Maximus III Formula

Motherboard

E4884

First Edition
July 2009

Contents

Contents

Contents

Contents

Notices

Federal Communications Commission Statement

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

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

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

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

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

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.

- The optical S/PDIF is an optional component (may or may not be included in your motherboard) and is defined as a CLASS 1 LASER PRODUCT.

INVISIBLE LASER RADIATION, AVOID EXPOSURE TO BEAM.

- Never dispose of the battery in fire. It could explode and release harmful substances into the environment.

- Never dispose of the battery with your regular household waste. Take it to a hazardous material collection point.

- Never replace the battery with an incorrect battery type.

- RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.

- DISPOSE OF USED BATTERIES ACCORDING TO THE ABOVE BATTERY-RELATED INSTRUCTIONS.

Operation safety

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

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

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

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

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

- Place the product on a stable surface.

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

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

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

About this guide

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

How this guide is organized

This guide contains the following parts:

*   **Chapter 1: Product introduction**

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

*   **Chapter 2: Hardware information**

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

*   **Chapter 3: BIOS setup**

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

*   **Chapter 4: Software support**

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

*   **Chapter 5: Multiple GPU technology support**

    This chapter describes how to install and configure multiple ATI® CrossFireX™ and NVIDIA® SLI™ 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+D>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.
	Example: At the DOS prompt, type the command line:
	`afudos /iMAIIIFOR.ROM`

Maximus III Formula specifications summary

CPU	Supports the Intel® Core™i7 and Intel® Core™i5 Processor in the LGA1156 package Supports Intel® Turbo Boost Technology * Refer to www.asus.com for Intel CPU support list
Chipset	Intel® P55 Express Chipset
Memory	Dual channel memory architecture 4 x DIMM, max. 16GB, DDR3 2133(O.C.)/ 2000(O.C.)/1800(O.C.)/1600/1333/1066 MHz, non-ECC, un-buffered memory modules * Hyper DIMM support is subject to the physical characteristics of individual CPUs. * Supports Intel® Extreme Memory Profile (XMP) * Please refer to www.asus.com or user manual for the Memory QVL(Qualified Vendors List).

Expansion Slots	3 x PCIe x16 slot
	  - 2 x PCIe 2.0 (red) support single at x16 or dual at x8 mode
	  - 1 x PCIe 1.0 (white) supports at x4 mode
	2 x PCIe x1
	2 x PCI 2.2

Multi-GPU Technology	Supports NVIDIA® SLI™ Technology / ATI® CrossFireX™ Technology

Storage	Intel® P55 Express Chipset built-in:
	  - 6 x SATA 3.0 Gb/s ports
	  - Intel Matrix Storage Technology supports RAID 0, 1, 5 and 10
	
	JMicron® 322 controller and 2 x JMicron® 363 controllers:
	  - 2 x SATA 3.0 Gb/s port (red) supporting Hardware RAID 0 and 1 (SPD_HDD1 + SPD_HDD2)
	  - 1 x External SATA 3.0 Gb/s port (SATA On-the-Go)
	  - 2 x SATA 3.0 Gb/s port (white) -SATA_ODD1 + SATA_ODD2

LAN	Realtek® RTL8110SC Gigabit LAN controller GameFirst

High Definition Audio	SupremeFX X-Fi discrete audio card
	  - 8-channel High Definition Audio CODEC
	  - EAX® Advanced™ HD 4.0
	  - X-Fi CMSS®-3D
	  - X-Fi Crystalizer™
	  - Creative ALchemy
	  - Supports 1 x S/PDIF out header
	  - Supports Coaxial/Optical S/PDIF out ports on rear
	  - Blu-ray support

IEEE 1394a	2 x 1394a ports (1 port at back I/O, 1 port onboard)

Maximus III Formula specifications summary

USB	max. 14 USB 2.0 ports (5 ports at mid-board, 9 ports at back panel)
ROG Exclusive Overclocking Features	**Extreme Engine Power Design** - 16-phase CPU power - 3-phase VTT power - 3-phase Memory power **ROG Connect** **CPU Level Up** **Memory Level Up** **Speeding HDD** **iROG** **Extreme Tweaker** **Loadline Calibration** **Intelligent overclocking tools:** - ASUS AI Booster Utility - O.C. Profile **Overclocking Protection:** - COP EX (Component Overheat Protection - EX) - Voltiminder LED - ASUS C.P.R.(CPU Parameter Recall)
Other Special Features	MemOK! MemPerfect ProbeIt Onboard Switches: Power / Reset / Clr CMOS (at rear) Q-Fan Plus ASUS EPU ASUS MyLogo3 ASUS Fan Xpert ASUS EZ Flash 2 ASUS CrashFree BIOS 3 ASUS Q-Connector ASUS Q-LED (CPU, DRAM, VGA, Boot Device LED) ASUS Q-Slot ASUS Q-DIMM
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
Back Panel I/O Ports	1 x PS/2 Keyboard port (purple) 1 x External SATA port 1 x LAN (RJ45) port 9 x USB 2.0/1.1 ports (1 port for ROG Connect) 1 x ROG Connect On/Off switch 1 x IEEE1394a port 1 x Clr CMOS switch

(continued on the next page)

Maximus III Formula specifications summary

Internal I/O Connectors	3 x USB 2.0 connectors support additional 5 USB 2.0 ports (1 port reserved for ROG Connect @ rear)
	10 x SATA connectors: 2 x Speeding HDD SATA connectors (Red) / 2 x SATA_ODD (White) / 6 x standard SATA connectors (Gray)
	8 x Fan connectors: 1 x CPU / 1 x PWR / 3 x Chassis / 3 x Optional
	3 x thermal sensor connectors
	1 x IEEE1394a connector
	1 x 24-pin ATX Power connector
	1 x 8-pin ATX 12V Power connector
	1 x En/Dis-able Clr CMOS header
	5 x ProbeIt measurement points
	1 x ROG light connector
	1 x Go Button
	System panel connector
Software	**Support DVD:**
	- Drivers and applications
	Sound Blaster X-Fi Utility
	Kaspersky® Anti-Virus
	ASUS TurboV utility
	ASUS PC Probe II
	ASUS Update
	ASUS AI Suite
Form Factor	ATX Form Factor, 12"x 9.6" (30.5cm x 24.4cm)

*Specifications are subject to change without notice.

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

Product introduction

1

Chapter summary

1

1.1 Welcome!
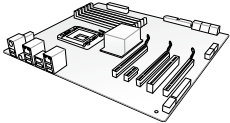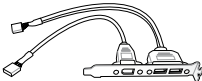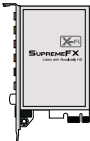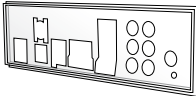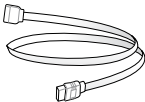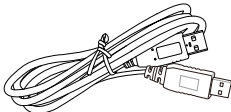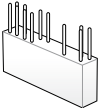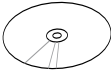
Thank you for buying an ROG Maximus III Formula motherboard!

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 Maximus III Formula Motherboard	**1 x Multi-functional module (2-port USB 2.0 and 1-port ESATA)**
SupremeFX X-Fi Audio Card	**1 x ASUS Q-Shield (I/O shield)**
3 x Serial ATA signal cables	**1 x ROG Connect cable**
1 x SLI Cable	**1 x 2-in1 ASUS Q-Connector Kit**
Cable ties **User Guide** **ROG Support DVD**	**1 x ROG theme label** **1 x ROG cable label** **(12-in-1)**

- 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.

Intel® LGA1156 Lynnfield Processor Ready

This motherboard supports the latest Intel® Lynnfield processors in LGA1156 package, which as memory and PCI Express controller integrated to support 2-channel (4 DIMMs) DDR3 memory and 16 PCI Express 2.0 lanes, providing great graphics performance. Intel® Lynnfield processor is one of the most powerful and energy efficient CPU in the world. Refer to page 2-5 for details.

Intel® P55 Chipset

The Intel® P55 Express Chipset is the latest one-chipset design to support the latest 1156 socket Intel® Lynnfield processors. Intel P55 provides improved performance by utilizing serial point-to-point links, allowing increased bandwidth and stability.

SLI/CrossFireX On-Demand

SLI or CrossFireX? Fret no longer because with the ROG Maximus III Formula, you'll be able to run both multi-GPU setups. The board features SLI/CrossFireX on Demand technology, supporting SLI or CrossFireX configuration. Whichever path you take, you can be assured of jaw-dropping graphics at a level previously unseen.

Dual-Channel, DDR3 2133(O.C.) MHz

The motherboard supports DDR3 memory that features data transfer rates of 2133(O.C.)/2000(O.C.)/1800(O.C.)/1600(O.C.)/1333/1066 MHz to meet the higher bandwidth requirements of the latest operation system, 3D graphics, multimedia, and Internet applications. The dual-channel DDR3 architecture double the bandwidth of your system memory to boost system performance.

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.

1.3.2   ROG Intelligent Performance & Overclocking features

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.

MemPerfect

Optimize your memory without lifting a finger!

Why risk crippling your system with poorly tuned memory? Now, with ROG's exclusive MemPerfect optimizing your memory performance is a simple matter of selecting the frequency you desire, and letting MemPerfect do the rest! MemPerfect quickly checks your memory settings for errors and automatically fixes them—ensuring system stability and maximum efficiency.

Speeding HDD

Wait less. Play more!

Double your hard disk drive performance easily and affordably with Speeding HDD, a remarkable ROG feature that utilizes a dual channel design to enhance HDD transfer rates. Wait less, play more!

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.

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.

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.

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!

ProbeIt

Get all hands-on with hardware-based overclocking

ProbeIt takes the guesswork out of locating the motherboard's measurement points, identifying them clearly in the form of 5 sets of detection points so you'll know exactly where to get quick yet accurate readings using a multitester.

"Voltiminder LED

Friendly reminder on Voltage Settings
In the pursuit of extreme performance, overvoltage adjustment is critical but risky. Acting as the "red zone" of a tachometer, the Voltiminder LED displays the voltage status for CPU, PCH, and Memory in a intuitive color-coded fashion. The Voltiminder LED allows quick voltage monitoring for overclockers.

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. The SupremeFX X-Fi features unique audio innovations for gamers to spot enemies in 3D environment during game play. SupremeFX X-Fi also provides gamers a special tool to emphasize human voices in games to help make dialogues clearer and more audible.

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.

Q-Fan Plus

Optimized quietness and cooling for more devices!

The Q-Fan function automatically detects temperature and adjusts fan speed accordingly to achieve quiet and efficient cooling.

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 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.

ASUS O.C. Profile

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

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.

ASUS EPU

System Level Energy Saving

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

C.P.R. (CPU Parameter Recall)

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

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

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

Hardware information

2

Chapter summary

2

2.1   Before you proceed

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

⚠️

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

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

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

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

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

Onboard LEDs

The motherboard comes with LEDs that indicate the voltage conditions of CPU, memory, and PCH. 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, CPU PLL, and IMC Voltage; you can select the voltage to display in BIOS. Refer to the illustration below for the location of the CPU LED and the table below for LED definition.

2. **Memory LED**

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

3. **PCH LED**

    The PCH LED shows the PCH Voltage. Refer to the illustration below for the location of the PCH LED and the table below for LED definition.

CPU_CRAZY
CPU_HIGH
CPU_NORMAL

DDR_CRAZY
DDR_HIGH
DDR_NORMAL

PCH_CRAZY
PCH_HIGH
PCH_NORMAL
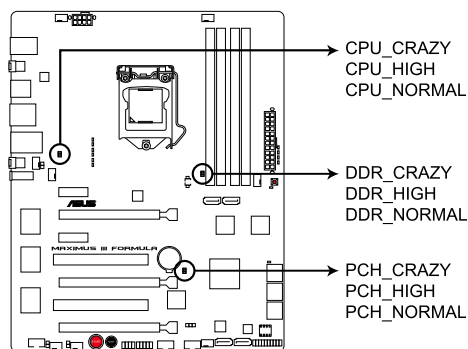
MAXIMUS III FORMULA CPU/ DDR/ PCH LED

	Normal (green)	High (yellow)	Crazy (red)
CPU Voltage (default)	0.85–1.4	1.40625–1.54375	1.55–
CPU PLL	1.60325–2.00075 (79h–97h)	2.014–2.10675 (98h–9Fh)	2.12– (A0h–)
IMC	1.007–1.3515 (4Ch–66h)	1.36475–1.60325 (67h–79h)	1.6165– (7Ah–)

	Normal (green)	High (yellow)	Crazy (red)
DRAM Bus Voltage	1.3515–1.60325 (66h–79h)	1.6165–1.78875 (7Ah–87h)	1.80200– (88h–)

	Normal (green)	High (yellow)	Crazy (red)
PCH Voltage	1.007–1.15275 (4Ch–57h)	1.166–1.20575 (58h–5Bh)	1.219– (5Ch–)

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.
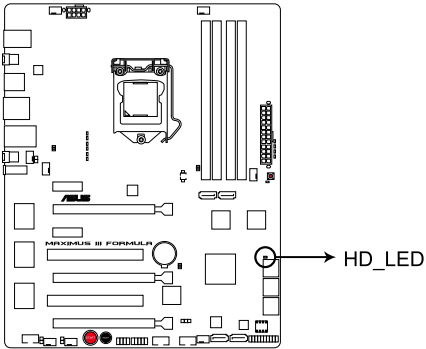
MAXIMUS III FORMULA Hard Disk LED

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.
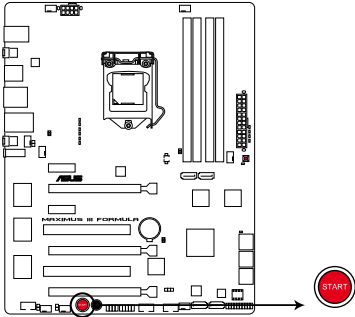
MAXIMUS III FORMULA Power on switch

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 (GO_Button file) for temporary overclocking when in OS.
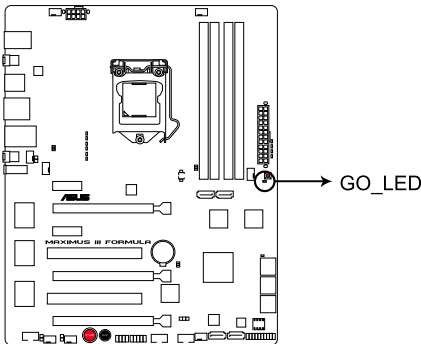
MAXIMUS III FORMULA GO_LED

2.2 Motherboard overview

2.2.1 Motherboard layout
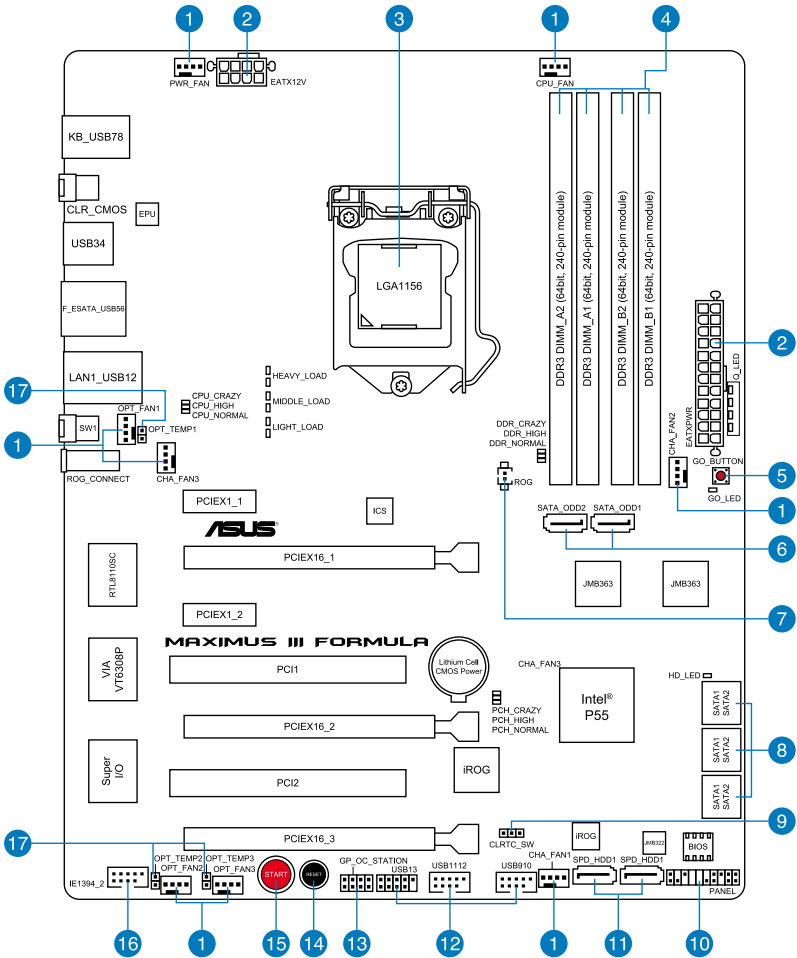
2.2.2   SupremeFX X-Fi audio card layout

Front view   Side view

Optical drive audio connector

Front panel audio connector

Digital audio connector

X-Fi

SUPREMEFX
Listen with Absolutely HD
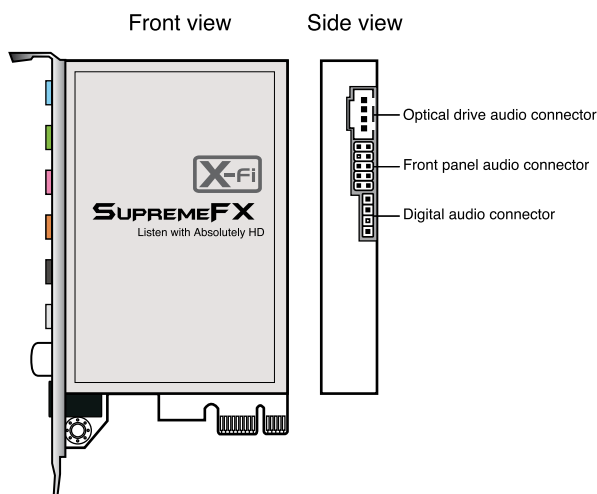
2.2.3   Layout contents

Connectors/Jumpers/Switches/Slots	Page
1.	CPU, chassis, and optional fan connectors (4-pin CPU_FAN; 4-pin PWR_FAN; 4-pin CHA_FAN1–2; 4-pin OPT_FAN1–3)	2-35
2.	ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)	2-37
3.	LGA1156 CPU Socket	2-8
4.	DDR3 DIMM slots	2-13
5.	GO Button	2-42
6.	JMicron® JMB363 Serial ATA connectors (7-pin SATA_ODD1 [white], SATA_ODD2 [white])	2-32
7.	ROG connector (3-pin ROG)	2-33
8.	Intel® P55 Serial ATA connectors (7-pin SATA 1-6)	2-31
9.	Clear RTC RAM (3-pin CLRTC_SW)	2-26
10.	System panel connector (20-8 pin PANEL)	2-38
11.	JMicron® JMB322 Serial ATA connectors (7-pin SPD_HDD1 [red], SPD_HDD2 [red])	2-32
12.	USB connectors (10-1 pin USB910; USB1112; USB13)	2-33
13.	GP connector (8-pin GP)	2-34
14.	Reset switch	2-41
15.	Power-on switch	2-41
16.	Thermal sensor cable connectors (2-pin OPT_TEMP1–3)	2-36
16.	IEEE 1394a port connector (10-1 pin IE1394_2)	2-34

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

2.2.4   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.

2.2.5   Screw holes

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

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

Place this side towards the rear of the chassis
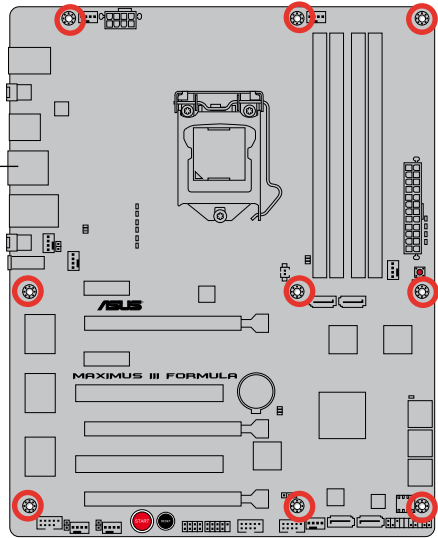
2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1156 socket designed for the Intel® Core™ i7 / Core™ i5 Processors.

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

> • Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
>
> • Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1156 socket.
>
> • The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/ incorrect removal of the PnP cap.

2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.
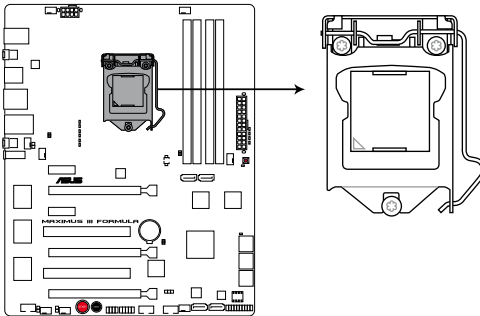
MAXIMUS III FORMULA CPU LGA1156

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

Load lever

A

B

Retention tab

> To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.
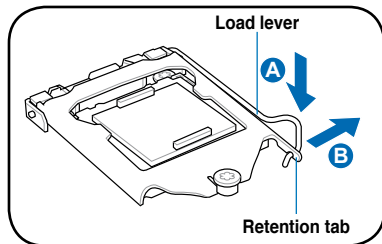
3.   Lift the load lever in the direction
     of the arrow until the load plate is
     completely lifted.

Load plate
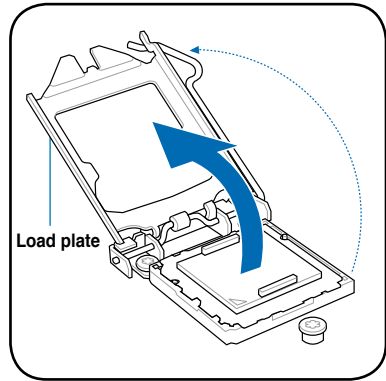
4.   Remove the PnP cap from the CPU
     socket.

PnP cap
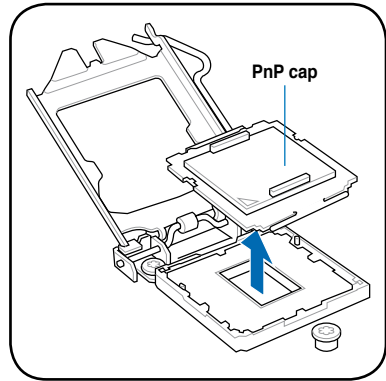
5.   Position the CPU over the socket,
     ensuring that the gold triangle is on
     the bottom-left corner of the socket,
     and then fit the socket alignment
     keys into the CPU notches.

CPU notches

⚠️   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!

**Gold
triangle
mark**

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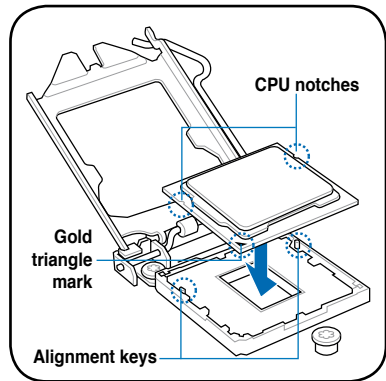
6. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.

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

> The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately, and seek professional medical help.
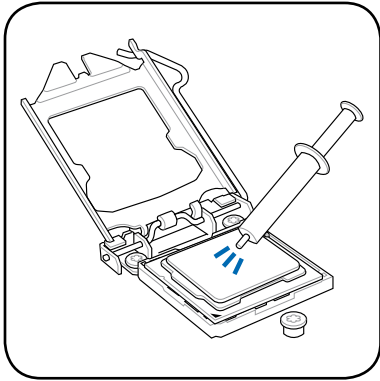
7. Close the load plate (A), and then push down the load lever (B), ensuring that the front edge of the load plate slides under the retention knob (C).
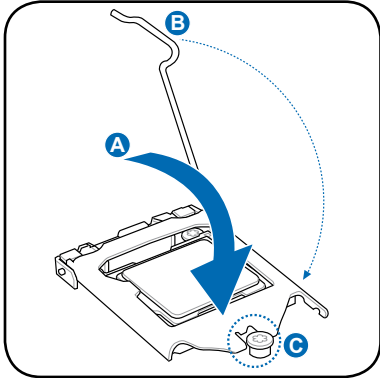
8. Insert the load lever under the retention tab.
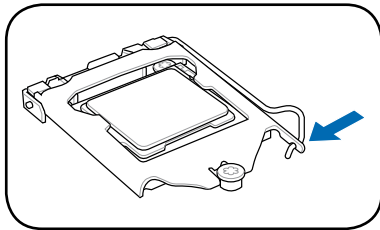
2.3.2   Installing the CPU heatsink and fan

The Intel® LGA1156 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

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

- • Your Intel® LGA1156 heatsink and fan assembly comes in a push-pin design and requires no tool to install.

