CrossFireX bridge connector to the goldfingers on each graphics card. Ensure that the connector is firmly in place.

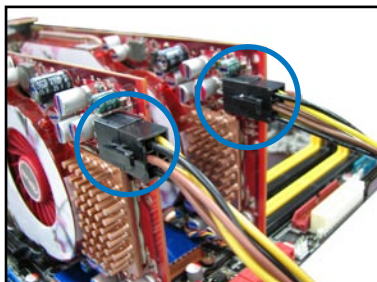


CrossFireX bridge



Goldfingers

5. Connect two independent auxiliary power sources from the power supply to the two graphics cards separately.
6. Connect a VGA or a DVI cable to the graphics card.



5.1.4 Installing the device drivers

Refer to the documentation that came with your graphics card package to install the device drivers.



Ensure that your PCI Express graphics card driver supports the ATI® CrossFireX™ technology. Download the latest driver from the AMD website (www.amd.com).

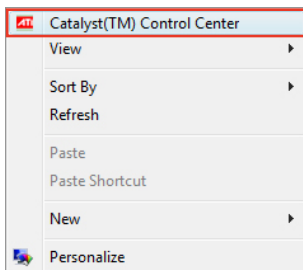
5.1.5 Enabling the ATI® CrossFireX™ technology

After installing your graphics cards and the device drivers, enable the CrossFireX™ feature through the ATI Catalyst™ Control Center in Windows environment.

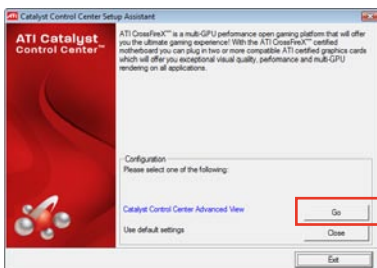
Launching the ATI Catalyst Control Center

To launch the ATI Catalyst Control Center

1. Right-click on the Windows® desktop and select **Catalyst(TM) Control Center**. You can also right-click the ATI icon in the Windows notification area and select **Catalyst Control Center**.



2. The **Catalyst Control Center Setup Assistant** appears when the system detects the existence of multi-graphics cards. Click **Go** to continue to the **Catalyst Control Center Advanced View** window.



Enabling CrossFireX settings

1. In the Catalyst Control Center window, click **Graphics Settings > CrossFireX > Configure**.
2. From the Graphics Adapter list, select the graphics card to act as the display GPU.
3. Select **Enable CrossFireX**.
4. Click **Apply**, and then click **OK** to exit the window.



The Appendix lists the debug code table
for the LCD Poster.

Debug code table

Chapter summary



| | |
|-----------------------|-----|
| Debug code table..... | A-1 |
|-----------------------|-----|

Debug code table

| Code | Description |
|-----------|--|
| CPU INIT | CPU Initiation |
| DET CPU | Test CMOS R/W functionality. |
| CHIPINIT | Early chipset initialization: -Disable shadow RAM -Disable L2 cache -Program basic chipset registers |
| DET DRAM | Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache |
| DC FCODE | Expand compressed BIOS code to DRAM |
| EFSHADOW | Call chipset hook to copy BIOS back to E000 & F000 shadow RAM. |
| INIT IO | Initialize IO devices. |
| INIT HWM | Initialize Hardware Monitor. |
| CLR SCRN | 1. Blank out screen 2. Clear CMOS error flag |
| INIT8042 | 1. Clear 8042 interface 2. Initialize 8042 self-test |
| ENABLEKB | 1. Test special keyboard controller for Super I/O chips. 2. Enable keyboard interface. |
| DIS MS | 1. Disable PS/2 mouse interface (optional). 2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Super I/O chips. |
| R/W FSEG | Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker. |
| DET FLASH | Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support. |
| TESTCMOS | Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override. |
| PRG CHIP | Program chipset default values into chipset. |
| INIT CLK | Initialize clock generator. |
| CHECKCPU | Detect CPU information including brand, type and CPU level (586 or 686). |
| INTRINIT | Initial interrupts vector table. |
| INITINT9 | Initialize INT 09 buffer |
| CPUSPEED | 1. Program CPU internal MTRR (Pentium class CPU) for 0-640K memory address. 2. Initialize the APIC for Pentium class CPU. 3. Program early chipset according to CMOS setup. Example: onboard IDE controller. 4. Measure CPU speed. 5. Invoke video BIOS. |
| VGA BIOS | Initialize VGA BIOS |
| TESTVRAM | 1. Initialize multi-language 2. Put information on screen display, including BIOS logo, CPU type, CPU speed . |
| RESET KB | Reset keyboard. |

