

**M5A99X
EVO**

ASUS[®]

Motherboard

E6411

First Edition (V1)

May 2011

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Notices

Federal Communications Commission Statement

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

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

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

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



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

Canadian Department of Communications Statement

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

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

REACH

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



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.

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Ensure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, ensure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

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.

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> +

M5A99X EVO specifications summary

CPU	<p>AMD® Socket AM3+ for AMD® FX Series CPU up to 8-core AMD® 140W CPU Support AMD® Cool 'n' Quiet™ Technology (by CPU type) Supports 32nm CPU * Compatible with AMD® Socket AM3 for AMD® Phenom™ II /Athlon™ II /Sempron™ 100 Series Processors</p>
Chipset	AMD® 990X / SB950
System bus	Up to 5200 MT/s; HyperTransport™ 3.0
Memory	<p>4 x DIMM, max. 32 GB, DDR3 2133(O.C.) / 1866 / 1800 / 1600 / 1333 / 1066 MHz ECC / non-ECC, un-buffered memory Dual channel memory architecture</p> <p>* Due to the CPU spec., AMD AM3 100 series CPUs support up to DDR3 1066MHz. With ASUS design, this motherboard can support up to DDR3 1333MHz.</p> <p>** Due to OS limitation, when installing total memory of 4GB capacity or more, Windows® 32-bit operation system may only recognize less than 3GB. Hence, a total installed memory of less than 3GB is recommended.</p> <p>*** Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lists)</p>
Expansion slots	<p>2 x PCI Express 2.0 x16 slots (single @ x16 speed, dual @ x8/x8 speed) 1 x PCI Express 2.0 x16 slot (Black @ x4 speed) 2 x PCI Express 2.0 x1 slots 1 x PCI slot</p>
Multi-GPU support	<p>Supports NVIDIA® Quad-GPU SLI™ Technology Supports ATI® Quad-GPU CrossFireX™ Technology</p>
Storage	<p>AMD® SB950 chipset</p> <ul style="list-style-type: none"> - 6 x SATA 6.0 Gb/s ports with RAID 0, 1, 5, and 10 support <p>2 x JMicron® JMB362 SATA controllers</p> <ul style="list-style-type: none"> - 2 x SATA 3.0 Gb/s ports - 1 x Power eSATA 3.0 Gb/s port - 1 x eSATA 3.0 Gb/s port
LAN	Realtek® 8111E PCIe Gigabit LAN controller
Audio	<p>Realtek® ALC892 8-channel High Definition Audio CODEC</p> <ul style="list-style-type: none"> - Supports 192khz/24bit BD Lossless Sound - DTS Surround Sensation UltraPC - Supports Jack-Detection, Multi-Streaming, and Front Panel Jack-Retasking - Optical S/PDIF Out port at back I/O - ASUS Noise Filter
USB	<p>2 x ASMedia USB 3.0 controllers</p> <ul style="list-style-type: none"> - 2 x USB 3.0/2.0 ports at mid-board for front panel support - 2 x USB 3.0/2.0 ports at back panel (blue) <p>AMD® SB950 chipset</p> <ul style="list-style-type: none"> - 14 x USB 2.0/1.1 ports (6 ports at mid-board, 8 ports at back panel)

(continued on the next page)

M5A99X EVO specifications summary

IEEE 1394	VIA® 6308P controller supports 2 x IEEE 1394a ports (one at mid-board, one at back panel)
ASUS unique features	ASUS Dual Intelligent Processors 2 with DIGI+ VRM: ASUS DIGI+ VRM <ul style="list-style-type: none">- Industry leading Digital 6+2 Phase Power Design- ASUS DIGI+ VRM Utility ASUS EPU <ul style="list-style-type: none">- EPU, EPU switch ASUS TPU <ul style="list-style-type: none">- Auto Tuning, TurboV, TPU switch ASUS Exclusive Features <ul style="list-style-type: none">- Front Panel USB 3.0 Support- MemOK!- AI Suite II- AI Charger+- ASUS UEFI BIOS EZ Mode featuring friendly graphics user interface ASUS Quiet Thermal Solution <ul style="list-style-type: none">- ASUS Fanless Design: Heat pipe solution- ASUS Fan Xpert ASUS Q-Design <ul style="list-style-type: none">- ASUS Q-Shield- ASUS Q-Slot- ASUS Q-DIMM- ASUS Q-LED (CPU, DRAM, VGA, Boot Device LED)- ASUS Q-Connector ASUS EZ DIY <ul style="list-style-type: none">- ASUS O.C. Profile- ASUS EZ Flash 2- ASUS MyLogo 2- Precision Tweaker 2- Multi-language BIOS
ASUS exclusive overclocking features	Precision Tweaker 2 <ul style="list-style-type: none">- vCore: Adjustable CPU voltage at 0.00625V increment- vDDNB: Adjustable CPU/NB voltage at 0.00625V increment- vNB: Adjustable NB voltage at 0.00625V increment- vNB HT: Adjustable HT voltage at 0.00625V increment- vDRAM Bus: Adjustable DRAM voltage at 0.00625V increment- vSB: Adjustable SB voltage at 0.00500V increment SFS (Stepless Frequency Selection) <ul style="list-style-type: none">- Internal Base Clock tuning from 100MHz up to 600MHz at 1MHz increment- PCI Express frequency tuning from 100MHz up to 150MHz at 1MHz increment Overclocking Protection <ul style="list-style-type: none">- ASUS C.P.R. (CPU Parameter Recall)

(continued on the next page)

M5A99X EVO specifications summary

Back panel I/O ports	<ul style="list-style-type: none"> 1 x PS/2 keyboard/mouse combo port 1 x Optical S/PDIF Out port 1 x LAN (RJ-45) port 1 x IEEE 1394a port 1 x Power eSATA port (green) 1 x eSATA port 2 x USB 3.0/2.0 ports (blue) 8 x USB 2.0/1.1 ports 8-channel Audio I/O ports
Internal I/O connectors	<ul style="list-style-type: none"> 1 x USB 3.0/2.0 connector supports additional 2 USB ports (19-pin) 3 x USB 2.0/1.1 connectors support additional 6 USB ports 6 x SATA 6.0 Gb/s connectors 2 x SATA 3.0 Gb/s connectors 1 x CPU Fan connector (4-pin) 3 x Chassis Fan connectors (1 x 4-pin, 2 x 3-pin) 1 x Power Fan connector (1 x 3-pin) 1 x IEEE1394a connector 1 x COM connector 1 x Front panel audio connector 1 x S/PDIF Out header 1 x Clear CMOS jumper 1 x 24-pin EATX Power connector 1 x 8-pin EATX 12V Power connector 1 x System Panel (Q-Connector) 1 x MemOK! button 1 x EPU switch 1 x TPU switch
BIOS features	32 Mb Flash ROM, UEFI BIOS, PnP, DMI 2.0, WfM2.0, SM BIOS 2.6, ACPI 2.0a, Multi-language BIOS, ASUS EZ Flash 2,
Manageability	WfM 2.0, DMI 2.0, WOL by PME, WOR by PME, PXE
Support DVD contents	<ul style="list-style-type: none"> Drivers ASUS Utilities ASUS Update Anti-virus software (OEM version)
Form factor	ATX form factor: 12 in. x 9.6 in. (30.5 cm x 24.4 cm)

*Specifications are subject to change without notice.

Chapter 1

1.1 Welcome!

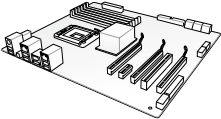

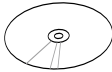
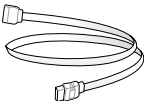
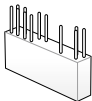
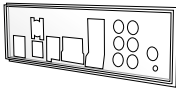

Thank you for buying an ASUS® M5A99X EVO motherboard!

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.

		
ASUS M5A99X EVO motherboard	User guide	Support DVD
		
4 x Serial ATA 6.0 Gb/s cables	1 x 2-in-1 ASUS Q-Connector kit	1 x ASUS Q-Shield
		
1 x ASUS SLI™ bridge connector		



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

1.3 Special features

1.3.1 Product highlights

AMD® FX™-Series / Phenom™ II / Athlon™ II / Sempron™ 100 Series Processors (socket AM3+/AM3)

This motherboard supports AMD® AM3+/AM3 multi-core processors with unique L3 cache and delivers better overclocking capabilities with less power consumption. It features dual-channel DDR3 1866 memory support and accelerates data transfer rate up to 5200MT/s via HyperTransport™ 3.0 based system bus. This motherboard also supports AMD® CPUs in the new 32nm manufacturing process.

AMD® 990X Chipset

AMD® 990X Chipset is designed to support up to 5200MT/s HyperTransport™ 3.0 (HT 3.0) interface speed and PCI Express™ 2.0 x16 graphics. It is optimized with AMD®'s latest AM3+ and multi-core CPUs to provide excellent system performance and overclocking capabilities.

Dual-Channel DDR3 2133(O.C.) / 1866 / 1800 / 1600 / 1333 / 1066 support

The motherboard supports DDR3 memory that features data transfer rates of 2133(O.C.) / 1866 / 1800 / 1600 / 1333 / 1066 MHz to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The dual-channel DDR3 architecture enlarges the bandwidth of your system memory to boost system performance.

Quad-GPU SLI™ and Quad-GPU CrossFireX™ Support

The motherboard's powerful AMD® 9900X platform optimizes PCIe allocation in multiple-GPU configurations of either SLI™ or CrossFireX™. This allows you to enjoy a never before-experienced brand new gaming style.

AMD® SB950 Chipset

The AMD® SB950 Southbridge natively supports the next generation SATA 6.0 Gb/s data transfer rate and PCI Express 2.0 interface.

Complete USB 3.0 Integration

ASUS facilitates strategic USB 3.0 accessibility for both the front and rear panel – 4 USB 3.0 ports in total. Experience the latest plug & play connectivity at speeds up to 10 times faster than USB 2.0. The M5A99X EVO affords greater convenience to high speed connectivity.

Front Panel USB 3.0 Support

ASUS provides standardized USB 3.0 front panel support which is compatible with any chassis. Enjoy faster throughput of USB 3.0 without relegating cables or hard-to-reach rear I/O.

1.3.2 Dual Intelligent Processors 2 with DIGI+ VRM

The world's first Dual Intelligent Processors from ASUS pioneered the use of two onboard chips—EPU (Energy Processing Unit) and TPU (TurboV Processing Unit). New generation Dual Intelligent Processors 2 with DIGI+ VRM digital power design launch control into a new era, empowering users with superior flexibility and perfect precision to ensure optimized performance, extreme system stability and greater power efficiency.

DIGI+ VRM

The new ASUS DIGI+ VRM design upgrades motherboard power delivery to a digital standard. The 6+2 digital architecture delivers twice the precision power, intelligently adjusting PWM voltage and frequency modulation with minimal power loss through BIOS tuning and exclusive user interface to increase over-clocking range while performance reaches its full potential. It also adjusts frequencies dynamically, cutting radiation interference by half to enhance system stability through enabling VRM spread spectrum. The DIGI+ VRM digital power design empowers users with superior flexibility and perfect precision to ensure optimized performance, extreme system stability, and greater power efficiency.

2X Precise Power Control

ASUS DIGI+ VRM delivers twice the precision power, intelligently adjusting PWM voltage and frequency modulation to minimize power loss while performance reaches its full potential.

TPU

Unleash your performance with ASUS' simple onboard switch or AI Suite II utility. The TPU chip offers precise voltage control and advanced monitoring through Auto Tuning and TurboV functions. Auto tuning offers a user friendly way to automatically optimize the system for fast, yet stable clock speeds, while TurboV enables unlimited freedom to adjust CPU frequencies and ratios for optimized performance in diverse situations.

EPU

Tap into the world's first real-time PC power saving chip through a simple onboard switch or AI Suite II utility. Get total system-wide energy optimization by automatically detecting current PC loadings and intelligently moderating power consumption. This also reduces fan noise and extends component longevity.

1.3.3 ASUS Exclusive Features

MemOK!

MemOK! quickly ensures memory boot compatibility. This remarkable memory rescue tool requires a mere push of a button to patch memory issues. MemOK! determines failsafe settings and dramatically improves your system boot success.

AI Suite II

With its user-friendly interface, ASUS AI Suite II consolidates all the exclusive ASUS features into one simple to use software package. It allows users to supervise overclocking, energy management, fan speed control, voltage and sensor readings. This all-in-one software offers diverse and ease to use functions, with no need to switch back and forth between different utilities.

1.3.4 ASUS Quiet Thermal Solution

ASUS Fanless Design—Heat-pipe solution

The ASUS heat-pipe features 0-dB thermal solution that offers you a noiseless PC environment. Its beautiful shape upgrades the visual enjoyment and the heat-pipe design lowers the temperature of the chipset and power phase area through high efficient heat-exchange. Combined with usability and aesthetics, the ASUS heat-pipe gives you an extremely silent and cooling experience with its elegant appearance.



DO NOT uninstall the heat-pipe by yourself. Doing so may bend the tubing and affect the heat dissipation performance.

ASUS Fan Xpert

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

1.3.5 ASUS EZ DIY

ASUS UEFI BIOS (EZ Mode)

The new ASUS UEFI BIOS is an Unified Extensible Firmware Interface, offering a user-friendly interface that goes beyond traditional keyboard-only BIOS controls to enable more flexible and convenient mouse input. Users can easily navigate the new UEFI BIOS with the same smoothness as their operating system. The exclusive EZ Mode displays frequently-accessed setup info, while the Advance Mode is for experienced performance enthusiasts that demand far more intricate system settings.

Supports Hard Drives over 2.2TB

ASUS UEFI BIOS natively supports hard drives larger than 2.2TB in 64-bit, with full storage space utilization, helping deliver far more exciting computing than traditional BIOS versions!

ASUS Q-Design

ASUS Q-Design enhances your DIY experience. All of Q-LED, Q-Slot, and Q-DIMM design speed up and simplify the DIY process!

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

ASUS Q-Connector allows you to easily connect or disconnect the chassis front panel cables to the motherboard. This unique module eliminates the trouble of connecting the system panel cables one at a time and avoiding wrong cable connections.

ASUS EZ-Flash 2

ASUS EZ Flash 2 is a user-friendly utility that allows you to update the BIOS without using a bootable floppy disk or an OS-based utility.

1.3.6 Other special features

Power eSATA on the Go

The Power eSATA solution combines the eSATA connector and power source together, allowing you to use external SATA devices without the need of additional power source*. Easily backup photos, videos and other entertainment contents on external devices.

*** Power eSATA requires a specially designed signal cable to provide 5V power for the external SATA device. The cable is purchased separately.**

DTS Surround Sensation UltraPC

DTS Surround Sensation UltraPC delivers exceptional 5.1 surround experience through the most common PC audio setups—your existing stereo speakers or headphones. In addition to virtual surround, “Bass enhancement” provides stronger low frequency bass sound, and “Voice clarification” provides clear human dialogue even with loud background sound. With these technologies, you may experience a better home-theater audio with ease.

ErP Ready

The motherboard is European Union’s Energy-related Products (ErP) ready, and ErP requires products to meet certain energy efficiency requirement in regards to energy consumptions. This is in line with ASUS vision of creating environment-friendly and energy-efficient products through product design and innovation to reduce carbon footprint of the product and thus mitigate environmental impacts.

2.1 Before you proceed

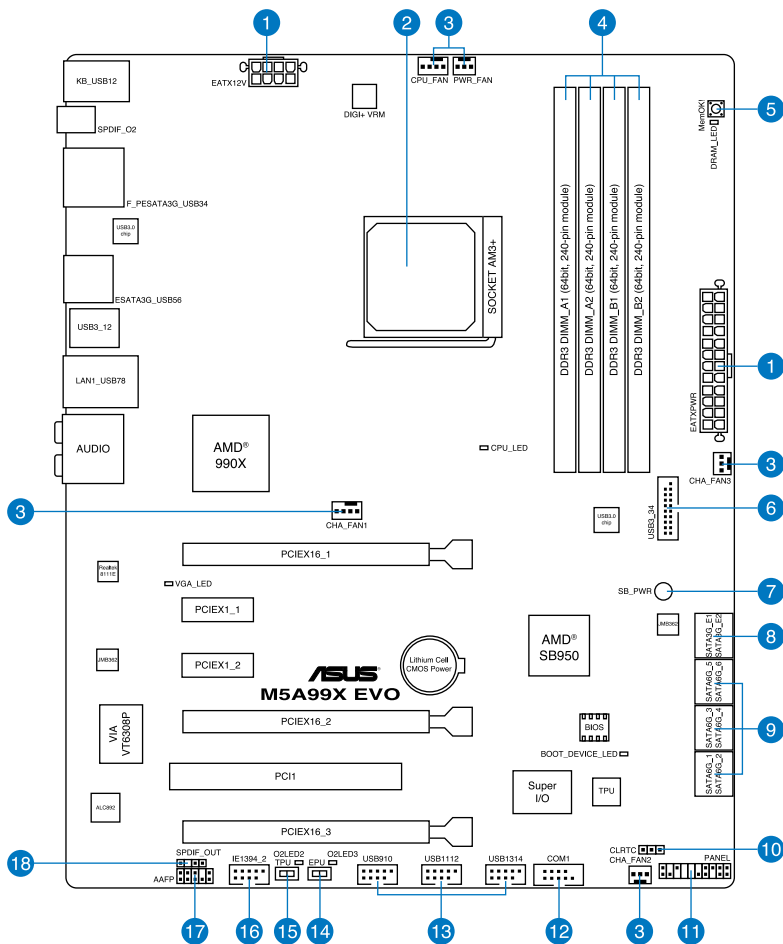
Take note of the following precautions before you install motherboard components or change any motherboard settings.



-
- 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.
-

2.2 Motherboard overview

2.2.1 Motherboard layout



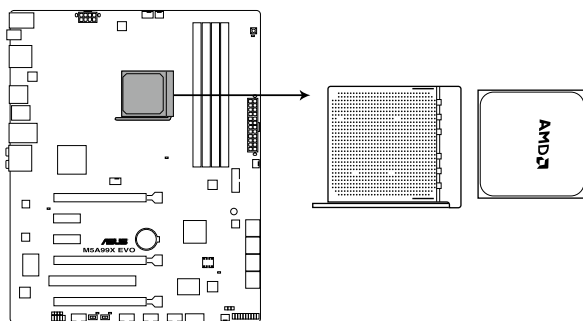
Refer to **2.2.8 Internal connectors** and **2.3.10 Rear panel connection** for more information about rear panel connectors and internal connectors.

Layout contents

Connectors/Jumpers/Slots		Page
1.	ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)	2-28
2.	AM3+ CPU Socket	2-4
3.	CPU, chassis, and power fan connectors (4-pin CPU_FAN, 4-pin CHA_FAN1, 3-pin CHA_FAN2/3, 3-pin PWR_FAN)	2-26
4.	DDR3 DIMM slots	2-6
5.	MemOK! switch	2-16
6.	USB 3.0 connector (20-1 pin USB3_34)	2-23
7.	Standby power LED (SB_PWR)	2-19
8.	JMicron JMB362 Serial ATA 3.0 Gb/s connectors (7-pin SATA3G_E1/E2)	2-22
9.	AMD® SB950 Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_1-6)	2-21
10.	Clear RTC RAM (3-pin CLRTC)	2-15
11.	System panel connector (20-8 pin PANEL)	2-29
12.	Serial port connector (10-1 pin COM1)	2-27
13.	USB 2.0 connectors (10-1 pin USB910, USB1112, USB1314)	2-24
14.	EPU switch	2-18
15.	TPU switch	2-17
16.	IEEE 1394a port connector (10-1 pin IE1394_2)	2-25
17.	Front panel audio connector (10-1 pin AAFP)	2-27
18.	Digital audio connector (4-1 pin SPDIF_OUT)	2-25

2.2.2 Central Processing Unit (CPU)

The motherboard comes with an AM3+/AM3 socket designed for AMD® FX™-Series / Phenom™ II / Athlon™ II / Sempron™ 100 Series Processors.



M5A99X EVO CPU AM3+



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



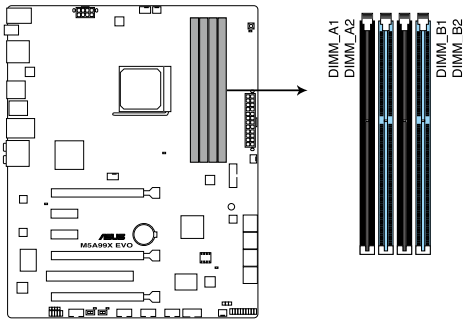
The AM3+ socket has a different pinout from the 940-pin socket designed for the AMD Opteron processor. Ensure that you use a CPU designed for the AM3+ socket. The CPU fits in only one correct orientation. **DO NOT** force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

2.2.3 System memory

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

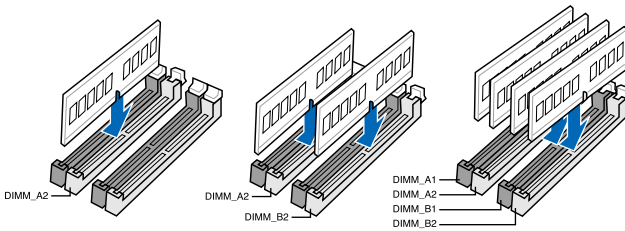


A DDR3 module is notched differently from a DDR or DDR2 module. DO NOT install a DDR or DDR2 memory module to the DDR3 slot.



M5A99X EVO 240-pin DDR3 DIMM socket

Recommended memory configurations



Memory configurations

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



- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- 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 CPU spec., AMD AM3 100 series CPUs support up to DDR3 1066MHz. With ASUS design, this motherboard can support up to DDR3 1333MHz.
- When overclocking, some AMD CPU models may not support DDR3 1600 or higher frequency DIMMs.
- Due to the memory address limitation on 32-bit Windows OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you do any of the following:
 - Use a maximum of 3GB system memory if you are using a 32-bit Windows OS.
 - Install a 64-bit Windows OS when you want to install 4GB or more on the motherboard.

For more details, refer to the Microsoft® support site at <http://support.microsoft.com/kb/929605/en-us>.
- This motherboard does not support DIMMs made up of 512Mb (64MB) chips or less (Memory chip capacity counts in Megabit, 8 Megabit/Mb = 1 Megabyte/MB).



- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, refer to section **3.4 Ai 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.