- • Use an LGA1156-compatible CPU heatsink and fan assembly only. The LGA1156 socket is incompatible with the LGA775 and LGA1366 sockets in size and dimension.

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

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

To install the CPU heatsink and fan:

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

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.
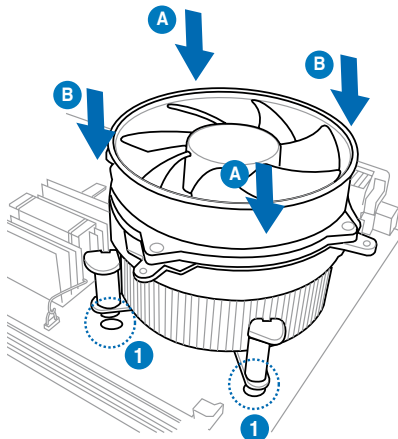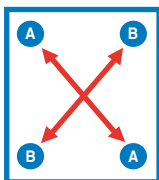
Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

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

CPU_FAN

GND
CPU FAN PWR
CPU FAN IN
CPU FAN PWM
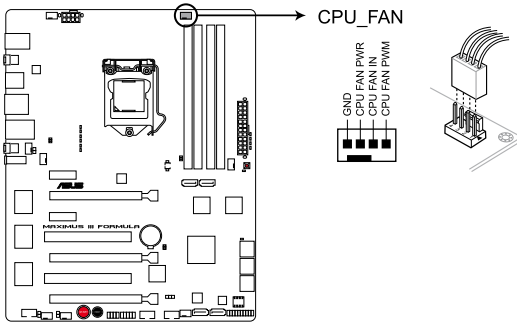
MAXIMUS III FORMULA CPU fan connector

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

2.3.3   Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

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

2. Rotate each fastener counterclockwise.

3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.

A   B

B   A

A

B

B

A
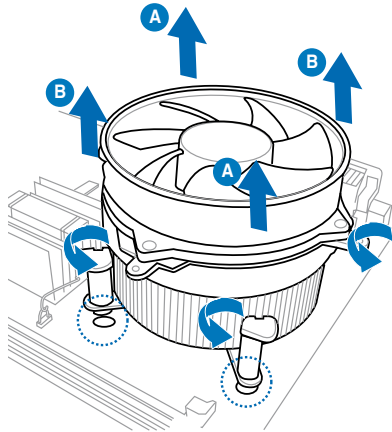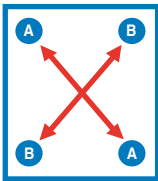
4. Carefully remove the heatsink and fan assembly from the motherboard.

2.4 System memory

2.4.1 Overview

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

A DDR3 module has the same physical dimensions as a DDR2 DIMM but is notched differently 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:
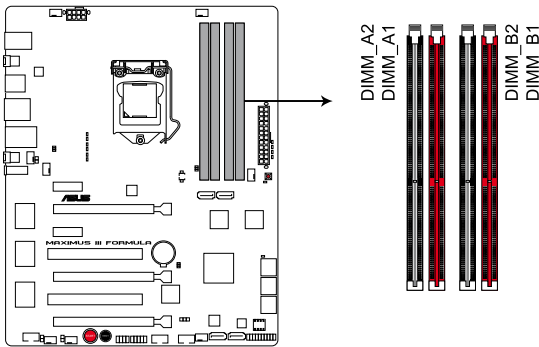
MAXIMUS III FORMULA 240-pin DDR3 DIMM sockets

Recommended memory configurations

One DIMM:

Install one memory module in DIMM_A1 slots as a single-channel operation.

Two DIMMs (dual-channel operation):   Four DIMMs (dual-channel operation):
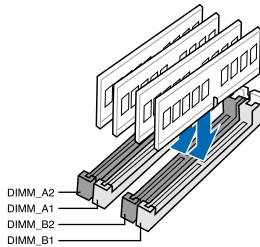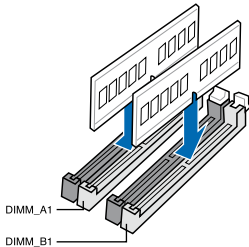
2.4.2   Memory configurations

You may install 1GB, 2GB and 4GB unbuffered 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.

- •   Due to Intel spec definition, X.M.P. DIMMs and DDR3-1600 are supported for one DIMM per channel only.

- •   According to Intel CPU spec, DIMMs with voltage requirement over 1.65V may damage the CPU permanently. We recommend you install the DIMMs with the voltage requirement below 1.65V.

- •   Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.

- •   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 512 Mb chips or less (Memory chip capacity counts in Megabit, 8 Megabit/Mb = 1 Megabyte/MB).

- •   The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, refer to section 3.5 Extreme Tweaker menu for manual memory frequency adjustment.

- •   For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.

Maximus III Formula Motherboard
Qualified Vendors Lists (QVL) DDR3-2133MHz capability

Vendor	Part No.	Size	SS/DS	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)		
							A*	B*	C*
G.SKILL	F3-17066CL9T-6GB-T	6144MB (Kit of 3)	DS	Heat-Sink Package	9-9-9-24 (1066-8-7-7-20)	1.65	•	•	

Maximus III Formula Motherboard
Qualified Vendors Lists (QVL) DDR3-2000MHz capability

Vendor	Part No.	Size	SS/DS	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)		
							A*	B*	C*
Apacer	78.0AGCQ.CBZ(XMP)	3072MB(Kit of 3)	SS	Heat-Sink Package	9-9-9-27 (1066-8-8-8-20)	N/A	•	•	
Crucial	BL12864BE2009.8SFB3(EPP)	1024MB	SS	Heat-Sink Package	9-9-9-28 (1333-9-9-9-24)	2	•	•	•
G.SKILL	F3-16000CL7T-6GBPS(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	7-8-7-20 (1066-8-8-8-20)	1.65	•	•	
G.SKILL	F3-16000CL9T-6GBPS(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	9-9-9-24 (1066-8-8-8-20)	1.65	•	•	
KINGSTON	KHX16000D3K2/2GN(EPP)	2048MB(Kit of 2)	SS	Heat-Sink Package		2.0		•	•
KINGSTON	KHX16000D3K3/3GX(XMP)	3072MB(Kit of 3)	SS	Heat-Sink Package	9(1333-9-9-9-24)	1.65	•	•	•
KINGSTON	KHX16000D3ULT1K3/6GX(XMP)	6144MB(Kit 0f 3)	DS	Heat-Sink Package	8(1066-8-8-8-20)	1.65	•	•	•
KINGSTON	KHX16000D3T1K3/6GX(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	9(1066-8-8-8-20)	1.65	•	•	•
OCZ	OCZ3FXT20002GK	2048MB(Kit of 2)	SS	Heat-Sink Package	8	1.9		•	
OCZ	OCZ3P20002GK(EPP)	2048MB(Kit of 2)	SS	Heat-Sink Package	9	1.9	•	•	
Gingle	9CAASS37AZZ01D1	2048MB	DS	Heat-Sink Package	9-9-9-24	N/A	•	•	•

Maximus III Formula Motherboard
Qualified Vendors Lists (QVL) DDR3-1800MHz capability

Vendor	Part No.	Size	SS/DS	Chip NO.	Timing Lable(Bios)	Voltage	DIMM socket support (Optional)		
							A*	B*	C*
Apacer	78.0AGCD-CDZ(XMP)	2048MB(Kit of 2)	SS	Heat-Sink Package	8-8-8-24 (1800-8-8-8-24)	1.8	•	•	
CORSAIR	BoxP/N:TW3X4G1800C8DF (CM3X2G1800C8D)(XMP)Ver4.1	4096MB(Kit of 2)	DS	Heat-Sink Package	8-8-8-24	1.80	•	•	
KINGSTON	KHX14400D3/1G	1024MB	SS	Heat-Sink Package		1.9	•	•	
KINGSTON	KHX14400D3K2/2GN(EPP)	2048MB(Kit of 2)	SS	Heat-Sink Package		1.9	•	•	
KINGSTON	KHX14400D3K3/3GX(XMP)	3072MB(Kit of 3)	SS	Heat-Sink Package	1800-9-9-9-27	1.65	•	•	•
OCZ	OCZ3P18002GK	2048MB(Kit of 2)	SS	Heat-Sink Package	8		•	•	•
OCZ	OCZ3P18004GK	4096MB(Kit of 2)	DS	Heat-Sink Package	8	1.9	•	•	•
Transcend	TX1800KLU-2GK(XMP)	2048MB(Kit of 2)	SS	Heat-Sink Package	8		•	•	
Patriot	PVS32G1800LLKN(EPP)	2048MB(Kit of 2)	SS	Heat-Sink Package	8-8-8-20 (1066-7-7-7-20)	1.9		•	

Maximus III Formula Motherboard
Qualified Vendors Lists (QVL) DDR3-1600MHz capability

Vendor	Part No.	Size	SS/DS	Chip NO.	Timing Lable(Bios)	Voltage	DIMM socket support (Optional)		
							A*	B*	C*
A-DATA	AD31600E001GMU	3072MB(Kit of 3)	SS	Heat-Sink Package	8-8-8-24(1333-9-9-9-24)	1.65-1.85	•	•	•
A-DATA	AD31600F002GMU(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	7-7-7-20(1333-9-9-9-24)	1.75-1.85	•	•	
CORSAIR	TR3X3G1600C8D(XMP)Ver2.1	3072MB(Kit of 3)	SS	Heat-Sink Package	8-8-8-24(1601-8-8-8-24)	1.65	•	•	
CORSAIR	TR3X3G1600C8D	3072MB(Kit of 3)	SS	Heat-Sink Package	8-8-8-24(1600-8-8-8-24)	1.65	•	•	
CORSAIR	TR3X3G1600C9(XMP)Ver1.1	3072MB(Kit of 3)	SS	Heat-Sink Package	9-9-9-24(1601-9-9-9-24)	1.65	•	•	
CORSAIR	BoxP/N:TW3X4G1600C9DHXNV (CM3X2G1600C9DHXNV)Ver4.1	4096MB(Kit of 2)	DS	Heat-Sink Package	(1333-9-9--9-24)	1.80	•	•	•
CORSAIR	TR3X6G1600C8D(XMP)Ver2.1	6144MB(Kit of 3)	DS	Heat-Sink Package	8-8-8-24(1601-8-8-8-24)	1.65	•	•	
CORSAIR	TR3X6G1600C8D	6144MB(Kit of 3)	DS	Heat-Sink Package	8-8-8-24(1600-8-8-8-24)	1.65	•	•	•
CORSAIR	TR3X6G1600C9(XMP)Ver2.1	6144MB(Kit of 3)	DS	Heat-Sink Package	9-9-9-24(1333-9-9-9-24)	1.65	•	•	
Crucial	BL12864BA1608.8SFB(XMP)	1024MB	SS	Heat-Sink Package	(1601-8-8-8-24)	1.8	•	•	
G.SKILL	F3-12800CL9D-2GBNQ	2048MB(Kit of 2)	SS	Heat-Sink Package	(1333-9-9-9-24)	1.6	•	•	
G.SKILL	F3-12800CL8T-6GBHK(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	8-8-8-21(1333-8-8-8-21)	1.6-1.65	•	•	
G.SKILL	F3-12800CL8T-6GBPI(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	8-8-8-21(1066-8-8-8-20)	1.6~1.65	•	•	•

Maximus III Formula Motherboard
Qualified Vendors Lists (QVL) DDR3-1600MHz capability

Vendor	Part Number	Size	SS/DS	Chip Brand/Package	Timing	Voltage	A*	B*	C*
G.SKILL	F3-12800CL9T-6GBNQ	6144MB(Kit of 3)	DS	Heat-Sink Package	9-9-9-24(1601-9-9-9-24)	1.5-1.6	•	•	•
GEIL	GV34GB1600C8DC	4096MB(Kit of 2)	DS	Heat-Sink Package	8-8-8-28(1600-8-8-8-28)	1.6	•	•	•
KINGMAX	FLGD45F-B8KG9-NAES	1024MB	SS	KFB8FNGXF-ANX-12A	9(1600-9-8-9-28)	1.5	•	•	•
KINGMAX	FLGE85F-B8KG9-NEES	2048MB	DS	KFB8FNGXF-ANX-12A	9(1600-9-8-9-28)	1.5	•	•	•
KINGSTON	KHX12800D3LLK3/3GX(XMP)	3072MB(Kit of 3)	SS	Heat-Sink Package	1600-8-8-8-20	1.65	•	•	
KINGSTON	KHX12800D3K3/12GX(XMP)	12288MB(Kit of 3)	DS	Heat-Sink Package	9(1066-9-9-9-24)		•	•	•
KINGSTON	KHX12800D3K2/4G	4096MB(Kit of 2)	DS	Heat-Sink Package	9(1333-9-9-9-24)	1.9	•	•	•
KINGSTON	KHX12800D3LLK3/6GX(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	(1066-8-8-8-20)	1.65	•	•	•
OCZ	OCZ3P1600EB1G	1024MB	SS	Heat-Sink Package	7-6-6-24(1333-7-7-7-20)		•	•	
OCZ	OCZ3G1600LV3GK	3072MB(Kit of 3)	SS	Heat-Sink Package	8-8-8(1066-7-7-7-20)	1.65	•	•	•
OCZ	OCZ3P1600LV3GK	3072MB(Kit of 3)	SS	Heat-Sink Package	7-7-7(1066-7-7-7-20)	1.65	•	•	•
OCZ	OCZ3P16004GK	4096MB(Kit of 2)	DS	Heat-Sink Package	7-7-7(1333-7-7-7-20)	1.9	•	•	•
OCZ	OCZ3P1600EB4GK	4096MB(Kit of 2)	DS	Heat-Sink Package	7-7-6(1333-7-7-7-20)	1.8	•	•	•
OCZ	OCZ3G1600LV6GK	6144MB(Kit of 3)	DS	Heat-Sink Package	8-8-8(1066-7-7-7-20)	1.65	•		•
OCZ	OCZ3G1600LV6GK	6144MB(Kit of 3)	DS	Heat-Sink Package	8-8-8(1066-7-7-7-16)	1.65	•	•	
OCZ	OCZ3X1600LV6GK(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	8-8-8(1600-8-8-8-24)	1.65	•	•	•
OCZ	OCZ3X1600LV6GK(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	8-8-8(1066-7-7-7-16)	1.65	•	•	
Super Talent	WB160UX6GB(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	1333-8-8-8-24		•	•	•
Cell Shock	CS322271	2048MB(Kit of 2)	DS	Heat-Sink Package	7-7-7-14(1066-7-7-7-20)	1.7-1.9	•	•	•
Elixir	M2F2G64CB8HA4N-DG	2048MB	DS	N2CB1G80AN-DG	9(1333-9-9-9-28)		•	•	•
Mushkin	996657	4096MB(Kit of 2)	DS	Heat-Sink Package	7-7-7-20		•	•	•
Mushkin	998659(XMP)	6144MB(Kit of 3)	DS	Heat-Sink Package	9-9-9-24(1333-9-9-9-24)	1.5-1.6	•	•	•
Patriot	PVT33G1600ELK	3072MB(Kit of 3)	SS	Heat-Sink Package	9-9-9-24(1066-7-7-7-20)	1.65	•	•	•
Patriot	PVS34G1600ELK	4096MB(Kit of 2)	DS	Heat-Sink Package	9-9-9-24(1066-7-7-7-20)	1.8	•		•
Patriot	PVS34G1600LLKN	4096MB(Kit of 2)	DS	Heat-Sink Package	7-7-7-20(1066-7-7-7-20)	2.0	•	•	
Patriot	PVT36G1600ELK	6144MB(Kit of 3)	DS	Heat-Sink Package	9-9-9-24(1066-7-7-7-20)	1.65	•	•	•
Patriot	PVT36G1600ELK	6144MB(Kit of 3)	DS	Heat-Sink Package	9-9-9-24(1600-7-7-7-20)	1.65	•	•	•
PQI	MFADR401PA0102(XMP)	2048MB	DS	K4B1G08460	1066-8-8-8-20		•	•	•

SS - Single-sided   DS - Double-sided DIMM support:

- **A*:** Supports one module inserted in any slot as single-channel memory configuration.
- **B*:** Supports one pair of modules inserted into either the yellow slots or the black slots as one pair of dual-channel memory configuration.
- **C*:** Supports four modules inserted into both the yellow and black slots as two pairs of dual-channel memory configuration.

Visit the ASUS website at www.asus.com for the latest QVL.

Maximus III Formula Motherboard
Qualified Vendors Lists (QVL) DDR3-1333MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)		
								A*	B*	C*
A-DATA	AD133301GOU	1024MB	SS	A-DATA	AD30908C8D-15IG	1333-9-9-9-24		•	•	•
A-DATA	AD1333002GOU	2048MB	DS	A-DATA	AD30908C8D-15IG	1333-9-9-9-24		•	•	•
A-DATA	AD31333E002G0U	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	7-7-7-20 (1333-9-9-9-24)	1.65-1.85	•	•	•
Apacer	78.01GC6.420	1024MB	SS	ELPIDA	J1108BABG-DJ-E	(1333-9-9-9-24)		•	•	•
Apacer	78.01GC6.9L0	1024MB	SS	Apacer	AM5D5808AEWSBG	9(1333-9-9-9-24)		•	•	•
Apacer	78.01GC8.422	1024MB	SS	ELPIDA	J1108BABG-DJ-E(ECC)	(1333-9-9-9-24)		•	•	•
Apacer	78.A1GC6.421	2048MB	DS	ELPIDA	J1108BABG-DJ-E	(1333-9-9-9-24)		•	•	•
Apacer	78.A1GC6.9L1	2048MB	DS	Apacer	AM5D5808AEWSBG	9(1333-9-9-9-24)		•	•	•
Apacer	78.A1GC8.423	2048MB	DS	ELPIDA	J1108BABG-DJ-E(ECC)	(1333-9-9-9-24)		•	•	•
CORSAIR	TR3X3G1333C9 (Ver2.1)	3072MB (Kit of 3)	SS	N/A	Heat-Sink Package	9-9-9-24 (1333-9-9-9-24)	1.5	•	•	•
CORSAIR	CM3X1024-1333C9DHX	1024MB	DS	N/A	Heat-Sink Package	(1333-9-9-9-24)	1.1	•	•	•
CORSAIR	BoxP/N:TWIN3X2048-1333C9 (CM3X1024-1333C9)Ver1.1	2048MB (Kit of 2)	DS	N/A	Heat-Sink Package	9-9-9-24 (1066-7-7-7-20)	1.70	•	•	•
CORSAIR	BoxP/N:TW3X4G1333C9DHX (CM3X2048-1333C9DHX)Ver3.2	4096MB (Kit of 2)	DS	N/A	Heat-Sink Package	9-9-9-24 (1066-7-7-7-20)	1.70	•	•	•
CORSAIR	TR3X6G1333C9 (Ver2.1)	6144MB (Kit of 3)	DS	N/A	Heat-Sink Package	9-9-9-24 (1333-9-9-9-24)	1.5	•	•	•
Crucial	CT12864BA1339.8SFD	1024MB	SS	MICRON	MT8JF12864AY-1G4D1	(1333-9-9-9-24)		•	•	•
Crucial	CT25664BA1339.16SFD	2048MB	DS	MICRON	D9JNM	(1333-9-9-9-24)		•	•	•
Crucial	BL25664BA1336.16SFB1	4096MB (Kit of 2)	DS	NA	Heat-Sink Package	6-6-6-20 (1333-9-9-9-24)	1.8	•	•	•
ELPIDA	EBJ10UE8BAW0-DJ-E	1024MB	SS	ELPIDA	J1108BABG-DJ-E	9(1333-9-9-9-24)		•	•	•
ELPIDA	EBJ21UE8BAW0-DJ-E	2048MB	DS	ELPIDA	J1108BABG-DJ-E	9(1333-9-9-9-24)		•	•	•
G.SKILL	F3-10600CL7D-2GBPI	2048MB (Kit of 2)	SS	N/A	Heat-Sink Package	(1337-7-7-7-18)	1.65	•	•	•
G.SKILL	F3-10600CL8D-2GBHK	2048MB (Kit of 2)	SS	N/A	Heat-Sink Package	(1337-8-8-8-22)	1.65	•	•	•
G.SKILL	F3-10666CL7T-6GBPK(XMP)	2048MB	DS	N/A	Heat-Sink Package	7-7-7-18 (1333-7-7-7-18)	1.5-1.6	•	•	•
G.SKILL	F3-10666CL8D-4GBHK(XMP)	4096MB (Kit of 2)	DS	N/A	Heat-Sink Package	8-8-8-21 (1333-7-7-7-20)	1.5-1.6	•	•	•
G.SKILL	F3-10666CL9T-6GBNQ	6144MB (Kit of 3)	DS	N/A	Heat-Sink Package	9-9-9-24 (1333-9-9-9-24)	1.5	•	•	•
GEIL	GV34GB1333C7DC	4096MB (Kit of 2)	DS	N/A	Heat-Sink Package	7-7-7-24 (1333-8-8-8-28)	1.5	•	•	•
Hynix	HMT112U6BFR8C-H9	1024MB	SS	Hynix	H5TQ1G83BFR	9(1333-9-9-9-24)		•	•	•
Hynix	HMT125U6BFR8C-H9	2048MB	DS	Hynix	H5TQ1G83BFR	9(1333-9-9-9-24)		•	•	•
Hynix	HMT125U6BFR8C-H9	2048MB	DS	Hynix	H5TQ1G83BFRH9C	9(1333-9-9-9-24)		•	•	•
KINGMAX	FLFD45F-B8EE9	1024MB	SS	ELPIDA	J1108BASE-DJ-E	(1333-9-9-9-24)		•	•	•
KINGSTON	KVR1333D3N9/1G	1024MB	SS	ELPIDA	J1108BABG-DJ-E	1333-9-9-9-24	1.5	•	•	•
KINGSTON	KVR1333D3N9/2G	2048MB	SS	ELPIDA	J1108BABG-DJ-E	1333-9-9-9-24	1.5	•	•	•
KINGSTON	KVR1333D3N9/2G	2048MB	DS	ELPIDA	J1108BABG-DJ-E	9(1066-8-7-7-20)	1.5	•	•	•