Debug code table

| Code | Description |
|----------|--|
| 8254TEST | Test 8254 |
| 8259MSK1 | Test 8259 interrupt mask bits for channel 1. |
| 8259MSK2 | Test 8259 interrupt mask bits for channel 2. |
| 8259TEST | Test 8259 functionality. |
| COUNTMEM | Calculate total memory by testing the last double word of each 64K page. |
| MP INIT | <ol style="list-style-type: none"> 1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical. |
| USB INIT | Initialize USB |
| TEST MEM | Test all memory (clear all extended memory to 0) |
| SHOW MP | Display number of processors (multi-processor platform) |
| PNP LOGO | Display PnP logo |
| ONBD IO | Initialize Onboard IO devices. |
| EN SETUP | Okay to enter Setup utility. |
| MSINSTAL | Initialize PS/2 Mouse |
| CHK ACPI | Prepare memory size information for function call: INT 15h ax=E820h |
| EN CACHE | Turn on L2 cache |
| SET CHIP | Program chipset registers according to items described in Setup & Auto-configuration table. |
| AUTO CFG | Assign resources to devices. |
| INIT FDC | <ol style="list-style-type: none"> 1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware. |
| DET IDE | Detect & install all IDE devices: HDD, LS120, ZIP, CDROM. |
| COM/LPT | Detect serial ports & parallel ports. |
| DET FPU | Detect & install co-processor |
| CPU CHG | New CPU installed |
| EZ FLASH | Execute EZ Flash |
| CPR FAIL | CPR error |
| FAN FAIL | Fan error |
| UCODEERR | UCODE error |
| FLOPYERR | Floppy error |
| KB ERROR | Keyboard error |
| HD ERR | HDD error |
| CMOS ERR | CMOS error |
| MS ERROR | Mouse error |
| SMARTERR | HDD smart function error |
| HM ERROR | Hard monitor error |
| AINETERR | AI NET error |
| CASEOPEN | Case open |

Debug code table

| Code | Description |
|------------------|---|
| PASSWORD | Clear EPA or customization logo. 1. Call chipset power management hook. 2. Recover the text fond used by EPA logo (not for full screen logo) 3. If password is set, ask for password. |
| USB FINAL | Initialize PnP boot devices 1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs. |
| INIT ROM | Initialize device option ROMs. |
| NUM LOCK | 1. Program daylight saving 2. Update keyboard LED & typematic rate |
| UPDT DMI | 1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table. |
| INT 19H | Boot attempt (INT 19h) |

| | |
|-------------------------------------|---|
| Manufacturer | ASUSTek COMPUTER INC. |
| Address, City | No. 150, LI-TE RD., PEITOU, TAIPEI 112, TAIWAN R.O.C |
| Country | TAIWAN |
| Authorized Representative in Europe | ASUS COMPUTER GmbH |
| Address, City | HARKORT STR. 21-23, 40880 RATINGEN |
| Country | GERMANY |

ASUS contact information

ASUSTeK COMPUTER INC.

| | |
|-----------|---|
| Address | 15 Li-Te Road, Peitou, Taipei, Taiwan 11259 |
| Telephone | +886-2-2894-3447 |
| Fax | +886-2-2890-7798 |
| E-mail | info@asus.com.tw |
| Web site | www.asus.com.tw |

Technical Support

| | |
|----------------|------------------|
| Telephone | +86-21-38429911 |
| Online support | support.asus.com |

ASUS COMPUTER INTERNATIONAL (America)

| | |
|-----------|---|
| Address | 800 Corporate Way, Fremont, CA 94539, USA |
| Telephone | +1-812-282-3777 |
| Fax | +1-510-608-4555 |
| Web site | usa.asus.com |

Technical Support

| | |
|----------------|------------------|
| Telephone | +1-812-282-2787 |
| Support fax | +1-812-284-0883 |
| Online support | support.asus.com |

ASUS COMPUTER GmbH (Germany and Austria)

| | |
|----------------|---|
| Address | Harkort Str. 21-23, D-40880 Ratingen, Germany |
| Fax | +49-2102-959911 |
| Web site | www.asus.de |
| Online contact | www.asus.de/sales |

Technical Support

| | |
|---------------------------------|------------------|
| Telephone (Component) | +49-1805-010923* |
| Telephone (System/Note/Eee/LCD) | +49-1805-010920* |
| Support Fax | +49-2102-9599-11 |
| Online support | support.asus.com |

* EUR 0.14/minute from a German fixed landline; EUR 0.42/minute from a mobile phone.