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 2000 MHz capability for AM3+ CPU

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
A-DATA	AX3U2000GB2G9B(XMP)	2GB	DS	-	-	9-11-9-27	1.55-1.75	*	*	
CORSAIR	CMT6GX3M3A2000C8(XMP)	6GB (3x 2GB)	DS	-	-	8-9-8-24	1.65	*	*	*
Crucial	BL12864BE2009.8SFB3(EPP)	1GB	SS	-	-	9-9-9-28	2	*		
KINGSTON	KHX2000C9AD3T1K3/6GX(XMP)	6GB (3x 2GB)	DS	-	-	-	1.65	*	*	*
AEXEA	AXA3ES4GK2000LG28V(XMP)	4GB (2x 2GB)	DS	-	-	-	1.65	*	*	*
Silicon Power	SP002GBLYU200S02(XMP)	2GB	DS	-	-	-	-	*	*	*
Team	TXD32048M2000C9-L(XMP)	2GB	DS	Team	T3D1288RT-20	9-9-9-24	1.6	*		

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 1866 MHz capability for AMD AM3+ CPU

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
CORSAIR	TR3X6G1866C9DVer4.1(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.65	*	*	
CORSAIR	CMZ8GX3M2A1866C9(XMP)	8GB (2x 4GB)	DS	-	-	9-10-9-27	1.5	*	*	*
G.SKILL	F3-15000CL9D-4GBRH(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65	*	*	*
G.SKILL	F3-15000CL9D-4GBTD(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65	*	*	*
G.SKILL	F3-14900CL9D-8GBSR(XMP)	8GB (2x 4GB)	DS	-	-	9-10-9-28	1.5	*	*	*
KINGSTON	KHX1866C9D3T1K3/3GX(XMP)	3GB (3x 1GB)	SS	-	-	-	1.65	*	*	*
KINGSTON	KHX1866C9D3T1K3/6GX(XMP)	6GB(3 x 2GB)	DS	-	-	9	1.65	*	*	*
OCZ	OCZ3G1866LV4GK	4GB (2x 2GB)	DS	-	-	10-10-10	1.65	*	*	*
OCZ	OCZ3P1866C9LV6GK	6GB(3 x 2GB)	DS	-	-	9-9-9	1.65	*	*	*
Super Talent	W1866UX2G8(XMP)	2GB(2 x 1GB)	SS	-	-	8-8-8-24	-	*	*	*
Team	TXD32048M1866C9(XMP)	2GB	DS	Team	T3D1288RT-16	9-9-9-24	1.65	*	*	*

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 1800 MHz capability for AMD AM3+ CPU

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
G.SKILL	F3-14400CL6D-4GBFLS(XMP)	4GB(2 x 2GB)	DS	-	-	6-8-6-24	1.65	*	*	*
G.SKILL	F3-14400CL9D-4GBRL(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.6	*	*	*
KINGSTON	KHX1800C9D3T1K3/6GX(XMP)	6GB(3 x 2GB)	DS	-	-	-	1.65	*	*	*

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 2000 MHz capability for AMD AM3 CPU

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
A-DATA	AX3U2000GC4G9B(XMP)	4GB	DS	-	-	9-11-9-27	1.55~1.75	*	*	*
Apacer	78.AAGD5.9KD(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-27	-	*	*	*
CORSAIR	CMT6GX3M3A2000C8(XMP)	6GB (3x 2GB)	DS	-	-	8-9-8-24	1.65	*	*	*
G.SKILL	F3-16000CL9D-4GBRH(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65	*	*	*
G.SKILL	F3-16000CL9D-4GBTD(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65	*	*	*
G.SKILL	F3-16000CL9T-6GBTD(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.6	*	*	*
G.SKILL	F3-16000CL7Q-8GBFLS(XMP)	8GB(4 x 2GB)	DS	-	-	7-9-7-24	1.65	*	*	*
GEIL	GUP34GB2000C9DC(XMP)	4GB (2x 2GB)	DS	-	-	9-9-9-28	1.65	*	*	*
KINGSTON	KHX2000C9AD3T1K2/4GX(XMP)	4GB (2x 2GB)	DS	-	-	9	1.65	*	*	*
KINGSTON	KHX2000C9AD3W1K3/6GX(XMP)	6GB (3x 2GB)	DS	-	-	9	1.65	*	*	*
Transcend	TX2000KLN-8GK (388375)(XMP)	4GB	DS	-	-	-	1.6	*	*	*
AEXEA	AXA3ES2G2000LG28V(XMP)	2GB	DS	-	-	-	1.65	*	*	*
AEXEA	AXA3ES4GK2000LG28V(XMP)	4GB (2x 2GB)	DS	-	-	-	1.65	*	*	*
Patriot	PX7312G2000ELK(XMP)	12GB (3x 4GB)	DS	-	-	9-11-9-27	1.65	*	*	*
Team	TXD32048M2000C9(XMP)	2GB	DS	Team	T3D1288RT-20	9-9-9-24	1.5	*	*	*
Team	TXD32048M2000C9-L(XMP)	2GB	DS	Team	T3D1288L-20	9-9-9-24	1.5	*	*	*
Team	TXD32048M2000C9-L(XMP)	2GB	DS	Team	T3D1288RT-20	9-9-9-24	1.6	*	*	*

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 1866 MHz capability for AMD AM3 CPU

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								1 DIMM	2 DIMM	4 DIMM	
CORSAIR	CMZ8GX3M2A1866C9(XMP)	8GB (2x 4GB)	DS	-	-	9-10-9-27	1.5	*	*	*	
G.SKILL	F3-15000CL9D-4GBRH (XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65	*	*	*	
G.SKILL	F3-15000CL9D-4GBTD(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65	*	*	*	
KINGSTON	KHX1866C9D3T1K3/3GX(XMP)	3GB (3x 1GB)	SS	-	-	-	1.65	*	*	*	
KINGSTON	KHX1866C9D3T1K3/6GX(XMP)	6GB(3 x 2GB)	DS	-	-	9	1.65	*	*	*	
OCZ	OCZ3G1866LV4GK	4GB (2x 2GB)	DS	-	-	10-10-10	1.65	*	*	*	
OCZ	OCZ3P1866C9LV6GK	6GB(3 x 2GB)	DS	-	-	9-9-9	1.65	*	*	*	
Super Talent	W1866UX2G8(XMP)	2GB(2 x 1GB)	SS	-	-	8-8-8-24	-	*	*	*	
Team	TXD32048M1866C9(XMP)	2GB	DS	Team	T3D1288RT-16	9-9-9-24	1.65	*	*	*	

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 1800 MHz capability for AMD AM3 CPU

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								1 DIMM	2 DIMM	4 DIMM	
G.SKILL	F3-14400CL6D-4GBFLS(XMP)	4GB(2 x 2GB)	DS	-	-	6-8-6-24	1.65	*	*	*	
G.SKILL	F3-14400CL9D-4GBRL(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.6	*	*	*	
KINGSTON	KHX1800C9D3T1K3/6GX(XMP)	6GB(3 x 2GB)	DS	-	-	-	1.65	*	*	*	

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 1600 MHz capability for AMD AM3 CPU

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								1 DIMM	2 DIMM	4 DIMM	
CORSAIR	HX3X12G1600C9(XMP)	12GB (6x 2GB)	DS	-	-	9-9-9-24	1.6	*	*	*	
CORSAIR	CMZ16GX3M4A1600C9(XMP)	16GB (4x 4GB)	DS	-	-	9-9-9-24	1.5	*	*	*	
CORSAIR	CMG4GX3M2A1600C6	4GB (2x 2GB)	DS	-	-	6-6-6-18	1.65	*	*	*	
CORSAIR	CMD4GX3M2B1600C8	4GB(2x 2GB)	DS	-	-	8-8-8-24	1.65	*	*	*	
CORSAIR	CMG4GX3M2A1600C6	4GB(2x 2GB)	DS	-	-	6-6-6-18	1.65	*	*	*	
CORSAIR	CMX4GX3M2A1600C8(XMP)	4GB(2x 2GB)	DS	-	-	8-8-8-24	1.65	*	*	*	
CORSAIR	CMD4GX3M2A1600C8(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.65	*	*	*	
CORSAIR	CMG4GX3M2A1600C7(XMP)	4GB(2 x 2GB)	DS	-	-	7-7-7-20	1.65	*	*	*	
CORSAIR	CMX4GX3M2A1600C9(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65	*	*	*	
CORSAIR	CMP6GX3M3A1600C8(XMP)	6GB (3x 2GB)	DS	-	-	8-8-8-24	1.65	*	*	*	
CORSAIR	CMP6GX3M3A1600C8(XMP)	6GB (3x 2GB)	DS	-	-	8-8-8-24	1.65	*	*	*	
CORSAIR	CMX6GX3M3C1600C7(XMP)	6GB (3x 2GB)	DS	-	-	7-8-7-20	1.65	*	*	*	
CORSAIR	TR3X8G1600C8D(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8-24	1.65	*	*	*	
CORSAIR	CMP8GX3M2A1600C9(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.65	*	*	*	
CORSAIR	CMZ8GX3M2A1600C8(XMP)	8GB (2x 4GB)	DS	-	-	8-8-8-24	1.5	*	*	*	
CORSAIR	CMZ8GX3M2A1600C9(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	*	*	*	
CORSAIR	CMX8GX3M4A1600C9(XMP)	8GB(4 x 2GB)	DS	-	-	9-9-9-24	1.65	*	*	*	
Crucial	BL12864B1608.8FF(XMP)	2GB(2x 1GB)	SS	-	-	8-8-8-24	1.65	*	*	*	
Crucial	BL25664B1608.16FF(XMP)	2GB	DS	-	-	8-8-8-24	1.65	*	*	*	
G.SKILL	F3-12800CL7D-4GBRH(XMP)	4GB(2 x 2GB)	DS	-	-	7-7-7-24	1.65	*	*	*	
G.SKILL	F3-12800CL8D-4GBRM(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.6	*	*	*	
G.SKILL	F3-12800CL9D-4GBECO(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.35	*	*	*	
G.SKILL	F3-12800CL8T-6GBPI(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8-21	1.6-1.65	*	*	*	
G.SKILL	F3-12800CL7D-8GBRH(XMP)	8GB (2x 4GB)	DS	-	-	7-8-7-24	1.6	*	*	*	
G.SKILL	F3-12800CL9D-8GBRL(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	*	*	*	
G.SKILL	F3-12800CL8D-8GBECO(XMP)	8GB (2x4GB)	DS	-	-	8-8-8-24	1.35	*	*	*	
GEIL	GET316GB1600C9QC(XMP)	16GB (4x 4GB)	DS	-	-	9-9-9-28	1.6	*	*	*	
GEIL	GE34GB1600C9DC(XMP)	4GB (2x 2GB)	DS	-	-	9-9-9-28	1.6	*	*	*	

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 1600 MHz capability for AMD AM3 CPU (Continued)

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
GEIL	GVP38GB1600C8QC(XMP)	8GB (4x 2GB)	DS	-	-	8-8-8-28	1.6	*	*	*
KINGMAX	FLGD45F-B8MF7(XMP)	1GB	SS	-	-	-	-	*	*	*
KINGSTON	KHX1600C9D3K3/12GX(XMP)	12GB(3x 4GB)	DS	N/A	-	-	1.65	*	*	*
KINGSTON	KHX1600C7D3K2/4GX(XMP)	4GB (2x 2GB)	DS	-	-	-	1.65	*	*	*
KINGSTON	KHX1600C8D3K2/4GX(XMP)	4GB (2x 2GB)	DS	-	-	8	1.65	*	*	*
KINGSTON	KHX1600C9D3K2/4GX(XMP)	4GB (2x 2GB)	DS	-	-	-	1.65	*	*	*
Kingston	KHX1600C9D3LK2/4GX(XMP)	4GB (2x 2GB)	DS	-	-	-	1.65	*	*	*
KINGSTON	KHX1600C9D3X2K2/4GX(XMP)	4GB (2x 2GB)	DS	-	-	9	1.65	*	*	*
KINGSTON	KHX1600C9D3K3/6GX(XMP)	6GB (3x 2GB)	DS	-	-	9	1.65	*	*	*
KINGSTON	KHX1600C9D3T1K3/6GX(XMP)	6GB (3x 2GB)	DS	-	-	-	1.65	*	*	*
OCZ	OCZ3G16004GK	4GB (2x 2GB)	DS	-	-	8-8-8	1.7	*	*	*
OCZ	OCZ3BE1600C8LV4GK	4GB(2x 2GB)	DS	-	-	8-8-8	1.65	*	*	*
OCZ	OCZ3OB1600LV4GK	4GB(2 x 2GB)	DS	-	-	9-9-9	1.65	*	*	*
OCZ	OCZ3G1600LV6GK	6GB(3 x 2GB)	DS	-	-	8-8-8	1.65	*	*	*
OCZ	OCZ3X1600LV6GK(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8	1.65	*	*	*
OCZ	OCZ3X1600LV6GK(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8	1.65	*	*	*
Super Talent	WP160UX4G8(XMP)	4GB(2 x 2GB)	DS	-	-	8	-	*	*	*
Super Talent	WP160UX4G9(XMP)	4GB(2 x 2GB)	DS	-	-	9	-	*	*	*
Super Talent	WB160UX6G8(XMP)	6GB(3 x 2GB)	DS	-	-	-	-	*	*	*
Super Talent	WB160UX6G8(XMP)	6GB(3 x 2GB)	DS	-	-	8	-	*	*	*
AEXEA	AXA3PS2G1600S18V(XMP)	2GB	DS	-	-	-	1.65	*	*	*
AEXEA	AXA3PS4GK1600S18V(XMP)	4GB (2x 2GB)	DS	-	-	-	1.65	*	*	*
Asint	SLZ3128M8-EGJ1D(XMP)	2GB	DS	Asint	3128M8-GJ1D	-	-	*	*	*
EK Memory	EKM324L28BP8-116(XMP)	4GB(2x 2GB)	DS	-	-	9	-	*	*	*
GoodRam	GR1600D364L9/2G	2GB	DS	GoodRam	GF1008KC-JN	-	-	*	*	*
KINGTIGER	KTG2G1600PG3(XMP)	2GB	DS	-	-	-	-	*	*	*
Mushkin	996805(XMP)	4GB (2x 2GB)	DS	-	-	6-8-6-24	1.65	*	*	*
Mushkin	998805(XMP)	6GB (3x 2GB)	DS	-	-	6-8-6-24	1.65	*	*	*
Patriot	PX7312G1600LLK(XMP)	12GB (3x 4GB)	DS	-	-	8-9-8-24	1.65	*	*	*
Patriot	PGS34G1600LLKA2	4GB (2x 2GB)	DS	-	-	8-8-8-24	1.7	*	*	*
Patriot	PGS34G1600LLKA	4GB(2x 2GB)	DS	-	-	7-7-7-20	1.7	*	*	*
PATRIOT	PGS34G1600LLKA	4GB(2 x 2GB)	DS	-	-	7-7-7-20	1.7	*	*	*
Patriot	PVT36G1600LLK(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8-24	1.65	*	*	*
Patriot	PX538G1600LLK(XMP)	8GB (2x 4GB)	DS	-	-	8-9-8-24	1.65	*	*	*
Team	TXD31024M1600C8-D(XMP)	1GB	SS	Team	T3D1288RT-16	8-8-8-24	1.65	*	*	*
Team	TXD32048M1600HC8-D(XMP)	2GB	DS	Team	T3D1288RT-16	8-8-8-24	1.65	*	*	*

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 1333 MHz capability for AMD AM3 CPU

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
Apacer	78.01GC6.9L0	1GB	SS	Apacer	AM5D5808DEJSBG	9	-	*	*	*
Apacer	78.A1GC6.9L1	2GB	DS	Apacer	AM5D5808FEQSBG	9	-	*	*	*
CORSAIR	TW3X4G1333C9A	4GB (2x 2GB)	DS	-	-	9-9-9-24	1.5	*	*	*
CORSAIR	CMX8GX3M2A1333C9(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	*	*	*
CORSAIR	CMX8GX3M4A1333C9	8GB(4 x 2GB)	DS	-	-	9-9-9-24	1.5	*	*	*
Crucial	CT12864BA1339.8FF	1GB	SS	MICRON	D9KPT	9	-	*	*	*
Crucial	BL25664BN1337.16FF(XMP)	2GB	DS	-	-	7-7-7-24	1.65	*	*	*
Crucial	CT25664BA1339.16FF	2GB	DS	MICRON	D9KPT	9	-	*	*	*
Crucial	CT25672BA1339.18FF	2GB	DS	MICRON	D9KPT(ECC)	9	-	*	*	*
ELPIDA	EBJ10UE8BDF0-DJ-F	1GB	SS	ELPIDA	J1108BDSE-DJ-F	-	-	*	*	*
ELPIDA	EBJ10UE8EDF0-DJ-F	1GB	SS	ELPIDA	J1108EDSE-DJ-F	-	-	*	*	*
ELPIDA	EBJ20JF8BCF0-DJ-F	2GB	SS	Elpida	J2108BCSE-DJ-F	-	-	*	*	*
ELPIDA	EBJ21UE8BDF0-DJ-F	2GB	DS	ELPIDA	J1108BDSE-DJ-F	-	-	*	*	*
G.SKILL	F3-10600CL9D-4GBNT	4GB (2x 2GB)	DS	G.SKILL	D3 128M8CE9 2GB	9-9-9-24	1.5	*	*	*
G.SKILL	F3-10666CL8D-4GBHK(XMP)	4GB (2x 2GB)	DS	-	-	8-8-8-21	1.5	*	*	*
G.SKILL	F3-10666CL7D-4GBRH(XMP)	4GB(2 x 2GB)	DS	-	-	7-7-7-21	1.5	*	*	*
G.SKILL	F3-10666CL8D-4GBECO(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.35	*	*	*
G.SKILL	F3-10666CL9D-8GBRL	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	*	*	*
G.SKILL	F3-10666CL9D-8GBRL	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	*	*	*
GEIL	GET316GB1333C9QC	16GB (4x 4GB)	DS	-	-	9-9-9-24	1.5	*	*	*
GEIL	GG34GB1333C9DC	4GB (2x 2GB)	DS	GEIL	GL1L128M88BA15F5W	9-9-9-24	1.3	*	*	*
GEIL	GB34GB1333C7DC	4GB(2 x 2GB)	DS	GEIL	GL1L128M88BA15F5W	7-7-7-24	1.5	*	*	*
GEIL	GG34GB1333C9DC	4GB(2 x 2GB)	DS	GEIL	GL1L128M88BA12N	9-9-9-24	1.3	*	*	*
GEIL	GV34GB1333C7DC	4GB(2 x 2GB)	DS	-	-	7-7-7-24	1.5	*	*	*
GEIL	GVP38GB1333C7QC	8GB (4x 2GB)	DS	-	-	7-7-7-24	1.5	*	*	*
Hynix	HMT112U6TFR8A-H9	1GB	SS	Hynix	H5TC1G83TFR	-	-	*	*	*
Hynix	HMT325U6BFR8C-H9	2GB	SS	Hynix	H5TQ2G83BFR	-	-	*	*	*
Hynix	HMT125U6BFR8C-H9	2GB	DS	Hynix	H5TQ1G83BFRH9C	9	-	*	*	*
Hynix	HMT125U6TFR8A-H9	2GB	DS	Hynix	H5TC1G83TFR	-	-	*	*	*
Hynix	HMT351U6BFR8C-H9	4GB	DS	Hynix	H5TQ2G83BFR	-	-	*	*	*
KINGMAX	FLFE85F-C8KM9	2GB	SS	Kingmax	KFC8FNMXF-BXX-15A	-	-	*	*	*
KINGMAX	FLFE85F-B8KL9	2GB	DS	KINGMAX	KFB8FNXLX-BNF-15A	-	-	*	*	*
KINGMAX	FLFF65F-C8KM9	4GB	DS	Kingmax	KFC8FNMXF-BXX-15A	-	-	*	*	*
Kingston	KVR1333D3N9/1G	1GB	SS	Elpida	J1108BDSE-DJ-F	9	1.5	*	*	*
Kingston	KVR1333D3N9/2G	2GB	DS	Kingston	D1288JPNDDPLD9U	9	1.5	*	*	*
Kingston	KHX1333C9D3UK2/4GX(XMP)	4GB (2x 2GB)	DS	-	-	9	1.25	*	*	*
KINGSTON	KVR1333D3N9K2/4G	4GB (2x 2GB)	DS	KINGSTON	D1288JEMFPD9U	-	1.5	*	*	*
MICRON	MT4JTF12864AZ-1G4D1	1GB	SS	Micron	D9LGQ	-	-	*	*	*
MICRON	MT8JTF25664AZ-1G4D1	2GB	SS	Micron	D9LGK	-	-	*	*	*
MICRON	MT8JTF25664AZ-1G4D1	2GB	SS	Micron	D9LGK	-	-	*	*	*
MICRON	MT16JTF51264AZ-1G4D1	4GB	DS	Micron	D9LGK	-	-	*	*	*
OCZ	OCZ3RPR13332GK	2GB (2x 1GB)	SS	-	-	6-6-6	1.75	*	*	*
OCZ	OCZ3P1333LV3GK	3GB(3 x 1GB)	SS	-	-	7-7-7	1.65	*	*	*
OCZ	OCZ3G1333LV4GK	4GB (2x 2GB)	DS	-	-	9-9-9	1.65	*	*	*

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 1333 MHz capability for AMD AM3 CPU (continued)

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
OCZ	OCZ3RPR13334GK	4GB (2x 2GB)	DS	-	-	6-6-6	1.75	*	*	*
OCZ	OCZ3P1333LV4GK	4GB(2x 2GB)	DS	-	-	7-7-7	1.65	*	*	*
OCZ	OCZX1333LV6GK(XMP)	6GB(3x 2GB)	DS	NA	-	8-8-8	1.6	*	*	*
OCZ	OCZ3G1333LV8GK	8GB (2x 4GB)	DS	-	-	9-9-9	1.65	*	*	*
OCZ	OCZ3G1333LV8GK	8GB (2x 4GB)	DS	-	-	9-9-9	1.65	*	*	*
OCZ	OCZ3RPR1333C9LV8GK	8GB (2x 4GB)	DS	-	-	9-9-9	1.65	*	*	*
PSC	PC310600U-9-10-A0	1GB	SS	PSC	A3P1GF3FGF	-	-	*	*	*
PSC	AL8F8G73D-DG1	2GB	DS	PSC	A3P1GF3DGF	-	-	*	*	*
PSC	PC310600U-9-10-B0	2GB	DS	PSC	A3P1GF3FGF	-	-	*	*	*
SAMSUNG	M378B2873EH1-CH9	1GB	SS	SAMSUNG	K4B1G0846E	-	-	*	*	*
SAMSUNG	M378B2873FHS-CH9	1GB	SS	SAMSUNG	K4B1G0846F	-	-	*	*	*
SAMSUNG	M378B5773DHO-CH9	2GB	SS	Samsung	K4B2G08460	-	-	*	*	*
SAMSUNG	M378B5673FHO-CH9	2GB	DS	SAMSUNG	K4B1G0846F	-	-	*	*	*
SAMSUNG	M378B5273BH1-CH9	4GB	DS	SAMSUNG	K4B2G0846B-HCH9	9	-	*	*	*
SAMSUNG	M378B5273CHO-CH9	4GB	DS	SAMSUNG	K4B2G0846C	K4B2G0846C	-	*	*	*
SAMSUNG	M378B5273DHO-CH9	4GB	DS	Samsung	K4B2G08460	-	-	*	*	*
SAMSUNG	M378B1G73AH0-CH9	8GB	DS	SAMSUNG	K4B4G0846A-HCH9	-	-	*	*	*
Transcend	TS256MLK64V3N (566577)	2GB	SS	Hynix	H5TQ2G83BFR	9	-	*	*	*
Transcend	TS256MLK64V3N (574206)	2GB	SS	Micron	D9LGK	9	-	*	*	*
Transcend	TS512MLK64V3N (389889)	4GB	DS	Hynix	H5TQ2G83BFR	9	-	*	*	*
Transcend	TS512MLK64V3N (574831)	4GB	DS	Micron	D9LGK	9	-	*	*	*
ACTICA	ACT1GHU64B8F1333S	1GB	SS	Samsung	K4B1G0846F	-	-	*	*	*
ACTICA	ACT1GHU72C8G1333S	1GB	SS	Samsung	K4B1G0846F(ECC)	-	-	*	*	*
ACTICA	ACT2GHU64B8G1333M	2GB	DS	Micron	D9KPT	-	-	*	*	*
ACTICA	ACT2GHU64B8G1333S	2GB	DS	Samsung	K4B1G0846F	-	-	*	*	*
ACTICA	ACT2GHU72D8G1333M	2GB	DS	Micron	D9KPT(ECC)	-	-	*	*	*
ACTICA	ACT2GHU72D8G1333S	2GB	DS	Samsung	K4B1G0846F(ECC)	-	-	*	*	*
ACTICA	ACT4GHU64B8H1333H	4GB	DS	Hynix	H5TQ2G83AFR	-	-	*	*	*
ACTICA	ACT4GHU72D8H1333H	4GB	DS	Hynix	H5TQ2G83AFR(ECC)	-	-	*	*	*
BUFFALO	D3U1333-1G	1GB	SS	Elpida	J1108BFBG-DJ-F	-	-	*	*	*
BUFFALO	FSH1333D3G-T3G(XMP)	3GB(3x 1GB)	SS	-	-	7-7-7-20	-	*	*	*
BUFFALO	D3U1333-2G	2GB	DS	Elpida	J1108BFBG-DJ-F	-	-	*	*	*
BUFFALO	D3U1333-4G	4GB	DS	NANYA	NT5CB256M8BN-CG	-	-	*	*	*
EK Memory	EKM324L28BP8-1H3	4GB(2x 2GB)	DS	-	-	9	-	*	*	*
Elixir	M2F2G64CB88B7N-CG	2GB	SS	Elixir	N2CB2G808N-CG	-	-	*	*	*
Elixir	M2F4G64CB88B5N-CG	4GB	DS	Elixir	N2CB2G808N-CG	-	-	*	*	*
GoodRam	GR1333D364L9/2G	2GB	DS	Qimonda	IDSH1G-03A1F1C-13H	-	-	*	*	*
KINGTIGER	F10A2T1680	2GB	DS	KINGTIGER	KTG1333PS1208NST-C9	-	-	*	*	*
KINGTIGER	KTG2G1333PG3	2GB	DS	-	-	-	-	*	*	*
Patriot	PSD32G13332	2GB	DS	Patriot	PM128M8D3BU-15	9	-	*	*	*
Patriot	PGS34G1333LLKA	4GB(2x 2GB)	DS	-	-	7-7-7-20	1.7	*	*	*
Patriot	PVS34G1333ELK	4GB(2x 2GB)	DS	-	-	9-9-9-24	1.5	*	*	*
Patriot	PVS34G1333LLK	4GB(2x 2GB)	DS	-	-	7-7-7-20	1.7	*	*	*
Silicon Power	SP001GBLTE133S01	1GB	SS	NANYA	NT5CB128M8AN-CG	-	-	*	*	*
Silicon Power	SP001GBLTU133S01	1GB	SS	NANYA	NT5CB128M8AN-CG	-	-	*	*	*
Silicon Power	SP002GBLTE133S01	2GB	DS	NANYA	NT5CB128M8AN-CG	-	-	*	*	*
Silicon Power	SP002GBLTU133S02	2GB	DS	S-POWER	I0YT3E0	9	-	*	*	*
Team	TXD31024M1333C7(XMP)	1GB	SS	Team	T3D1288LT-13	7-7-7-21	1.75	*	*	*
Team	TXD31048M1333C7-D(XMP)	1GB	SS	Team	T3D1288LT-13	7-7-7-21	1.75	*	*	*
Team	TXD32048M1333C7-D(XMP)	2GB	DS	Team	T3D1288LT-13	7-7-7-21	1.5-1.6	*	*	*
Team	TXD32048M1333C7-D(XMP)	2GB	DS	Team	T3D1288LT-13	7-7-7-21	1.5-1.6	*	*	*