Maximus III Formula Motherboard
Qualified Vendors Lists (QVL) DDR3-1333MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip No.	Timing	Voltage	A	B	C
MICRON	MT8JTF12864AY-1G4BYES	1024MB	SS	MICRON	Z9HWR	(1333-9-9-9-24)		•	•	
MICRON	MT8JTF12864AZ-1G4F1	1024MB	SS	MICRON	9FF22 D9KPT	9(1066-8-8-8-20)		•	•	•
MICRON	MT16JTF25664AZ-1G4F1	2048MB	DS	MICRON	9FF22 D9KPT	9(1066-8-8-8-20)		•	•	•
OCZ	OCZ3RPX1333EB2GK	1024MB	SS	N/A	Heat-Sink Package	(1066-6-5-5-20)		•		
OCZ	OCZ3G1333LV3GK	3072MB (Kit of 3)	SS	N/A	Heat-Sink Package	9-9-9 (1066-7-7-7-20)	1.65	•	•	
OCZ	OCZ3P1333LV3GK	3072MB (Kit of 3)	SS	N/A	Heat-Sink Package	7-7-7 (1066-7-7-7-16)	1.65	•	•	•
OCZ	OCZ3P13332GK	1024MB	DS	N/A	Heat-Sink Package	7-7-7-20 (1333-9-9-9-24)		•	•	
OCZ	OCZ3P13334GK	4096MB (Kit of 2)	DS	N/A	Heat-Sink Package	7(1333-7-7-7-20)	1.8	•	•	
OCZ	OCZ3RPX1333EB4GK	4096MB (Kit of 2)	DS	N/A	Heat-Sink Package	(1066-6-5-5)	1.85	•	•	
OCZ	OCZ3G1333LV6GK	6144MB (Kit of 3)	DS	N/A	Heat-Sink Package	9-9-9 (1066-7-7-7-20)	1.65	•	•	
OCZ	OCZ3P1333LV6GK	6144MB (Kit of 3)	DS	N/A	Heat-Sink Package	7-7-7 (1066-7-7-7-20)	1.65	•	•	•
OCZ	OCZX1333LV6GK(XMP)	6144MB (Kit of 3)	DS	NA	Heat-Sink Package	8-8-8 (1066-7-7-7-16)	1.6	•	•	•
SAMSUNG	M378B2873DZ1-CH9	1024MB	SS	SAMSUNG	K4B1G0846D	9(1333-9-9-9-24)		•	•	•
SAMSUNG	M378B2873EH1-CH9	1024MB	SS	SAMSUNG	K4B1G0846E	1066-8-7-7-20		•	•	•
SAMSUNG	M391B2873DZ1-CH9	1024MB	SS	SAMSUNG	K4B1G0846D(ECC)	9(1333-9-9-9-24)		•	•	•
SAMSUNG	M378B5673DZ1-CH9	2048MB	DS	SAMSUNG	K4B1G0846D	9(1333-9-9-9-24)		•	•	•
SAMSUNG	M378B5673EH1-CH9	2048MB	DS	SAMSUNG	K4B1G0846E	1066-8-7-7-20		•	•	•
SAMSUNG	M391B5673DZ1-CH9	2048MB	DS	SAMSUNG	K4B1G0846D(ECC)	9(1333-9-9-9-24)		•	•	•
SAMSUNG	M378B5273BH1-CH9	4096MB	DS	SAMSUNG	K4B2G0846B-HCH9	9(1333-9-9-9-24)		•	•	•
Super Talent	W1333UX2GB(XMP)	2048MB (Kit of 2)	SS	N/A	Heat-Sink Package	8(1333-8-8-8-24)	1.8	•	•	
Transcend	TS128MLK64V3U	1024MB	SS	SAMSUNG	K4B1G0846D	9(1333-9-9-9-24)		•	•	•
Transcend	TS256MLK64V3U	2048MB	DS	SAMSUNG	K4B1G0846D	9(1333-9-9-9-24)		•	•	•
Asint	SLY3128M8-EDJ	1024MB	SS	Asint	DDRIII1208-DJ	(9-9-9-24)		•	•	•
Asint	SLY3128M8-EDJE	1024MB	SS	ELPIDA	J1108BASE-DJ-E	1066-8-8-8-20		•	•	•
Asint	SLZ3128M8-EDJ	2048MB	DS	Asint	DDRIII1208-DJ	(9-9-9-24)		•	•	•
Asint	SLZ3128M8-EDJE	2048MB	DS	ELPIDA	J1108BASE-DJ-E	1066-8-8-8-20		•	•	
ASUS	N/A	1024MB	DS	N/A	Heat-Sink Package	(1333-9-9-9-24)		•	•	
BUFFALO	FSX1333D3G-1G	1024MB	SS	N/A	Heat-Sink Package	(1066-7-7-7-20)		•	•	
BUFFALO	FSH1333D3G-T3G(XMP)	3072MB (Kit of 3)	SS	N/A	Heat-Sink Package	7-7-7-20 (1066-8-7-7-20)		•	•	
BUFFALO	FSX1333D3G-2G	2048MB	DS	N/A	Heat-Sink Package	(1066-7-7-7-20)		•	•	
Elixir	M2F2G64CB8HA4N-CG	2048MB	DS	Elixir	N2CB1G80AN-CG	(1333-9-9-9-24)		•	•	
Patriot	PDC32G1333LLK	1024MB	SS	PATRIOT	Heat-Sink Package	7(1337-7-7-7-20)	1.7	•	•	
Patriot	PVT33G1333ELK	3072MB (Kit of 3)	SS	N/A	Heat-Sink Package	9-9-9-24 (1066-7-7-7-20)	1.65	•	•	
Patriot	PVS34G1333ELK	4096MB (Kit of 2)	DS	N/A	Heat-Sink Package	9-9-9-24 (1066-7-7-7-20)	1.5	•	•	

Maximus III Formula Motherboard
Qualified Vendors Lists (QVL) DDR3-1333MHz capability

Patriot	PVS34G1333LLK	4096MB (Kit of 2)	DS	N/A	Heat-Sink Package	7-7-7-20 (1066-7-7-7-20)	1.7	•	•	
Patriot	PVT36G1333ELK	6144MB (Kit of 3)	DS	N/A	Heat-Sink Package	9-9-9-24 (1066-7-7-7-20)	1.65	•	•	•
Silicon Power	SP001GBLTU133S02	1024MB	SS	S-POWER	I0YT3E0	9(1333-9-9-9-24)		•	•	
Silicon Power	SP002GBLTU133S02	2048MB	DS	S-POWER	I0YT3E0	9(1333-9-9-9-24)		•	•	•

Maximus III Formula Motherboard
Qualified Vendors Lists (QVL) DDR3-1066MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)		
								A*	B*	C*
CORSAIR	CM3X1024-1066C7	1024MB	DS	N/A	Heat-Sink Package	7	1.1	•	•	•
Crucial	CT12864BA1067.8SFD	1024MB	SS	MICRON	D9JNL	7		•	•	•
Crucial	CT25664BA1067.16SFD	2048MB	DS	MICRON	D9JNL	7		•	•	•
ELPIDA	EBJ10UE8BAW0-AE-E	1024MB	SS	ELPIDA	J1108BABG-DJ-E	7(1066-7-7-7-20)		•	•	•
ELPIDA	EBJ11RD8BAFA-AE-E	1024MB	DS	ELPIDA	J5308BASE-AC-E(ECC)	7		•	•	•
ELPIDA	EBJ11UD8BAFA-AG-E	1024MB	DS	ELPIDA	J5308BASE-AC-E	8		•	•	
ELPIDA	EBJ21UE8BAW0-AE-E	2048MB	DS	ELPIDA	J1108BABG-DJ-E	7(1066-7-7-7-20)		•	•	•
Hynix	HMT112U6AFP8C-G7N0	1024MB	SS	HYNIX	H5TQ1G83AFPG7C	7		•	•	•
Hynix	HYMT112U64ZNF8-G7	1024MB	SS	HYNIX	HY5TQ1G831ZNFP-G7	7		•	•	•
Hynix	HMT125U6AFP8C-G7N0	2048MB	SS	HYNIX	H5TQ1G83AFPG7C	7		•	•	•
Hynix	HYMT125U64ZNF8-G7	2048MB	DS	HYNIX	HY5TQ1G831ZNFP-G7	7		•	•	•
KINGSTON	KVR1066D3N7/1G	1024MB	SS	ELPIDA	J1108BABG-DJ-E	1066-7-7-7-20	1.5	•	•	•
KINGSTON	KVR1066D3N7/2G	2048MB	DS	ELPIDA	J1108BABG-DJ-E	1066-7-7-7-20	1.5	•	•	•
KINGSTON	KVR1066D3N7/4G	4096MB	DS	SAMSUNG	K4B2G0846B-HCF8	1066-7-7-7-20	1.5	•	•	•
MICRON	MT8JTF12864AY-1G1D1	1024MB	SS	MICRON	7VD22	7		•	•	•
MICRON	MT8JTF12864AZ-1G1F1	1024MB	SS	MICRON	8ZF22 D9KPV	7(1066-7-7-7-20)		•	•	•
MICRON	MT16JTF25664AY-1G1D1	2048MB	DS	MICRON	7VD22	7		•	•	•
MICRON	MT16JTF25664AZ-1G1F1	2048MB	DS	MICRON	8ZF22 D9KPV	7(1066-7-7-7-20)		•	•	•
SAMSUNG	M378B5273BH1-CF8	4096MB	DS	SAMSUNG	K4B2G0846B-HCF8	8(7-7-7-20)	1.5	•	•	•
Transcend	TS256MLK64V1U	2048MB	DS	ELPIDA	J1108BABG-AE-E	7(1066-7-7-7-20)		•	•	•
Asint	SLY3128M8-EAE	1024MB	SS	Asint	DDRIII1208-AE	(7-7-7-20)		•	•	•
Asint	SLZ3128M8-EAE	2048MB	DS	Asint	DDRIII1208-AE	(7-7-7-20)		•	•	•
Elixir	M2F2G64CB8HAN4-BE	2048MB	DS	Elixir	N2CB1G80AN-BE	7			•	
WINTEC	3DU3191A-10	1024MB	DS	Qimonda	IDSH51-03A1F1C-10F	7		•	•	•

2.4.3 Installing a DIMM

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

To install a DIMM

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 break on the socket.

DIMM notch

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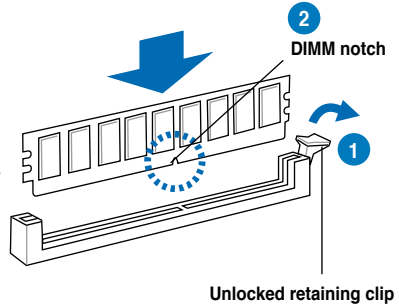
✏ A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

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

Locked Retaining Clip
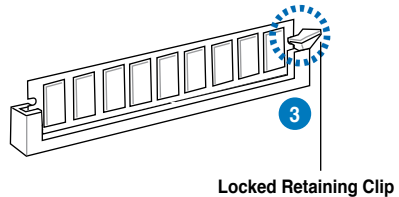
2.4.4 Removing a DIMM

Follow these steps to remove a DIMM.

1. Press the retaining clip outward to unlock the DIMM.
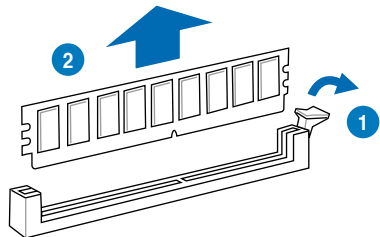
✏ Support the DIMM lightly with your fingers when pressing the retaining clip. The DIMM might get damaged when it flips out with extra force.

2. Remove the DIMM from the socket.

2.5   Expansion slots

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

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

2.5.1   Installing an expansion card

To install an expansion card:

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

2.5.2   Configuring an expansion card

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

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

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

2.5.3   Interrupt assignments

Standard interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	–	Redirect to IRQ#9
4	12	Communications Port (COM1)*
5	13	IRQ Holder for PCI Steering*
6	14	Reserved
7	15	Reserved
8	3	System CMOS/Real Time Clock
9	4	IRQ Holder for PCI Steering*
10	5	IRQ Holder for PCI Steering*
11	6	IRQ Holder for PCI Steering*
12	7	Reserved
13	8	Numeric Data Processor
14	9	Primary IDE Channel

* These IRQs are usually available for PCI devices.

IRQ assignments for this motherboard

	A	B	C	D	E	F	G	H
PCIEX16_1	shared	–	–	–	–	–	–	–
PCIEX16_2	–	shared	–	–	–	–	–	–
PCIEX16_3	–	–	shared	–	–	–	–	–
PCI_1	–	–	–	–	–	shared	–	–
PCI_2	–	–	–	–	–	–	shared	–
USB 2.0 controller1	–	–	–	–	–	–	–	shared
USB 2.0 controller2	shared	–	–	–	–	–	–	–
LAN1	–	–	–	–	–	–	shared	–
SATA controller	–	–	–	–	shared	–	–	–
Onboard ATA controller I	–	–	shared	–	–	–	–	–
1394 Controller	–	–	–	–	–	–	–	shared
HD Audio	–	–	–	–	–	–	shared	–
Onboard ATA controller II	–	–	–	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 x1 slots

This motherboard supports PCI Express x1 network cards, SCSI cards and other cards that comply with the PCI Express specifications.

> Install a PCIe x1 device to a PCIe x1 slot prior to a PCIe x16 slot.

2.5.6   PCI Express x16 slot

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

2.5.7   PCI Express 2.0 x16 slots

This motherboard has two 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.

PCI slot   PCI slot   PCI Express x16_3 slot

PCI Express x16_2 slot

PCI Express x1_2 slot

PCI Express x16_1 slot

PCI Express x1_1 slot
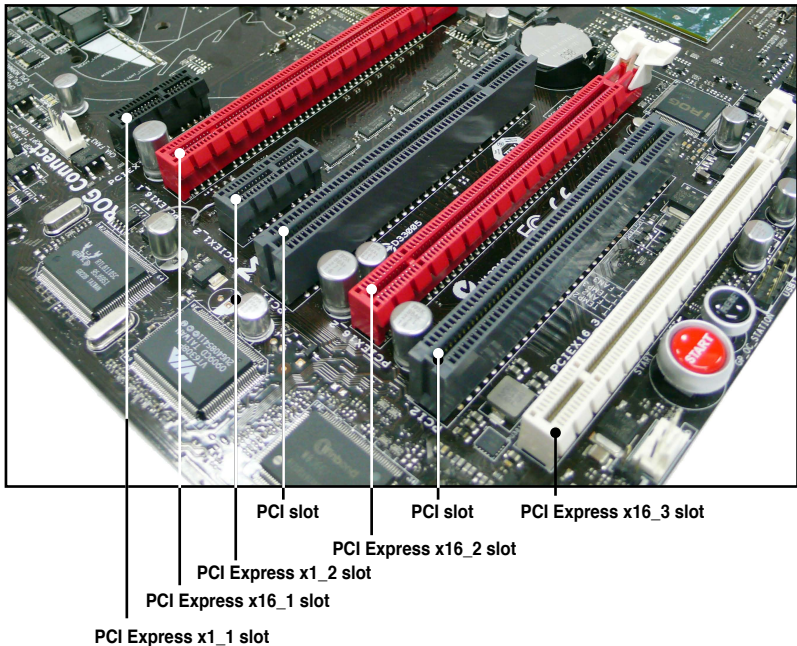
- In single VGA card mode, use first the PCIe 2.0 x16_1 slot for a PCI Express x16 graphics card to get better performance.

- In CrossFireX™ or SLI mode, use the PCIe 2.0 x16_1 and PCIe 2.0 x16_2 (red) slots for PCI Express x16 graphics cards to get better performance.

- We recommend that you provide sufficient power when running CrossFireX™ or SLI mode. See page 2-37 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 <Del> key during the boot process and enter BIOS setup to re-enter data.

CLRTC_SW

1 2   2 3

Enable   Disable
(Default)

MAXIMUS III FORMULA Clear RTC RAM
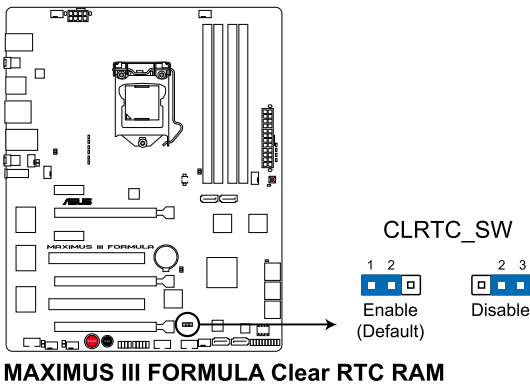
clr CMOS switch behavior

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

*G3: Power off without +5VSB power (AC power loss); S5: Power off with +5VSB power
**The system shuts dowm immediately.

- •   The clr CMOS switch will not function if the 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 overclocking. With the C.P.R. (CPU Parameter Recall) feature, shut down and reboot the system so the BIOS can automatically reset CPU parameter settings to default values.

2.7 I/O shield and Audio card Installation

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

2.7.2   Audio card Installation

1.   Take out the Audio card from the package.

2.   Locate the audio slot on the
      motherboard.
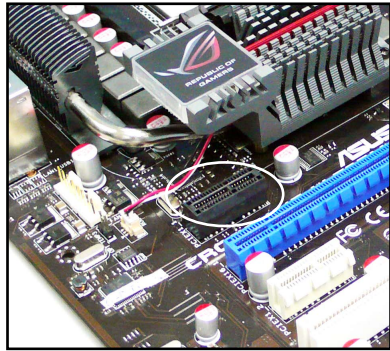
3.   Align the card connector with the
      slot and press firmly until the card
      sits on the slot completely.
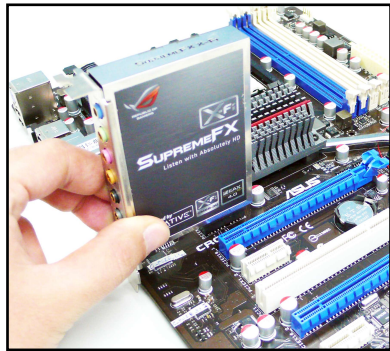
4.   The photo below shows the audio
      card installed on the motherboard.
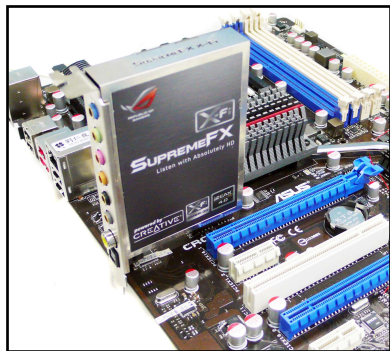
The photos above are for reference only.

2.8 Connectors

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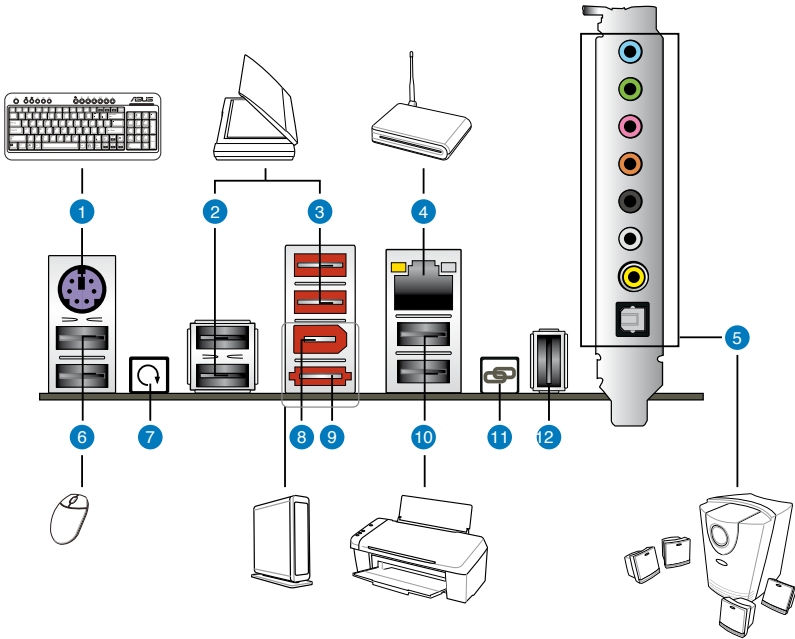
Rear panel connectors			
1.	PS/2 keyboard port (purple)	7.	Clear CMOS switch
2.	USB 2.0 ports 3 and 4	8.	IEEE 1394a port
3.	USB 2.0 ports 5 and 6	9.	External SATA port
4.	LAN (RJ-45) port*	10.	USB 2.0 ports 1 and 2
5.	Audio Ports**	11.	ROG Connect switch
6.	USB 2.0 ports 7 and 8	12.	USB 2.0 port 14

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

* LAN port LED indications

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

Activity/ Speed
Link LED   LED

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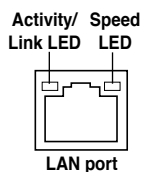
**Audio 2, 4, 6, or 8-channel configuration

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 Internal connectors

1. Intel® P55 Serial ATA connectors (7-pin SATA 1-6)

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

If you installed Serial ATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the Intel® Matrix Storage Technology through the onboard Intel® P55 chipset.

SATA1   SATA2

SATA3   SATA4

SATA5   SATA6
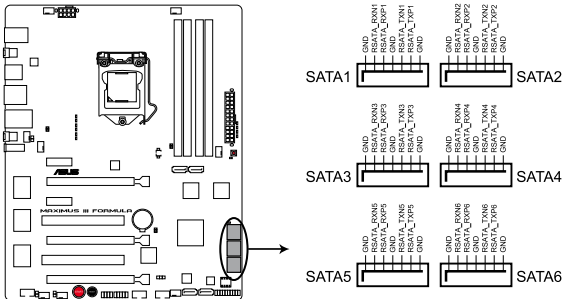
MAXIMUS III FORMULA SATA connectors
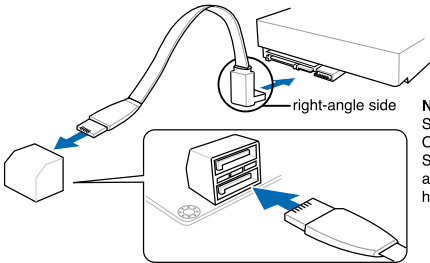
right-angle side

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

- These connectors are set to Standard IDE mode by default. In Standard IDE mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the **Configure SATA as** item in the BIOS to [RAID]. See section **3.4.5 Storage Configuration** for details.

- Before creating a RAID set, refer to section **4.4 RAID configurations** or the manual bundled in the motherboard support DVD.

- You must install Windows® XP Service Pack 2 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP2 or later versions.

- When using hot-plug and NCQ, set the **Configure SATA as** in the BIOS to [AHCI]. See section **3.4.5 Storage Configuration** for details.

2. JMicron® JMB322 Serial ATA connectors (7-pin SPD_HDD1 [red], SPD_HDD2 [red])

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives. Connect Serial ATA hard disk drives to these ports if you want to create hardware RAID.
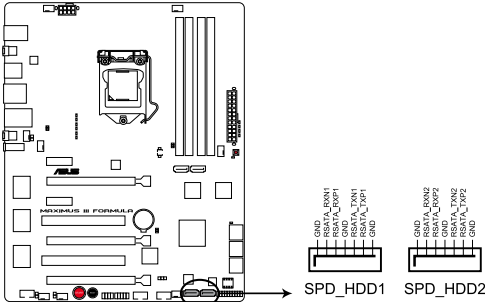
MAXIMUS III FORMULA SPD_HDD connectors

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

These connectors are for the Serial ATA signal cables for Serial ATA optical disk drives.
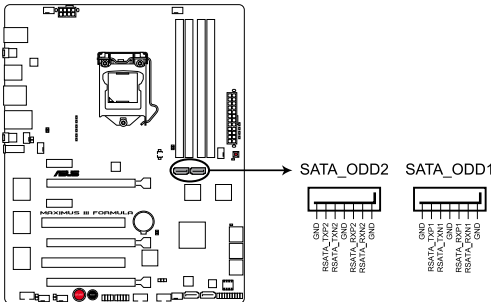
MAXIMUS III FORMULA SATA_ODD connectors

4. **USB connectors (10-1 pin USB910; USB1112; USB13)**

   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.

   MAXIMUS III FORMULA USB2.0 connectors
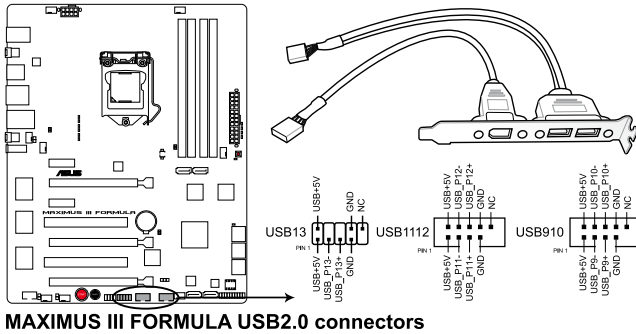
   Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

   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.

5. **ROG connector (3-pin ROG)**

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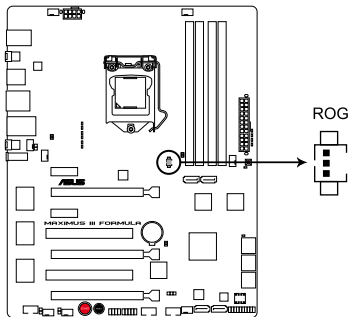
   MAXIMUS III FORMULA ROG connector

6. GP connector (8-pin GP)

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.
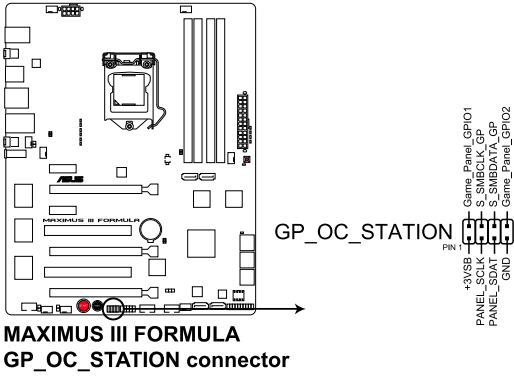
**MAXIMUS III FORMULA
GP_OC_STATION connector**

7. 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.
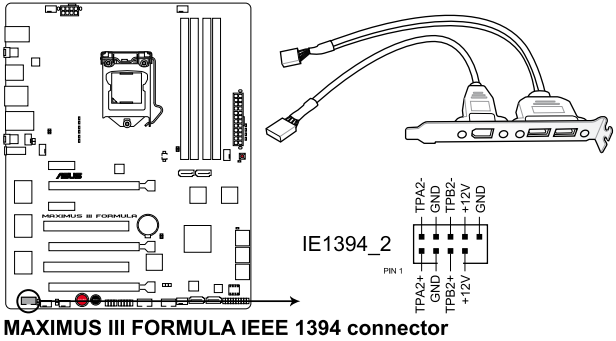
MAXIMUS III FORMULA IEEE 1394 connector

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

8. 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!