Per FCC Part 2 Section 2.1077(a)



Address: 800 Corporate Way, Fremont, CA 94539.

Phone/Fax No: (510)739-3777/(510)608-4555

hereby declares that the product

Product Name : Motherboard

Model Number : CROSSHAIR IV FORMULA

Conforms to the following specifications:

- ☒ FCC Part 15, Subpart B, Unintentional Radiators
☐ FCC Part 15, Subpart C, Intentional Radiators
☐ FCC Part 15, Subpart E, Intentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Representative Person's Name: Steve Chang / President

Signature :

Date: **Mar. 09, 2010**

Year to begin affixing CE marking

Year to begin affixing CE marking:2010

EC Declaration of Conformity



We. the undersigned.

Manufacturer:

ASUSTek COMPUTER INC.

No. 150, LI-TE RD., PEITOU, TAIPEI 112, TAIWAN R.O.C.

TAIWAN

Counter:

ALMAZ

ASUS COMPUTER GmbH

HARKORT

declare the following apparatus:

Product name :

Motherboard

CROSSHAIR IV FORMULA

conform with the essential requirements of the following directives:

2004/108/EC-EMC Directive

- | | | | |
|-------------------------------------|-------------------------------|-------------------------------------|-----------------------------------|
| <input checked="" type="checkbox"/> | EN 55022:2006+A1:2007 | <input checked="" type="checkbox"/> | EN 55024:1998+A1:2001+A2:2003 |
| <input checked="" type="checkbox"/> | EN 61000-3-2:2006 | <input checked="" type="checkbox"/> | EN 61000-3-3:1995+A1:2001+A2:2005 |
| <input type="checkbox"/> | EN 55013:2001+A1:2003+A2:2006 | <input type="checkbox"/> | EN 55020:2007 |

☐ 1999/5/EC-R & TTE Directive

- | | |
|--|---|
| <input type="checkbox"/> EN 300 328 V1.1 (2008-05) | <input type="checkbox"/> EN 301 489-1 V1.8 (2008-05) |
| <input type="checkbox"/> EN 300 440 V1.1 (2008-05) | <input type="checkbox"/> EN 301 489-3 V1.4 (2002-08) |
| <input type="checkbox"/> EN 300 440-2 V1.2 (2008-03) | <input type="checkbox"/> EN 301 489-4 V1.3 (2002-08) |
| <input type="checkbox"/> EN 301 511 V6.0 2/2003-03 | <input type="checkbox"/> EN 301 489-7 V1.3.1 (2005-11) |
| <input type="checkbox"/> EN 301 908-1 V3.2 (2007-06) | <input type="checkbox"/> EN 301 489-9 V1.4 (2007-11) |
| <input type="checkbox"/> EN 301 908-2 V3.2.1 (2007-06) | <input type="checkbox"/> EN 301 489-14 V1.4 (2008-04) |
| <input type="checkbox"/> EN 301 893 V1.4 (2006-03) | <input type="checkbox"/> EN 301 489-24 V1.4.1 (2007-09) |
| <input type="checkbox"/> EN 50360 2001 | <input type="checkbox"/> EN 302 326-2 V1.2.1 (2007-06) |
| <input type="checkbox"/> EN 50371:2002 | <input type="checkbox"/> EN 302 326-3 V1.3.1 (2007-09) |

☒ 2006/95/EC-LVD Directive

- ☒ EN 60950-1:2001+A11:2004
☐ EN 60950-1:2006
☐ EN 60065:2002+A1:2006

☐ 2009/125/EC-ErP Directive

Regulation (EC) No. 278/2009

- ☐ EN 62301:2005 ☐ EN 62301:2005

CE marking



(EC conformity marking)

Position : CEO

Name : Jerry Shen

Signature : _____