M5A99X EVO Motherboard Qualified Vendors Lists (QVL) DDR3 1067 MHz capability for AMD AM3 CPU

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
Crucial	CT12864BA1067.8FF	1GB	SS	MICRON	D9KPT	7	-	*	*	*
Crucial	CT12864BA1067.8SFD	1GB	SS	MICRON	D9JNL	7	-	*	*	*
Crucial	CT12872BA1067.9FF	1GB	SS	MICRON	D9KPT(ECC)	7	-	*	*	*
Crucial	CT25664BA1067.16FF	2GB	DS	MICRON	D9KPT	7	-	*	*	*
Crucial	CT25664BA1067.16SFD	2GB	DS	MICRON	D9JNL	7	-	*	*	*
Crucial	CT25672BA1067.18FF	2GB	DS	MICRON	D9KPT(ECC)	7	-	*	*	*
ELPIDA	EBJ10UE8BAW0-AE-E	1GB	SS	ELPIDA	J1108BAG-DJ-E	7	-	*	*	*
ELPIDA	EBJ10UE8EDF0-AE-F	1GB	SS	ELPIDA	J1108EDSE-DJ-F	-	-	*	*	*
ELPIDA	EBJ21UE8BAW0-AE-E	2GB	DS	ELPIDA	J1108BAG-DJ-E	7	-	*	*	*
ELPIDA	EBJ21UE8EDF0-AE-F	2GB	DS	ELPIDA	J1108EDSE-DJ-F	-	-	*	*	*
GEIL	GG34GB1066C8DC	4GB (2x 2GB)	DS	GEIL	GL1L128M88BA115FW	8-8-8-20	1.3	*	*	*
Hynix	HMT112U6AFP8C-G7N0	1GB	SS	HYNIX	H5TQ1G83AFP7G7	7	-	*	*	*
Hynix	HYMT112U64ZNF8-G7	1GB	SS	HYNIX	HY5TQ1G831ZNF7-G7	7	-	*	*	*
Hynix	HMT125U6AFP8C-G7N0	2GB	DS	HYNIX	H5TQ1G83AFP7G7	7	-	*	*	*
Hynix	HYMT125U64ZNF8-G7	2GB	DS	HYNIX	HY5TQ1G831ZNF7-G7	7	-	*	*	*
Kingston	KVR1066D3N7/1G	1GB	SS	Kingston	D1288JPNDPLD9U	7	1.5	*	*	*
Kingston	KVR1066D3N7/2G	2GB	DS	Elpida	J1108BDSE-DJ-F	7	1.5	*	*	*
KINGSTON	KVR1066D3N7K2/4G	4GB (2x 2GB)	DS	KINGSTON	D1288JELDNGD9U	-	1.5	*	*	*
MICRON	MT8JTF12864AZ-1G1F1	1GB	SS	MICRON	8ZF22 D9KPV	7	-	*	*	*
MICRON	MT16JTF25664AZ-1G1F1	2GB	DS	MICRON	8ZF22 D9KPV	7	-	*	*	*
SAMSUNG	M378B5273BH1-CF8	4GB	DS	SAMSUNG	K4B2G0846B-HCF8	8	1.5	*	*	*
Elixir	M2Y2G64CB8HCSN-BE	2GB	DS	Elixir	N2CB1G80CN-BE	-	-	*	*	*
Elixir	M2Y2G64CB8HCSN-BE	2GB	DS	-	-	-	-	*	*	*



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

DIMM support:

- **1 DIMM:** Supports one (1) module inserted into any slot as Single-channel memory configuration. We suggest that you install the module into A2 slot.
- **2 DIMMs:** Supports two (2) modules inserted into either the black slots as one pair of Dual-channel memory configuration.
- **4 DIMMs:** Supports four (4) modules inserted into the black slots as two pairs of Dual-channel memory configuration.

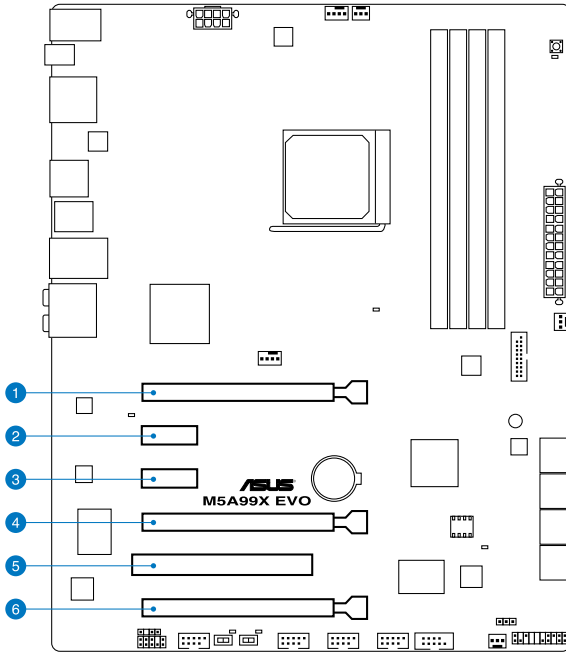


Visit the ASUS website for the latest QVL.

2.2.4 Expansion slots



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.



Slot No.	Slot Description
1	PCIe 2.0 x16_1 slot (single at x16 or dual at x8/x8 mode)
2	PCIe 2.0 x1_1 slot
3	PCIe 2.0 x1_2 slot
4	PCIe 2.0 x16_2 slot (at x8 mode)
5	PCI slot 1
6	PCIe 2.0 x16_3 slot [black] (at x4 mode, compatible with PCIe x1 and x4 devices)

VGA configuration	PCI Express operating mode	
	PCIe 2.0 x16_1	PCIe 2.0 x16_2
Single VGA/PCIe card	x16 (Recommend for single VGA)	N/A
Dual VGA/PCIe card	x8	x8



- In single VGA card mode, use the PCIe 2.0 x16_1 slot (navy blue) 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 slots for PCI Express x16 graphics cards to get better performance.
- We recommend that you provide sufficient power when running CrossFireX™ or SLI™ mode. Refer to page 2-28 for details.
- Connect a chassis fan to the motherboard connector labeled CHA_FAN1/2/3 when using multiple graphics cards for better thermal environment. See page 2-26 for details.

PCIe 2.0 x1_1 configuration	PCI Express operating mode	
	PCIe 2.0 x1_1	Power eSATA/eSATA
PCIe 2.0 x1_1	x1	Disabled
JMB362	Disabled	Enabled

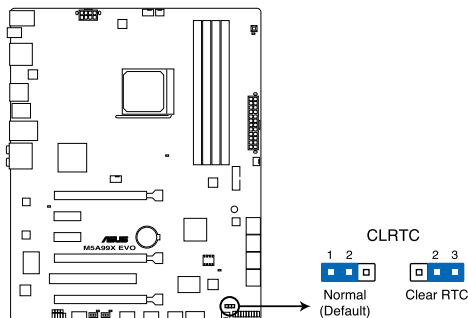
IRQ assignments for this motherboard

	A	B	C	D	E	F	G	H
PCIe 2.0 x16_1	shared	-	-	-	-	-	-	-
PCIe 2.0 x16_2	-	-	-	-	shared	-	-	-
PCIe 2.0 x16_3	shared	-	-	-	-	-	-	-
PCIe 2.0 x1_1	-	-	-	-	-	-	-	shared
PCIe 2.0 x1_2	shared	-	-	-	-	-	-	-
PCI_1	-	-	-	-	shared	-	-	-
LAN	-	-	-	-	shared	-	-	-
USB 3.0_1	-	-	-	-	-	-	shared	-
USB 3.0_2	-	-	shared	-	-	-	-	-
Onchip SATA Controller	-	-	-	shared	-	-	-	-
JMB 362_1	-	-	-	shared	-	-	-	-
JMB 362_2	-	-	-	-	-	-	-	shared
1394 Controller	-	-	-	-	-	shared	-	-
HD Audio	shared	-	-	-	-	-	-	-

2.2.5 Jumper

Clear RTC RAM (CLRTC)

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



M5A99X EVO Clear RTC RAM

To erase the RTC RAM

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



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



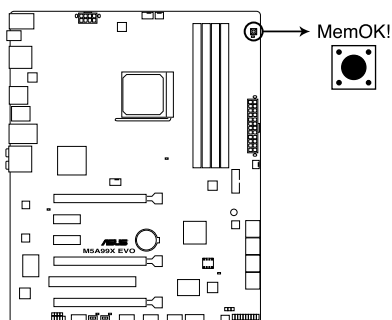
- If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.
- You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the C.P.R.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

2.2.6 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. MemOK! switch

Installing DIMMs that are incompatible with the motherboard may cause system boot failure, and the DRAM_LED near the MemOK! switch lights continuously. Press and hold the MemOK! switch until the DRAM_LED starts blinking to begin automatic memory compatibility tuning for successful boot.



M5A99X EVO MemOK! switch



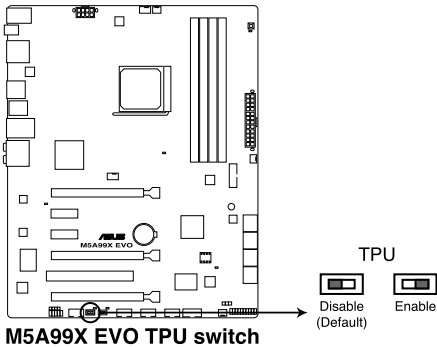
- Refer to section **2.2.7 Onboard LEDs** for the exact location of the DRAM_LED.
- The DRAM_LED also lights when the DIMM is not properly installed. Turn off the system and reinstall the DIMM before using the MemOK! function.
- The MemOK! switch does not function under Windows™ OS environment.
- During the tuning process, the system loads and tests failsafe memory settings. It takes about 30 seconds for the system to test one set of failsafe settings. If the test fails, the system reboots and test the next set of failsafe settings. The blinking speed of the DRAM_LED increases, indicating different test processes.
- Due to memory tuning requirement, the system automatically reboots when each timing set is tested. If the installed DIMMs still fail to boot after the whole tuning process, the DRAM_LED lights continuously. Replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) in this user manual or on the ASUS website at www.asus.com.
- If you turn off the computer and replace DIMMs during the tuning process, the system continues memory tuning after turning on the computer. To stop memory tuning, turn off the computer and unplug the power cord for about 5–10 seconds.
- If your system fail to boot due to BIOS overclocking, press the MemOK! switch to boot and load BIOS default settings. A message will appear during POST reminding you that the BIOS has been restored to its default settings.
- We recommend that you download and update to the latest BIOS version from the ASUS website at www.asus.com after using the MemOK! function.

2. TPU switch

Turning this switch to **Enable** will automatically optimize the system for fast, yet stable clock speeds.



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



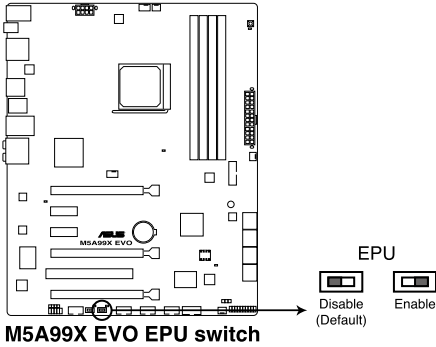
- The TPU LED (O2LED2) near the TPU switch lights when the switch setting is turned to **Enable**. Refer to section 2.2.7 **Onboard LEDs** for the exact location of the TPU LED.
- If you change the switch setting to **Enable** under the OS environment, the TPU function will be activated after the next system bootup.
- You may use the TurboV and Auto Tuning feature in the TurboV EVO application, adjust the BIOS setup program, or enable the TPU switch at the same time. However, the system will use the last setting you have made.

3. EPU switch

Turning this switch to **Enable** will automatically detect the current PC loadings and intelligently moderate the power consumption.



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

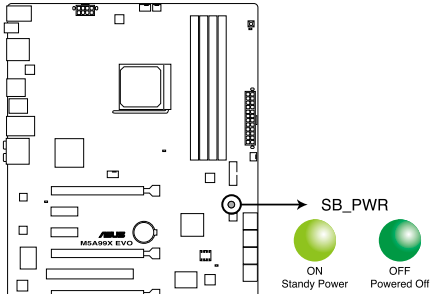


- The EPU LED (O2LED3) near the EPU switch lights when the switch setting is turned to **Enable**. Refer to section 2.2.7 Onboard LEDs for the exact location of the EPU LED.
 - If you change the switch setting to **Enable** under the OS environment, the EPU function will be activated after the next system bootup.
 - You may change the EPU settings in the software application or BIOS setup program, and enable the EPU function at the same time. However, the system will use the last setting you have made.
-

2.2.7 Onboard LEDs

1. Standby Power LED

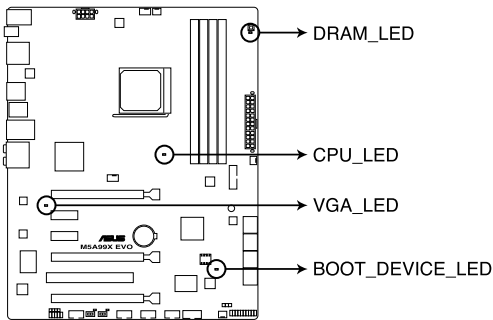
The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration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



M5A99X EVO Onboard LED

2. POST State LEDs

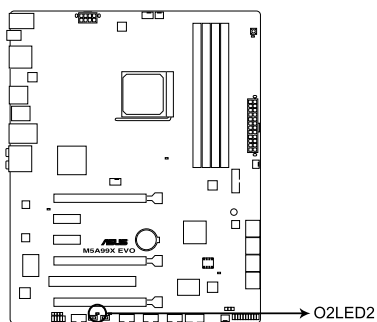
The POST State LEDs of CPU, DRAM, VGA card, and HDD indicate key components status during POST (Power-on Self Test). If an error is found, the LED next to the error device will continue lighting until the problem is solved. This user-friendly design provides an intuitive way to locate the root problem within a second.



**M5A99X EVO CPU/ DRAM/
BOOT_DEVICE/ VGA LED**

3. TPU LED

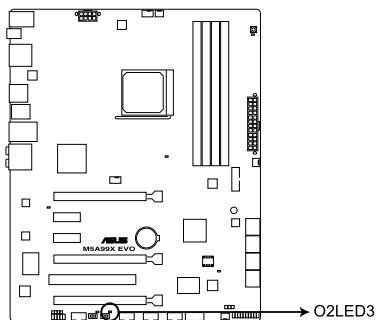
The TPU LED lights when the TPU switch is turned to **Enable**.



M5A99X EVO TPU LED

4. EPU LED

The EPU LED lights when the EPU switch is turned to **Enable**.



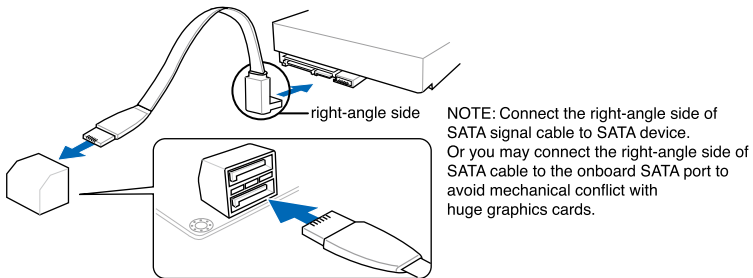
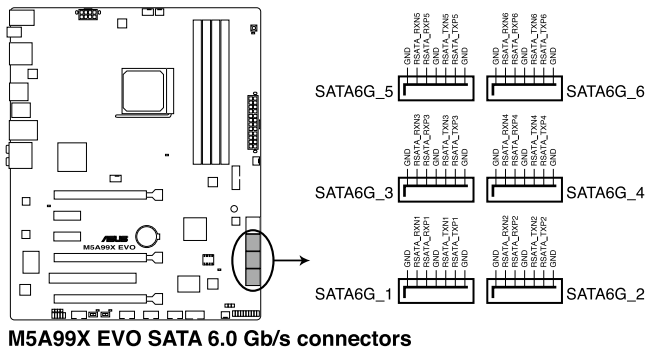
M5A99X EVO EPU LED

2.2.8 Internal connectors

1. AMD® Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_1-6)

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

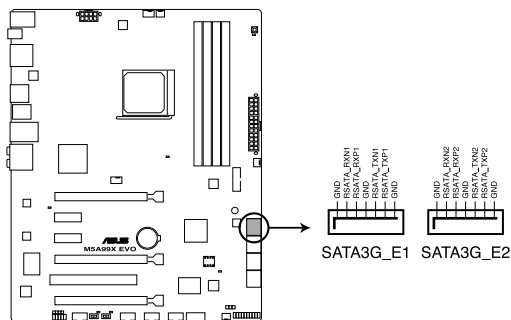
If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 5, or RAID 10 configuration through the onboard AMD® SB950 controller.



- These connectors are set to [AHCI Mode] by default. If you intend to create a Serial ATA RAID set using these connectors, set the **SATA Mode** item in the BIOS to [RAID Mode]. Refer to section **3.5.3 SATA Configuration** for details.
- Before creating a RAID set, refer to section **4.4 RAID configurations** or the manual bundled in the motherboard support DVD.
- When using NCQ, set the **SATA Mode** in the BIOS to [AHCI Mode]. Refer to section **3.5.3 SATA Configuration** for details.
- You must install Windows® XP Service Pack 3 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP3 or later versions.

2. JMicron® JMB362 Serial ATA 3.0 Gb/s connectors (7-pin SATA3G_E1/E2 [black])

These connectors connect to Serial ATA 3.0 Gb/s hard disk drives and optical disc drives via Serial ATA 3.0 Gb/s signal cables.



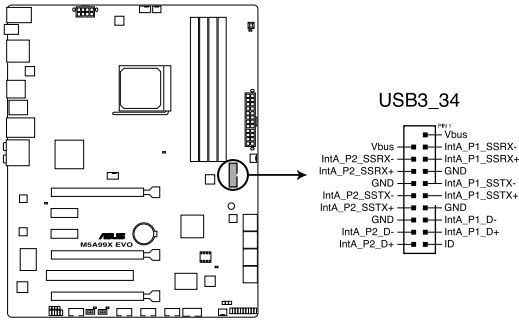
M5A99X EVO JMicron® SATA 3.0 Gb/s connectors



- These connectors are set to [AHCI Mode] by default. If you intend to create a Serial ATA RAID set using these connectors, set the **SATA Mode** item in the BIOS to [RAID Mode]. Refer to section **3.5.3 SATA Configuration** for details.
- Before creating a RAID set, refer to section **4.4 RAID configurations** or the manual bundled in the motherboard support DVD.
- When using NCQ, set the **SATA Mode** in the BIOS to [AHCI Mode]. Refer to section **3.5.3 SATA Configuration** for details.
- You must install Windows® XP Service Pack 3 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP3 or later versions.

3. USB 3.0 connector (20-1 pin USB3_34)

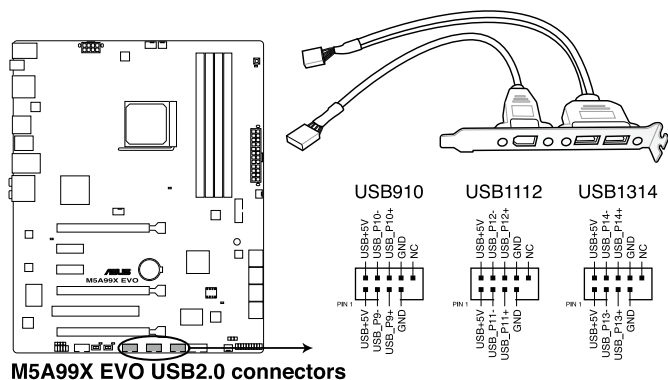
This connector is for the additional USB 3.0 ports, and complies with the USB 3.0 specification that supports up to 480 Mbps connection speed. If the USB 3.0 front panel cable is available from your system chassis, with this USB 3.0 connector, you can have a front panel USB 3.0 solution.



M5A99X EVO USB3.0 connector

4. USB 2.0 connectors (10-1 pin USB910; USB1112; USB1314)

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 48 MBps connection speed.



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



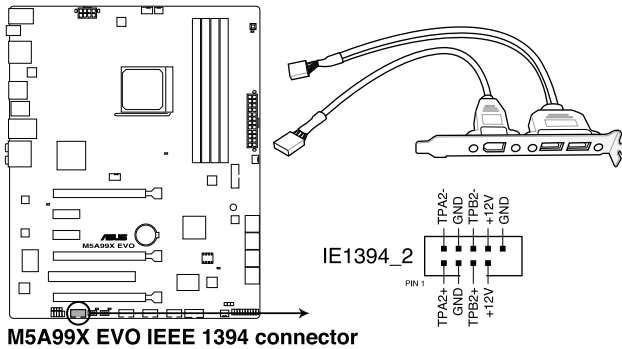
You can connect the front panel USB cable to the ASUS Q-Connector (USB, blue) first, and then install the Q-Connector (USB) to the USB connector onboard if your chassis supports front panel USB ports.



The USB 2.0 module is purchased separately.

5. 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.



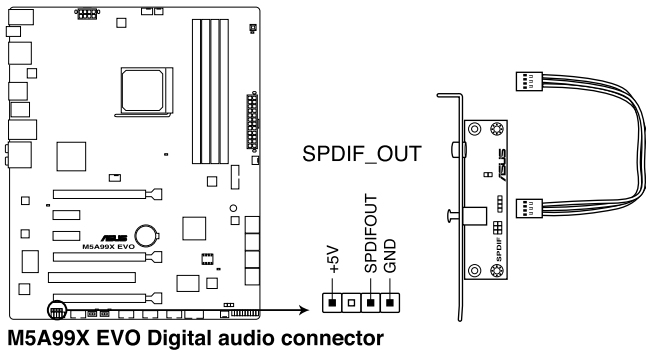
Never connect a USB cable to the IEEE 1394a connector. Doing so will damage the motherboard!



The IEEE 1394 bracket is purchased separately.

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

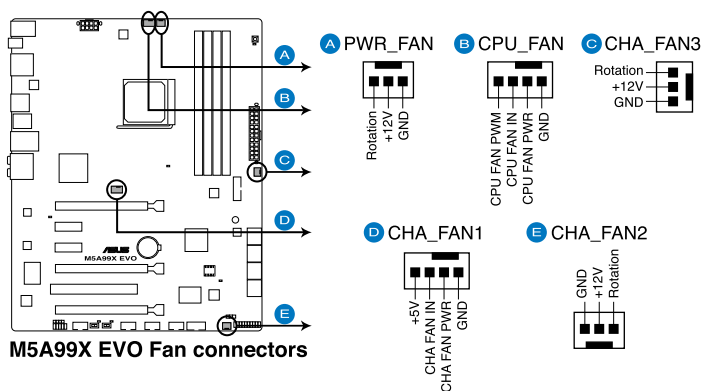
This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port(s). Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis.



The S/PDIF module is purchased separately.

7. CPU, chassis, and power fan connectors (4-pin CPU_FAN; 4-pin CHA_FAN1; 3-pin CHA_FAN2/3; 3-pin PWR_FAN)

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.



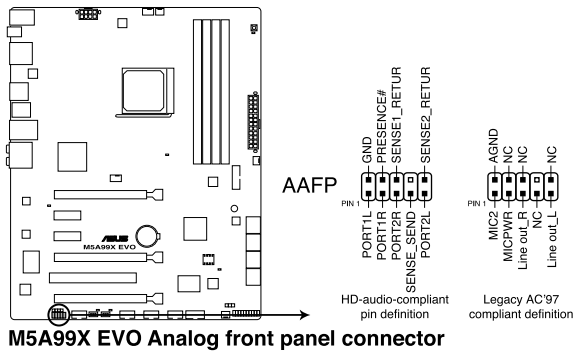
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



- The CPU_FAN connector supports the CPU fan of maximum 1A (12 W) fan power.
- Only the CPU_FAN, CHA_FAN1, CHA_FAN2 and CHA_FAN3 connectors support the ASUS FAN Xpert feature.
- If you install two VGA cards, we recommend that you plug the rear chassis fan cable to the motherboard connector labeled CHA_FAN1, CHA_FAN2 or CHA_FAN3 for better thermal environment.