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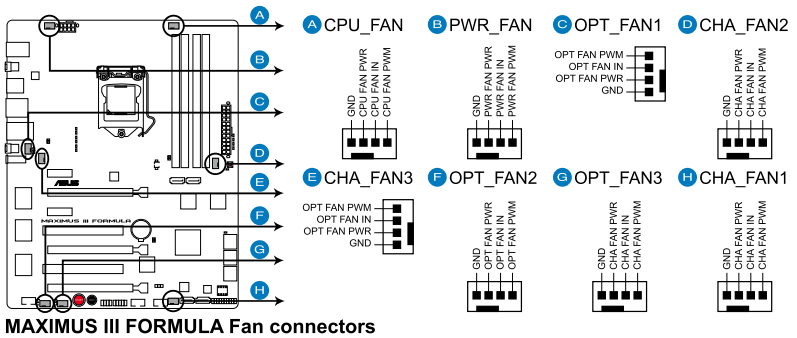
If you install two VGA cards, we recommend that you plug the chassis fan cable to the motherboard connector labeled OPT_FAN1/2/3 for better thermal environment.

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

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

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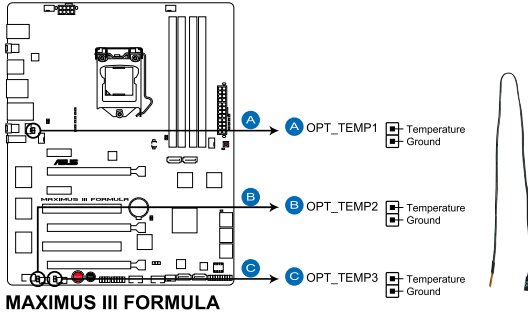
Enable **OPT FAN1/2/3 overheat protection** in BIOS if you connect thermal sensor cables to these connectors.

The thermal sensor cable is purchased separately.

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.
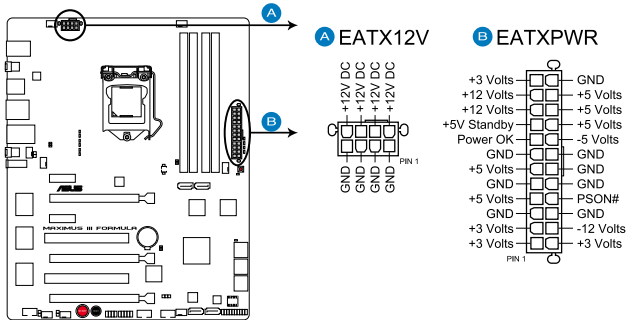
MAXIMUS III FORMULA ATX power connectors

• For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 600 W.

• Do not forget to connect the 8-pin 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.

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

PSU suggested list

PS U suggested list
SilverStone ST1000
Seasonic SS-600HT
Thermaltake W0083RE
Thermaltake PUREPower-600AP
Silverstone SST-ST75ZF
EnerMAX EG701AX-VE (E)(24P)

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

This connector supports several chassis-mounted functions.
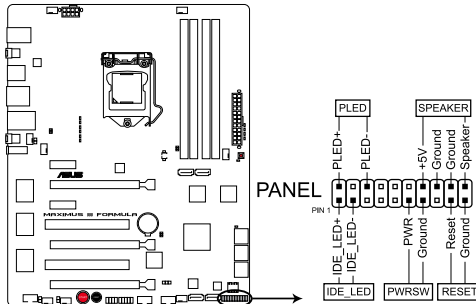
MAXIMUS III FORMULA System panel connector

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

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

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

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

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

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

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

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

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

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

12. **Audio connectors**

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

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

We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

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

Front view   Side view

Optical drive audio connector

Front panel audio connector

Digital audio connector

X-Fi

SUPREMEFX

Listen with Absolutely HD
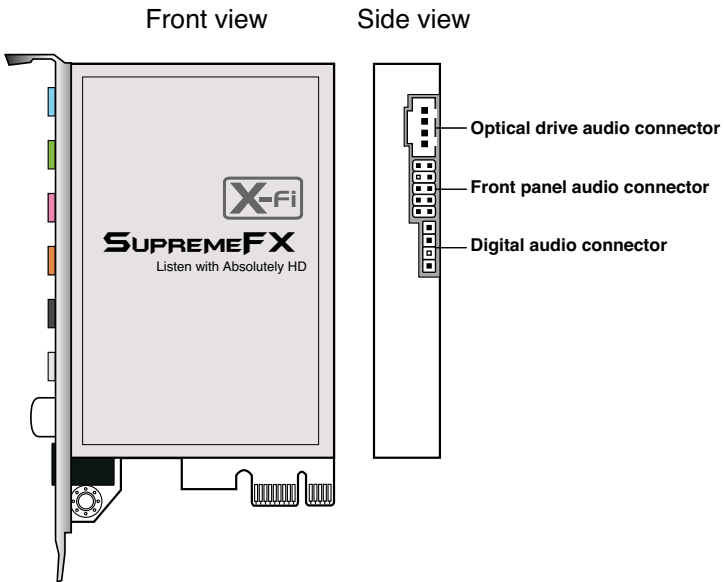
13. ASUS Q-Connector (system panel)

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.
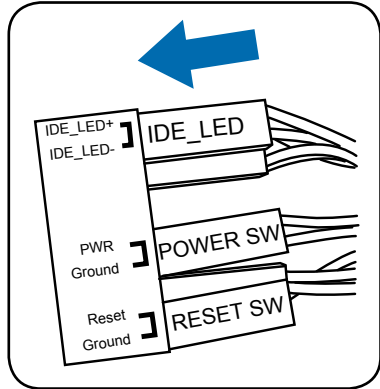
2. Install the ASUS Q-Connector to the system panel connector, ensuring the orientation matches the labels on the motherboard.
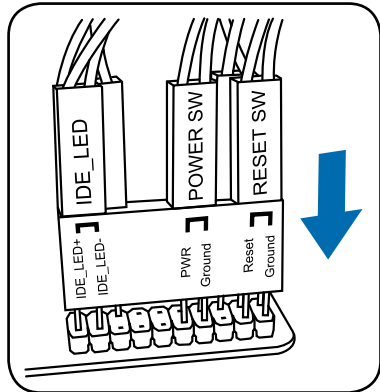
3. The front panel functions are now enabled. The figure shows the Q-Connector is properly installed on the motherboard.
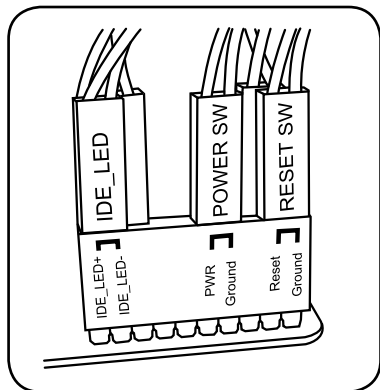
2.8.3 Onboard switches

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

1. **Power-on switch**

   Press the power-on switch to wake/power up the system.
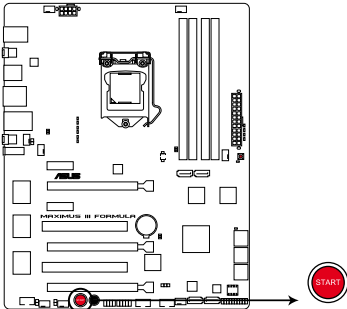
MAXIMUS III FORMULA Power on switch

2. **Reset switch**

   Press the reset switch to reboot the system.
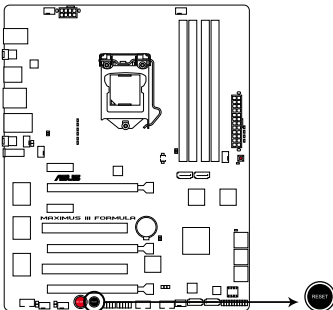
MAXIMUS III FORMULA Reset switch

3. **GO button**

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

   MAXIMUS III FORMULA GO_BUTTON
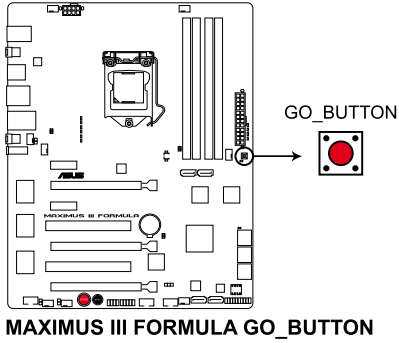
2.9   Starting up for the first time

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

2.   Be sure that all switches are off.

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

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

5.   Turn on the devices in the following order:

    a.   Monitor

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

    c.   System power

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

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

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

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

2.10 Turning off the computer

2.10.1 Using the OS shut down function

If you are using Windows® Vista™:

1. Click the **Start** button 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 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

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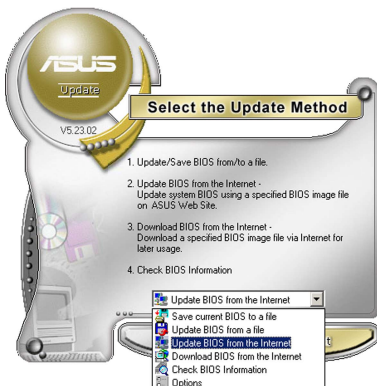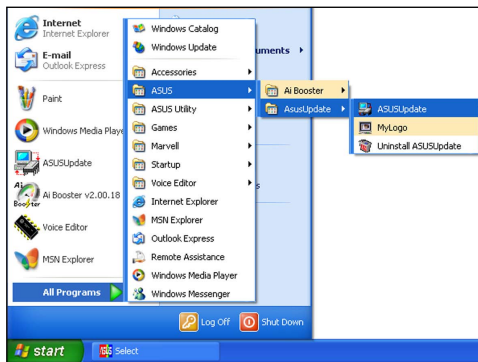
2.   Select **Update BIOS** from the Internet option from the drop-down menu, then click **Next**.

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

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

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

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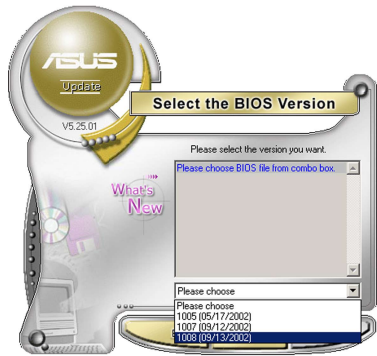
Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

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

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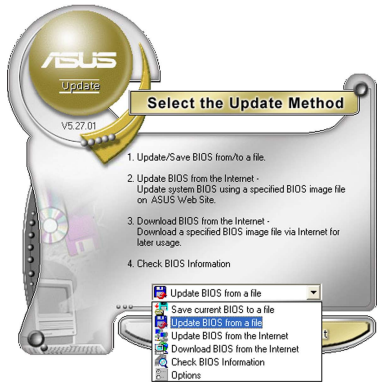
3.   Locate the BIOS file from the Open
      window, then click **Open**.

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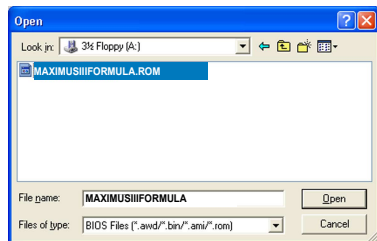
3.1.2   ASUS EZ Flash 2 utility

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

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

To update the BIOS using EZ Flash 2

1.   Insert the USB flash disk that contains the latest BIOS file to the USB port, and then launch EZ Flash 2 in any of these two ways:

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

   •   Enter the BIOS setup program. Go to the **Tools** menu to select **EZ Flash 2** and press <Enter> to enable it.

```
            ASUSTek EZ Flash 2 BIOS ROM Utility V3.34
   FLASH TYPE: MXIC 25L1605A
   ┌─────── Current ROM ───────┐    ┌─────── Update ROM ───────┐
   │ BOARD: Maximus III Formula │    │ BOARD: Unknown           │
   │ VER: 0229                  │    │ VER: Unknown             │
   │ DATE: 07/29/2009           │    │ DATE: Unknown            │
   └────────────────────────────┘    └──────────────────────────┘
   PATH: A:\

   ┌──────┐  ┌──────────────────────────────────────────┐
   │ A:   │  │                                          │
   │      │  │                                          │
   │      │  │                                          │
   │      │  │                                          │
   │      │  │                                          │
   │      │  │                                          │
   └──────┘  └──────────────────────────────────────────┘
   ┌ Note ──────────────────────────────────────────────┐
   │  [Enter] Select or Load    [Tab] Switch    [V] Drive Info │
   │  [Up/Down/Home/End] Move    [B] Backup      [Esc] Exit    │
   └──────────────────────────────────────────────────────┘
```
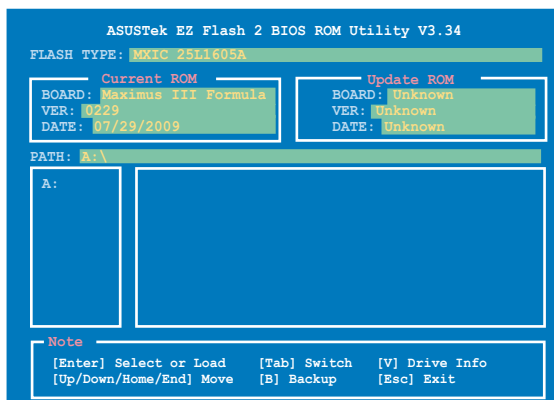
2.   Press <Tab> to switch between drives until the correct BIOS file is found. When found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.

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

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

3.1.3 ASUS CrashFree BIOS 3 utility

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

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

Recovering the BIOS

To recover the BIOS

1. Turn on the system.

2. Insert the motherboard support DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.

3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.

4. Turn off the system after the utility completes the updating process and power on again.

5. The system requires you to enter BIOS Setup to recover BIOS setting. To ensure system compatibility and stability, we recommend that you press <F2> to load default BIOS values.

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

3.2 BIOS setup program

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

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

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

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

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

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

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section **3.9 Exit Menu**.

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

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

3.2.1   BIOS menu screen

Menu items   Menu bar   Configuration fields   General help

```
                          BIOS SETUP UTILITY
  Extreme Tweaker    Main    Advanced    Power    Boot    Tools    Exit
 ┌──────────────────────┐ ┌─────────────────────┐ ┌──────────────────────┐
 │ System Time          │ │ [13:51:25]          │ │ Use [ENTER], [TAB]   │
 │ System Date          │ │ [Thu 07/30/2009]    │ │ or [SHIFT-TAB] to    │
 │ Language             │ │ [English]           │ │ select a field.      │
 │                      │ │                     │ │                      │
 │ ▶ SATA1              │ │ [HDT722516DLA380]   │ │ Use [+] or [-] to    │
 │ ▶ SATA2              │ │ [Not Detected]      │ │ configure system Date.│
 │ ▶ SATA3              │ │ [ATAPI DVD D DH1]   │ │                      │
 │ ▶ SATA4              │ │ [Not Detected]      │ └──────────────────────┘
 │ ▶ SATA5              │ │ [Not Detected]      │ ┌──────────────────────┐
 │ ▶ SATA6              │ │ [Not Detected]      │ │ ←→    Select Screen   │
 │                      │ └─────────────────────┘ │ ↑↓    Select Item     │
 │ ▶ Storage Configuration                        │ +-    Change Field    │
 │ ▶ System Information │                          │ Tab   Select Field    │
 └──────────────────────┘                          │ F1    General Help    │
                                                    │ F10   Save and Exit   │
                                                    │ ESC   Exit            │
                                                    └──────────────────────┘
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```

Sub-menu items   Navigation keys

3.2.2   Menu bar

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

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

3.2.3   Navigation keys

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

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

ROG Maximus III Formula   3-7

3.2.4   Menu items

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

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

3.2.5   Submenu items

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

3.2.6   Configuration fields

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

A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to **3.2.7 Pop-up window.**

3.2.7   Pop-up window

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

3.2.8   Scroll bar

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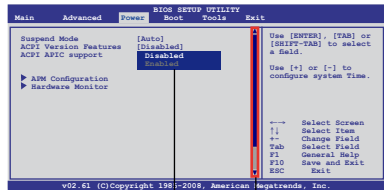
Scroll bar

Pop-up window

3.2.9   General help

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

3.3 Extreme Tweaker menu

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

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

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

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

 Configure System Frequency/Voltage            ▲       Tuning Mode is the
                                                       BIOS menu switch for
 Target CPU Frequency: 2128MHZ                         different purpose.
 Target DRAM Frequency: 1066MHZ                        Extreme OC offers
                                                       the max tuning degree
 CPU Level Up                   [Auto]                 of freedom to the
 Memory Level Up                [Auto]                 extreme.
 ---------------------------------------------         Gaming provides the
 Ai Overclock Tuner             [Auto]                 major tuning settings
 CPU Ratio Setting              [Auto]                 for system
 ▶  CPU Configuration                                  performance boot.
 *Intel(R) SpeedStep(TM) Tech [Enabled]
 *Intel(R) Turbo Mode Tech    [Enabled]                ←→    Select Screen
 QPI Frequency                  [Auto]                 ↑↓    Select Item
                                                       +-    Change Field
 ▶  DRAM Timing Control                                F1    General Help
                                                       F10   Save and Exit
 CPU Clock Amplitude            [Auto]                 ESC   Exit
 PCU Clock Amplitude            [Auto]
 CPU Clock Skew                 [Auto]          ▼

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```

Scroll down to display the following items:

```
 PCU Clock Skew                 [Auto]          ▲
 ******** Please key in numbers directly! ********
 Current Voltage: 1.078V  1.799V  1.118V
 CPU Temperature: 33°C/91°F
 Extreme OV                     [Disabled]
 Full Phase Control             [HW TEST]
 Load-Line Calibration          [Auto]
 CPU Voltage Mode               [VID]
 CPU Voltage                    [Auto]
 CPU PLL Voltage                [Auto]
 IMC Voltage                    [Auto]
 Current Voltage: 1.058V
 PCH Temperature: 38°C/100°F
 PCH Voltage                    [Auto]
 Current Voltage: 1.535V
 DRAM Voltage                   [Auto]
 DRAM DATA REF Voltage on CHA   [Auto]
 DRAM CTRL REF Voltage on CHA   [Auto]
 DRAM DATA REF Voltage on CHB   [Auto]
 DRAM CTRL REF Voltage on CHB   [Auto]          ←→    Select Screen
                                                ↑↓    Select Item
 Keyboard Tweakit Control       [Disabled]      +-    Change Option
                                                F1    General Help
 ******** Spread Spectrum and Clock Skew *********  F10   Save and Exit
 CPU Spread Spectrum            [Auto]          ESC   Exit
 PCIE Spread Spectrum           [Auto]          ▼

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```

3.3.1   Ai Overclock Tuner [Auto]

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

Manual	Allows you to individually set overclocking parameters.
Auto	Loads the optimal settings for the system.
X.M.P.	If you install memory module(s) supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to set the profile(s) supported by your memory module(s) for optimizing the system performance.
CPU Level Up	Allows you to select a CPU level, and the related parameters will be adjusted automatically.
Memory Level Up	Allows you to select a memory level, and the related parameters will be adjusted automatically.

3.3.2   eXtreme Memory Profile [High Performance]

This item appears only when you set the **Ai Overclock Tuner** item to [X.M.P.] and allows you to select the X.M.P. mode supported by your memory module. Configuration options: [High Performance] [High Frequency]

3.3.3   OC From CPU/Memory Level Up [Auto]

These item appear only when you set the **Ai Overclock Tuner** item to [Manual].

3.3.4   CPU Ratio Setting [Auto]

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

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

When set to [Disabled], the CPU runs at its default speed. When set to [Enabled], the CPU speed is controlled by the operating system.
Configuration options: [Disabled] [Enabled]

3.3.6   Intel(R) TurboMode Tech [Enabled]

This item appears only if you set the **CPU Ratio Setting** item to [Auto]. Turbo mode allows processor cores to run faster than marked frequency in specific condition. Configuration options: [Disabled] [Enabled]

The following two items do not appear when you set the **Ai Overclock Tuner** item to [Auto].

3.3.7 BCLK Frequency [XXX]

Allows you to adjust the Internal Base Clock (BCLK). Use the <+> and <-> keys to adjust the value. You can also type the desired value using the numeric keypad. The values range from 80 to 500.

3.3.8 PCIE Frequency [XXX]

Allows you to set the PCI Express frequency. Use the <+> and <-> keys to adjust the PCIE frequency. The values range from 100 to 200.

3.3.9 QPI Frequency [Auto]

Configuration options: [Auto] [4270MHz] [4800MHz]

3.3.10 DRAM Frequency [Auto]

Allows you to set the DDR3 operating frequency.
Configuration options: [Auto] [800MHz] [1066MHz] [1333MHz]

3.3.11 DRAM Timing Control

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

1st Information: 6-6-6-15-4-36-6-5-16

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

DRAM CAS# Latency [Auto]
Configuration options: [Auto] [3 DRAM Clock] [4 DRAM Clock] – [10 DRAM Clock] [11 DRAM Clock]

DRAM RAS# to CAS# Delay [Auto]
Configuration options: [Auto] [3 DRAM Clock] [4 DRAM Clock] – [9 DRAM Clock] [10 DRAM Clock]

DRAM RAS# PRE Time [Auto]
Configuration options: [Auto] [3 DRAM Clock] [4 DRAM Clock] – [9 DRAM Clock] [10 DRAM Clock]

DRAM RAS# ACT Time [Auto]
Configuration options: [Auto] [3 DRAM Clock] [4 DRAM Clock] – [30 DRAM Clock] [31 DRAM Clock]

DRAM RAS# to RAS# Delay [Auto]
Configuration options: [Auto] [1 DRAM Clock] – [7 DRAM Clock]

DRAM REF Cycle Time [Auto]
Configuration options: [Auto] [30 DRAM Clock] [36 DRAM Clock]
[48 DRAM Clock] [60 DRAM Clock] [72 DRAM Clock] [82 DRAM Clock]
[88 DRAM Clock] [90 DRAM Clock] [100 DRAM Clock] [110 DRAM Clock]

DRAM WRITE Recovery Time [Auto]
Configuration options: [Auto] [1 DRAM Clock] – [15 DRAM Clock]

DRAM READ to PRE Time [Auto]
Configuration options: [Auto] [1 DRAM Clock] – [15 DRAM Clock]

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

2nd Information: 1N-49-52

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

DRAM Timing Mode [Auto]
Configuration options: [Auto] [1N] [2N] [3N]

DRAM Round Trip Latency on CHA/B [Auto]
[Auto] [Advance 15 Clock]–[Advance 1 Clock] [Normal] [Delay 1 Clock]
[Delay 15 Clock]

3rd Information: 6-6-13-9-9-9-7-6-4-7-7-4

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

DRAM WRITE to READ Delay(DD) [Auto]
Configuration options: [Auto] [1 DRAM Clock] – [8 DRAM Clock]

DRAM WRITE to READ Delay(DR) [Auto]
Configuration options: [Auto] [1 DRAM Clock] – [8 DRAM Clock]

DRAM WRITE to READ Delay(SR) [Auto]
Configuration options: [Auto] [10 DRAM Clock] – [22 DRAM Clock]

DRAM READ to WRITE Delay(DD) [Auto]
Configuration options: [Auto] [2 DRAM Clock] – [14 DRAM Clock]

DRAM READ to WRITE Delay(DR) [Auto]
Configuration options: [Auto] [2 DRAM Clock] – [14 DRAM Clock]

DRAM READ to WRITE Delay(SR) [Auto]
Configuration options: [Auto] [2 DRAM Clock] – [14 DRAM Clock]

DRAM READ to READ Delay(DD) [Auto]
Configuration options: [Auto] [2 DRAM Clock] – [9 DRAM Clock]

DRAM READ to READ Delay(DR) [Auto]
Configuration options: [Auto] [2 DRAM Clock] – [9 DRAM Clock]

DRAM READ to READ Delay(SR) [Auto]
Configuration options: [Auto] [4 DRAM Clock] [6 DRAM Clock]

DRAM WRITE to WRITE Delay(DD) [Auto]
Configuration options: [Auto] [2 DRAM Clock] – [9 DRAM Clock]

DRAM WRITE to WRITE Delay(DR) [Auto]
Configuration options: [Auto] [2 DRAM Clock] – [9 DRAM Clock]

DRAM WRITE to WRITE Delay(SR) [Auto]
Configuration options: [Auto] [4 DRAM Clock] [6 DRAM Clock]

3.3.12   CPU Clock Amplitude [Auto]

Different AMP might enhance BCLK overclocking ability.
Configuration options: [Auto] [700mV] [800mV] [900mV] [1000mV]

3.3.13   PCH Clock Amplitude [Auto]

Configuration options: [Auto] [700mV] [800mV] [900mV] [1000mV]

3.3.14   CPU Clock Skew [Auto]

Adjusting this item may help enhancing BCLK overclocking ability. You may need
to adjust the IOH Clock Skew item at the same time.
Configuration options: [Auto] [Normal] [Delay 100ps]–[Delay 1500ps]

3.3.15   PCH Clock Skew [Auto]

Adjusting this item may help enhancing BCLK overclocking ability. You may need
to adjust the CPU Clock Skew item at the same time.
Configuration options: [Auto] [Normal] [Delay 100ps]–[Delay 1500ps]

3.3.16   Extreme OV [Disabled]

[Enabled]   Enables the Extreme OV function.