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

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



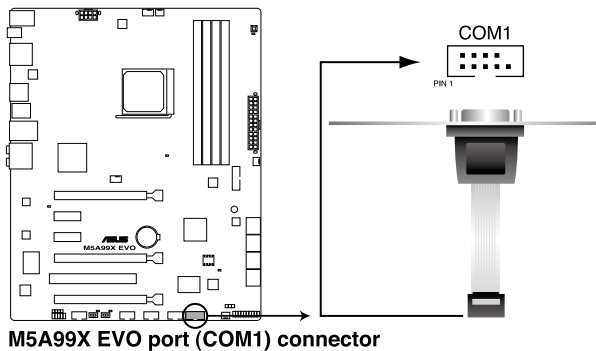
M5A99X EVO Analog front panel connector



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

9. Serial port connector (10-1 pin COM1)

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.



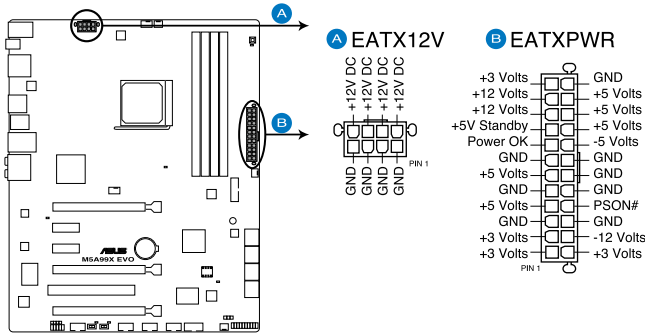
M5A99X EVO port (COM1) connector



The COM module 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.



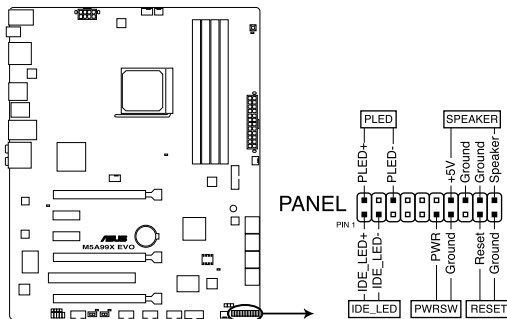
M5A99X EVO ATX power connectors



- 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 450 W.
- Do not forget to connect the 8-pin EATX12 V power plug; otherwise, the system will not boot.
- We recommend that you use a PSU with higher power output 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 high-end PCI Express x16 cards, use a PSU with 1000W power or above to ensure the system stability.

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

This connector supports several chassis-mounted functions.



M5A99X EVO 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)**

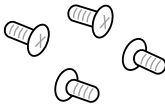


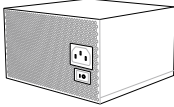

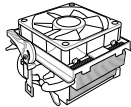
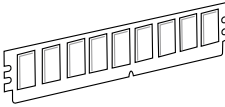
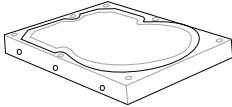
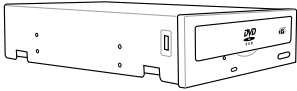
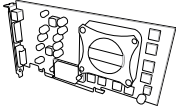
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **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.

2.3 Building your computer system

2.3.1 Additional tools and components to build a PC system

	
1 bag of screws	Philips (cross) screwdriver
	
PC chassis	Power supply unit
	
AMD AM3+ CPU	AMD AM3+ compatible CPU Fan
	
DIMM	SATA hard disk drive
	
SATA optical disc drive (optional)	Graphics card (optional)



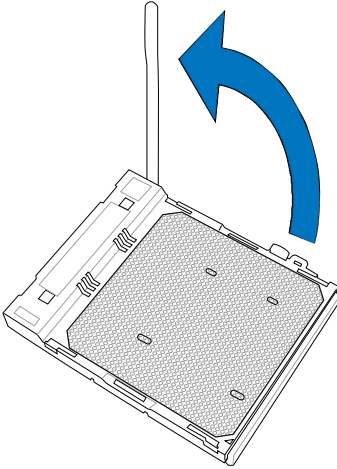
The tools and components in the table above are not included in the motherboard package.

2.3.2 CPU installation

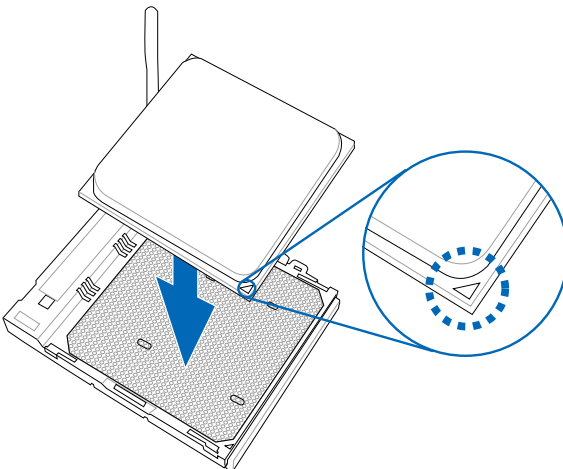


The AMD AM3+ socket is compatible with AMD AM3+ and AM3 processors. Ensure you use a CPU designed for the AM3+ socket. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

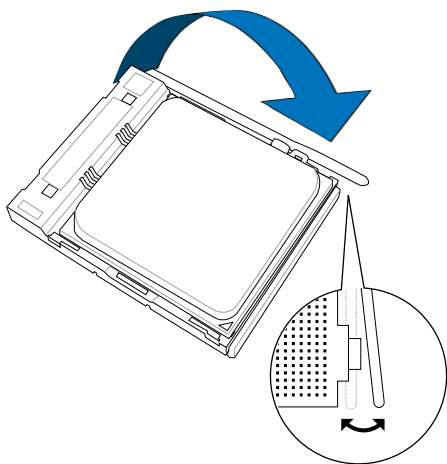
1



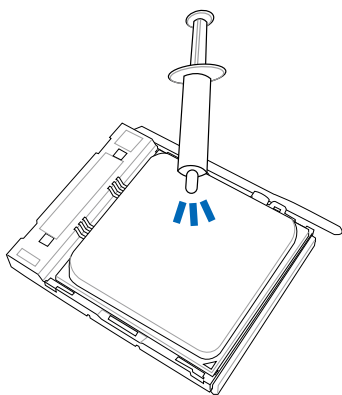
2



3



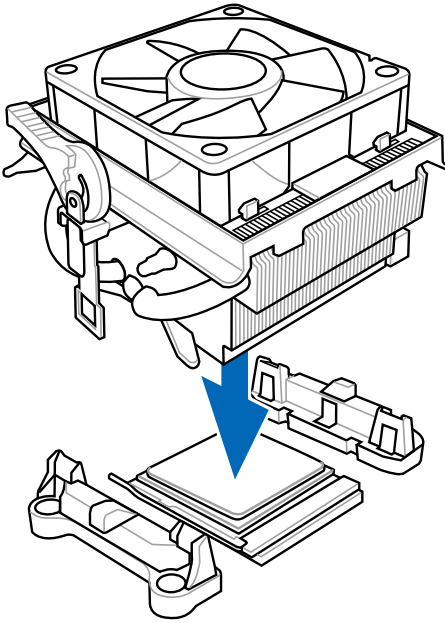
2.3.3 CPU heatsink and fan assembly installation



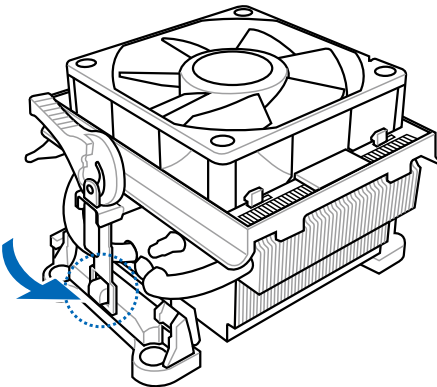
Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan if necessary.

To install the CPU heatsink and fan assembly

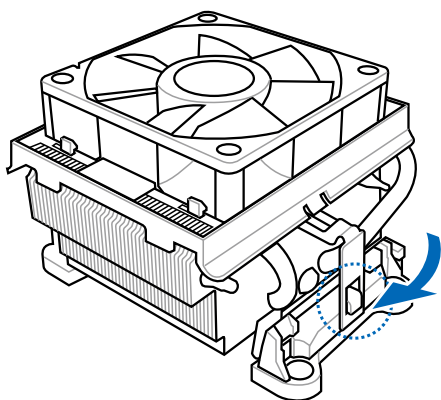
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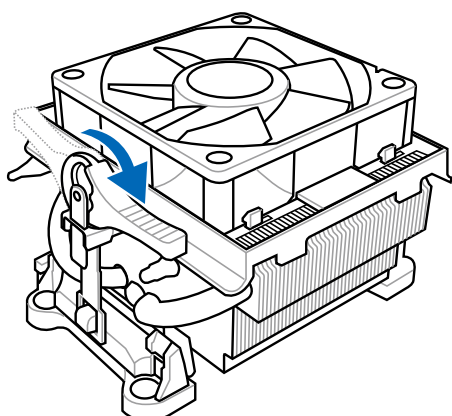
2



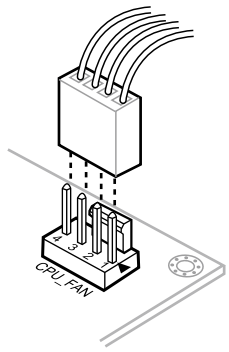
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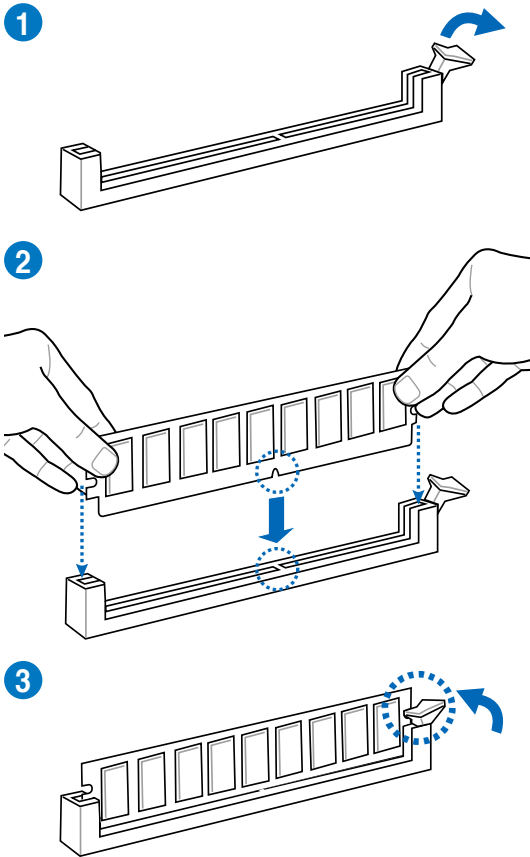
4



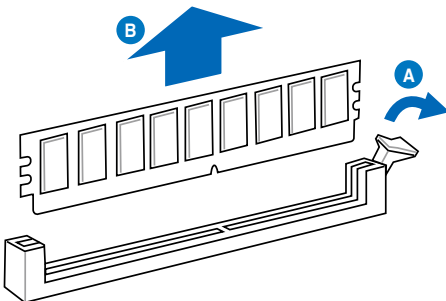
5



2.3.4 DIMM installation



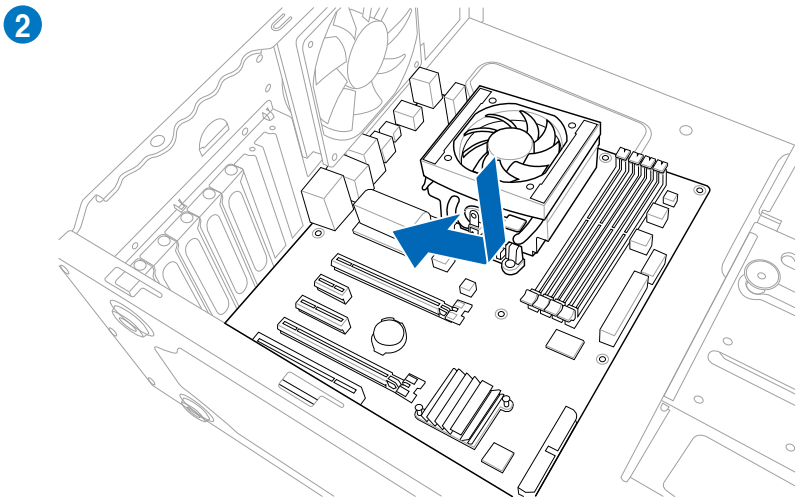
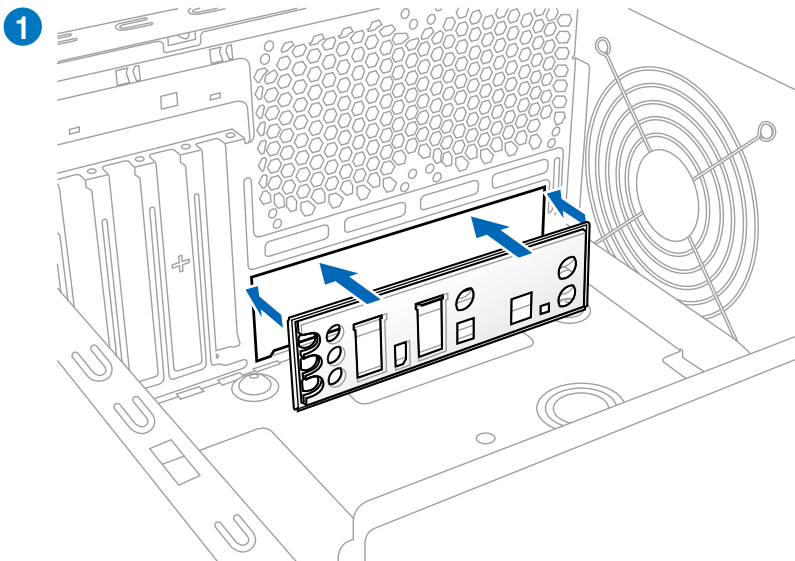
To remove a DIMM



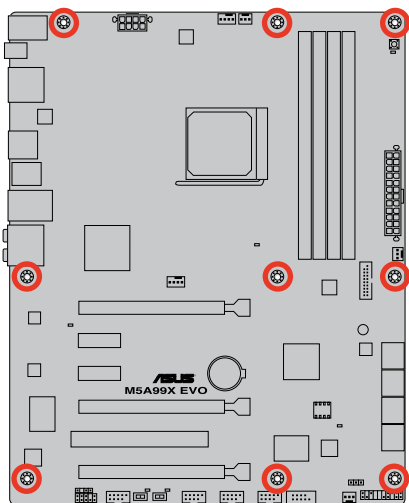
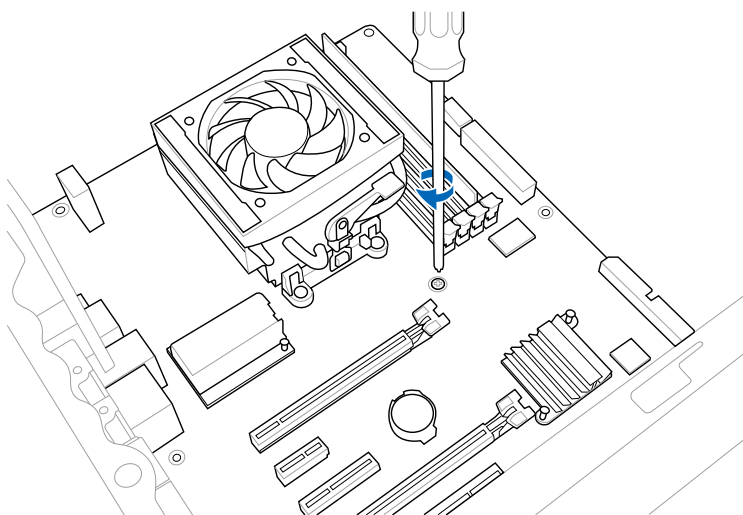
2.3.5 Motherboard installation



The diagrams in this section are for reference only. The motherboard layout may vary with models, but the installation steps remain the same.



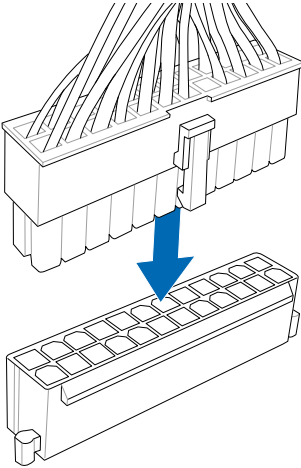
3



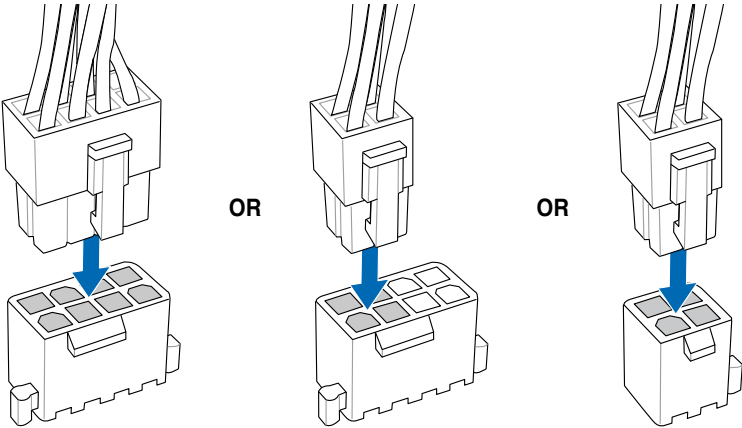
DO NOT overtighten the screws! Doing so can damage the motherboard.

2.3.6 ATX Power connection

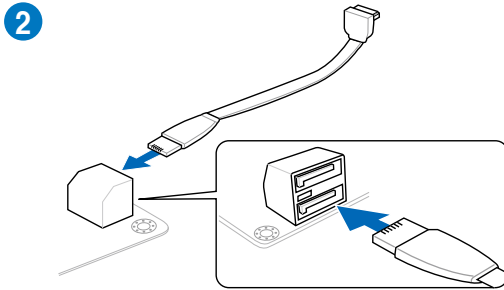
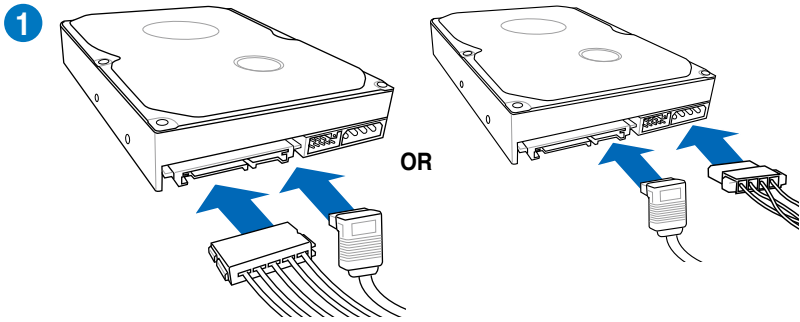
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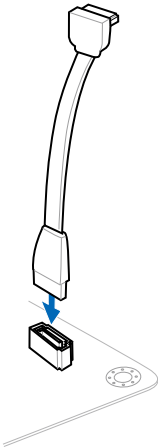
2



2.3.7 SATA device connection

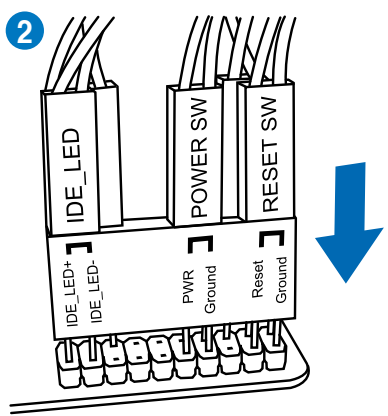
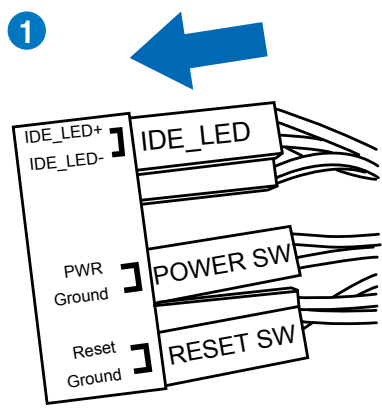


OR

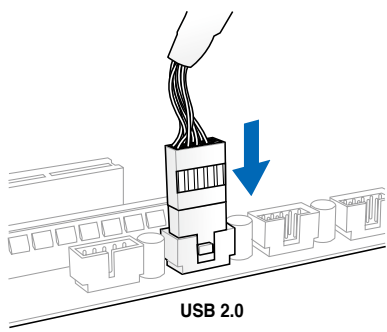


2.3.8 Front I/O Connector

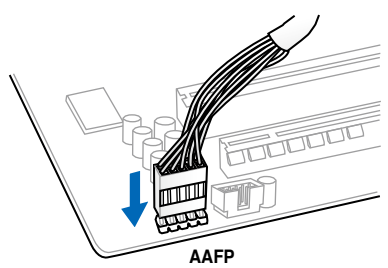
To install ASUS Q-Connector



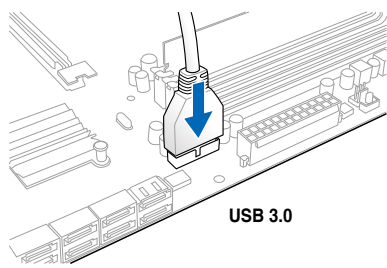
To install USB 2.0 Connector



To install front panel audio connector

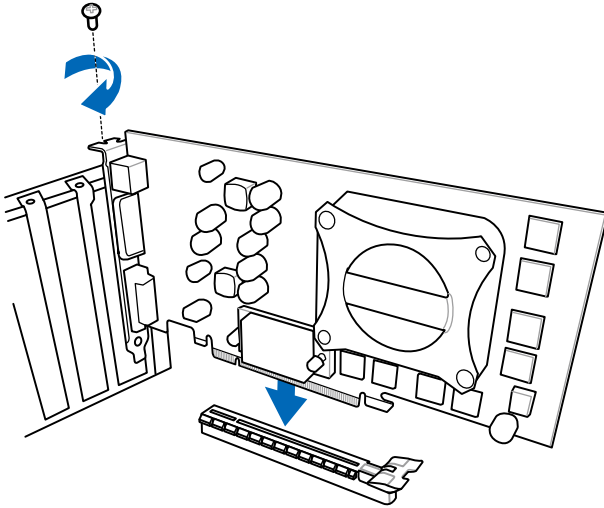


To install USB 3.0 Connector

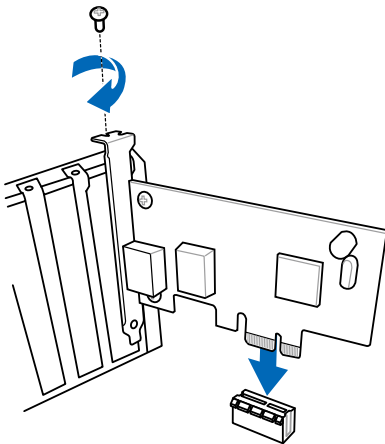


2.3.9 Expansion Card installation

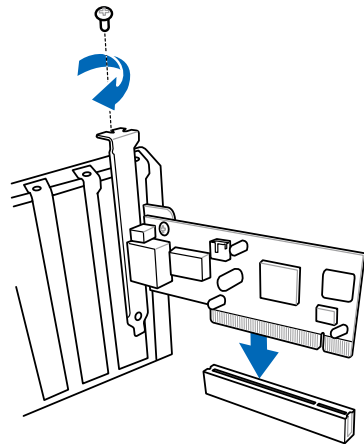
To install PCIe x16 cards



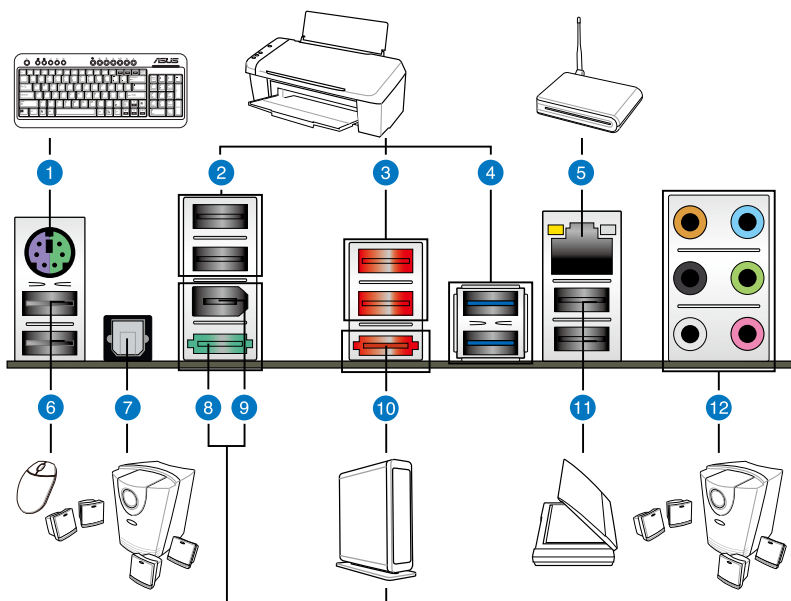
To install PCIe x1 cards



To install PCI cards



2.3.10 Rear panel connection



Rear panel connectors

1. PS/2 keyboard/mouse combo port	7. Optical S/PDIF Out port
2. USB 2.0 ports 3 and 4	8. Power External SATA port
3. USB 2.0 ports 5 and 6	9. IEEE 1394a port
4. USB 3.0 ports 1 and 2	10. External SATA port
5. LAN (RJ-45) port*	11. USB 2.0 ports 7 and 8
6. USB 2.0 ports 1 and 2	12. Audio I/O ports**

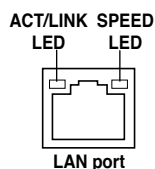
* and **: Refer to the tables on the next page for LAN port LED and audio port definitions.