[Disabled]   Disables this function.

3.3.17   Full Phase Control [HW TEST]

Configuration options: [HW TEST]

3.3.18   CPU Load-Line Calibration [Auto]

Allows you to select the CPU Load-Line mode.

[Auto]   BIOS automatically adjust the voltage.

[Disabled]   Follows Intel specifications.

[Enabled]   Improve CPU VDroop directly.

3.3.19   CPU Voltage Mode [Offset]

Allows you to set the CPU Voltage Mode. Configuration options: [Offset] [VID]

3.3.20   CPU Voltage [Auto]

Allows you to set the CPU VCore voltage.

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

3.3.21   CPU PLL Voltage [Auto]

Allows you to set the CPU PLL voltage. The values range from 1.60325V to 2.50425V with a 0.01325V interval.

3.3.22   IMC Voltage [Auto]

Allows you to set the CPU Integrated Memory Controller voltage. The values range from 1.00700V to 2.00075V* with a 0.01325V interval.

3.3.23   PCH Voltage [Auto]

Allows you to set the Platform Controller Hub voltage. The values range from 1.00700V to 1.35150V with a 0.101325V interval.

> • The values of the **IMC Voltage**, **DRAM Voltage**, and **CPU PLL Voltage** items are labeled in different color, indicating the risk levels of high voltage settings. Refer to the table on the next page for details.
>
> • The system may need better cooling system to work stably under high voltage settings.

	Green	Blue	Yellow	Red
CPU		−1.4	1.40625–1.54375	1.55–
CPU PLL	1.60325–1.78875	1.802–2.00075	2.014–2.10675	2.12–
IMC	1.007–1.09975	1.113–1.3515	1.36475–1.60325	1.6165–
PCH	1.007–1.04675	1.06–1.15275	1.166–1.20575	1.219–
DRAM Voltage	1.3515–1.537	1.55025–1.60325	1.6165–1.78875	1.80200–

3.3.24   DRAM Voltage [Auto]

Allows you to set the DRAM voltage. The values range from 1.35150V to 2.50425V with a 1.01325V interval.

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

Allows you to set the DRAM DATA Reference Voltage on Channel A/B/C. The values range from -157.5mV to +200mV with a 12.5mV interval. Different ratio might enhance DRAM overclocking ability.

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

Allows you to set the DRAM Control Reference Voltage on Channel A/B. The values range from -157.5mV to +200mV with a 12.5mV interval. Different ratio might enhance DRAM overclocking ability.

3.3.27   Keyboard TweakIt Control [Disabled]

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

3.3.28   CPU Spread Spectrum [Auto]

[Disabled]   Enhances the BCLK overclocking ability.
[Auto]   Sets to [Auto] for EMI control.

3.3.29   PCIE Spread Spectrum [Auto]

[Disabled]   Enhances the PCIE overclocking ability
[Auto]   Sets to [Auto] for EMI control.

3.4 Main menu

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

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

```
                         BIOS SETUP UTILITY
 Extreme Tweaker    Main    Advanced    Power    Boot    Tools    Exit
                                              Use [ENTER], [TAB]
                                              or [SHIFT-TAB] to
 System Time              [13:51:25]          select a field.
 System Date              [Thu 07/30/2009]
 Language                 [English]           Use [+] or [-] to
                                              configure system Time.
 ▶ SATA1                  [HDT722516DLA380]
 ▶ SATA2                  [Not Detected]
 ▶ SATA3                  [ATAPI DVD D DH1]
 ▶ SATA4                  [Not Detected]
 ▶ SATA5                  [Not Detected]
 ▶ SATA6                  [Not Detected]
                                              ←→   Select Screen
                                              ↑↓   Select Item
 ▶ Storage Configuration                      +-   Change Field
 ▶ System Information                          Tab  Select Field
                                              F1   General Help
                                              F10  Save and Exit
                                              ESC  Exit

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```

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] [简体中文] [日本語] [Français] [Deutsch] [English]

3.4.4   SATA 1–6

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

```
                              BIOS SETUP UTILITY
                    Main

   SATA 1                                          Select the type
                                                   of device connected
   Device    :Hard Disk                            to the system.
   Vendor    :HDT722516DLA380
   Size      :164.7GB
   LBA Mode  :Supported
   Block Mode:16Sectors
   PIO Mode  :4
   Async DMA :MultiWord DMA-2
   Ultra DMA :Ultra DMA-5
   SMART Monitoring:Supported

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


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```

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

Type [Auto]

Allows you to select the type of IDE drive installed.

[Not Installed]   Select this option if no IDE drive is installed.

[Auto]   Allows automatic selection of the appropriate IDE 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.

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.

```
                          BIOS SETUP UTILITY
                 Main

  Storage Configuration                              Options

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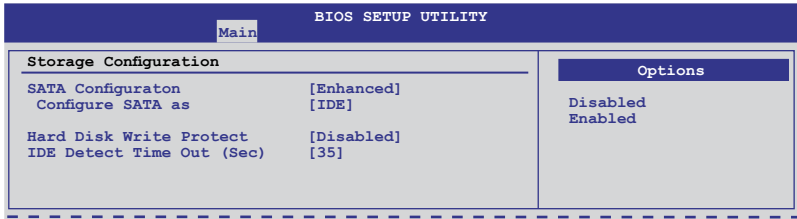
SATA Configuration [Enhanced]

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

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

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

Hard Disk Write Protect [Disabled]

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

IDE Detect Time Out (Sec) [35]

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

3.4.6 AHCI Configuration

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

```
                          BIOS SETUP UTILITY
              Main

  AHCI Settings                                    While entering setup,
                                                   BIOS auto detects
 ► SATA Port1 [Not Detected]                       the presence of
 ► SATA Port2 [Not Detected]                       SATA devices. This
 ► SATA Port3 [Not Detected]                       displays the status
 ► SATA Port4 [Not Detected]                       of auto detection of
 ► SATA Port5 [Not Detected]                       SATA devices.
 ► SATA Port6 [Not Detected]
```
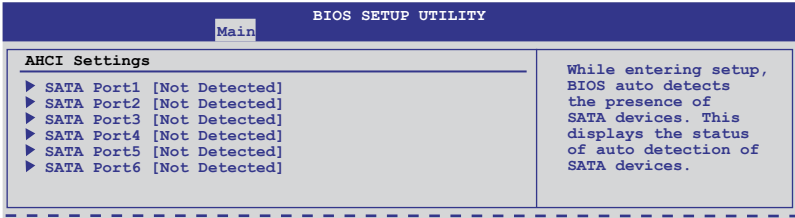
SATA Port1–6 [XXXX]

Displays the status of auto-detection of SATA devices.

```
                          BIOS SETUP UTILITY
              Main

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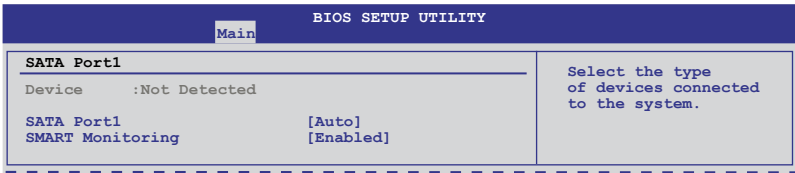
SATA Port1 [Auto]
Allows you to select the type of device connected to the system.
Configuration options: [Auto] [Not Installed]

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

3.4.7 System Information

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

```
                          BIOS SETUP UTILITY
              Main

  BIOS Information
  Version  : 0227
  Build Date: 07/29/09


  Processor
  Type     : Genuine Intel(R) CPU @ 2.13GHz
  Speed    : 21393MHz

  System Memory
  Usable Size   : 1015MB

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

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```
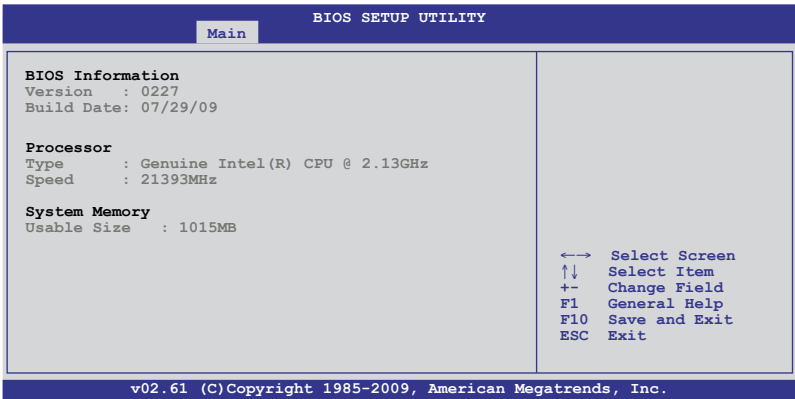
3.5 Advanced menu

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

```
                    BIOS SETUP UTILITY
  Extreme Tweaker   Main   Advanced   Power   Boot   Tools   Exit
 ┌──────────────────────────────────────────┬────────────────────────────────┐
 │  ▶  CPU Configuration                     │  Configure CPU.                │
 │  ▶  Chipset                               │                                │
 │  ▶  Onboard Devices Configuration         │                                │
 │  ▶  USB Configuration                     │                                │
 │  ▶  LED Control                           │                                │
 │  ▶  iROG Configuration                    │                                │
 │  ▶  ROG Connect                           │                                │
 │                                           │                                │
 │                                           │                                │
 │                                           │                                │
 │                                           │  ←→    Select Screen           │
 │                                           │  ↑↓    Select Item             │
 │                                           │  Enter Go to Sub Screen        │
 │                                           │  F1    General Help            │
 │                                           │  F10   Save and Exit           │
 │                                           │  ESC   Exit                    │
 └──────────────────────────────────────────┴────────────────────────────────┘
       v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```
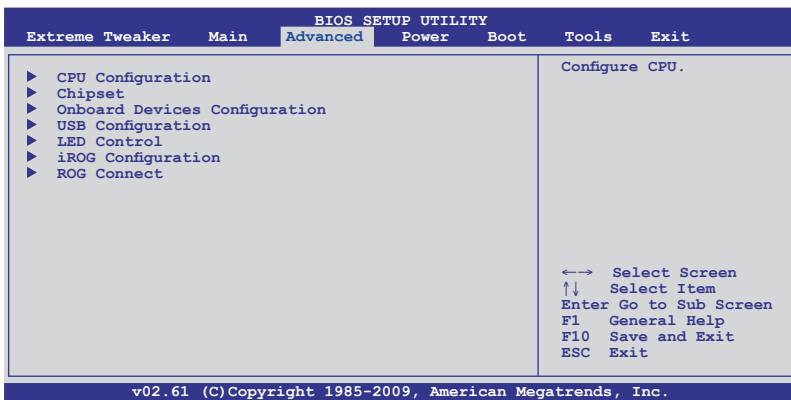
3.5.1 CPU Configuration

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.

```
                    BIOS SETUP UTILITY
             Advanced
 ┌──────────────────────────────────────────┬────────────────────────────────┐
 │  Configure advanced CPU settings          │  Sets the ratio between        │
 │  Module Version:01.04                     │  CPU Core Clock and the        │
 │                                           │  FSB Frequency.                │
 │  Manufacturer:Intel                       │  NOTE: If an invalid           │
 │  Brand String:Genuine Intel(R) CPU        │  ratio is set in CMOS          │
 │  Frequency   :2.13GHz                     │  then actual and               │
 │  BCLK Speed  :133MHz                       │  setpoint values may           │
 │  Cache L1    :128 KB                       │  differ.                       │
 │  Cache L2    :1024 KB                      │                                │
 │  Cache L3    :8192 KB                      │  NOTE: Please key in           │
 │  Ratio Status:Unlocked (Min:09, Max:16)   │  ratio numbers directly        │
 │  Ratio Actual Value:16                     │                                │
 │                                           │  ←→    Select Screen           │
 │  CPU Ratio Setting        [Auto]          │  ↑↓    Select Item             │
 │  C1E Support              [Enabled]       │  F1    General Help            │
 │  Hardware Prefetcher      [Enabled]       │  F10   Save and Exit           │
 │  Adjacent Cache Line Prefetch [Enabled]   │  ESC   Exit                    │
 │  Max CPUID Value Limit    [Disabled]      │                                │
 │                                           │                                │
 └──────────────────────────────────────────┴────────────────────────────────┘
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```

Scroll down to display the following items:

```
 ┌──────────────────────────────────────────┬────────────────────────────────┐
 │  Intel(R) Virtualization Tech   [Enabled] │                                │
 │  CPU TM Function                [Enabled] │                                │
 │  Execute-Disable Bit Capability    [Enabled] │                             │
 │  Intel(R) HT Technology         [Enabled] │  ←→    Select Screen           │
 │  Active Processor Cores         [All]     │  ↑↓    Select Item             │
 │  A20M                           [Disabled]│  +-    Change Option           │
 │  Intel(R) SpeedStep(TM) Tech    [Enabled] │  F1    General Help            │
 │  Intel(R) Turbo Mode Tech       [Enabled] │  F10   Save and Exit           │
 │  Intel(R) C-STATE Tech          [Disabled]│  ESC   Exit                    │
 └──────────────────────────────────────────┴────────────────────────────────┘
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```

CPU Ratio Setting [Auto]

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

C1E Support [Disabled]

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

[Disabled]   Disables this function.

Hardware Prefetcher [Enabled]

[Enabled]   Enables the Hardware Prefetcher function. This item should be enabled in order to enable the L2 cache (MLC) Streamer Prefetcher for tuning performance of the specific application.

[Disabled]   Disables this function.

Adjacent Cache Line Prefetcher [Enabled]

[Enabled]   Enables the Adjacent Cache Line Prefetcher function. This item should be enabled in order to enable the L2 cache (MLC) Spatial Prefetcher for tuning performance of the specific application.

[Disabled]   Disables this function.

Max CPUID Value Limit [Disabled]

[Enabled]   Allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.

[Disabled]   Disables this function.

Intel(R) Virtualization Tech [Enabled]

[Enabled]   Allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

[Disabled]   Disables this function.

CPU TM Function [Enabled]

[Enabled]   Enables the overheated CPU to throttle its clock speed to cool down.

[Disabled]   Disables this function.

Execute-Disable Bit Capability [Enabled]

[Enabled]   Enables the No-Execution Page Protection Technology.

[Disabled]   Forces the XD feature flag to always return to zero (0).

Intel(R) HT Technology [Enabled]

[Enabled]   Enables the Intel Hyper-Threading Technology.

[Disabled]   Only one thread per activated CPU core is enabled.

Active Processor Cores [All]

[All]   Activate all CPU cores in the processor package.

[1]   Activate only 1 CPU core in the processor package.

[2]   Activate 2 CPU cores in the processor package.

A20M [Disabled]

[Enabled]   Legacy OSes and APs may need this function enabled.

[Disabled]   Disables this function.

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

[Enabled]   The CPU speed is controlled by the operating system.

[Disabled]   The CPU runs at its default speed.

Intel(R) TurboMode Tech [Enabled]

[Enabled]   Allows processor cores to run faster than marked frequency in
                 specific condition.

[Disabled]   Disables this function.

Intel(R) C-STATE Tech [Disabled]

[Enabled]   Allows the CPU to save more power under idle mode. Enable this
                 item only when you install a C-State Technology-supported CPU.

[Disabled]   Disables this function.

C State package limit setting [Auto]

This item appears only when you set the **Intel(R) C-STATE Tech** item to [Enabled].
We recommend that you set this item to [Auto] for BIOS to automatically detect the
C-State mode supported by your CPU. Configuration options: [Auto] [C1] [C3] [C6]

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.

```
                    BIOS SETUP UTILITY
              Advanced

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

 ▶ North Bridge Configuration


```

North Bridge Configuration

```
                    BIOS SETUP UTILITY
              Advanced

 North Bridge Chipset Configuration                 Set the ECC options
                                                    for cache and dram
 IMC Type : Lynnfield                               scrubbing.

 Memory Remap Feature         [Enabled]
   PCI MMIO Allocation: 4GB To 3072MB

```
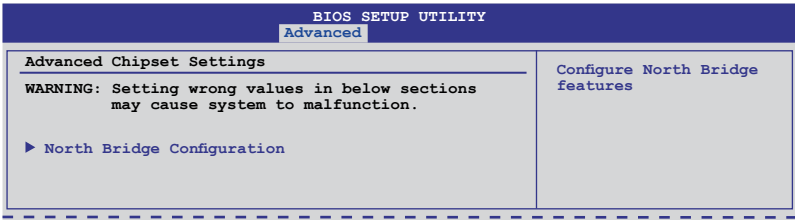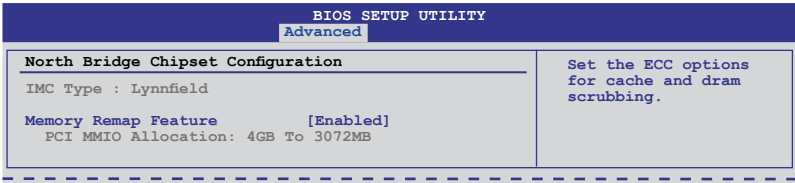
Memory Remap Feature [Enabled]

[Disabled] Do not allow remapping of memory.

[Enabled] Allows for the segment of system memory that was previously overwritten by PCI devices to be remapped above the total physical memory.

3.5.3   Onboard Device Configuration

```
                              BIOS SETUP UTILITY
                           Advanced

  Onboard Device Configuration
                                                          Options
  HDA Controller              [Enabled]
    Front Panel Type          [HD Audio]                  Enabled
  Realtek LAN                 [Enabled]                   Disabled
    LAN Boot ROM              [Disabled]
  Onboard 1394 Controller     [Enabled]
  J-Micron Controller01       [IDE Mode]
  J-Micron Controller02       [IDE Mode]
```
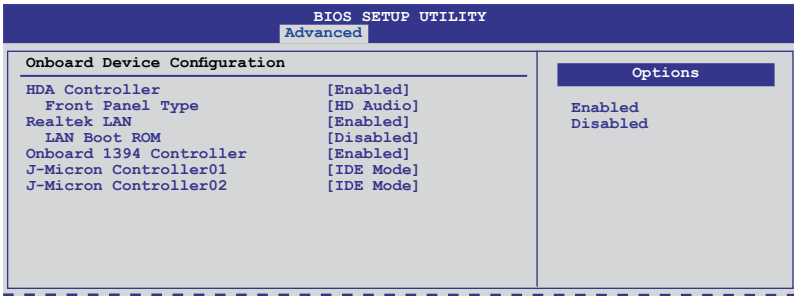
HDA Controller [Enabled]

[Enabled]   Enables the High Definition Audio Controller.

[Disabled]   Disables the controller.

Front Panel Type [HD Audio]

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

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

Realtek LAN [Enabled]

[Enabled]   Enables Realtek LAN Controller.

[Disabled]   Disables Realtek LAN Controller.

LAN Boot ROM [Disabled]
This item appears only when you enable the previous item(s).

[Disabled] Disables Realtek LAN Boot ROM.

[Enabled] Enables Realtek LAN Boot ROM.

Onboard 1394 Controller [Enabled]

[Enabled]   Enables the onboard 1394 Controller.

[Disabled]   Disables the controller.

J-Micron Controller01/02 [IDE Mode]

[Disabled]   Disables the J-Micron controller.

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

[AHCI Mode]   Set to [AHCI] when you want the SATA hard disk drives to use the
                 AHCI (Advabced Host Controller Interface). The AHCI allows the
                 onboard storage driver to enable advanced Serial ATA features that
                 increases storage performance on random workloads by allowing
                 the drive to internally optimize the order of commands.

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.

```
                          BIOS SETUP UTILITY
                    Advanced

   USB Configuration                              Enable support for
                                                  all USB ports.
   Module Version - 2.24.3-13.4

   USB Devices Enabled:
     2 Hubs

   USB Functions              [Enabled]
   Legacy USB Support         [Auto]
   BIOS EHCI Hand-off         [Enabled]

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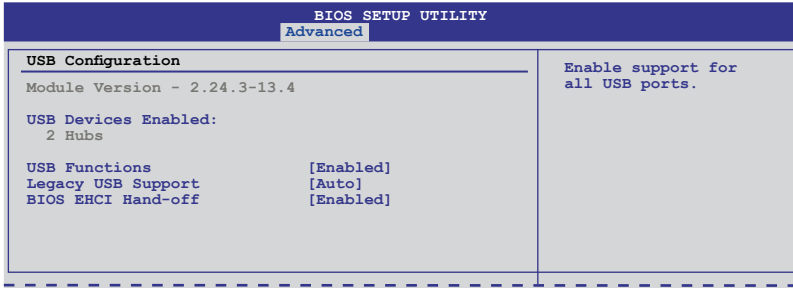
> The **USB Devices Enabled** item shows the auto-detected values. If no USB device is detected, the item shows None.

USB Functions [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]

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

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

[Disabled]   Disables the function.

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   LED Control

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

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

```
                            BIOS SETUP UTILITY
                    Advanced

 LED Control                                    ▲    All LED Control

 All LED Control            [Enabled]
 ROG Logo                   [Enabled]
 Voltiminder LED            [Enabled]
 CPU LED Selection          [CPU]




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

                                                ▼

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```
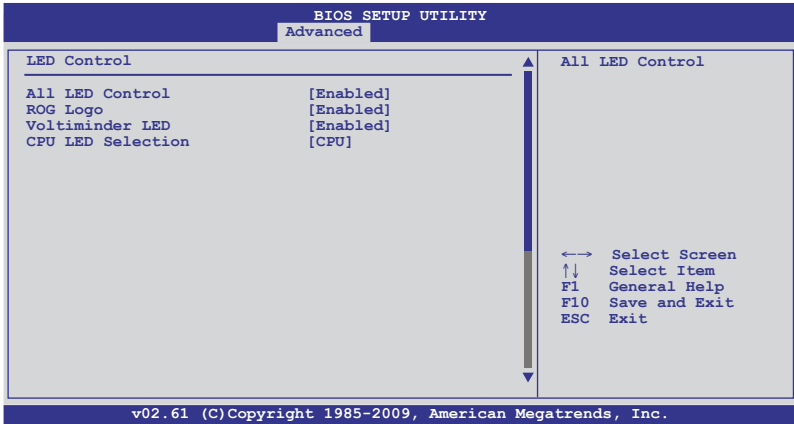
All LED Control [Enabled]

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

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

ROG Logo [Enabled]

Allows you to enable or disable the onboard ROG light box.
Configuration options: [Disabled] [Enabled]

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 PLL voltage [CPU PLL] and IMC voltage [IMC].
Configuration options: [CPU] [CPU PLL] [IMC]

3.5.6 iROG Configuration

```
                    BIOS SETUP UTILITY
              Advanced

  iROG Configuration                          iROG Timer Keeper
                                              System will record
  iROG ID_Number Information                  using time every 1
  iROG_1 ID_Number: 54                        minute
  iROG_2 ID_Number: 9

  iROG Timer Keeper            [Last State]
  Current Operation time:

  Total Operation time:



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


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```
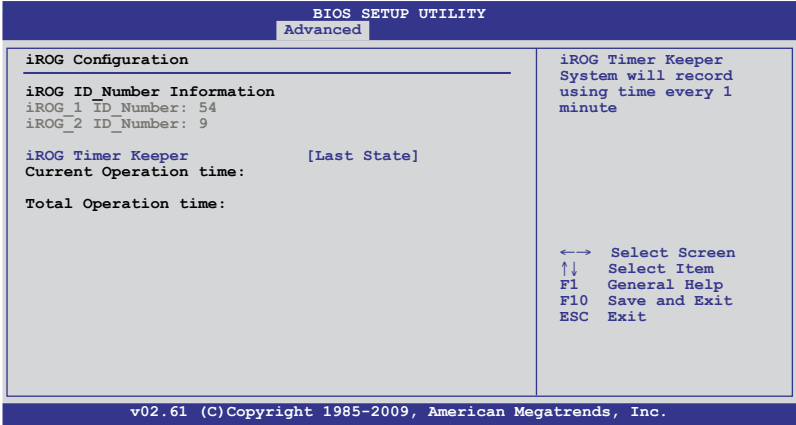
iROG Timer Keeper [Last State]

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

3.5.7 ROG Connect

```
                    BIOS SETUP UTILITY
              Advanced

  ROG Connect              [Enabled]               Options
  Debug Mode               [String]
                                              Enabled
                                              Disabled




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


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```
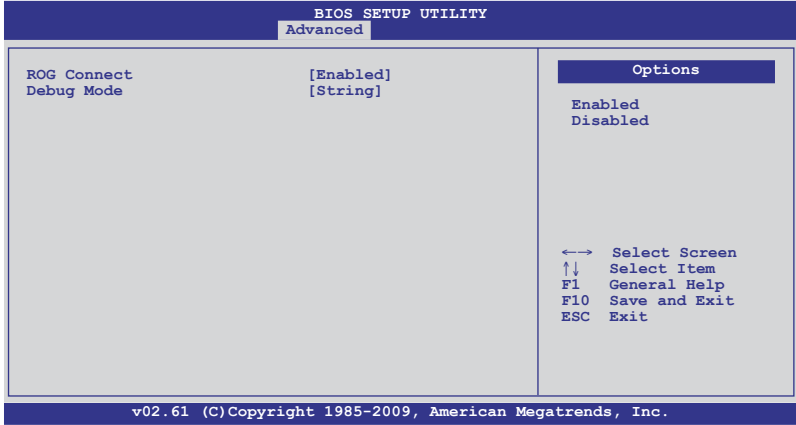
ROG Connect [Enabled]

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

Debug Mode [String]

Allows you to select the debug 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.