- DO NOT insert a different connector to the external SATA port.
- Due to USB 3.0 controller limitation, USB 3.0 devices can only be used under Windows® OS environment and after the USB 3.0 driver installation.
- USB 3.0 devices can only be used as data storage only.
- We strongly recommend that you connect USB 3.0 devices to USB 3.0 ports for faster and better performance for your USB 3.0 devices.
- If you want to use the hot-plug function of the external SATA ports, you have to set the **JMB Storage Controller** item in the BIOS setting to [Enabled] and install the **JMicron JMB36X Controller Driver** from the motherboard support DVD. Refer to section **3.5.6 Onboard Devices Configuration** for details.

* LAN ports LED indications

Activity Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
ORANGE	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

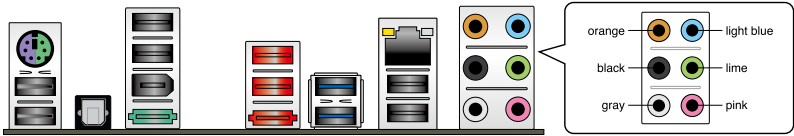


** Audio 2, 4, 6, or 8-channel configuration

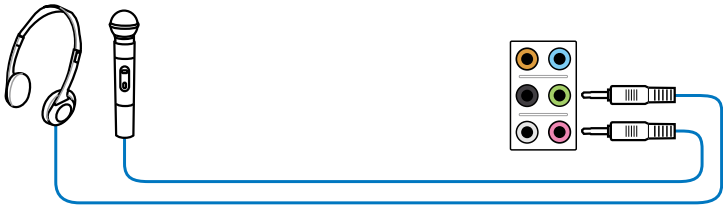
Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Line In
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	–	–	Center/Subwoofer	Center/Subwoofer
Black	–	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out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

2.3.11 Audio I/O connections

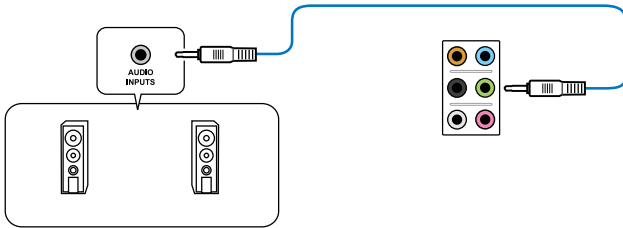
Audio I/O ports



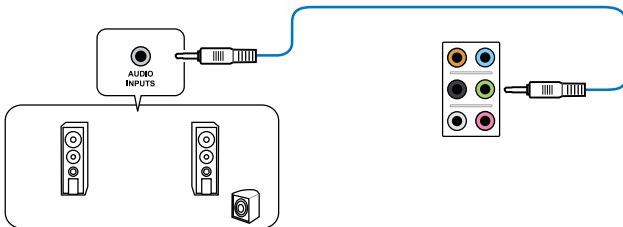
Connect to Headphone and Mic



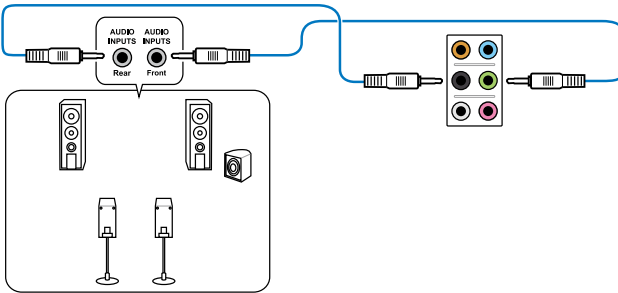
Connect to Stereo Speakers



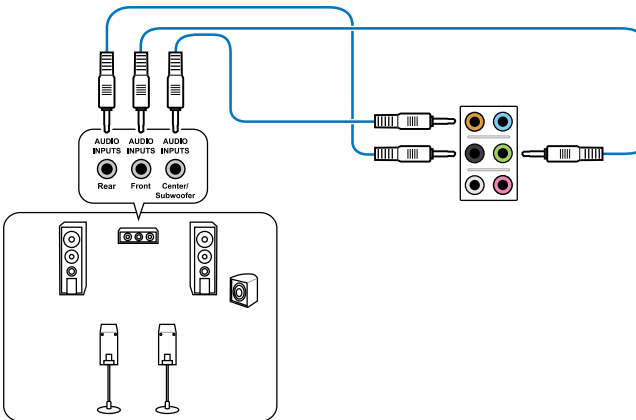
Connect to 2.1 channel Speakers



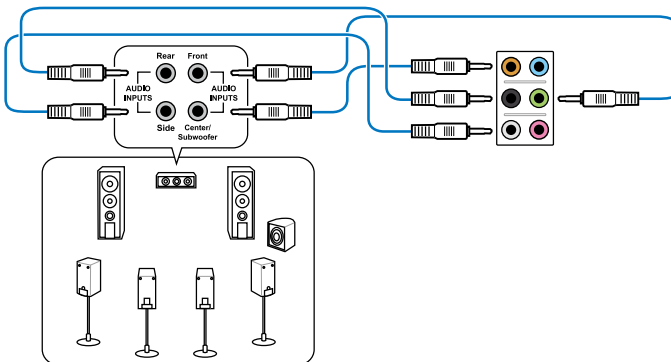
Connect to 4.1 channel Speakers



Connect to 5.1 channel Speakers



Connect to 7.1 channel Speakers



When the DTS Surround Sensation UltraPC function is enabled, ensure to connect the rear speaker to the gray port.

2.4 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 the “green” standards or if it has a “power standby” feature, the monitor LED may light up or change from orange to 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 (refer to the 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.

2.5 Turning off the computer

While the system is ON, pressing the power switch for less than four seconds puts the system on sleep mode or 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.

Chapter 3

3.1 Knowing BIOS



The new ASUS UEFI BIOS is an Unified Extensible Firmware Interface, offering a user-friendly interface that goes beyond traditional keyboard-only BIOS controls to enable more flexible and convenient mouse input. Users can easily navigate the new UEFI BIOS with the same smoothness as their operating system. The term “BIOS” in this user manual refers to “UEFI BIOS” unless otherwise specified.

BIOS (Basic Input and Output System) stores system hardware settings such as storage device configuration, overclocking settings, advanced power management, and boot device configuration that are needed for system startup in the motherboard CMOS. In normal circumstances, the default BIOS settings apply to most conditions to ensure optimum performance. **We recommend that you not change the default BIOS settings** except in the following circumstances:

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.
- You have installed a new system component that requires further BIOS settings or update.



Inappropriate settings of the BIOS may result to instability or failure to boot. **We strongly recommend that you change the BIOS settings only with the help of a trained service personnel.**

3.2 BIOS setup program

A BIOS setup program is provided for BIOS item modification. When you start up the computer, the system provides you with the opportunity to run this program. Press during the Power-On Self-Test (POST) to enter the Setup utility. Otherwise, POST continues with its test routines.

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



- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Ensure that a USB mouse is connected to your motherboard if you want to use the mouse to control the BIOS setup program.
- If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu. See section **3.9 Exit Menu** for details.
- If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See section **2.2.5 Jumper** for information on how to erase the RTC RAM.

The BIOS 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 submenus and select from the available options using a keyboard or a USB mouse.

The BIOS setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from the **Exit** menu or from the **Exit/Advanced Mode** button in the **EZ Mode/Advanced Mode** screen.

3.2.1 EZ Mode

By default, the EZ Mode screen appears when you enter the BIOS setup program. The EZ Mode provides you an overview of the basic system information, and allows you to select the display language, system performance mode and boot device priority. To access the Advanced Mode, click **Exit/Advanced Mode**, then select **Advanced Mode**.



The default screen for entering the BIOS setup program can be changed. Refer to the **Setup Mode** item in section 3.7 **Boot menu** for details.

Displays the CPU/motherboard temperature, CPU/5V/3.3V/12V voltage output, CPU/chassis/power fan speed

Selects the display language of the BIOS setup program

Clicks to display all fan speeds if available

Exits the BIOS setup program without saving the changes, saves the changes and resets the system, or enters the Advanced Mode

Selects the boot device priority

Displays the system properties of the selected mode on the right hand side

Power Saving mode

Normal mode

Selects the boot device priority

Loads optimized default

ASUS Optimal mode



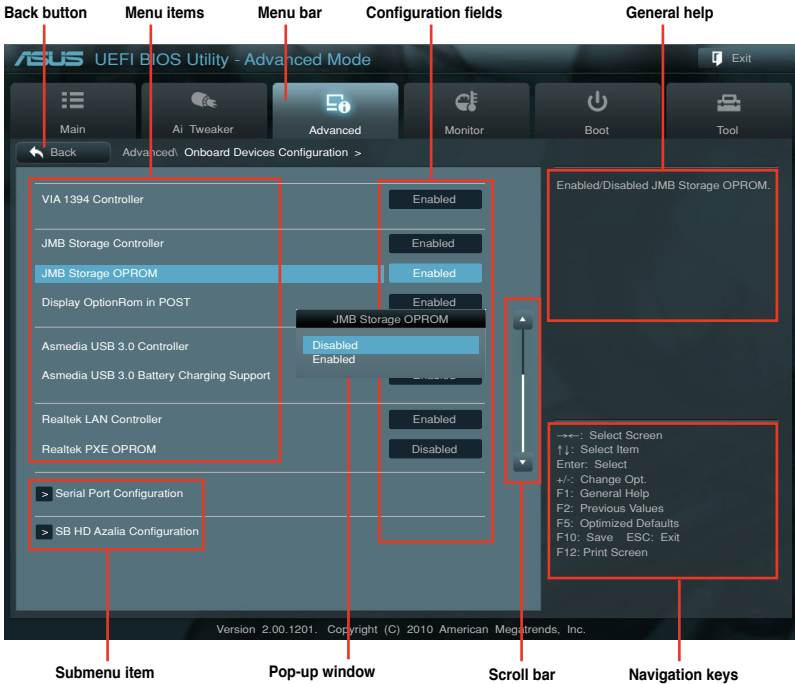
- The boot device options vary depending on the devices you installed to the system.
- The **Boot Menu(F8)** button is available only when the boot device is installed to the system.

3.2.2 Advanced Mode

The Advanced Mode provides advanced options for experienced end-users to configure the BIOS settings. The figure below shows an example of the Advanced Mode. Refer to the following sections for the detailed configurations.



To access the EZ Mode, click **Exit**, then select **ASUS EZ Mode**.



Menu bar

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

Main	For changing the basic system configuration
Ai Tweaker	For changing the overclocking settings
Advanced	For changing the advanced system settings
Monitor	For displaying the system temperature, power status, and changing the fan settings.
Boot	For changing the system boot configuration
Tool	For configuring options for special functions
Exit	For selecting the exit options and loading default settings

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 (Ai Tweaker, Advanced, Monitor, Boot, Tool, and Exit) on the menu bar have their respective menu items.

Back button

This button appears when entering a submenu. Press <Esc> or use the USB mouse to click this button to return to the previous menu screen.

Submenu items

A greater than sign (>) before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

Pop-up window

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

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.

Navigation keys

At the bottom right corner of the menu screen are the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings. Use <F12> key to capture the BIOS screen and save it to the removable storage device.

General help

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

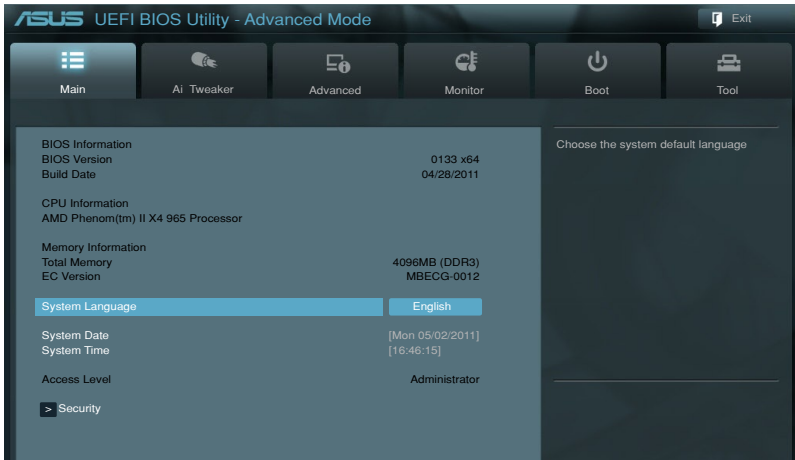
Configuration fields

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 highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

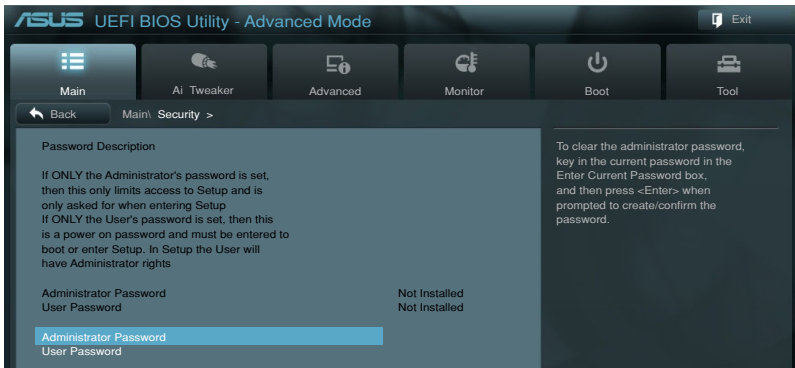
3.3 Main menu

The Main menu screen appears when you enter the Advanced Mode of the BIOS Setup program. The Main menu provides you an overview of the basic system information, and allows you to set the system date, time, language, and security settings.



Security

The Security menu items allow you to change the system security settings.



- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See section 2.2.5 **Jumper** for information on how to erase the RTC RAM.
- The **Administrator** or **User Password** items on top of the screen show the default **Not Installed**. After you set a password, these items show **Installed**.

Administrator Password

If you have set an administrator password, we recommend that you enter the administrator password for accessing the system. Otherwise, you might be able to see or change only selected fields in the BIOS setup program.

To set an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **Administrator Password** item on top of the screen shows **Not Installed**.

User Password

If you have set a user password, you must enter the user password for accessing the system. 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 **User Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear the user password, follow the same steps as in changing a user password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **User Password** item on top of the screen shows **Not Installed**.

3.4 Ai Tweaker menu

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



Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction.



The configuration options for this section vary depending on the CPU and DIMM model you installed on the motherboard.

ASUS

Main | **Ai Tweaker** | Advanced | Monitor | Boot | Tool

Current CPU Speed : 3446MHz
Target CPU Speed : 3400MHz
Current Memory Frequency : 1066MHz
Current NB Frequency : 1200MHz
Current HT Link Speed : 1200MHz

AI Overclock Tuner: Auto
OC Tuner: CANCEL
CPU Ratio: Auto
Memory Frequency: Auto
CPU/NB Frequency: Auto
HT Link Speed: Auto
CPU Spread Spectrum: Auto
PCIe Spread Spectrum: Auto
EPU Power Saving Mode: Disabled
EPU Setting: Auto
> DRAM Timing Control
> DRAM Driving Control
DIGI+ VRM
CPU Load-Line Calibration: Auto
CPU/NB Load-Line Calibration: Auto

[D.O.C.P.] When DOCP is enabled CPU Bus, CPU ratio and memory parameters will be auto optimized.

←←: Select Screen
↑↓: Select Item
Enter: Select
*←: Change Opt.
F1: General Help
F2: Previous Values
F5: Optimized Defaults
F10: Save ESC: Exit
F12: Print Screen

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Scroll down to display the following items:

100%
100%
Standard
Auto
Disabled
T.Probe
Offset Mode
+
CPU Offset Voltage 1.320V Auto
+
CPU/NB Offset Voltage 1.100V Auto
CPU VDDA Voltage 2.500V Auto
DRAM Voltage 1.550V Auto
NB Voltage 1.100V Auto
NB HT Voltage 1.200V Auto
NB 1.8V Voltage 1.800V Auto
SB Voltage 1.800V Auto

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Ai Overclock Tuner [Auto]

Allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. Select any of these preset overclocking configuration options:

- [Auto] Loads the optimal settings for the system.
- [Manual] Allows you to individually set overclocking parameters.
- [D.O.C.P.] CPU Bus, CPU ratio and memory parameters will be auto optimized.

OC Tuner [CANCEL]

OC Tuner automatically overclocks the frequency and voltage of CPU and DRAM for enhancing the system performance. Configuration options: [OK] [Cancel]

CPU Ratio [Auto]

Allows user can manually adjust the maximum non-CPB mode CPU ratio. The value will be limit to CPU base or factory setting. Use the <+> and <-> keys to adjust the ratio. The valid value ranges vary according to your CPU model.

Memory Frequency [Auto]

Allows you to set the memory operating frequency.
Configuration options: [Auto] [DDR3-800MHz] [DDR3-1066MHz] [DDR3-1333MHz] [DDR3-1600MHz]



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

CPU/NB Frequency [Auto]

Allows you to select the CPU/NB frequency.
Configuration options: [Auto] [1400MHz] [1600MHz] [1800MHz] [2000MHz]

HT Link Speed [Auto]

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

CPU Spread Spectrum [Auto]

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

PCIe Spread Spectrum [Auto]

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

EPU Power Saving Mode [Disabled]

Allows you to enable or disable the EPU power saving function.
Configuration options: [Disabled] [Enabled]

EPU Setting [Auto]

This item appears only when you set the **EPU Power Saving Mode** item to [Enabled] and allows you to select the EPU power saving mode.

Configuration options: [AUTO] [Light Power Saving Mode] [Medium Power Saving Mode] [Max Power Saving Mode]

DRAM Timing Control

DRAM CAS# Latency [Auto]

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

DRAM RAS# to CAS# Delay [Auto]

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

DRAM RAS# PRE Time [Auto]

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

DRAM RAS# ACT Time [Auto]

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

DRAM READ to PRE Time [Auto]

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

DRAM RAS# to RAS# Delay [Auto]

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

DRAM WRITE to READ Delay [Auto]

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

DRAM CAS# write Latency [Auto]

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

DRAM WRITE Recovery Time [Auto]

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

DRAM REF Cycle Time [Auto]

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

DRAM Row Cycle Time [Auto]

Configuration options: [Auto] [11 CLK] – [42 CLK]

DRAM READ to WRITE Delay [Auto]

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

DRAM WRITE to READ Delay(DD) [Auto]

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

DRAM WRITE to WRITE Timing [Auto]

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

DRAM READ to READ Timing [Auto]

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

DRAM Refresh Rate [Auto]

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

DRAM Command Rate [Auto]

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

DRAM Driving Control

DCT0 Information:

CKE drive strength [Auto]

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

CS/ODT drive strength [Auto]

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

ADDR/CMD drive strength [Auto]

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

MEMCLK drive strength [Auto]

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

Data drive strength [Auto]

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

DQS drive strength [Auto]

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

Processor ODT [Auto]

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

DCT1 Information:

CKE drive strength [Auto]

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

CS/ODT drive strength [Auto]

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

ADDR/CMD drive strength [Auto]

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

MEMCLK drive strength [Auto]

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

Data drive strength [Auto]

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

DQS drive strength [Auto]

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

Processor ODT [Auto]

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

DIGI+ VRM

CPU Load-Line Calibration [Auto]

Load-line is defined by AMD VRM spec and affects CPU voltage. The CPU working voltage will decrease proportionally to CPU loading. Higher load-line calibration would get higher voltage and better overclocking performance, but increase the CPU and VRM thermal. This item allows you to adjust the voltage range from the following percentages to boost the system performance: 0% (Regular), 25% (Medium), 50% (High), 75% (Ultra High) and 100% (Extreme).

Configuration options: [Auto] [Regular] [Medium] [High] [Ultra High] [Extreme]



The actual performance boost may vary depending on your CPU specification.

CPU/NB Load-Line Calibration [Auto]

Allows you to select the CPU/NB Load-Line mode.

Configuration options: [Auto] [Regular] [High] [Extreme]

CPU Current Capability [Auto]

This item provides wider total power range for overclocking. A higher value brings a wider total power range and extends the overclocking frequency range simultaneously.

Configuration options: [Auto] [100%] [110%] [120%] [130%] [140%]



Do not remove the thermal module while changing the DIGI+ VRM related parameters . The thermal conditions should be monitored.



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

CPU/NB Current Capability [Auto]

This item provides wider total DRAM controller power range for overclocking. A higher value brings a wider total power range and extends the overclocking frequency range simultaneously.

Configuration options: [Auto] [100%] [110%] [120%] [130%]

CPU Power Phase Control [Standard]

Phase number is the number of working VRM phase. Increasing phase number under heavy system loading to get more transient and better thermal performance. Reducing phase number under light system loading to increase VRM efficiency

[Standard] Proceeds phase control depending on the CPU loading.

[Optimized] Loads the ASUS optimized phase tuning profile.

[Extreme] Proceeds the full phase mode.

[Manual Adjustment] Allows manual adjustment.

CPU Voltage Frequency [Auto]

Switching frequency will affects the VRM transient response and component thermal. Higher frequency gets quicker transient response. Configuration options: [Auto] [Manual]

VRM Spread Spectrum [Disabled]

This item allows you to enable the spread spectrum to enhance system stability.
Configuration options: [Disabled] [Enabled]

CPU Power Duty Control [T.Probe]

[T.Probe] Maintains the VRM thermal balance.

[Extreme] Maintains the VRM current balance.

CPU & NB Voltage [Offset Mode]

[Manual Mode] Allows you to set a fixed CPU & NB voltage.

[Offset Mode] Allows you to set the Offset voltage.

Offset Mode Sign [+]

This item appears only when you set the **CPU & NB Voltage** item to [Offset Mode].

[-] To offset the voltage by a negative value.

[+] To offset the voltage by a positive value.

CPU Offset Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage** item to [Offset Mode] and allows you to set the Offset voltage. The values range from 0.00625V to 0.70000V with a 0.00625V interval.

CPU/NB Offset Mode Sign [+]

[+] To offset the voltage by a positive value.

[-] To offset the voltage by a negative value.

CPU/NB Offset Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage** item to [Offset Mode] and allows you to set the CPU/NB Offset voltage. The values range from 0.00625V to 0.70000V with a 0.00625V interval.

CPU Manual Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage** item to [Manual Mode] and allows you to set a fixed CPU voltage. The values range from 0.00625V to 1.344V with a 0.00625V interval.



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

CPU/NB Manual Voltage [Auto]

[+] To offset the voltage by a positive value.

[-] To offset the voltage by a negative value.

CPU VDDA Voltage [Auto]

Allows you to set the CPU VDDA voltage. The values range from 2.20000V to 2.90000V with a 0.00625V interval.

DRAM Voltage [Auto]

Allows you to set the DRAM voltage. The values range from 1.20V to 2.20V with a 0.00625V interval.

NB Voltage [Auto]

Allows you to set the Northbridge voltage. The values range from 1.10000V to 1.25V with a 0.00625V interval.

NB HT Voltage [Auto]

Allows you to set the HyperTransport voltage. The values range from 1.2V to 1.4V with a 0.00625V interval.

NB 1.8V Voltage [Auto]

The values range from 1.80V to 2.80V with a 0.005V interval.

SB Voltage [Auto]

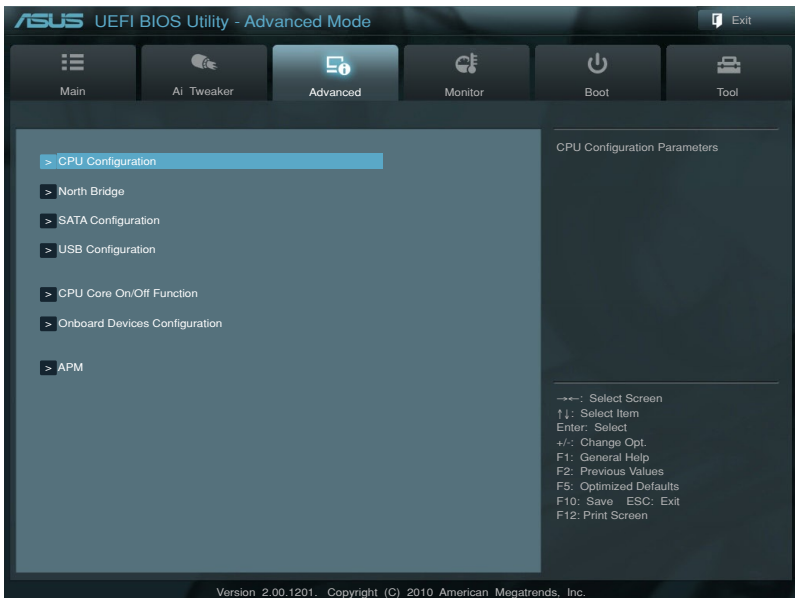
Allows you to set the Southbridge voltage. The values range from 1.10V to 1.80V with a 0.005V interval.

3.5 Advanced menu

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



Be cautious when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



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.



Cool'n'Quiet [Enabled]

Allows you to enable or disable AMD Cool'n'Quiet function.
Configuration options: [Enabled] [Disabled]

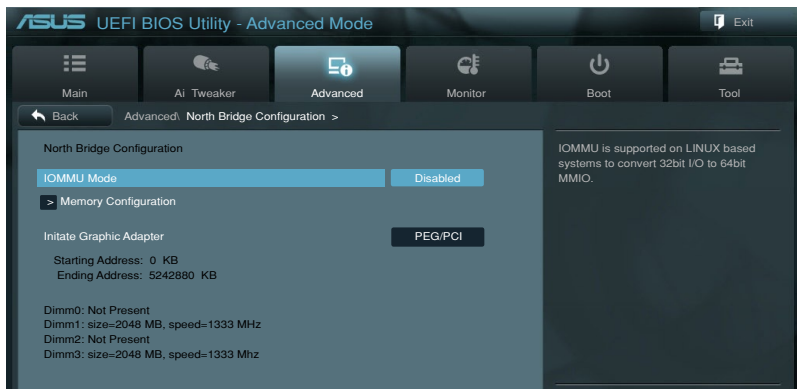
C1E [Enabled]

Enable this feature will let your system utilize the AMD specific ACPI states to save power consumption. Configuration options: [Enabled] [Disabled]

SVM [Enabled]

Enable AMD virtualization in CPU. This secure virtual mode will let you run multiple OS (guest) on the same physical hardware by decoupling OS and physical hardware with the hypervisor layer.
Configuration options: [Enabled] [Disabled]

3.5.2 North Bridge Configuration



IOMMU Mode [Disabled]

IOMMU is supported on LINUX based systems to convert 32bit I/O to 64bit MMIO.
Configuration options: [Disabled] [64MB]

Memory Configuration

Bank Interleaving [Auto]

Configuration options: [Auto] [Disabled]

Channel Interleaving [Auto]

Configuration options: [Auto] [Disabled]

ECC Mode [Enable]

Enables or disables the DRAM ECC mode that allows the hardware to report and correct memory errors.

[Disabled] Disables the DRAM ECC mode.

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

Power Down Enable [Disabled]

Enables or disables the DDR power down mode.

Configuration options: [Disabled] [Enabled]

Memory Hole Remapping [Enabled]

Configuration options: [Disabled] [Enabled]

DCT Unganged Mode [Enabled]

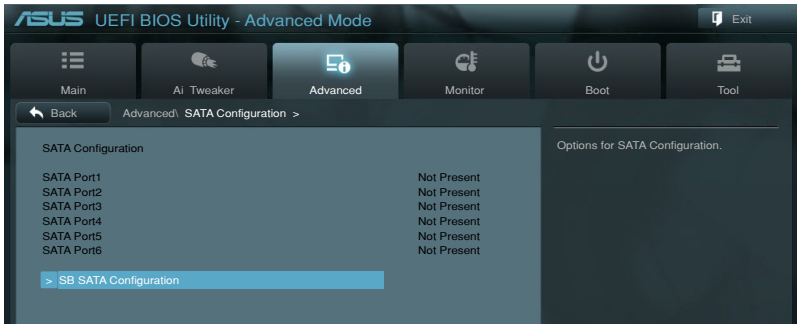
Configuration options: [Disabled] [Enabled]

Initiate Graphic Adapter [PEG/PCI]

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

3.5.3 SATA Configuration

While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show **Not Present** if no SATA device is installed to the corresponding SATA port.



SB SATA Configuration

Options for SATA Configuration.

OnChip SATA Channel [Enabled]

[Enabled] Enables the onboard channel SATA port.

[Disabled] Disables the onboard channel SATA port.



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

SATA Port1–Port4 [AHCI]

Allows you to set the SATA configuration.

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

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

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

SATA Port5–Port6 [AHCI]

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



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



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

S.M.A.R.T Status Check [Enabled]

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

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

SATA Hot Plug on PORT1 [Disabled]

Configuration options: [Enabled] [Disabled]

SATA Hot Plug on PORT2 [Disabled]

Configuration options: [Enabled] [Disabled]

SATA Hot Plug on PORT3 [Disabled]

Configuration options: [Enabled] [Disabled]

SATA Hot Plug on PORT4 [Disabled]

Configuration options: [Enabled] [Disabled]

SATA Hot Plug on PORT5 [Disabled]

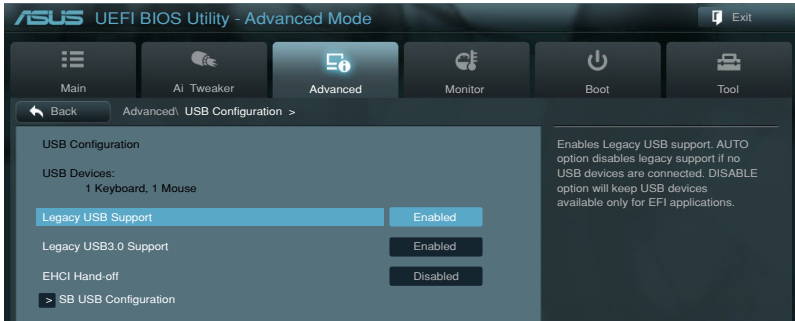
Configuration options: [Enabled] [Disabled]

SATA Hot Plug on PORT6 [Disabled]

Configuration options: [Enabled] [Disabled]

3.5.4 USB Configuration

The items in this menu allow you to change the USB-related features.



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

Legacy USB Support [Enabled]

- [Enabled] Enables the support for USB devices on legacy operating systems (OS).
- [Disabled] The USB devices can be used only for the BIOS setup program.
- [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.

Legacy USB3.0 Support [Enabled]

- [Enabled] Enables the support for USB 3.0 devices on legacy operating systems (OS).
- [Disabled] Disables the function.

EHCI Hand-off [Disabled]

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

SB USB Configuration

Options for SB USB Configuration.

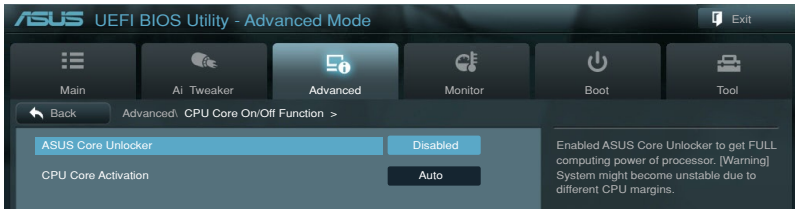
OHCI HC (Bus 0 Dev 18 Fn 0) [Enabled]
Configuration options: [Enabled] [Disabled]

OHCI HC (Bus 0 Dev 19 Fn 0) [Enabled]
Configuration options: [Enabled] [Disabled]

OHCI HC (Bus 0 Dev 22Fn 0) [Enabled]
Configuration options: [Enabled] [Disabled]

OHCI HC (Bus 0 Dev 20 Fn 5) [Enabled]
Configuration options: [Enabled] [Disabled]

3.5.5 CPU Core On/Off Function



ASUS Core Unlocker [Disabled]

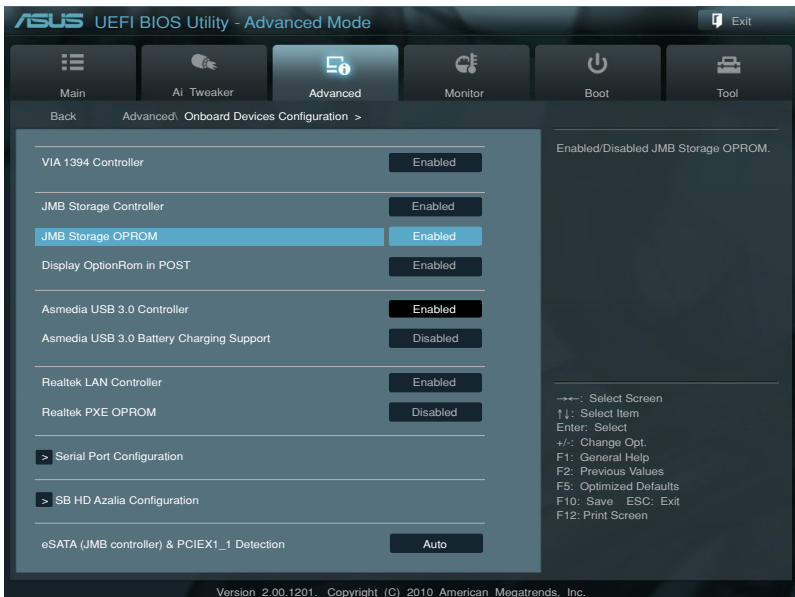
[Enabled] Enables the ASUS Core Unlocker to get the full computing power of the processor.

[Disabled] Disables this function.

CPU Core Activation [Auto]

This item lets user turn off core except core 1, user can turn off 2nd, 3rd, 4th, 5th, etc core manually. Configuration options: [Auto] [Manual]

3.5.6 Onboard Devices Configuration



VIA 1394 Controller [Enabled]

[Enabled] Enables the onboard IEEE 1394a controller.

[Disabled] Disables the controller.

JMB Storage Controller [Enabled]

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



If you want to use the full function of the JMB storage controller (ex. AHCI), we recommend that you set this item to [Enabled] and install the JMicron JMB36X Controller Driver from the motherboard support DVD.

JMB Storage OPROM [Enabled]

This item appears only when you set the previous item to [Enabled] and allows you to enable or disable the OptionRom of the JMB storage controller.
Configuration options: [Enabled] [Disabled]

Display OptionRom in POST [Enabled]

This item appears only when you set the JMB Storage OPROM item to [Enabled] and allows you to display or hide the OptionRom of the JMB storage controller during POST.
Configuration options: [Enabled] [Disabled]

Asmedia USB 3.0 Controller [Enabled]

[Enabled] Enables the USB 3.0 controller.
[Disabled] Disables the controller.

Asmedia USB 3.0 Battery Charging Support [Disabled]

[Enabled] Enables this function.
[Disabled] Disables this function.

Realtek LAN Controller [Enabled]

[Enabled] Enables the Realtek LAN controller.
[Disabled] Disables the controller.

Realtek PXE OPROM [Disabled]

This item appears only when you set the previous item to [Enabled] and allows you to enable or disable the PXE OptionRom of the Realtek LAN controller.
Configuration options: [Enabled] [Disabled]

Serial Port Configuration

The sub-items in this menu allow you to set the serial port configuration.



This item functions only if there is a serial port (COM1) connector on the motherboard.

Serial Port [Enabled]

Allows you to enable or disable the serial port (COM).
Configuration options: [Enabled] [Disabled]

Change Settings [IO=3F8h; IRQ=4]

Allows you to select the Serial Port base address.
Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4] [IO=2E8h; IRQ=3]

SB HD Azalia Configuration

Options for SB HD Azalia.

HD Audio Azalia Device [Enabled]

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

Azalia Front Panel [HD]

Allows you to set the front panel audio connector (AAFP) mode to legacy AC'97 or high-definition audio depending on the audio standard that the front panel audio module supports.

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

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

SPDIF Out Type [SPDIF]

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

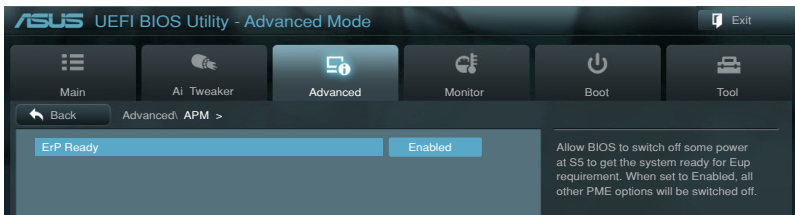
[HDMI] Sets to [HDMI] for HDMI audio output.

eSATA (JMB controller) & PCIEX1_1 Detection [Auto]

[Auto] The system auto-detects the occupied PCIEX1_1 slot or eSATA/Power eSATA connector. When both are occupied, only PCIEX1_1 slot can work.

[eSATA] If eSATA (JMB controller) is enabled, PCIEX1_1 slot will be blocked and you can connect eSATA/Power eSATA devices.

3.5.7 APM



ErP Ready [Enabled]

[Disabled] Disables the Energy Related Products (ErP) Ready function.

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

3.6 Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.



CPU Temperature / MB Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the CPU and motherboard temperatures.

VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage, VDDA2.5V Voltage

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

CPU Fan Speed [xxxx RPM] / [N/A]

Chassis Fan 1/2/3 Speed [xxxx RPM] / [N/A]

Power Fan Speed [xxxx RPM] / [N/A]

The onboard hardware monitor automatically detects and displays the CPU, chassis, and power fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows N/A.

CPU Q-Fan Control [Enabled]

[Disabled] Disables the CPU Q-Fan control feature.

[Enabled] Enables the CPU Q-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] Sets to [Turbo] to achieve maximum CPU fan speed.

[Manual] Sets to [Manual] to assign detailed fan speed control parameters.



The following four items appear only when you set **CPU Fan Profile** to [Manual].

CPU Upper Temperature [70]

Use the <+> and <-> keys to adjust the upper limit of the CPU temperature. The values range from 20°C to 75°C.

CPU Lower Temperature [20]

Displays the lower limit of the CPU temperature.

CPU Fan Max. Duty Cycle(%) [20]

Use the <+> and <-> keys to adjust the maximum CPU fan duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the CPU fan will operate at the maximum duty cycle.

CPU Fan Min. Duty Cycle(%) [20]

Set the minimum CPU fan duty cycle when CPU temperature is lower the CPU Lower Temperature setting.

CPU Fan Speed Low Limit [600 RPM]

This item appears only when you enable the **CPU Q-Fan Control** feature and allows you to disable or set the CPU fan warning speed.

Configuration options: [Ignore] [100RPM] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

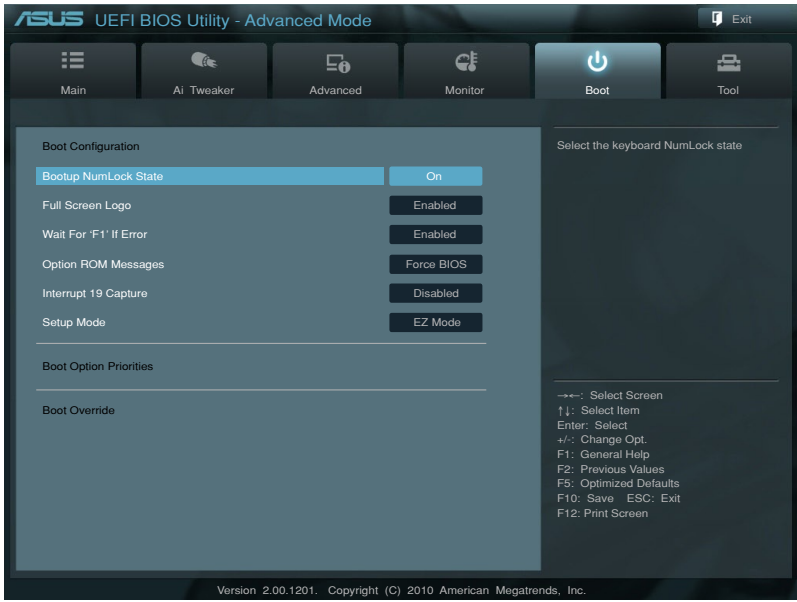
Chassis Q-Fan Control [Disabled]

[Disabled] Disables the Chassis Q-Fan control feature.

[Enabled] Enables the Chassis Q-Fan control feature.

3.7 Boot menu

The Boot menu items allow you to change the system boot options.



Bootup NumLock State [On]

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

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

Full Screen Logo [Enabled]

[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 MyLogo 2™ feature.

Wait for 'F1' If Error [Enabled]

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

Configuration options: [Disabled] [Enabled]

Option ROM Messages [Force BIOS]

[Force BIOS] The third-party ROM messages will be forced to display during the boot sequence.

[Keep Current] The third-party ROM messages will be displayed only if the third-party manufacturer had set the add-on device to do so.

Interrupt 19 Capture [Disabled]

- [Enabled] Enables option ROMs to trap Int 19.
[Disabled] Disables option ROMs to trap Int 19.

Setup Mode [EZ Mode]

- [Advanced Mode] Sets Advanced Mode as the default screen for entering the BIOS setup program.
[EZ Mode] Sets EZ Mode as the default screen for entering the BIOS setup program.

Boot Option Priorities

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.



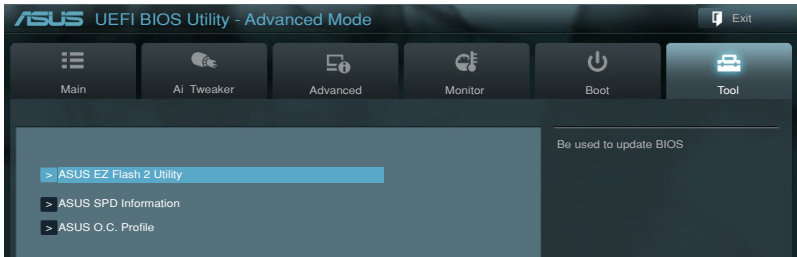
-
- To select the boot device during system startup, press <F8> when ASUS Logo appears.
 - To access Windows OS in Safe Mode, do any of the following:
 - Press <F8> after POST.
-

Boot Override

These items displays the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Click an item to start booting from the selected device.

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 submenu.



3.8.1 ASUS EZ Flash 2

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



For more details, refer to **section 3.10.2 ASUS EZ Flash 2 utility**.

3.8.2 ASUS SPD Information

This item allows you to get DRAM SPD information.

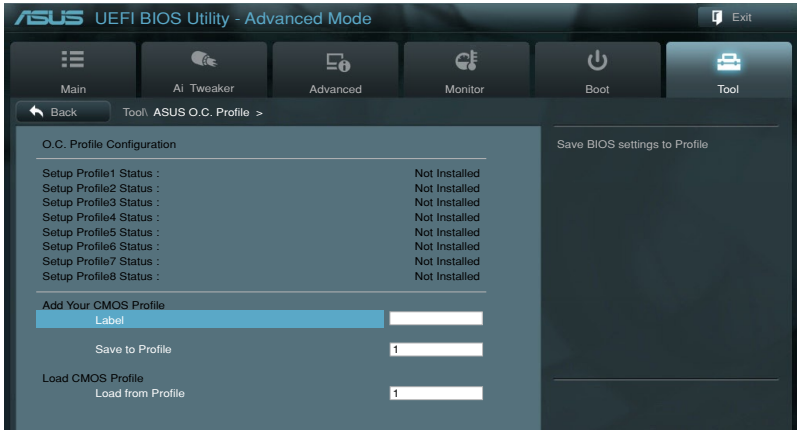


DIMM Slot # [Slot 2]

Configuration options: [Slot 1] [Slot 2] [Slot 3] [Slot 4]

3.8.3 ASUS O.C. Profile

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



The **Setup Profile Status** items show **Not Installed** if no profile is created.

Save to Profile

Allows you to save the current BIOS settings to the BIOS Flash, and create a profile. Key in a profile number from one to eight and label name, press <Enter>, and then select **Yes**.

Load from Profile

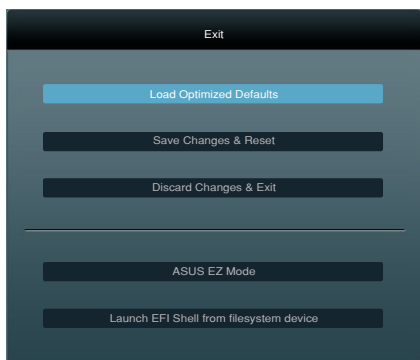
Allows you to load the previous BIOS settings saved in the BIOS Flash. Key in the profile number that saved your BIOS settings, press <Enter>, and then select **Yes**.



- 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.

3.9 Exit menu

The Exit menu items allow you to load the optimal default values for the BIOS items, and save or discard your changes to the BIOS items. You can access the **EZ Mode** from the Exit menu.



Load Optimized 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 the default values.

Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select **Yes** to save changes and exit.

Discard Changes & Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

ASUS EZ Mode

This option allows you to enter the EZ Mode screen.

Launch EFI Shell from filesystem device

This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices.

3.10 Updating BIOS

The ASUS website publishes the latest BIOS versions to provide enhancements on system stability, compatibility, or performance. However, BIOS updating is potentially risky. If there is no problem using the current version of BIOS, **DO NOT manually update the BIOS**. Inappropriate BIOS updating may result in the system's failure to boot. Carefully follow the instructions of this chapter to update your BIOS if necessary.



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

The following utilities allow you to manage and update the motherboard BIOS setup program.

1. **ASUS Update:** Updates the BIOS in Windows® environment.
2. **ASUS EZ Flash 2:** Updates the BIOS using a USB flash drive.
3. **ASUS BIOS Updater:** Updates and backups the BIOS in DOS environment using the motherboard support DVD and a USB flash disk drive.

Refer to the corresponding sections for details on these utilities.



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

3.10.1 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:

- Update the BIOS directly from the Internet
- Download the latest BIOS file from the Internet
- Update the BIOS from an updated BIOS file
- Save the current BIOS file
- 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).

Launching ASUS Update

After installing AI Suite II from the motherboard support DVD, launch ASUS Update by clicking **Update > ASUS Update** on the AI Suite II main menu bar.



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

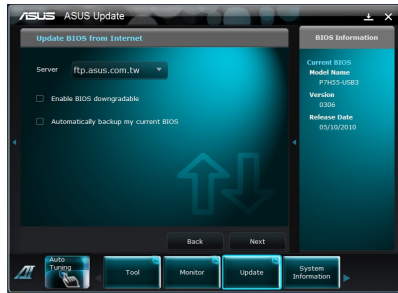
Updating the BIOS through the Internet

To update the BIOS through the Internet:

1. From the ASUS Update screen, select **Update BIOS from Internet**, and then click **Next**.



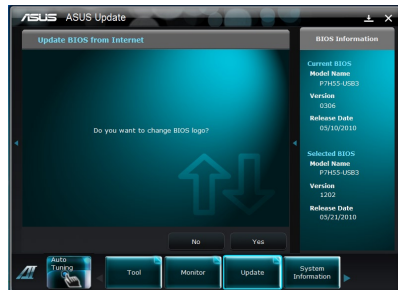
2. Select the ASUS FTP site nearest you to avoid network traffic.
If you want to enable the BIOS downgradable function and auto BIOS backup function, check the checkboxes before the two items on the screen.



3. Select the BIOS version that you want to download. Click **Next**.



4. You can decide whether to change the BIOS boot logo, which is the image appearing on screen during the Power-On Self-Tests (POST). Click **Yes** if you want to change the boot logo or **No** to continue.
5. Follow the onscreen instructions to complete the update process.