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

  Suspend Mode                 [Auto]                  Select the ACPI state
  Repost Video on S3 Resume    [No]                    used for System
  ACPI 2.0 Support             [Disabled]              Suspend.
  ACPI APIC Support            [Enabled]
  EuP Ready                    [Disabled]

  ▶  APM Configuration
  ▶  Hardware Monitor




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

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```

3.6.1   Suspend Mode [Auto]

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

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

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

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

3.6.2   Repost Video on S3 Resume [Disabled]

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

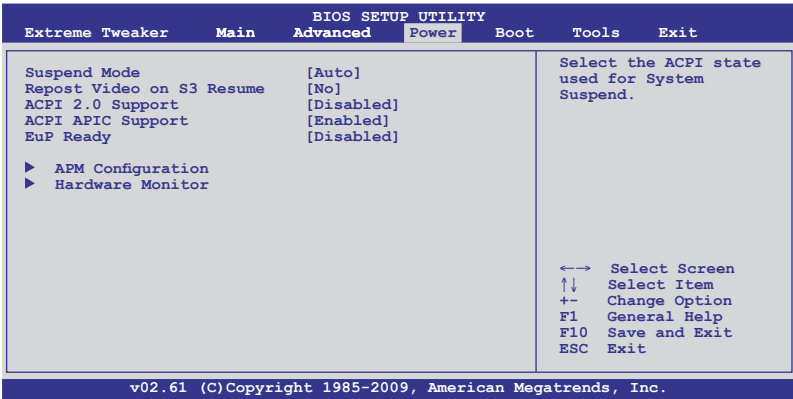[Disabled]   When set to [Disabled], the system will not invoke VGA BIOS POST on S3/STR resume.

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

3.6.3   ACPI 2.0 Support [Disabled]

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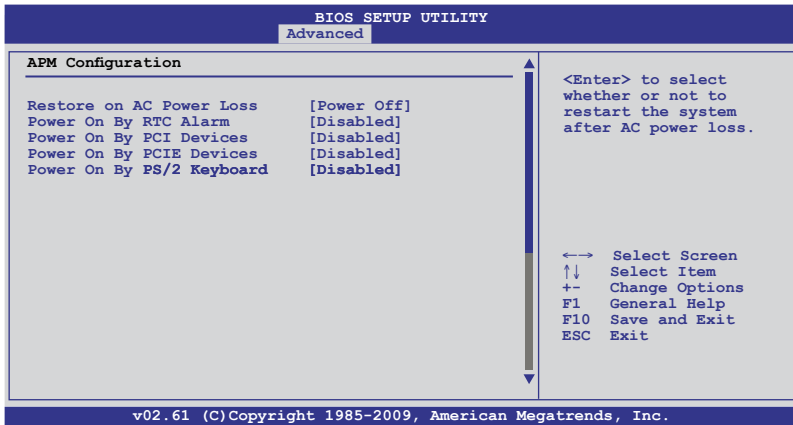
[Enabled]   When set to [Enabled], the ACPI APIC table pointer is included in the RSDT pointer list.

3.6.5   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.

3.6.6   APM Configuration

```
                         BIOS SETUP UTILITY
                 Advanced

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




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

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```

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 RTC Alarm [Disabled]

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

[Disabled]   Disables RTC to generate a wake event.

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

Power On By PCI Devices [Disabled]

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

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

Power On By PCIE Devices [Disabled]

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

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

[Enabled]   Enables the PCIE devices to generate a wake event.
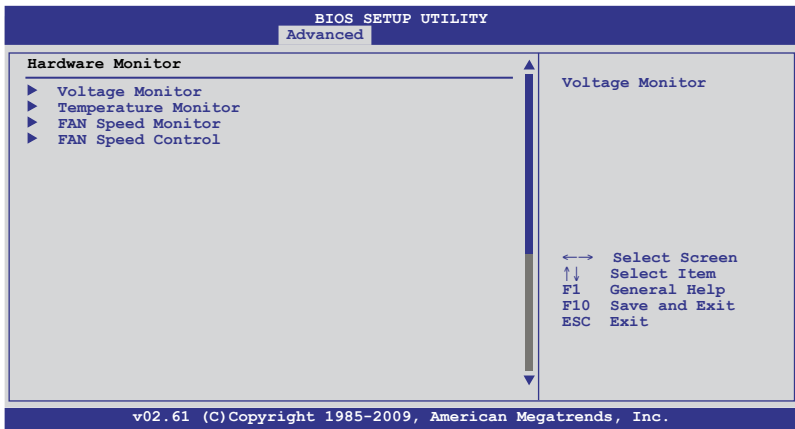
Power On By PS/2 Keyboard [Disabled]

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

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

[Enabled]   Sets specific keys on the PS/2 keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

3.6.7   Hardware Monitor

```
                        BIOS SETUP UTILITY
                 Advanced

 Hardware Monitor                                ▲
 ▶   Voltage Monitor                                   Voltage Monitor
 ▶   Temperature Monitor
 ▶   FAN Speed Monitor
 ▶   FAN Speed Control




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

                                                 ▼
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```

Voltage Monitor

CPU Voltage; CPU PLL Voltage; PCH Voltage; IMC Voltage; DRAM Voltage;
DRAM Termination 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 (PECI); PCH Temperature; MB Temperature
OPT FAN1/2/3 Temperature [xxxºC/xxxºF]
The onboard hardware monitor automatically detects and displays the CPU,
northbridge, southbridge, motherboard, power, and the assigned devices
temperatures. Select [Ignored] if you do not wish to display the detected
temperatures.

PCH overheat protection
The system automatically shuts down when the northbridge chipset is heated
over the set temperature to protect it from damage.
Configuration optitons: [Disabled] [70ºC] [80ºC] [90ºC] **[100ºC]**

OPT FAN1/2/3 overheat protection [90ºC]
Allows you to set the temperature over which the system automatically shuts
down when any of the thermal sensor cables connected to the motherboard
detects device overheat to protect the device from damage.
Configuration options: [Disabled] [70ºC] [80ºC] [90ºC] **[100ºC]**

Fan Speed Monitor

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

Fan Speed Control

```
                        BIOS SETUP UTILITY
                              Power

     Fan Speed Control                           Disable/Enable
                                                 Q-Fan functions of
     CPU Q-Fan Control          [Disabled]       CPU fan
     Chassis Q-Fan Function     [Disabled]

     PWRFAN Control             [Disabled]
     OPTFAN1 Control            [Disabled]
     OPTFAN2 Control            [Disabled]
     OPTFAN3 Control            [Disabled]
```

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

[Disabled]   Disables the CPU Q-fan controller.

[Enabled]   Enables the CPU Q-fan controller.

🖉 The **CPU Fan Profile** item appears when you enable the CPU Fan Control feature.

CPU Fan Profile [Standard]
This item appears only when you enable the **CPU Q-Fan Control** feature and allows you to set the appropriate performance level of the CPU fan.

[Standard] Sets to [Standard] 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.

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

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 **Chassis Fan Profile** item appears when you enable the **Chassis Q-Fan Function** feature.

Chassis Fan Profile [Standard]
This item appears only when you enable the **Chassis Q-Fan Control** feature and allows you to set the appropriate performance level of the chassis fan.

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

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

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

PWRFAN Control [Disabled]
Allows you to select the power fan control mode. When this item is set to [Duty Mode], you can configure the **PWRFan Duty** item.

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

OPTFAN1/2/3 Control [Disabled]
Allows you to select the optional fan control mode. When this item is set to [Duty Mode], you can configure the **OPTFan1/2/3 Duty** item. If you set this item to [User Mode], you are allowed to configure the **OPTFan1/2/3 Low Speed Temp** and **OPTFan1/2/3 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.

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

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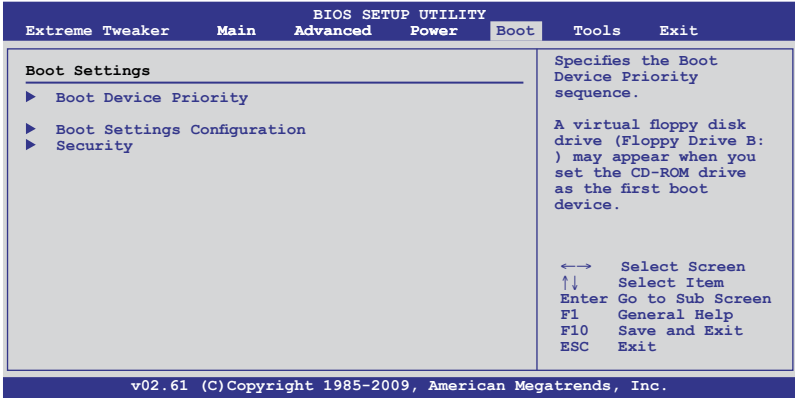Configuration options: [25˚C] [30˚C] [35˚C] [40˚C]

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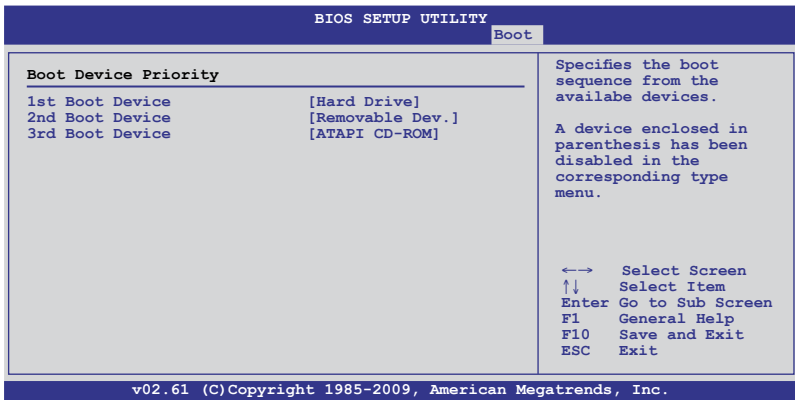Configuration options: [60˚C] [70˚C] [80˚C] [90˚C]

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.

```
                              BIOS SETUP UTILITY
 Extreme Tweaker      Main      Advanced      Power    Boot     Tools    Exit
──────────────────────────────────────────────────────────────────────────────
                                                     Specifies the Boot
   Boot Settings                                     Device Priority
   ─────────────                                     sequence.
►   Boot Device Priority
►   Boot Settings Configuration                      A virtual floppy disk
►   Security                                         drive (Floppy Drive B:
                                                     ) may appear when you
                                                     set the CD-ROM drive
                                                     as the first boot
                                                     device.


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

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```

3.7.1 Boot Device Priority

```
                              BIOS SETUP UTILITY
                                          Boot
──────────────────────────────────────────────────────────────────────────────
   Boot Device Priority                               Specifies the boot
   ─────────────────────                              sequence from the
   1st Boot Device          [Hard Drive]              availabe devices.
   2nd Boot Device          [Removable Dev.]
   3rd Boot Device          [ATAPI CD-ROM]            A device enclosed in
                                                      parenthesis has been
                                                      disabled in the
                                                      corresponding type
                                                      menu.


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

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```

1st–xxth Boot Device [xxx Drive]

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

3.7.2 Boot Settings Configuration

```
                          BIOS SETUP UTILITY
                                          Boot

    Boot Settings Configuration                     Allows BIOS to skip
                                                    certain tests while
    Quick Boot              [Enabled]               booting. This will
    Full Screen Logo        [Enabled]               decrease the time
    AddOn ROM Display Mode   [Force BIOS]           needed to boot the
    Bootup Num-Lock         [On]                    system.
    Wait for 'F1' if Error  [Enabled]
    Hit 'DEL' Message Display [Enabled]
    POST State LEDs         [Enabled]
```

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.

POST State LEDs [Enabled]

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

[Disabled]   Disables this function.

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.

```
                        BIOS SETUP UTILITY
                                           Boot

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

   Change Supervisor Password
   Change User Password




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

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```
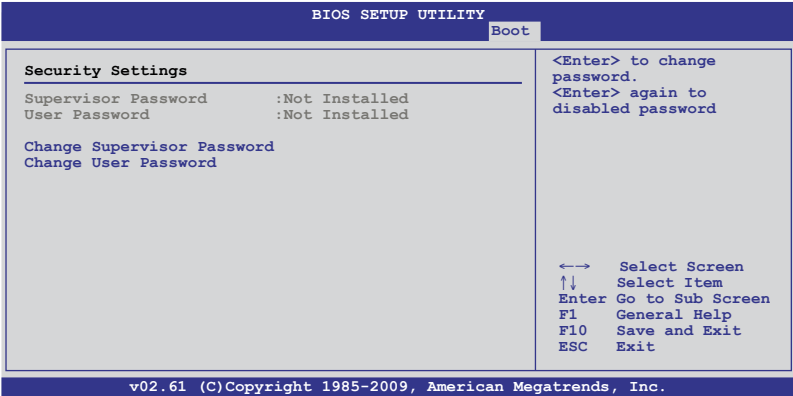
Change Supervisor Password

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

To set a Supervisor Password:

1.   Select the Change Supervisor Password item and press <Enter>.

2.   From the password box, type a password composed of at least six letters and/or numbers, then press <Enter>.

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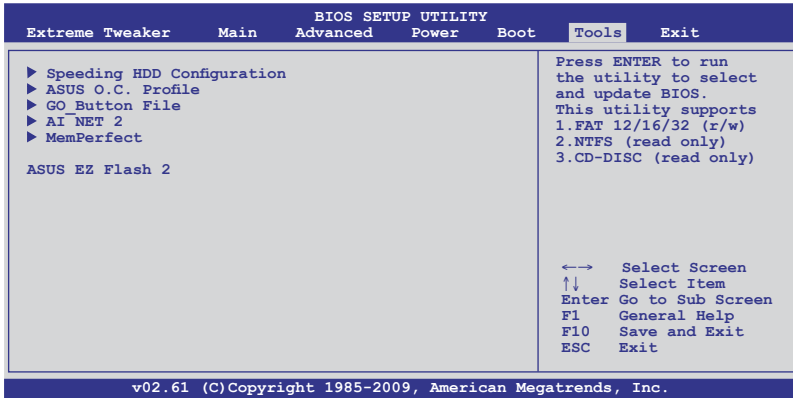
To change the supervisor password, follow the same steps as in setting a user password.

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

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

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

```
                        BIOS SETUP UTILITY
                                        Boot

   Security Settings                              <Enter> to change
   Supervisor Password        :Installed         password.
   User Password              :Installed         <Enter> again to
                                                 disabled password.
   Change Supervisor Password
   User Access Level           [Full Access]
   Change User Password
   Password Check              [Setup]
```
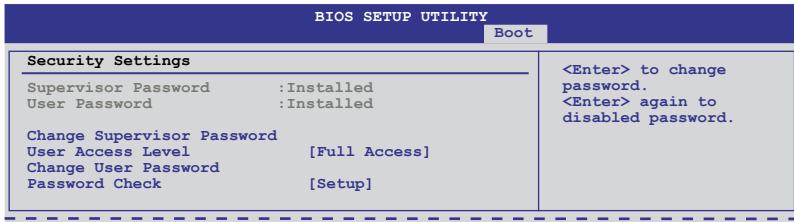
User Access Level [Full Access]

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

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

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

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

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

Change User Password

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

To set a User Password:

1.   Select the Change User Password item and press <Enter>.

2.   On the password box that appears, type a password composed of at least six letters and/or numbers, then press <Enter>.

3.   Confirm the password when prompted.
The message "Password Installed" appears after you set your password successfully.

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

Password Check [Setup]

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

3.8 Tools menu

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

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

  ▶ Speeding HDD Configuration                        Press ENTER to run
  ▶ ASUS O.C. Profile                                 the utility to select
  ▶ GO_Button File                                    and update BIOS.
  ▶ AI_NET 2                                          This utility supports
  ▶ MemPerfect                                        1.FAT 12/16/32 (r/w)
                                                      2.NTFS (read only)
   ASUS EZ Flash 2                                    3.CD-DISC (read only)




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

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```

3.8.1 Speeding HDD Configuration

```
                              BIOS SETUP UTILITY
                                                    Tools

   Speeding HDD configuration                          Update Speeding HDD
                                                       Mode changes after
   Speeding HDD Group :                                saving changes and
   Current Mode                  :Normal Mode          exiting BIOS setup.

   Speeding HDD Mode Update:                           Discard Speeding HDD
                                                       Mode changes after
   Update To Normal Mode         [Press Enter]         exiting BIOS setup
                                                       without saving any
   Speeding HD Device(s) List :                        changes.
   ▶    SPD_HDD1 (Red)            : [ST380817AS]
   ▶    SPD_HDD2 (Red)            : [ST380817AS]

```

> • Before using the Speeding HDD function, ensure that you have connected the SATA signal cables and installed SATA hard disk drives to the SPD_HDD1 and SPD_HDD2 connectors.
>
> • You can only make one Speeding HDD change a time before you save BIOS settings and restart the computer.

Speeding HDD Group:

Current Mode
Displays the current Speeding HDD mode.

Changed Mode
This item appears only when you select a Speeding HDD mode to update and displays the Speeding HDDt mode that you have changed.

Ultra Space
This item appears only when you have created a drive partition using the **Ultra Space** function.

Speeding HDD Mode Update:

Update To Normal Mode [Press Enter]
Allows you to use the SPD_HDD1 (red) and SPD_HDD2 (red) connectors as normal SATA connectors.

When using only one hard disk in **Normal Mode**, connect the hard disk to the SPD_HDD1 (red) connector on the motherboard.

Speeding HDD Device(s) List:

SPD_HDD1 (Red) / SPD_HDD2 (Red)
Press <Enter> to display the information of the hard disks which are connected to the SPD_HDD1 (red) and SPD_HDD1 (red) connectors on the motherboard.

3.8.2   ASUS O.C. Profile

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

```
                       BIOS SETUP UTILITY
                                            Tools

    O.C. PROFILE Configuration                   Typing your profile
                                                 name, [0-9][a-z][A-Z]
    O.C. Profile 1 Status  : Not Installed       are acceptable.
    O.C. Profile 2 Status  : Not Installed
    O.C. Profile 3 Status  : Not Installed
    O.C. Profile 4 Status  : Not Installed
    O.C. Profile 5 Status  : Not Installed
    O.C. Profile 6 Status  : Not Installed
    O.C. Profile 7 Status  : Not Installed
    O.C. Profile 8 Status  : Not Installed

    Add Your CMOS Profile.
      Name:              [Default-Profile]
      Save To:           [Uninstalled]        ←→   Select Screen
    Load CMOS Profiles.                       ↑↓   Select Item
      Load From:         [Blank]              F1   General Help
                                              F10  Save and Exit
    Start O.C. Profile                        ESC  Exit

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```

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.

```
                    ASUSTek O.C. Profile Utility V2.00b


            ───── Current CMOS ─────          ───── Restore CMOS ─────
    BOARD: Maximus III Formula          BOARD: Unknown
    VER: 0227                           VER: Unknown
    DATE: 07/29/2009                    DATE: Unknown
   PATH: A:\
    ┌──────────┐ ┌──────────────────────────────────────────────┐
    │  A:      │ │                                                │
    │          │ │                                                │
    │          │ │                                                │
    │          │ │                                                │
    │          │ │                                                │
    │          │ │                                                │
    │          │ │                                                │
    └──────────┘ └──────────────────────────────────────────────┘
   ── Note ──────────────────────────────────────────────────────
    [Enter] Select or Load    [Tab] Switch    [V] Drive Info
    [Up/Down/Home/End] Move    [B] Backup      [Esc] Exit
```
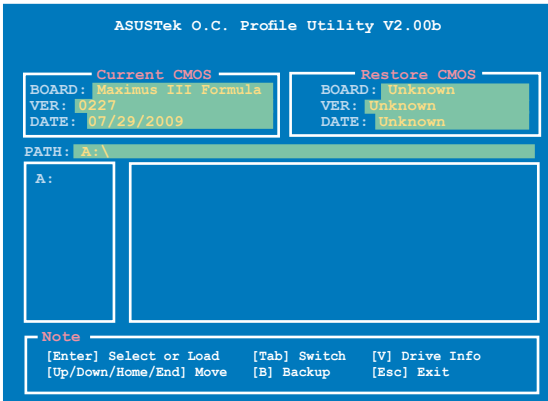
- • This function supports devices such as a USB flash disk (FAT 32/16 format) or a floppy disk with single partition only.

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

- • We recommend that you update the BIOS file only coming from the same memory/CPU configuration and BIOS version.

- • Only the CMO file can be loaded.

3.8.3 GO_Button File

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

```
                        BIOS SETUP UTILITY
                                              Tools

  GO_Button File                            Save GO_Button File

   Save File to:                 [None]
   Load File From:               [None]
     FSB Frequency Controller    [Auto]
     CPU Voltage                 [Auto]
     CPU PLL Voltage             [Auto]
     IMC Voltage                 [Auto]
     PCH Voltage                 [Auto]
     DRAM Voltage                [Auto]


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

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```
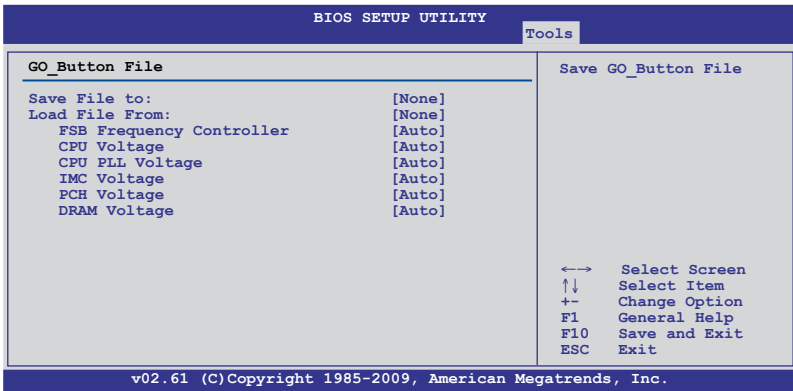
Save File to:

Allows you to save the adjusted values for specific items as a GO_Button file. Configuration options: [None] [File]

Load File to:

Allows you to load the desired GO_Button file. Configuration options: [None] [File]

FSB Frequency Controller; CPU Voltage; CPU PLL Voltage; IMC Voltage; PCH Voltage; DRAM Voltage

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

3.8.4 AI NET 2

```
                        BIOS SETUP UTILITY
                                              Tools

  Ai Net 2
  Pair   Status   Length                    Check Realtek LAN
                                            cable during POST.

                                            It will take 3 to 10
  Check Realtek LAN cable     [Disabled]    seconds to diagnose
                                            LAN cable.
```

Check Realtek LAN cable [Disabled]

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

3.8.5   MemPerfect

```
                    BIOS SETUP UTILITY
                                            Tools
    MemPerfect Option                       Select the memory
                                            frequency you desire,
    MemPerfect            [Disabled]        and let MemPerfect do
                                            the rest!
                                            MemPerfect can quickly
                                            check your memory
                                            settings for errors
                                            and automatically fix
                                            them - ensuring system
                                            stability and maximum
                                            efficiency.
```
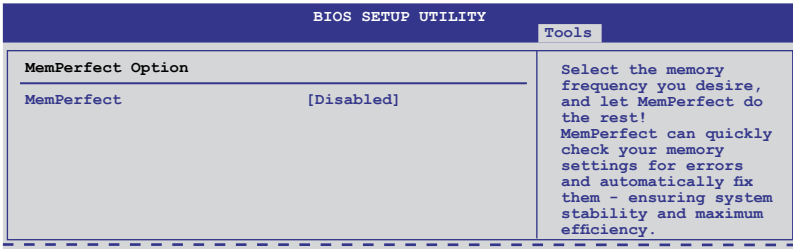
MemPerfect [Disabled]

MemPerfect can quickly check your memory settings and automatically fix errors.
Configuration options: [Disabled] [Enabled]

3.8.6   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**.

```
         ASUSTek EZ Flash 2 BIOS ROM Utility V4.00b
    FLASH TYPE: MXIC 25L1605A
            Current ROM                    Update ROM
     BOARD: Maximus III Formula      BOARD: Unknown
     VER: 0227 (H:00 B:14)           VER: Unknown
     DATE: 07/29/2009                DATE: Unknown
    PATH: A:\
     A:

      Note
     [Enter] Select or Load    [Tab] Switch   [V] Drive Info
     [Up/Down/Home/End] Move   [B] Backup     [Esc] Exit
```
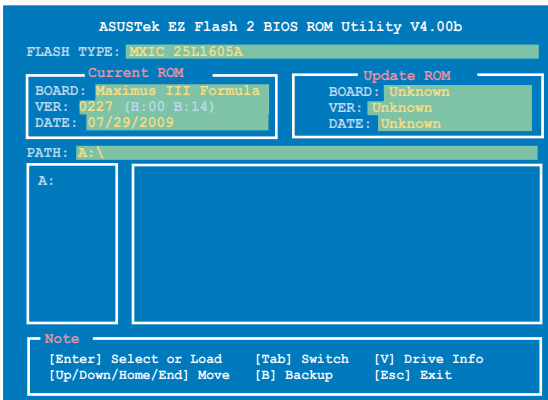
3.9   Exit menu

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.

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

 ┌────────────────────────────────────────────┐  ┌──────────────────────────┐
  Exit Options                                     Exit system setup after
 ──────────────────────────────────────────       saving the changes.

  Exit & Save Changes                              F10 key can be used for
  Exit & Discard Changes                           this operation.
  Discard Changes

  Load Setup Defaults



                                                   ←→    Select Screen
                                                   ↑↓    Select Item
                                                   Enter Go to Sub Screen
                                                   F1    General Help
                                                   F10   Save and Exit
                                                   ESC   Exit
 ──────────────────────────────────────────────────────────────────────────
        v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```

> 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.

Software
support

4

Chapter summary

4

4.1 Installing an operating system

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

> • Motherboard settings and hardware options vary. Use the setup procedures presented in this chapter for reference only. Refer to your OS documentation for detailed information.
>
> • Ensure that you install Windows® XP Service Pack 2 or later versions before installing the drivers for better compatibility and system stability.

4.2 Support DVD information

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

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

4.2.1 Running the support DVD

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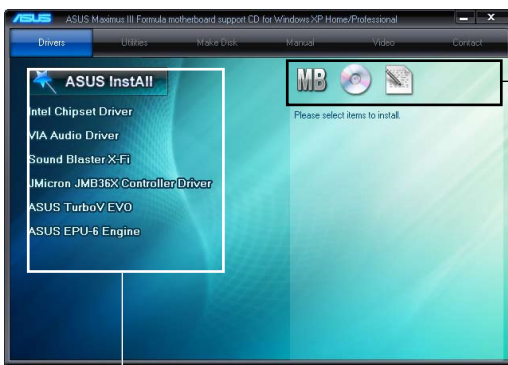
Click an icon to display support DVD/motherboard information

Click an item to install

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

4.2.2 Drivers menu

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

Intel Chipset Driver

Installs the Intel® 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.

ASUS TurboV EVO

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

ASUS EPU-6 Engine

Installs ASUS EPU-6 Engine driver and utility.

4.2.3 Utilities menu

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

Anti-Virus Utility

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

Speeding HDD

ASUS Speeding HDD helps secure data on the hard drives and enhance the hard drive performance.

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 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.

ASUS AI Direct Link

The ASUS AI Direct Link provides up to 70% transferring speed improvement when compared to traditional USB 2.0 and is the easiest and fastest way for users to enjoy large-sized data exchange of files such as movies, music, etc.

ASUS ROG GameFirst

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

ASUS ROG Connect

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

Adobe Reader 8

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

Microsoft DirectX 9.0c

Installs Microsoft DirectX 9.0c.

4.2.4 Make disk menu

The Make disk menu contains items to create the Intel and JMicron RAID driver disk.

Intel AHCI/RAID Driver

Allows you to create an Intel AHCI/RAID Driver disk.

JMicron JMB36X AHCI Driver

Allows you to create a JMicron AHCI Driver disk.

4.2.5 Manual menu

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

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

4.2.6   Video menu

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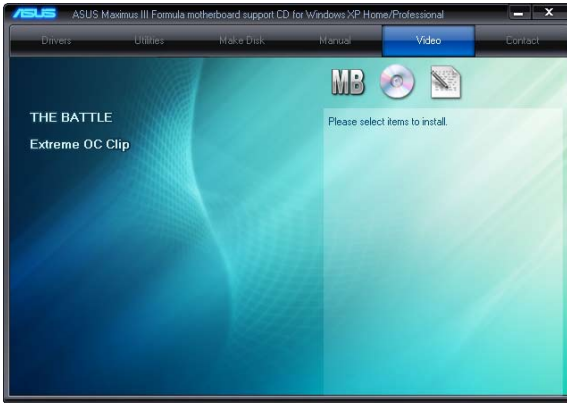
4.2.7   ASUS Contact information

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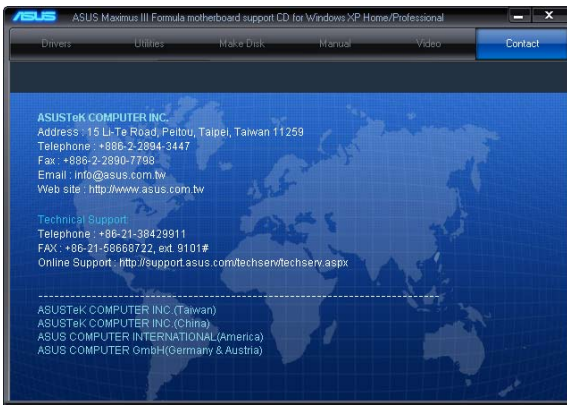
4.2.8   Other information

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

Motherboard Info

Displays the general specifications of the motherboard.
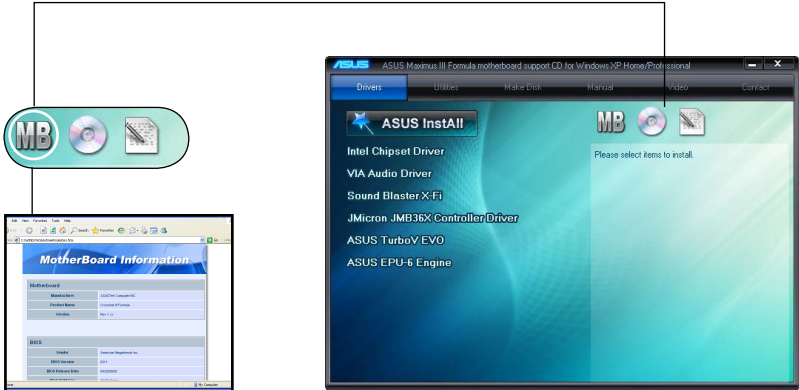
Browse this DVD

Displays the support DVD contents in graphical format.
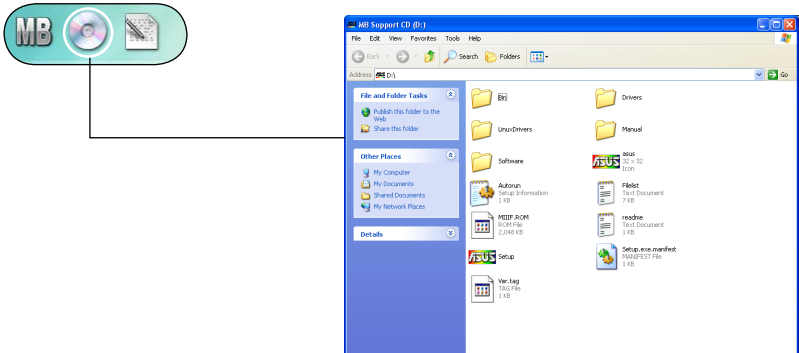
Filelist

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


```
Filelist - Notepad
File  Edit  Format  View  Help
File list for the included support software for motherboard
===========================================================================
File Name          Description
---------------------------------------------------------------------------

--Drivers
  -Chipset         -Intel(R) Chipset Software Installation Utility V9.1.1.1015 fo

  -Audio           -VIA Audio Driver V6.0.1.7330 for Windows 32/64bit XP & 32/64b
                   -VIA Audio Driver V6.0.1.7330 for Windows 32/64bit Windows 7.

  -Lan
    -RTL8110SC     -Realtek RTL8111B/C 10/100/1000M LAN Driver V5.687.225.2008 fo
                   -Realtek RTL8111B/C 10/100/1000M LAN Driver V6.223.525.2009 fo
                   -Realtek RTL8111B/C 10/100/1000M LAN Driver V7.3.522.2009 for
    -Novell        -Realtek Novell V1.00.
    -NDIS2         -Realtek NDIS2 V1.24.

  -RAID
    -JMB36x
      -Install     -JMicron JMB36x(JMB363.JMB322) Controller Driver V1.17.49.4 fo
      -Driver      -JMicron JMB36x(JMB363.JMB322) Controller Driver Disk for Wind
      -Disk        -JMicron JMB36x(JMB363.JMB322) Controller Driver Disk for Wind

    -IMSM
      -Install     -Intel(R) Matrix Storage Manager Driver V8.9.0.1023 for Window
      -Driver      -Intel AHCI/RAID Driver Disk for Windows XP/Vista & 64bit XP/V
      -Disk        -Intel AHCI/RAID Driver Disk for Windows XP/Vista & 64bit XP/V

  -TurboVEVO       -ASUS TurboV EVO V1.00.12 for Windows 32/64bit XP & 32/64bit v

  -Epu6Engine      -ASUS EPU-6 Engine V1.01.20 for Windows 32/64bit XP & 32/64bit
```

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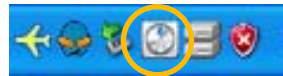
Click the Volume Panel icon to display a list of Creative® media utilities that help you manage and play your media files. Click **Help** in each utility control panel to know more about them.

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.

Click each icon to configure further settings

Minimize

Exit

Help

Drag to adjust volume

Click to mute volume

Click to restore default settings
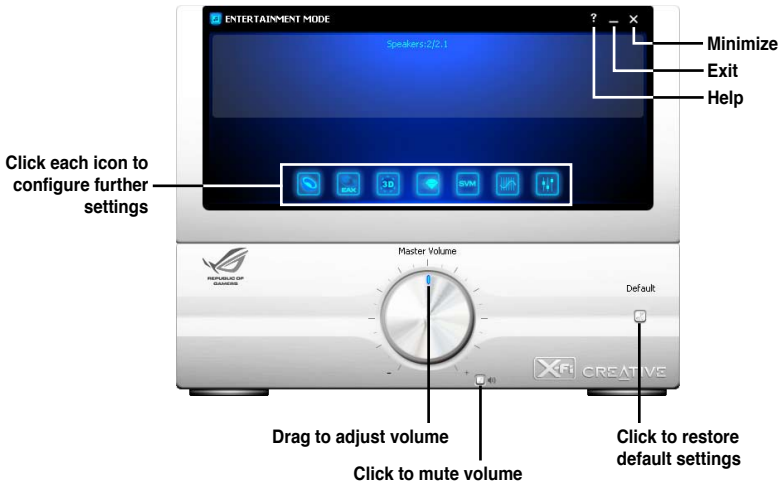
Speakers and Headphone Panel

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

Click to select a speaker type

Click to adjust bass

Click to adjust volume of each speaker

Click to test speaker sound in turn

Click to test speaker noise in turn

EAX Effects Panel [EAX]

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

Click to enable EAX Effects

Drag to adjust effects amount

Click to select an environment
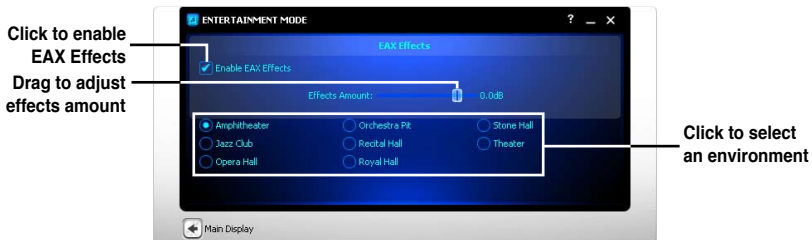
X-Fi CMSS-3D Panel [3D]

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

Click to enable X-Fi 3D Virtual effects

Click to select an upmix mode (appears when using 4/4.1/5.1/7.1 Speakers)

Drag to adjust effects
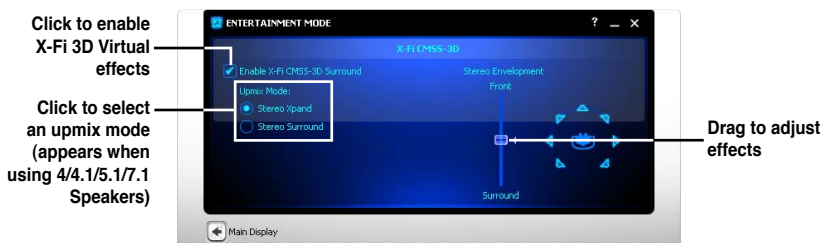
X-Fi Crystalizer Panel

Enable X-Fi Crystalizer to obtain more audio dynamics.

Click to enable X-Fi Crystalizer

Drag to adjust effects
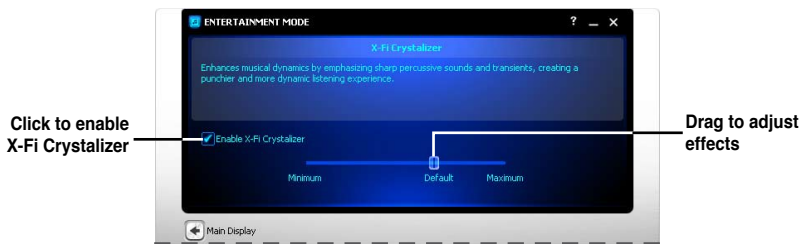
Smart Volume Management Panel

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

Click to switch on/off SVM

Graphic Equalizer Panel

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

Click to enable EQ

Drag to customize effects

Click to select an EQ preset

Click to save settings

EQ Acoustic
EQ Classical
EQ Country
EQ Dance
EQ Flat
EQ Jazz
EQ New Age
EQ Pop
EQ Rock
EQ Vocal
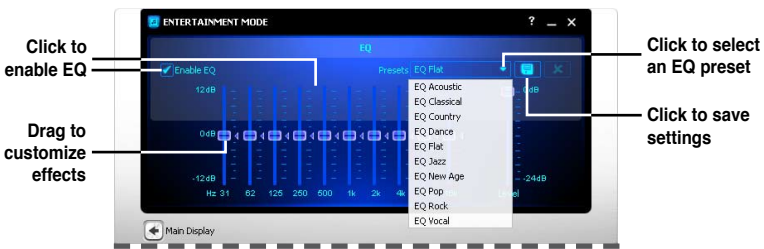
Mixer Panel

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

Drag to adjust volume

Click to select a recording device

Click to adjust volume

Click to mute volume

4.3.2 ASUS PC Probe II

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

Installing PC Probe II

To install PC Probe II on your computer:

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

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

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

Launching PC Probe II

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

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

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

Using PC Probe II

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

Click to close the Preference panel

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

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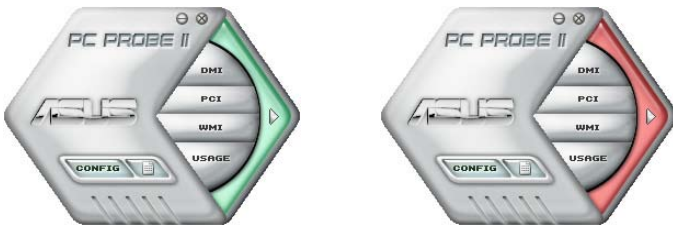
When displayed, the monitor panel for that sensor also turns red. Refer to the Monitor panels section for details.

Preferences

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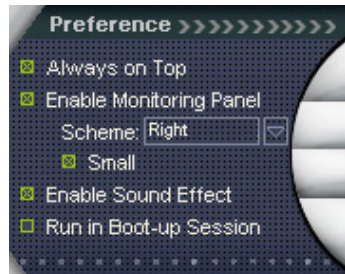
Hardware monitor panels

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

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

Large display

Small display

Changing the monitor panels position
To change the position of the monitor panels in the desktop, click the arrow down button of the Scheme options, then select another position from the list box. Click OK when finished.
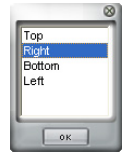
Moving the monitor panels
All monitor panels move together using a magnetic effect. If you want to detach a monitor panel from the group, click the horseshoe magnet icon. You can now move or reposition the panel independently.

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

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

Click to increase value

Click to decrease value
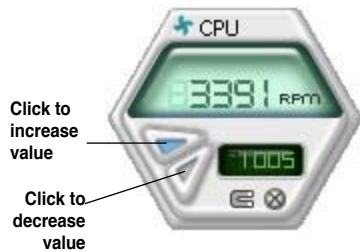
Monitoring sensor alert

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

Large display

Small display

WMI browser

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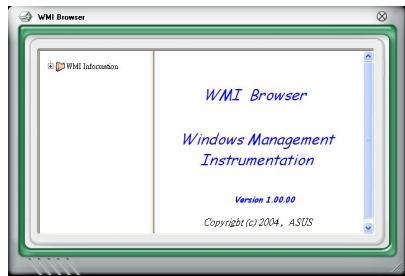
You can enlarge or reduce the browser size by dragging the bottom right corner of the browser.

DMI browser

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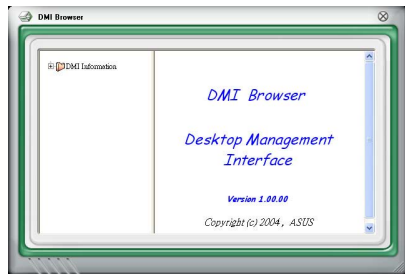
PCI browser

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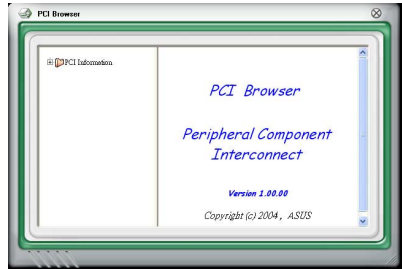
Usage

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

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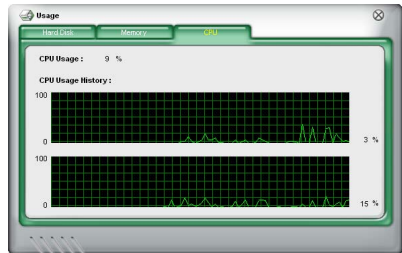
Hard disk drive space usage
The Hard Disk tab displays the
used and available hard disk
drive space. The left panel of the
tab lists all logical drives. Click
a hard disk drive to display the
information on the right panel.
The pie chart at the bottom of
the window represents the used
(blue) and the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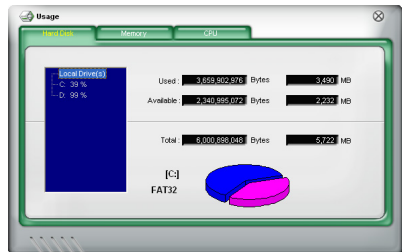
Memory usage
The Memory tab shows both used and available physical memory. The pie chart at the bottom of the window represents the used (blue) and the available physical memory.
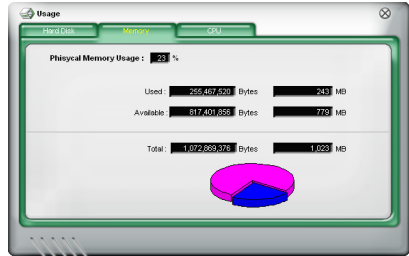
Configuring PC Probe II

Click CONFIG to view and adjust the sensor threshold values.

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

Loads the default threshold values for each sensor

Applies your changes

Cancels or ignores your changes

Loads your saved configuration

Saves your configuration

4.3.3 ASUS AI Suite

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

Installing AI Suite

To install AI Suite on your computer:

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

Launching AI Suite

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

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

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

Using AI Suite

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

Click to restore to normal

Click to launch EPU

Click to launch TurboV

Click to launch Fan Xpert
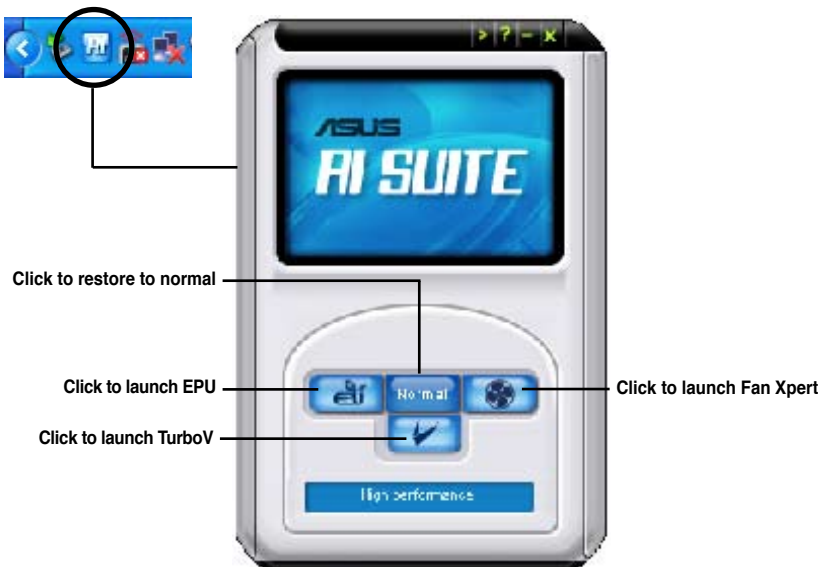
Other feature buttons

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

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

Displays the FSB/CPU frequency
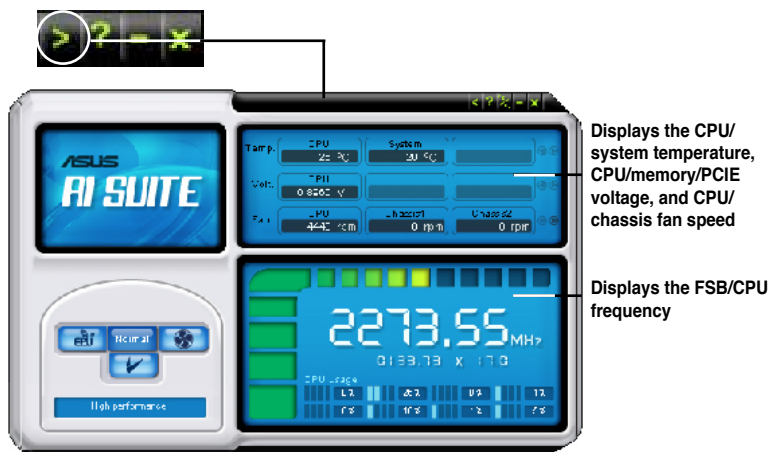
Click ![%°F] on right corner of the expanded window to switch the temperature from degrees Centigrade to degrees Fahrenheit.

4.3.4 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

Click to open the Calibration window

Click to select a fan

Click to select a fan profile

Click to display the current CPU temperature and the fan speed ratio

Click to apply the settings

Click to cancel the settings

Fan profiles

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

4.3.5 ASUS EPU-6 Engine

ASUS EPU-6 Engine is an energy-efficient tool that satisfies different computing needs. This utility provides four modes that you can select to enhance system performance or save power:

- **Turbo Mode**

- **High Performance Mode**

- **Medium Power Saving Mode**

- **Max. Power Saving Mode**

Selecting **Auto Mode** will have the system shift modes automatically according to current system status. You can also customize each mode by configuring settings like CPU frequency, vCore Voltage, and Fan Control.

Launching 6 Engine

After installing EPU-6 Engine from the motherboard support DVD, launch the program by double-clicking the 6 Engine tray icon.

The first time you launch 6 Engine, the following message will appear, asking you to run Calibration first. Running calibration allows the system to detect CPU properties to optimize power management.
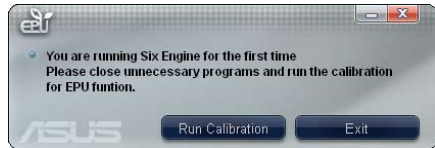
Click **Run Calibration** and wait for a few seconds. Then, the 6 Engine main menu appears.

6 Engine main menu

4.3.6   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.
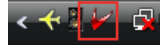
> Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

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.

Easy Mode   Auto Tuning Mode

Manual Mode
Load profile

Target values

Start-up values

Advanced
CPU, chipset
and DRAM
voltage
settings

Save the
current
settings as a
new profile

Voltage
Adjustment
bars

Click to show / hide
more settings

Click to restore all
start-up settings

Undoes all changes without applying

Applies all changes immediately

	•	Set the **CPU Ratio Setting** item in BIOS to [Auto] before using the CPU Ratio function in TurboV. See Chapter 3 for details.
	•	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.
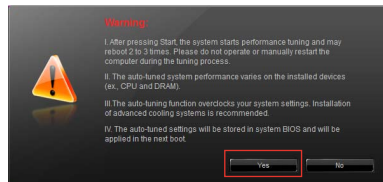
3. An animation appears indicating the overclocking process. Click **Stop** if you want to cancel the current Overclocking process.
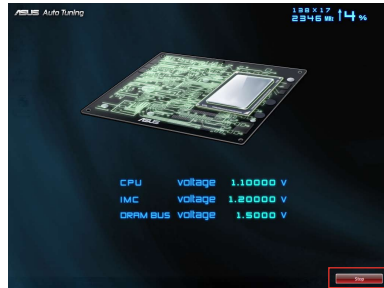
⚠️
    •   After pressing Start, the system starts performance tuning and may reboot 2 to 3 times. Please do not operate or manually restart the computer during the tuning process.

    •   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 overclocks 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.

Configuring ASUS Turbo Key (with TurboV Remote installed)
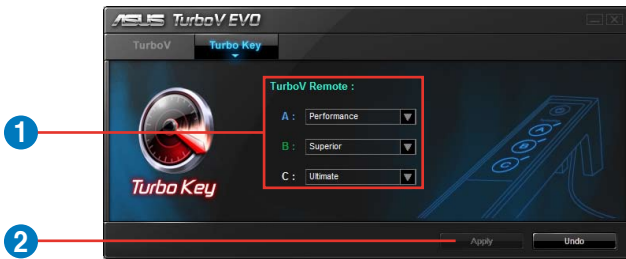
1. If your motherboard comes with a bundled TurboV Remote, you can assign a **Turbo Key Profile** to work with the hotkeys on the TurboV Remote. You can also load personal profiles saved in the ASUS TurboV utility.
2. Click **Apply** to save Turbo Key settings.

You have to press the keys on TurboV Remote to use the Turbo Key function.

4.4 RAID configurations

The motherboard comes with the Intel® P55 chipset that allows you to configure Serial ATA hard disk drives as RAID sets. The motherboard supports the following RAID configurations: RAID 0, RAID 1, RAID 10 and RAID 5.

> • 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 10* configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

Intel® Matrix Storage. The Intel® Matrix Storage technology supported by the P55 chip allows you to create a RAID 0, RAID 1, RAID 5, and RAID 10* function to improve both system performance and data safety. You can also combine two RAID sets to get higher performance, capacity, or fault tolerance provided by the difference RAID function. For example, RAID 0 and RAID 1 set can be created by using only two identical hard disk drives.

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 set(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 **Configure SATA as** 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.

> Due to chipset limitation, when set any of SATA ports to RAID mode, all SATA ports run at RAID mode together.

4.4.4   Intel® Matrix Storage Manager option ROM utility

To enter the Intel® Matrix Storage Manager option ROM utility

1.   Turn on the system.

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