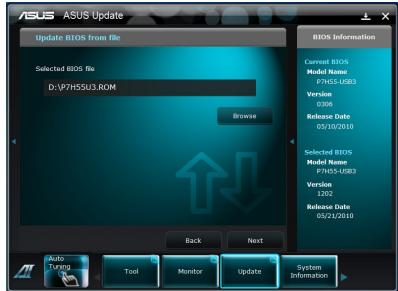
Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

1. From the ASUS Update screen, select **Update BIOS from file**, and then click **Next**.



2. Locate the BIOS file from the Open window, click **Open**, and click **Next**.



3. You can decide whether to change the BIOS boot logo. Click **Yes** if you want to change the boot logo or **No** to continue.
4. Follow the onscreen instructions to complete the update process.



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

3.10.2 ASUS EZ Flash 2 utility

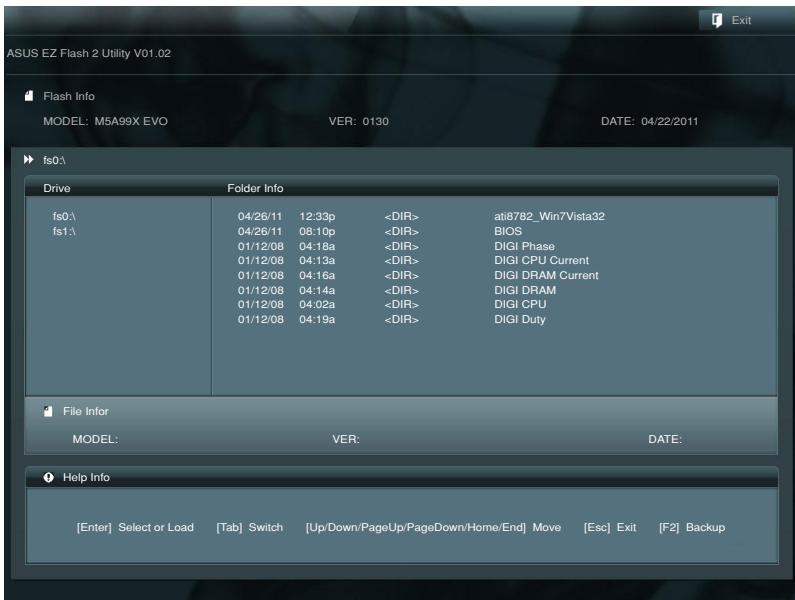
The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use a bootable floppy disk or an OS-based utility.



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.
2. Enter the **Advanced Mode** of the BIOS setup program. Go to the **Tool** menu to select **ASUS EZ Flash Utility** and press <Enter> to enable it.



3. Press <Tab> to switch to the **Drive** field.
4. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, and then press <Enter>.
5. Press <Tab> to switch to the **Folder Info** field.
6. Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is 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 Optimized Defaults** item under the **Exit** menu. See section **3.9 Exit Menu** for details.

3.10.3 ASUS BIOS Updater

The ASUS BIOS Updater allows you to update BIOS in DOS environment. This utility also allows you to copy the current BIOS file that you can use as a backup when the BIOS fails or gets corrupted during the updating process.



The succeeding utility screens are for reference only. The actual utility screen displays may not be same as shown.

Before updating BIOS

1. Prepare the motherboard support DVD and a USB flash drive in FAT32/16 format and single partition.
2. Download the latest BIOS file and BIOS Updater from the ASUS website at <http://support.asus.com> and save them on the USB flash drive.

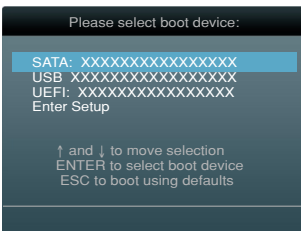


- NTFS is not supported under DOS environment. Do not save the BIOS file and BIOS Updater to a hard disk drive or USB flash drive in NTFS format.
- Do not save the BIOS file to a floppy disk due to low disk capacity.

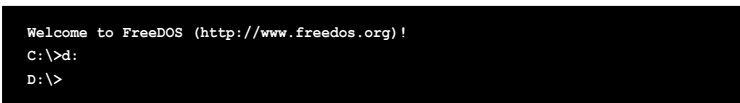
3. Turn off the computer and disconnect all SATA hard disk drives (optional).

Booting the system in DOS environment

1. Insert the USB flash drive with the latest BIOS file and BIOS Updater to the USB port.
2. Boot your computer. When the ASUS Logo appears, press <F8> to show the **BIOS Boot Device Select Menu**. Insert the support DVD into the optical drive and select the optical drive as the boot device.



3. When the **Make Disk** menu appears, select the **FreeDOS command prompt** item by pressing the item number.
4. At the FreeDOS prompt, type **d:** and press <Enter> to switch the disk from Drive C (optical drive) to Drive D (USB flash drive).



Backing up the current BIOS

To backup the current BIOS file using the BIOS Updater



Ensure that the USB flash drive is not write-protected and has enough free space to save the file.

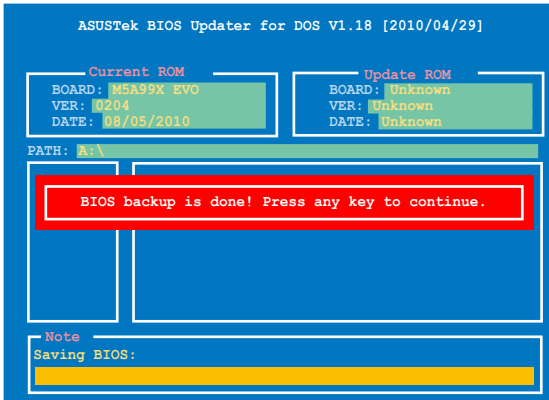
1. At the FreeDOS prompt, type `bupdater /o [filename]` and press <Enter>.

```
D:\>bupdater /oOLDBIOS1_rom
```

Filename Extension

The [filename] is any user-assigned filename with no more than eight alphanumeric characters for the filename and three alphanumeric characters for the extension.

2. The BIOS Updater backup screen appears indicating the BIOS backup process. When BIOS backup is done, press any key to return to the DOS prompt.



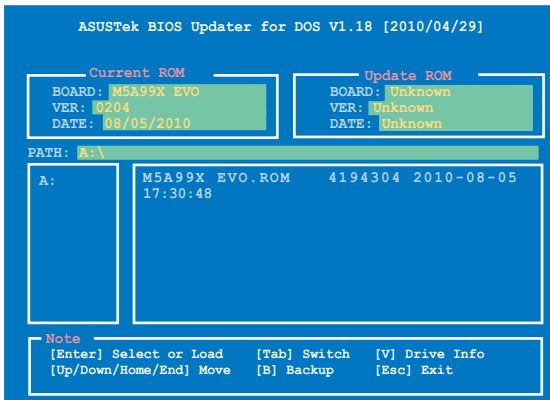
Updating the BIOS file

To update the BIOS file using BIOS Updater

1. At the FreeDOS prompt, type `bupdater /pc /g` and press <Enter>.

```
D:\>bupdater /pc /g
```

2. The BIOS Updater screen appears as below.



3. Press <Tab> to switch between screen fields and use the <Up/Down/Home/End> keys to select the BIOS file and press <Enter>. BIOS Updater checks the selected BIOS file and prompts you to confirm BIOS update.



4. Select **Yes** and press <Enter>. When BIOS update is done, press <ESC> to exit BIOS Updater. Restart your computer.



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



- For BIOS Updater version 1.04 or later, the utility automatically exits to the DOS prompt after updating BIOS.
- Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit BIOS** menu. See Chapter 3 of your motherboard user manual for details.
- Ensure to connect all SATA hard disk drives after updating the BIOS file if you have disconnected them.

Chapter 4

4.1 Installing an operating system

This motherboard supports Windows® XP/ 64-bit XP/ Vista / 64-bit Vista / 7 / 64-bit 7 operating systems (OS). Always install the latest OS version and corresponding updates to maximize the features of your hardware.



- Motherboard settings and hardware options vary. Use the setup procedures presented in this chapter for reference only. Refer to your OS documentation for detailed information.
- Ensure that you install the Windows® XP Service Pack 3 or later versions before installing the drivers for better compatibility and system stability.

4.2 Support DVD information

The support DVD that comes 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 into the optical drive. The DVD automatically displays the Drivers menu if Autorun is enabled in your computer. Click each menu tab and select the items you want to install.

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

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

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

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

Click the Contact tab to display the ASUS contact information.

Click an icon to display 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 Obtaining the software manuals

The software manuals are included in the support DVD. Follow the instructions below to get the necessary software manuals.

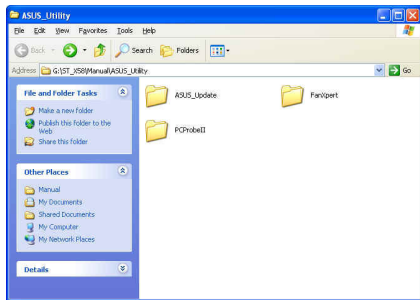


The software manual files are in Portable Document Format (PDF). Install the Adobe® Acrobat® Reader from the Utilities menu before opening the files.

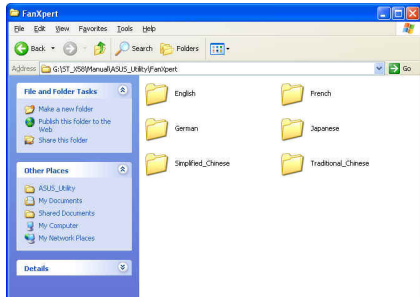
1. Click the **Manual** tab. Click **ASUS Motherboard Utility Guide** from the manual list on the left.



2. The **Manual** folder of the support DVD appears. Double-click the folder of your selected software.



3. Some software manuals are provided in different languages. Double-click the language to show the software manual.



The screenshots in this section are for reference only. The actual software manuals containing in the support DVD vary by models.

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 AI Suite II

AI Suite II is an all-in-one interface that integrates several ASUS utilities and allows users to launch and operate these utilities simultaneously.

Installing AI Suite II

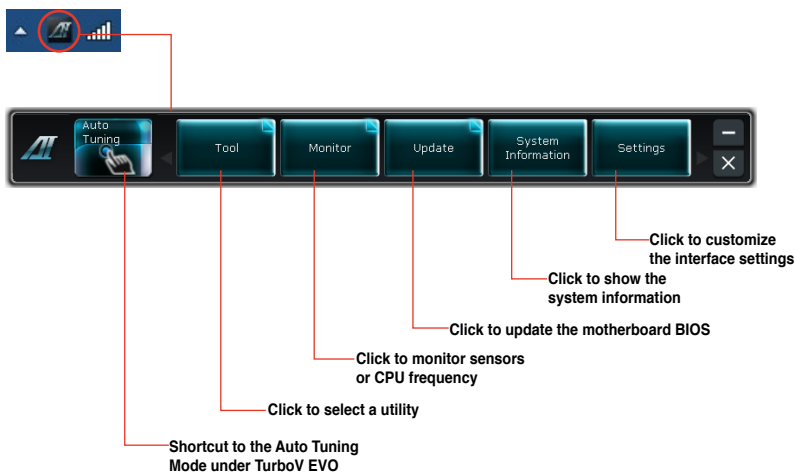
To install AI Suite II on your computer

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

Using AI Suite II

AI Suite II automatically starts when you enter the Windows® operating system (OS). The AI Suite II icon appears in the Windows® notification area. Click the icon to open the AI Suite II main menu bar.

Click each button to select and launch a utility, to monitor the system, to update the motherboard BIOS, to display the system information, and to customize the settings of AI Suite II.

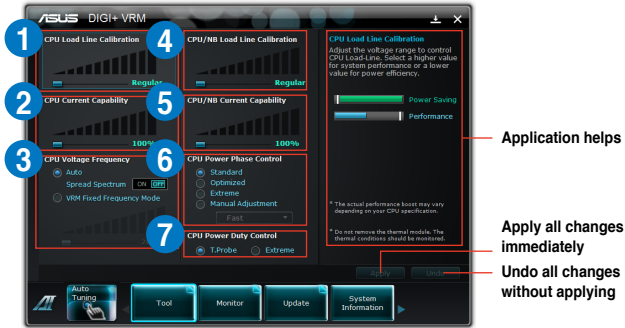


- The **Auto Tuning** button appears only on models with the TurboV EVO function.
- The applications in the Tool menu vary with models.
- The screenshots of AI Suite II in this user manual are for reference only. The actual screenshots vary with models.
- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.3.2 DIGI+ VRM

ASUS DIGI+ VRM allows you to adjust VRM voltage and frequency modulation to enhance reliability and stability. It also provides the highest power efficiency, generating less heat to longer component lifespan and minimize power loss.

After installing AI Suite II from the motherboard support DVD, launch DIGI+ VRM by clicking **Tool > DIGI+ VRM** on the AI Suite II main menu bar.



Function description

1. CPU Load-line Calibration

Higher load-line calibration could get higher voltage and good overclocking performance but increase the CPU and VRM thermal.

2. CPU Current Capability

CPU Current Capability provides wider total power range for overclocking. A higher value setting gets higher VRM power consumption delivery.

3. CPU Voltage Frequency

Switching frequency will affect the VRM transient response and component thermal.

4. CPU/NB Load Line Calibration

Set to a higher value for system performance, or to a lower value for better thermal solution.

5. CPU/NB Current Capability

Setting CPU/NB Current Capability to a higher value increases the overclocking frequency range of the DRAM Controller.

6. CPU Power Phase Control

Increase phase number under heavy system loading to get more transient and better thermal performance. Reduce phase number under light system loading to increase VRM efficiency.

7. CPU Power Duty Control

CPU Power Duty Control adjusts the current of every VRM phase and the thermal of every phase component.



- The actual performance boost may vary depending on your CPU and DRAM specification.
- Do not remove the thermal module. The thermal conditions should be monitored.

4.3.3 TurboV EVO

ASUS TurboV EVO introduces **TurboV** that allows you to manually adjust the CPU frequency and related voltages as well as **Auto Tuning** function that offers automatic and easy overlocking and system level up. **After installing AI Suite II from the motherboard support DVD, launch TurboV EVO by clicking Tool > TurboV EVO on the AI Suite II main menu bar.**

TurboV

TurboV allows you to overclock the CPU Bus/PEG frequency, CPU voltage, CPU/NB voltage, and DRAM 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 **TurboV** 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.

Auto Tuning Mode

Profile	Current	Target	Unit
CPU Bus/PEG Freq	200	200	MHz
CPU Voltage	1.375000	1.375000	V
CPU/NB Voltage	1.175000	1.175000	V
DRAM Voltage	1.500000	1.500000	V

OS Default Settings **Undo** **Apply**

Auto Tuning Tool Monitor Update System Information



For advanced overclock ability, adjust first the BIOS items, and then proceed more detailed adjustments in **More Settings**.

Using Advanced Mode

Click **More Settings**, and then click the **Advanced Mode** tab to adjust the advanced voltage settings.



CPU Ratio

Allows you to manually adjust the CPU ratio.

1. Click **More Settings**, and then click the **CPU Ratio** tab.
2. Drag the adjustment bar upwards or downwards to the desired value.



- Set the **CPU Ratio Setting** item in BIOS to [Auto] before using the CPU Ratio function in TurboV. Refer to Chapter 3 of your motherboard user manual for details.
- The CPU Ratio bars show the status of the CPU cores, which vary with your CPU model.

Auto Tuning

ASUS TurboV EVO includes two auto tuning modes, providing the most flexible auto-tuning options.



- The overclocking result varies with the CPU model and the system configuration.
- To prevent overheating from damaging the motherboard, a better thermal environment is strongly recommended.

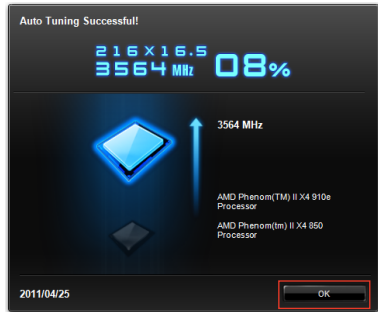
- **Fast Tuning:** fast CPU overclocking
- **Extreme Tuning:** extreme overclocking for CPU and memory

Using Fast Tuning

1. Click the **Auto Tuning** tab and then click **Fast**.
2. Read through the warning messages and click **Start** to start auto-overclocking.



3. TurboV automatically overclocks the CPU, saves BIOS settings and restarts the system. After re-entering Windows, a message appears indicating auto tuning success. Click **OK** to exit.



Using Extreme Tuning

1. Click the **Auto Tuning** tab and then click **Extreme**.
2. Read through the warning messages and click **Start** to start auto-overclocking.



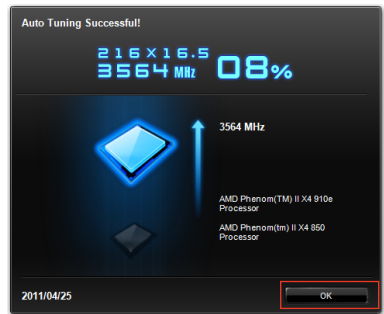
3. TurboV automatically overlocks the CPU and memory and restarts the system. After re-entering Windows, a message appears indicating the current overclocking result. To keep the result, click **Stop**.



4. If you did not click **Stop** in the previous step, TurboV automatically starts further system overclocking and stability test. An animation appears indicating the overclocking process. Click **Stop** if you want to cancel the Overclocking process.



5. TurboV automatically adjusts and saves BIOS settings and restarts the system. After re-entering Windows, a message appears indicating auto tuning success. Click **OK** to exit.



4.3.4 EPU

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

Launching EPU

After installing AI Suite II from the motherboard support DVD, launch EPU by clicking **Tool > EPU** on the AI Suite II main menu bar.

The screenshot shows the ASUS EPU Control Panel. On the left, there are three mode buttons: 'Auto', 'High performance', and 'Max. power saving'. The main area features a central pentagon with five points labeled 'Tranquility', 'Performance', 'Convenience', 'Reliability', and 'Energy Saved'. On the right, the 'EPU Status' panel shows the current mode as 'Auto:Max. power saving' and lists components like CPU, HDD, FAN, Chipset, Memory, and VGA, some of which are highlighted. Below this, it shows 'Reduced CO2 Emission' statistics, including 'Time Started' and 'Time Started Since' with a 'Clear' button. At the bottom, there are buttons for 'Auto Tuning', 'Tool', 'Monitor', 'Update', and 'System Information'. A 'Configurations' button is also visible near the bottom right.

Callouts and their descriptions:

- Warning**: Displays the following message if no VGA power saving engine is detected.
- Auto:Max. power saving**: Displays current mode
- CPU, HDD, FAN, Chipset, Memory, VGA**: The items lighting up means power saving engine is activated
- Reduced CO2 Emission**: Displays the amount of CO2 reduced
- Time Started**: Shifts between the display of Total and Current CO2 reduced
- Current CPU Power**: Displays the current CPU power
- Configurations**: Advanced settings for each mode
- Auto, High performance, Max. power saving**: Multiple system operating modes
- Tool, Monitor, Update, System Information**: Displays the system properties of each mode



- * Select **From EPU Installation** to show the CO2 that has been reduced since you installed EPU.
- * Select **From the Last Reset** to show the total CO2 that has been reduced since you click the Clear button .

4.3.5 FAN Xpert

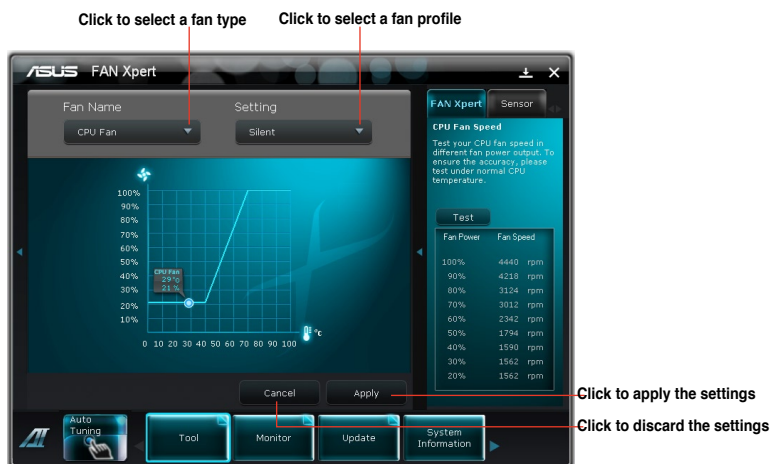
Fan Xpert intelligently allows you to adjust both the CPU and chassis fan speeds according to different ambient temperatures caused by different climate conditions in different geographic regions and your PC's system loading. The built-in variety of useful profiles offer flexible controls of fan speed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

Launching FAN Xpert

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

Using FAN Xpert

Click **Fan Name** to select a fan and then click **Setting** to select a preset mode for your selected fan.



Fan setting

- **Disable:** disables the **Fan Xpert** function.
- **Standard:** adjusts fan speed in a moderate pattern.
- **Silent:** minimizes fan speed for quiet fan operation.
- **Turbo:** maximizes the fan speed for the best cooling effect.
- **User:** Allows you to configure the CPU fan profile under certain limitations.

4.3.6 Probe II

Probe II is a utility that monitors the computer's vital components, and detects and alerts you of any problem with these components. Probe II senses fan rotations, CPU temperature, and system voltages, among others. With this utility, you are assured that your computer is always at a healthy operating condition.

Launching Probe II

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

Configuring Probe II

Click the **Voltage/Temperature/Fan Speed** tabs to activate the sensors or to adjust the sensor threshold values. The **Preference** tab allows you to customize the time interval of sensor alerts, or change the temperature unit.



Saves your configuration

Loads your saved configuration

Loads the default threshold values for each sensor

Applies your changes

4.3.7 Sensor Recorder

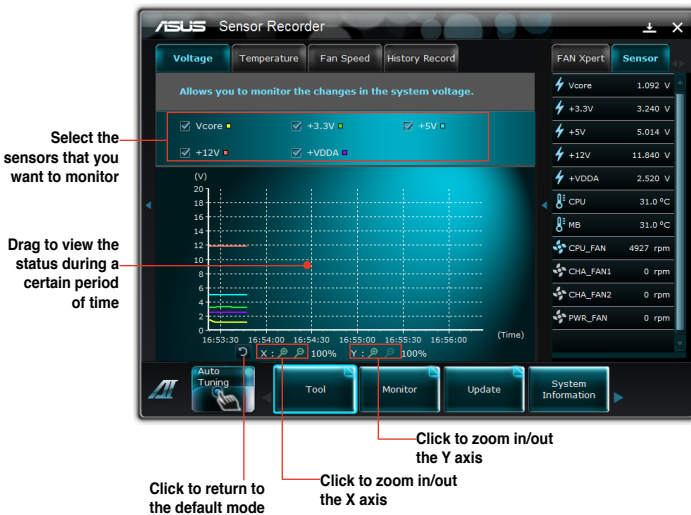
Sensor Recorder allows you to monitor the changes in the system voltage, temperature, and fan speed, as well as recording the changes.

Launching Sensor Recorder

After installing AI Suite II from the motherboard support DVD, click **Tool > Sensor Recorder** on the AI Suite II main menu bar to launch Sensor Recorder.

Configuring Sensor Recorder

Click the **Voltage/Temperature/Fan Speed** tabs and select the sensors that you want to monitor. The **History Record** tab allows you to record the changes in the sensors that you enable.

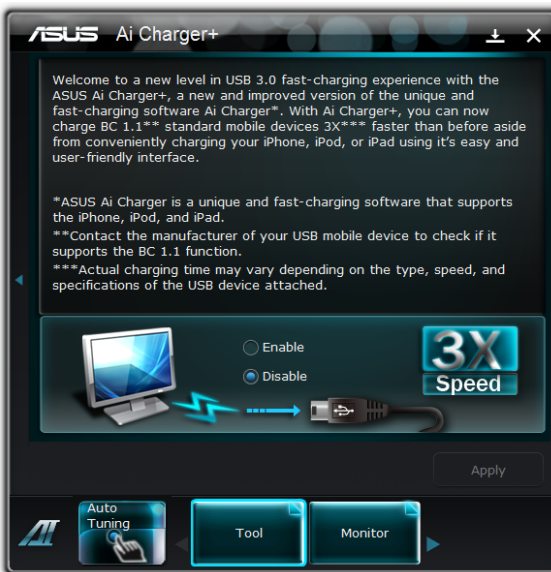


4.3.8 Ai Charger+

Battery Charging Version 1.1 (BC 1.1), a USB Implementers Forum (USB-IF) certified USB charging function, is designed to make USB charging faster than the standard USB devices. If your USB device supports the BC 1.1 function*, when you connect your USB device to your system, the system automatically detects your USB device and starts a fast USB charging. The charging speed may get 3 times faster than that of the standard USB devices**.

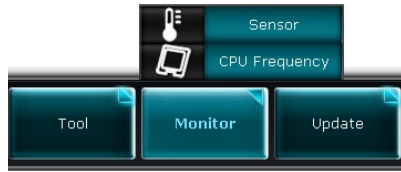


- * Check your USB device manufacturer if it fully supports the BC 1.1 function.
- ** The actual charging speed may vary with your USB device's conditions.
- Ensure to remove and reconnect your USB device after enabling or disabling Ai Charger+ to ensure normal charging function.



4.3.9 Monitor

The Monitor section includes the Sensor and CPU Frequency panels.



Sensor

The Sensor panel displays the current value of a system sensor such as fan rotation, CPU temperature, and voltages. Click **Monitor > Sensor** on the AI Suite II main menu bar to launch the Sensor panel.

CPU Frequency

The CPU Frequency panel displays the current CPU frequency and CPU usage. Click **Monitor > CPU Frequency** on the AI Suite II main menu bar to open the CPU Frequency panel.

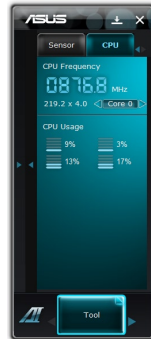
Resident in the right pane (system information area)



Sensor panel



CPU Frequency panel



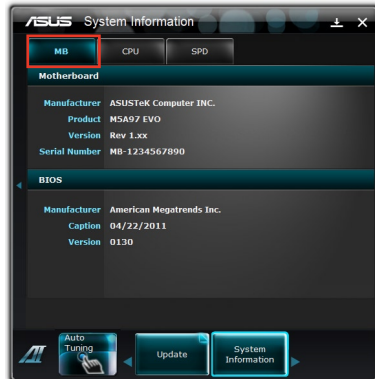
4.3.10 System Information

The System Information section displays the information about the motherboard, CPU, and memory slots.

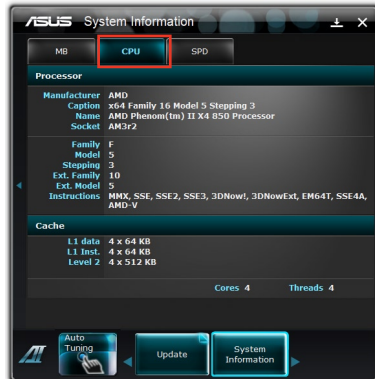
- Click the **MB** tab to see the details on the motherboard manufacturer, product name, version, and BIOS.



- Click the **CPU** tab to see the details on the processor and the Cache.



- Click the **SPD** tab and then select the memory slot to see the details on the memory module installed on the corresponding slot.



4.3.11 Audio configurations

The Realtek® audio CODEC provides 8-channel audio capability to deliver the ultimate audio experience on your computer. The software provides Jack-Detection function, S/PDIF Out support, and interrupt capability. The CODEC also includes the Realtek® proprietary UAJ® (Universal Audio Jack) technology for all audio ports, eliminating cable connection errors and giving users plug and play convenience.

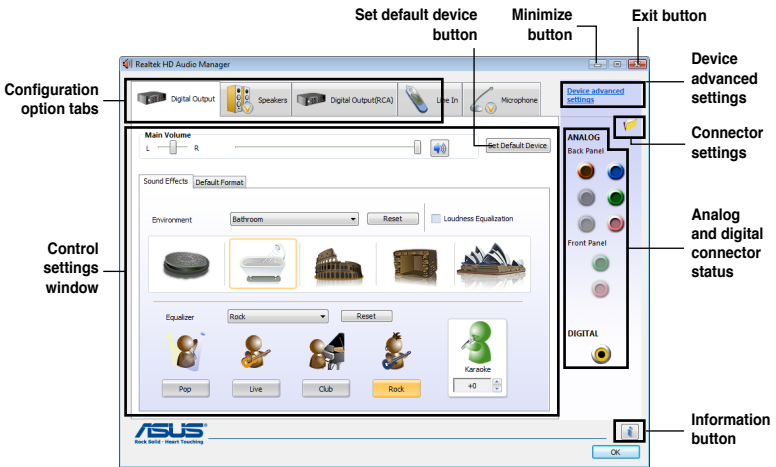
Follow the installation wizard to install the Realtek® Audio Driver from the support DVD that came with the motherboard package.

If the Realtek audio software is correctly installed, you will find the **Realtek HD Audio Manager** icon on the taskbar. Double-click on the icon to display the Realtek HD Audio Manager.



Realtek HD Audio Manager

A. Realtek HD Audio Manager for Windows® Vista™



B. Realtek HD Audio Manager for Windows XP



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

4.4 RAID configurations

The motherboard comes with the AMD® SB950 chipset that allows you to configure Serial ATA hard disk drives as RAID sets. The motherboard supports the following RAID configurations: RAID 0, RAID 1, RAID 5 and RAID 10.



- You must install Windows® XP Service Pack 3 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP3 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.

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 UEFI **Advanced Mode** and go to the **Advanced** menu > **SATA Configuration** > **SB SATA Configuration**, and then press <Enter>.
3. Set the **SATA Port** item to [RAID Mode].
4. Save your changes, and then exit the BIOS Setup.



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

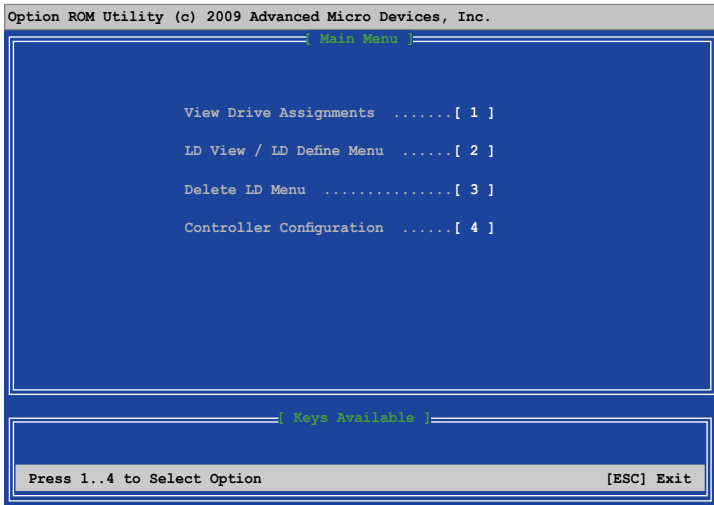


Due to chipset limitation, when set any of SATA Port1–Port4 to RAID mode, all SATA Port1–Port4 run at RAID mode together.

4.4.4 AMD® Option ROM Utility

To enter the AMD® Option ROM utility:

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



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

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

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



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

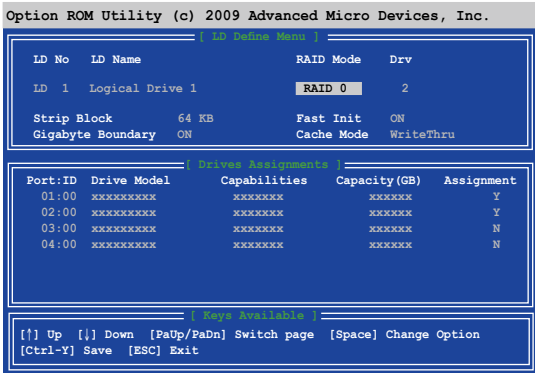


To create a RAID volume using more than four hard disk drives, ensure that the SATA connectors 5/6 are set to [RAID] mode.

Creating a RAID volume

To create a RAID volume:

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



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

```

Please press Ctrl-Y key to input the LD Name
or press any key to exit.
If you do not input any LD name, the default LD
name will be used.
  
```

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

```

Enter the LD name here:
  
```

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

```

Fast Initialization Option has been selected
It will erase the MBR data of the disks.
<Press Ctrl-Y Key if you are sure to erase it>
<Press any other key to ignore this option>
  
```

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

Deleting a RAID configuration



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

To delete a RAID volume:

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

```
Option ROM Utility (c) 2009 Advanced Micro Devices, Inc.
[ Delete LD Menu ]
LD No      RAID Mode  Drv      Capacity(GB)  Status
LD 1      RAID 0     2        xxxxxx        Functional

[ Keys Available ]
[{} Up [{} Down [PaUp/PaDn] Switch page [Del/Alt+D] Delete LD
```

3. The utility prompts the following messages:

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

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

Displaying a RAID set information

To display a RAID set information:

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

```
Option ROM Utility (c) 2009 Advanced Micro Devices, Inc.
[ View LD Definition Menu ]
LD No  LD Name      RAID Mode  Drv  Capacity(GB)
LD 1   xxxxxx      RAID 0     2    157.99
Strip Block      64 KB      Cache Mode  WriteThru

[ Drives Assignments ]
Port:ID  Drive Model  Capabilities  Capacity(GB)
01:00   xxxxxxxxxx  xxxxxxxx     xxxxxx
02:00   xxxxxxxxxx  xxxxxxxx     xxxxxx

Any Key To Continue.....
```

4.5 Creating a RAID driver disk

A floppy disk with the RAID driver is required when installing a Windows® operating system on a hard disk drive that is included in a RAID set.



- **The motherboard does not provide a floppy drive connector.** You have to use a USB floppy disk drive when creating a **SATA** RAID driver disk.
- Windows® XP may not recognize the USB floppy disk drive due to Windows® XP limitation. To work around this OS limitation, refer to section **4.5.4 Using a USB floppy disk drive**.

4.5.1 Creating a RAID driver disk without entering the OS

To create a RAID driver disk without entering the OS:

1. Boot your computer.
2. Press during POST to enter the BIOS setup utility.
3. Set the optical drive as the primary boot device.
4. Insert the support DVD into the optical drive.
5. Save changes and exit BIOS.
6. When the **Make Disk** menu appears, press <1> to create a RAID driver disk.
7. Insert a formatted floppy disk into the USB floppy disk drive, then press <Enter>.
8. Follow the succeeding screen instructions to complete the process.

4.5.2 Creating a RAID driver disk in Windows®

To create a RAID driver disk in Windows®:

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



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

4.5.3 Installing the RAID driver during Windows® OS installation

To install the RAID driver in Windows® XP:

1. During the OS installation, the system prompts you to press the F6 key to install third-party SCSI or RAID driver.
2. Press <F6>, and then insert the floppy disk with RAID driver into the USB floppy disk drive.
3. When prompted to select the SCSI adapter to install, select the RAID driver for the corresponding OS version.
4. Follow the succeeding screen instructions to complete the installation.

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

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



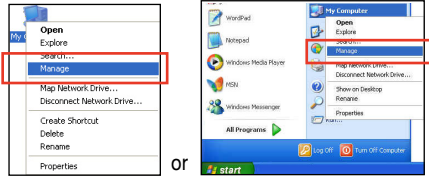
Before loading the RAID driver from a USB flash drive, you have to use another computer to copy the RAID driver from the support DVD to the USB flash drive.

4.5.4 Using a USB floppy disk drive

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

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

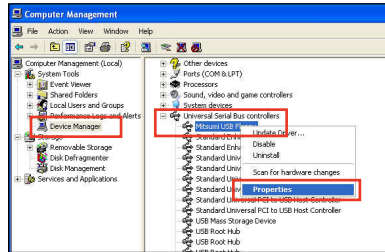
1. Using another computer, plug the USB floppy disk drive, and insert the floppy disk containing the RAID driver.
2. Right-click **My Computer** on the Windows® desktop or **start** menu, and then select **Manage** from the pop-up window.



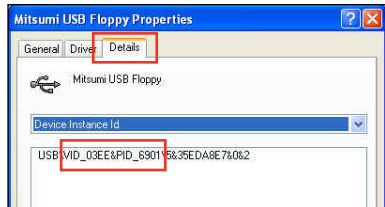
3. Select **Device Manager**. From the **Universal Serial Bus controllers**, right-click **xxxxxx USB Floppy**, and then select **Properties** from the pop-up window.



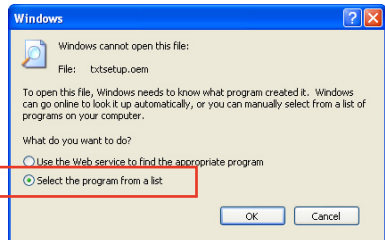
The name of the USB floppy disk drive varies with different vendors.



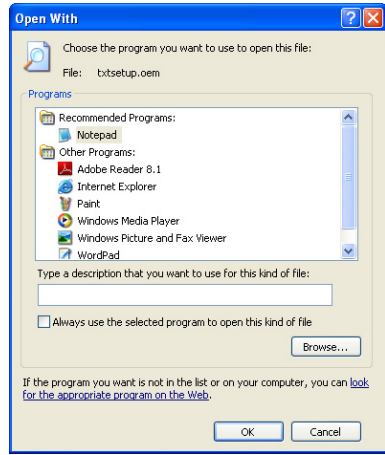
4. Click **Details** tab. The Vendor ID (VID) and Product ID (PID) are displayed.



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_DesktopWorkstationServer]` and `[HardwareIds.scsi.iaStor_DesktopWorkstationServer]` 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_DesktopWorkstationServer]
id= "PCI\VEN_8086&DEV_1C02&CC_0106", "iaStor"
id= "USB\VID_03EE&PID_6901", "usbstor"

[HardwareIds.scsi.iaStor_DesktopWorkstationServer]
id= "PCI\VEN_8086&DEV_2822&CC_0104", "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.

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

- Prepare 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 Chapter 2 for details.



-
- We recommend that you install additional chassis fans for better thermal environment.
 - Visit the [AMD ATI website](http://www.amd.com) for the latest graphics card support 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 all existing graphics card drivers:

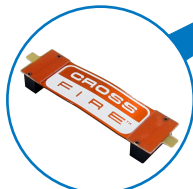
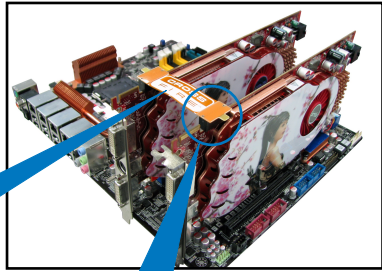
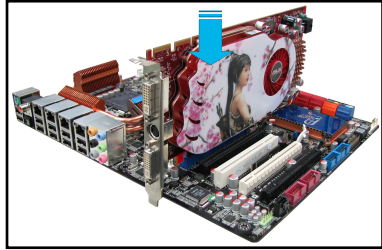
1. Close all current applications.
2. For Windows XP, go to **Control Panel > Add/Remove Programs**.
For Windows Vista, go to **Control Panel > Programs and Features**.
3. Select your current graphics card drivers.
4. For Windows XP, select **Add/Remove**.
For Windows Vista, select **Uninstall**.
5.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

5.1.3 Installing two CrossFireX™ graphics cards

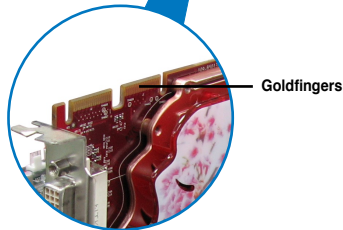


The following pictures are for reference only. The graphics cards and the motherboard layout may vary with models, but the installation steps remain the same.

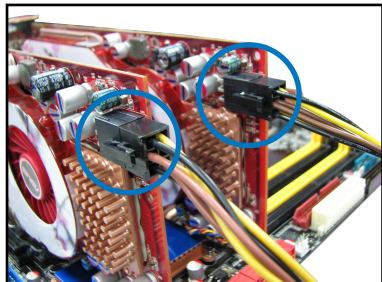
1. Prepare two CrossFireX-ready graphics cards.
2. Insert the two graphics card into the PCIEX16 slots. If your motherboard has more than two PCIEX16 slots, refer to Chapter 2 in this user manual for the locations of the PCIEX16 slots recommended for multi-graphics card installation.
3. Ensure that the cards are properly seated on the slots.
4. Align and firmly insert the CrossFireX bridge connector to the goldfingers on each graphics card. Ensure that the connector is firmly in place.



CrossFireX bridge
(bundled with
graphics cards)



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



5.1.4 Installing the device drivers

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



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

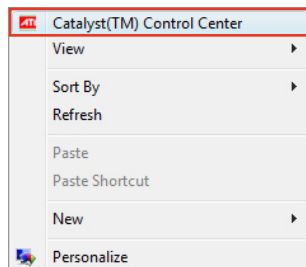
5.1.5 Enabling the ATI® CrossFireX™ technology

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

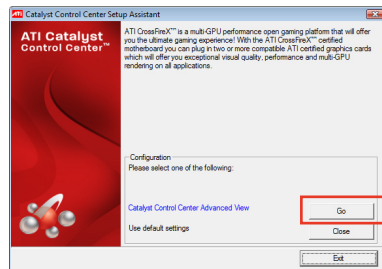
Launching the ATI Catalyst Control Center

To launch the ATI Catalyst Control Center

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

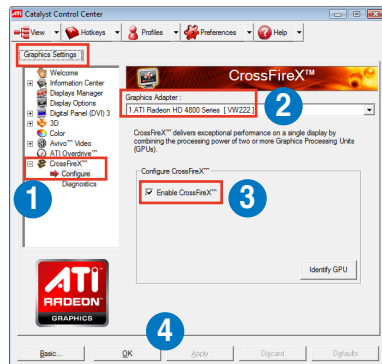


2. The **Catalyst Control Center Setup Assistant** appears when the system detects the existence of multi-graphics cards. Click **Go** to continue to the **Catalyst Control Center Advanced View** window.



Enabling CrossFireX settings

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



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.



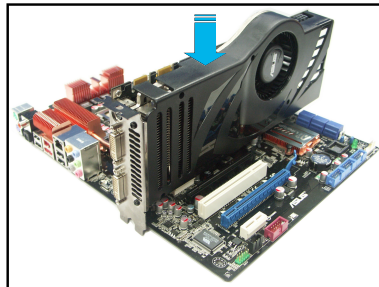
- We recommend that you install additional chassis fans for better thermal environment.
- Visit the NVIDIA zone website (<http://www.nzone.com>) for the latest certified graphics card and supported 3D application list.

5.2.2 Installing two SLI-ready graphics cards

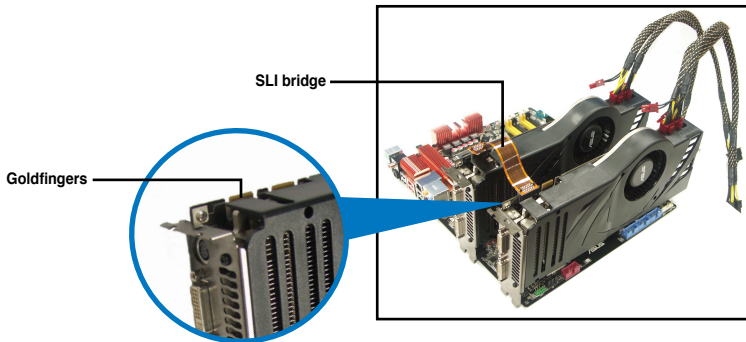


The following pictures are for reference only. The graphics cards and the motherboard layout may vary with models, but the installation steps remain the same.

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

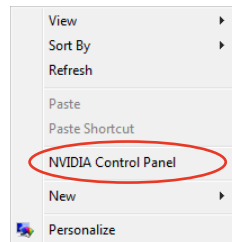
After installing your graphics cards and the device drivers, enable the SLI feature in NVIDIA® Control Panel under the Windows® Vista™ operating system.

Launching the NVIDIA Control Panel

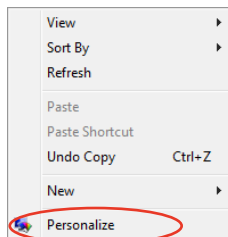
You can launch the NVIDIA Control Panel by the following two methods.

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

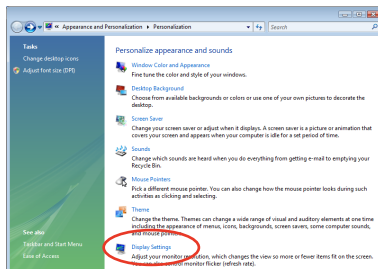
The NVIDIA Control Panel window appears (See Step B5).



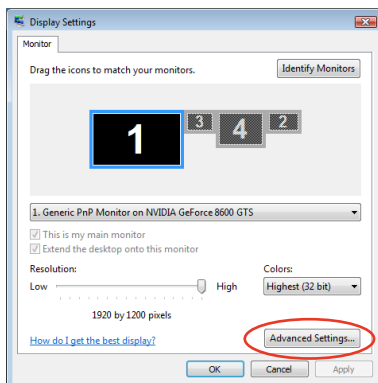
- B1. If you cannot see the NVIDIA Control Panel item in step (A), select **Personalize**.



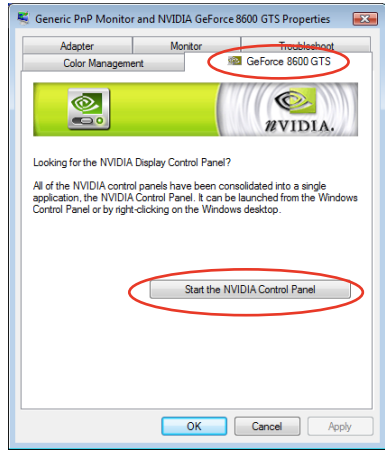
- B2. From the **Personalization** window, select **Display Settings**.



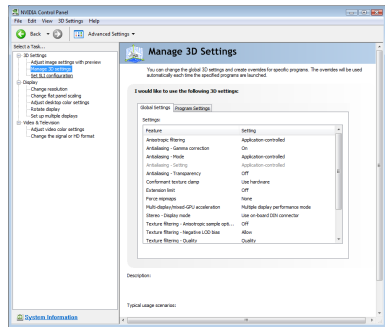
- B3. From the Display Settings dialog box, click **Advanced Settings**.



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

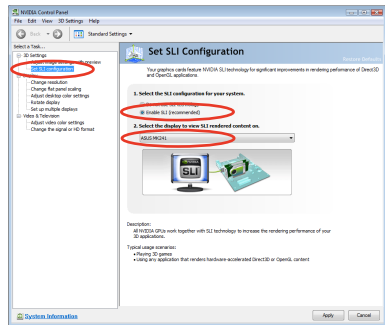


- B5. The NVIDIA Control Panel window appears.



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**.



ASUS contact information

ASUSTeK COMPUTER INC.

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

Technical Support

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

ASUS COMPUTER INTERNATIONAL (America)

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

Technical Support

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

ASUS COMPUTER GmbH (Germany and Austria)

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

Technical Support

Telephone +49-1805-010923*
Support Fax +49-2102-9599-11
Online support support.asus.com

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

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2.1077(e)



Responsible Party Name: **Asus Computer International**

Address: **800 Corporate Way, Fremont, CA 94539.**

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

hereby declares that the product

Product Name : Motherboard

Model Number : M5A99X EVO

Conforms to the following specifications:

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

Supplementary Information:

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

Representative Person's Name : **Steve Chang / President**

Signature : 
Date : **May 20, 2011**

EC Declaration of Conformity



We, the undersigned,

Manufacturer: **ASUSTeK COMPUTER, INC.**
Address, City: **No. 150, LI-TE RD., REITOU, 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**

declare the following apparatus:

Product name : **Motherboard**
Model name : **M5A99X EVO**

conform with the essential requirements of the following directives:

2004/108/EC-EMC Directive
 EN 61000-3-2:2006
 EN 55013:2001+A1:2003+A2:2006
 EN 55022:2008+A1:2007
 EN 55024:1998+A1:2001+A2:2003
 EN 61000-3-3:2008
 EN 55020:2007

1989/59/EC-R & TTE Directive

EN 300 328 V1.7.1(2006-05)
 EN 300 440-1 V1.4 (12008-05)
 EN 300 440-2 V1.4 (12008-05)
 EN 300 511 V9.0.2(2003-03)
 EN 301 888-1 V3.2.1(2007-05)
 EN 301 888-2 V3.2.1(2007-05)
 EN 301 888-17 V2.1.1(2009-05)
 EN 301 888-18 V2.1.1(2009-05)
 EN 302 542-2 V1.1.1(2009-01)
 EN 302 542-1 V1.1.1(2009-01)
 EN 50260:2001
 EN 50371:2002
 EN 50385:2002

2006/95/EC-LVD Directive

EN 60950-1:2006
 EN 60950-1:2006/A1:2009

2009/125/EC-ERP Directive

Regulation (EC) No. 1275/2008
 EN 62301:2005
 EN 62301:2005
Regulation (EC) No. 642/2009
 EN 62301:2005

CE marking



(EC conformity marking)

Ver. 10101

Position : **CEO**
Name : **Jerry Shen**



Signature : _____

Declaration Date: **May 20, 2011**
Year to begin affixing CE marking: **2011**