```
        Intel(R) Matrix Storage Manager option ROM v8.9.0.1014 PCH-D wRAID5
            Copyright(C) 2003-09 Intel Corporation.  All Rights Reserved.
    ════════════════════════[ MAIN MENU ]════════════════════════
        1. Create RAID Volume              3. Reset Disks to Non-RAID
        2. Delete RAID Volume              4. Recovery Volume Options
                            5. Exit


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

      Physical Disks:
      Port Drive Model     Serial #          Size      Type/Status(Vol ID)
      0    ST3160812AS     9LS0HJA4          149.0GB   Non-RAID Disk
      1    ST3160812AS     9LS0F4HL          149.0GB   Non-RAID Disk
      2    ST3160812AS     3LS0JYL8          149.0GB   Non-RAID Disk
      3    ST3160812AS     9LS0BJ5H          149.0GB   Non-RAID Disk




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

The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.

> The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.
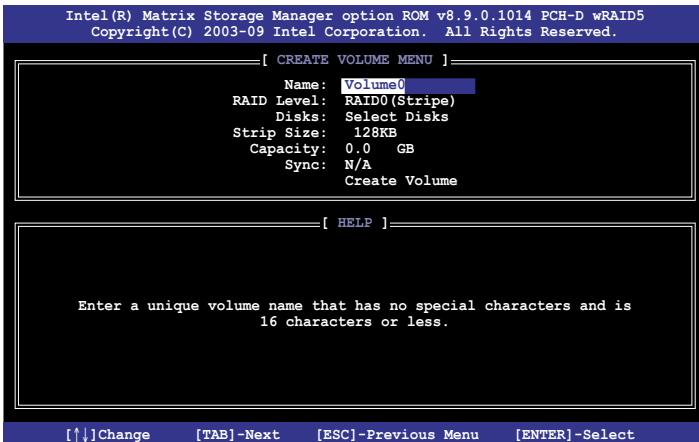
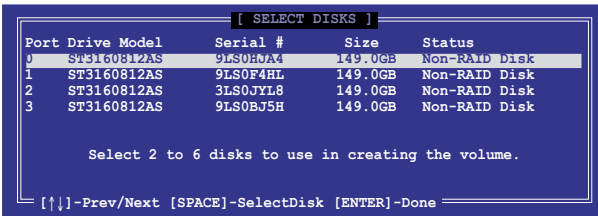> The utility supports maximum four hard disk drives for RAID configuration.

Creating a RAID volume

To create a RAID set

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

```
        Intel(R) Matrix Storage Manager option ROM v8.9.0.1014 PCH-D wRAID5
             Copyright(C) 2003-09 Intel Corporation.  All Rights Reserved.
   ===============================[ CREATE VOLUME MENU ]===============================
                                Name:   Volume0
                          RAID Level:   RAID0(Stripe)
                               Disks:   Select Disks
                          Strip Size:   128KB
                            Capacity:   0.0   GB
                                Sync:   N/A
                                        Create Volume

   =======================================[ HELP ]====================================



        Enter a unique volume name that has no special characters and is
                              16 characters or less.



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

2. Enter a name for the RAID set and press <Enter>.

3. When the **RAID Level** item is selected, press the up/down arrow key to select a RAID mode to create, and then press <Enter>.

4. When the **Disks** item is selected, press <Enter> to select the hard disk drives you want to include in the RAID set. The **SELECT DISKS** screen appears.

```
                          ============[ SELECT DISKS ]============
        Port Drive Model       Serial #        Size       Status
        0    ST3160812AS       9LS0H0A4        149.0GB    Non-RAID Disk
        1    ST3160812AS       9LS0F4HL        149.0GB    Non-RAID Disk
        2    ST3160812AS       3LS0JYL8        149.0GB    Non-RAID Disk
        3    ST3160812AS       9LS0BJ5H        149.0GB    Non-RAID Disk


             Select 2 to 6 disks to use in creating the volume.


        == [↑↓]-Prev/Next [SPACE]-SelectDisk [ENTER]-Done ==
```

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

6.	Use the up/down arrow key to select the stripe size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
	RAID 0: 128KB
	RAID 10: 64KB
	RAID 5: 64KB

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

7.	When the **Capacity** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.

8.	When the **Create Volume** item is selected, press <Enter>. The following warning message appears.

```
          WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.
      Are you sure you want to create this volume? (Y/N):
```
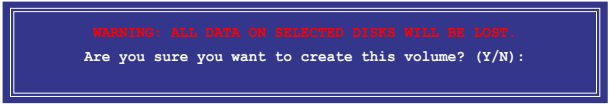
9.	Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the **CREATE VOLUME** menu.

Deleting a RAID set

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

To delete a RAID set

1. From the utility main menu, select **2. Delete RAID Volume** and press <Enter>. The following screen appears.

```
        Intel(R) Matrix Storage Manager option ROM v8.9.0.1014 PCH-D wRAID5
           Copyright(C) 2003-09 Intel Corporation.  All Rights Reserved.
    ════════════════════════════[ DELETE VOLUME MENU ]════════════════════════
     Name         Level        Drives    Capacity     Status      Bootable
     Volume0      RAID0(Stripe)   2        298.0GB      Normal        Yes



    ───────────────────────────────────[ HELP ]───────────────────────────────


            Deleting a volume will reset the disks to non-RAID.

                    WARNING: ALL DISK DATA WILL BE DELETED.
                    (This does not apply to Recovery volumes)




        [↑↓]-Select         [ESC]-Previous Menu     [DEL]-Delete Volume
```

2. Use the up/down arrow key to select the RAID set you want to delete, and then press <Del>. The following warning message appears.

```
    ═══════════════════════[ DELETE VOLUME VERIFICATION ]═══════════════════

                      ALL DATA IN THE VOLUME WILL BE LOST!
                   (This does not apply to Recovery volumes)

          Are you sure you want to delete volume "Volume0"? (Y/N):
```
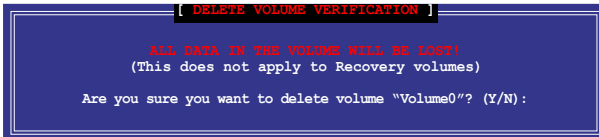
3. Press <Y> to delete the RAID set and return to the utility main menu, or press <N> to return to the **DELETE VOLUME** menu.

Exiting the Intel® Matrix Storage Manager

To exit the utility

1. From the utility main menu, select **5. Exit**, and then press <Enter>. The following warning message appears.

```
    ════════════════════════════[ CONFIRM EXIT ]════════════════════════════

                       Are you sure you want to exit? (Y/N):
```
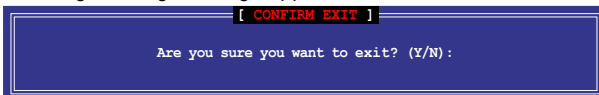
2. Press <Y> to exit or press <N> to return to the utility main menu.

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 floppy disk or a USB flash drive with the RAID driver.

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

4.5.1   Creating a RAID driver disk without entering the OS

To create a RAID driver disk without entering the OS

1.   Boot your computer.
2.   Press <Del> during POST to enter the BIOS setup utility.
3.   Set the optical drive as the primary boot device.
4.   Insert the support DVD into the optical drive.
5.   Save changes and exit BIOS.
6.   When the **Make Disk** menu appears, press <1> to create a 32/64bit **Intel AHCI/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 **Intel AHCI/RAID Driver** to create an Intel® 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

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, ensure that you select **Intel(R) ICH8R/ICH9R/ICH10R/DO/PCH SATA RAID Controller**.

4. Follow the succeeding screen instructions to complete the installation.

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

1. Insert the floppy disk or USB flash drive with RAID driver into the USB floppy disk drive or USB port.

2. During the OS installation, select **Intel(R) ICH8R/ICH9R/ICH10R/DO/PCH SATA RAID Controller**.

3. Follow the succeeding screen instructions to complete the installation.

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
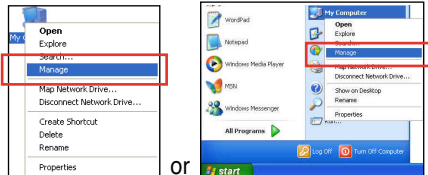
3. Select **Device Manager**. From the **Universal Serial Bus controllers**, right-click **xxxxxx USB Floppy**, and then select **Properties** from the pop-up window.
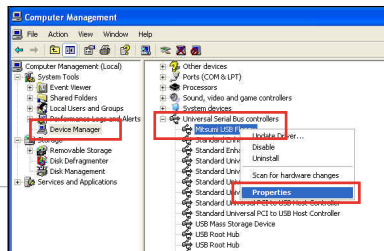
The name of the USB floppy disk drive varies with different vendors.

4. Click **Details** tab. The Vendor ID
    (VID) and Product ID (PID) are
    displayed.
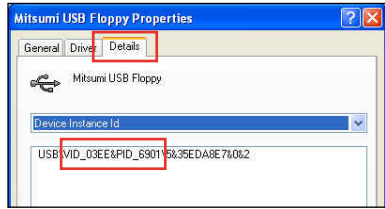
5. Browse the contents of the
    RAID driver disk to locate the file
    txtsetup.oem.

6. Double-click the file. A window
    appears, allowing you to select the
    program for opening the oem file.
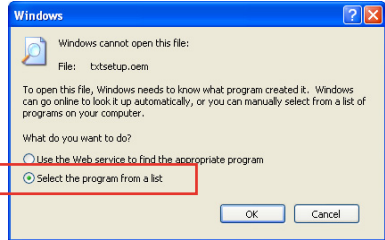
7. Use Notepad to open the file.
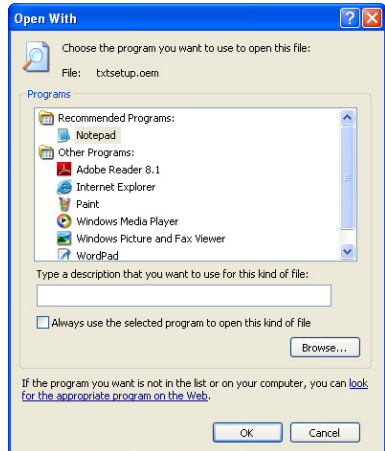
8.	Find the **[HardwareIds.scsi.iaAHCI_PCH]** and **[HardwareIds.scsi.iastor_8R9R10RDOPCH]** sections in the **txtsetup.oem** file.

9.	Type the following line to the bottom of the two sections:
	id = "USB\VID_xxxx&PID_xxxx", "usbstor"

```
[HardwareIds.scsi.iaAHCI_PCH]
id= "PCI\VEN_8086&DEV_3A22&CC_0106","iaStor"
id= "USB\VID_03EE&PID_6901", "usbstor"

[HardwareIds.scsi.iaStor_8R9R10RDOPCH]
id= "PCI\VEN_8086&DEV_3A22&CC_0106","iaStor"
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.

ATI® CrossFireX™ technology support

5

Chapter summary

5

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 2-41 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.
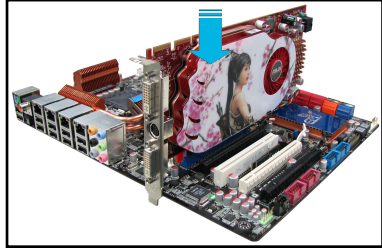
4. Align and firmly insert the CrossFireX bridge connector to the goldfingers on each graphics card. Ensure that the connector is firmly in place.
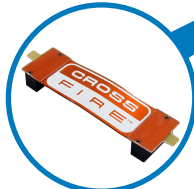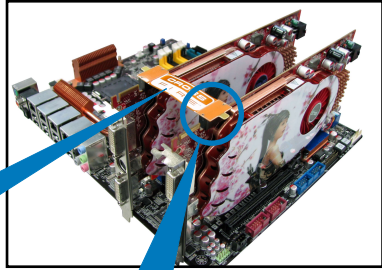
CrossFireX bridge
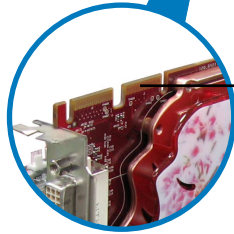
Goldfingers

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.
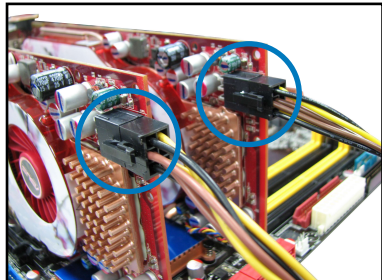
5.1.4   Installing the device drivers

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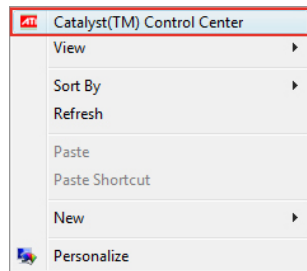
2.   The **Catalyst Control Center Setup Assistant** appears when the system detects the existance of multi-graphics cards. Click **Go** to continue to the **Catalyst Control Center Advanced View** window.
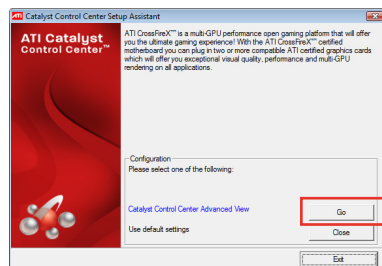
Enabling CrossFireX settings

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.
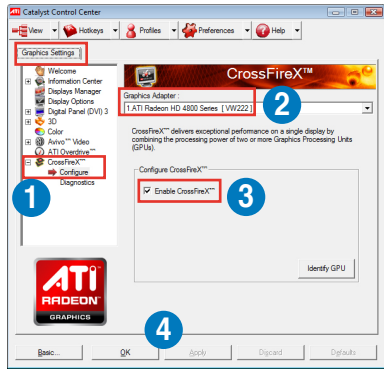
5.2 NVIDIA® SLI™ technology

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

5.2.1 Requirements

- In SLI mode, you should have two identical SLI-ready graphics cards that are NVIDIA® certified.

- Ensure that your graphics card driver supports the NVIDIA SLI technology. Download the latest driver from the NVIDIA website (www.nvidia.com).

- Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system. See Chapter 2 for details.

> - We recommend that you install additional chassis fans for better thermal environment.
>
> - Visit the NVIDIA zone website (http://www.nzone.com) for the latest certified graphics card and supported 3D application list.

5.2.2 Installing two SLI-ready 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 SLI-ready graphics cards.

2. Insert the two graphics card into the PCIEX16 slots. If your motherboard has more than two PCIEX16 slots, refer to Chapter 2 in this user manual for the locations of the PCIEX16 slots recommended for multi-graphics card installation.

3. Ensure that the cards are properly seated on the slots.
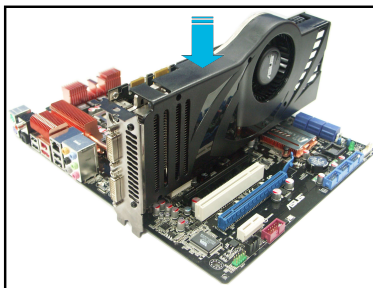
4. Align and firmly insert the SLI bridge connector to the goldfingers on each graphics card. Ensure that the connector is firmly in place.

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.
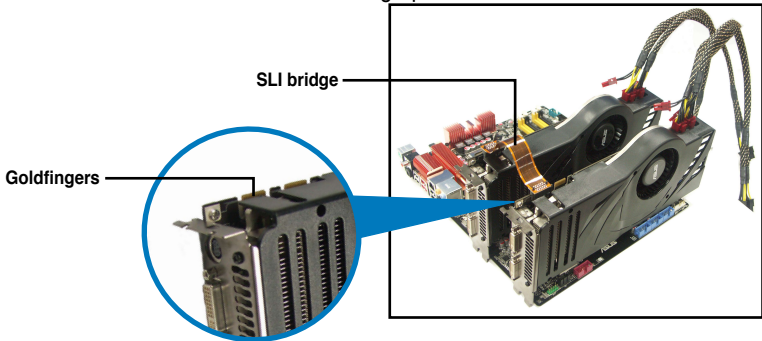
5.2.3   Installing the device drivers

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 NVIDIA® SLI™ technology. Download the latest driver from the NVIDIA website (www.nvidia.com).

5.2.4   Enabling the NVIDIA® SLI™ technology

After installing your graphics cards and the device drivers, enable the SLI feature in NVIDIA® Control Panel under the Windows® Vista™ operating system.
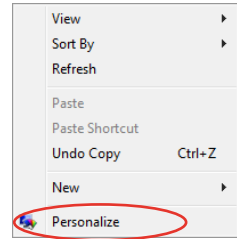
Launching the NVIDIA Control Panel

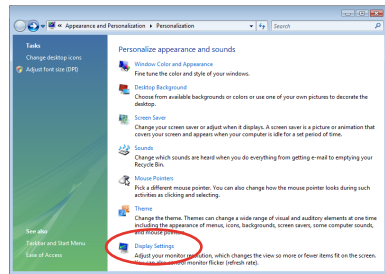You can launch the NVIDIA Control Panel by the following two methods.

A. Right click on the empty space of the Windows® desktop and select **NVIDIA Control Panel**.

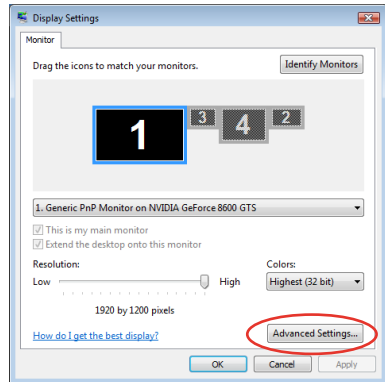The NVIDIA Control Panel window appears (See Step B5).
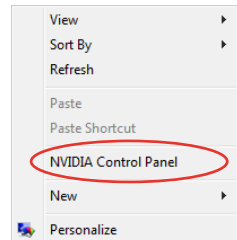
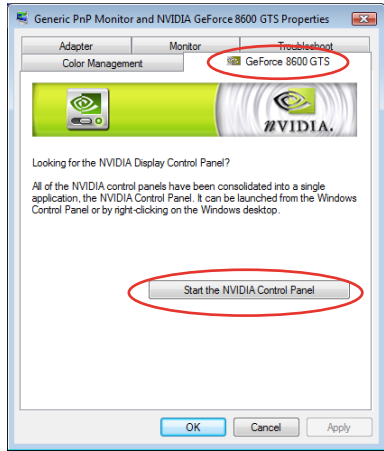B1. If you cannot see the NVIDIA Control Panel item in step (A), select **Personalize**.

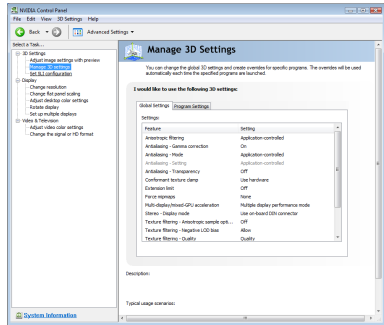B2. From the **Personalization** window, select **Display Settings**.

B3. From the Display Settings dialog box, click **Advanced Settings**.

B4. Select the NVIDIA GeForce tab, and then click **Start the NVIDIA Control Panel**.
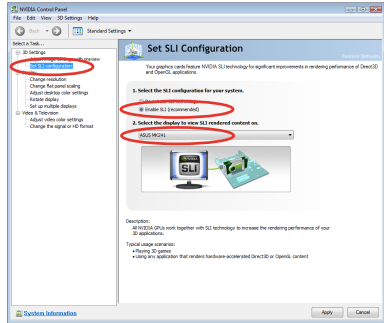

B5. The NVIDIA Control Panel window appears.

Enabling SLI settings

From the NVIDIA Control Panel window, select **Set SLI Configuration**. Click **Enable SLI** and set the display for viewing SLI rendered content. When done, click **Apply**.

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

Debug code table

Chapter summary

A

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	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	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