

**M5A88-M EVO**

**Motherboard**

**ASUS®**

E6716

Second Edition (V2)

June 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.



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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.

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## 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://csr.asus.com/english/REACH.htm>.



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**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.

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**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.

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# Safety information

## Electrical safety

- To prevent electric shock hazard, disconnect the power cable from the electric 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 that 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: BIOS information**  
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

## 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.

## 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.

## Typography

### **Bold text**

Indicates a menu or an item to select.

### *Italics*

Used to emphasize a word or a phrase.

### <Key>

Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.

Example: <Enter> means that you must press the Enter or Return key.

### <Key1>+<Key2>+<Key3>

If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

Example: <Ctrl>+<Alt>+<D>

## M5A88-M EVO specifications summary

<b>CPU</b>	<p>AMD® Socket AM3+ for AMD® FX™ / Phenom™ II / Athlon™ II / Sempron™ 100 series processors</p> <p>Supports 32nm CPU</p> <p>Supports up to 140W CPU</p> <p>AMD® Cool 'n' Quiet™ Technology</p> <p>* Refer to <a href="http://www.asus.com">www.asus.com</a> for the AMD® CPU support list</p>
<b>Chipset</b>	AMD® 880G / SB850
<b>System Bus</b>	Up to 5200MT/s; HyperTransport™ 3.0 interface
<b>Memory</b>	<p>Dual-channel memory architecture</p> <p>4 x DIMM, max. 16GB, DDR3 2000(O.C.)/1333/1066MHz, ECC, non-ECC, unbuffered memory*</p> <p>* AMD® AM3 100 and 200 series CPUs support up to DDR3 1066MHz. With ASUS design, this motherboard supports up to DDR3 1333MHz</p> <p>** AMD® FX Series CPU for this motherboard supports up to DDR3 1866MHz as its standard memory frequency.</p> <p>*** Refer to <a href="http://www.asus.com">www.asus.com</a> for the latest Memory QVL (Qualified Vendors List).</p> <p>****When you install a total memory of 4GB or more, Windows® 32-bit operating system may only recognize less than 3GB. We recommend a maximum of 3GB system memory if you are using a Windows® 32-bit operating system.</p>
<b>Integrated Memory</b>	<p>SidePort Memory:</p> <p>Onboard 128MB DDR3 1333 memory</p>
<b>Graphics</b>	<p>Integrated ATI Radeon™ HD 4250 GPU</p> <p>Dual independent displays support:</p> <ul style="list-style-type: none"> <li>• HDMI and D-Sub</li> <li>• DVI and D-Sub</li> </ul> <p>Supports HDMI™ with max. resolution up to 1920x1200p</p> <p>Supports Dual-link DVI with max. resolution up to 2560x1600 @60Hz</p> <p>Supports D-Sub with max. resolution up to 2048x1536 @85Hz</p> <p>Supports Microsoft® DirectX 10.1, OpenGL 2.0, and Shader Model 4.1, Universal Video Decoder (UVD) 2.0</p> <p>Hardware Decode Acceleration for H.264, VC-1, and MPEG-2</p> <p>Maximum shared memory of 1GB</p> <p>Hybrid CrossFireX™ support*</p> <p>* Refer to <a href="http://www.amd.com">www.amd.com</a> for the discrete GPUs which support Hybrid CrossFireX™.</p> <p>** Please use Windows Vista or above OS for Blu-ray Playback.</p>
<b>Expansion slots</b>	<p>1 x PCI Express 2.0 x16 slot</p> <p>2 x PCI Express 2.0 x1 slots</p> <p>1 x PCI slot</p>
<b>Storage / RAID</b>	<p>AMD® SB850 southbridge:</p> <ul style="list-style-type: none"> <li>- 5 x Serial ATA 6Gb/s connectors support RAID 0, RAID 1, RAID 5, RAID 10 and JBOD configurations</li> <li>- 1 x eSATA port (6Gb/s ready)</li> </ul>
<b>LAN</b>	Realtek® 8111E Gigabit LAN controller

(continued on the next page)

## M5A88-M EVO specifications summary

<b>Audio</b>	Realtek® ALC892 8-channel* High Definition Audio CODEC <ul style="list-style-type: none"> <li>- BD Audio Layer Content Protection</li> <li>- Supports 192khz/24bit True BD Lossless Sound</li> <li>- Supports Jack-Retasking, Multi-streaming, and Front Panel Jack-Retasking</li> <li>- ASUS Noise Filter</li> <li>- Optical S/PDIF Out port at back I/O</li> </ul>
<b>USB</b>	12 USB 2.0/1.1 ports (8 ports at the mid-board, 4 ports at the back panel) 2 USB 3.0/2.0 ports (blue, at back panel)
<b>ASUS unique features</b>	<p><b>ASUS Dual Intelligent Processors - TPU &amp; EPU</b></p> <ul style="list-style-type: none"> <li>- Turbo Unlocker, TurboV, Auto Tuning, CPU Level UP, GPU Boost and TPU Switch</li> </ul> <p><b>ASUS Hybrid Switches</b></p> <ul style="list-style-type: none"> <li>- Core Unlocker</li> </ul> <p><b>ASUS Exclusive Features</b></p> <ul style="list-style-type: none"> <li>- MemOK!</li> <li>- ASUS Anti-Surge Protection</li> </ul> <p><b>ASUS Power Solutions</b></p> <ul style="list-style-type: none"> <li>- 4+1 Phase Power Design</li> </ul> <p><b>ASUS Quiet Thermal Solutions</b></p> <ul style="list-style-type: none"> <li>- ASUS Fanless Design, stylish heat sink solution</li> <li>- ASUS Fan Xpert</li> </ul> <p><b>ASUS EZ DIY</b></p> <ul style="list-style-type: none"> <li>- ASUS O.C. Profile</li> <li>- ASUS CrashFree BIOS 3</li> <li>- ASUS EZ Flash 2</li> <li>- ASUS MyLogo 2™</li> </ul>
<b>ASUS exclusive overclocking features</b>	<p><b>Intelligent overclocking tools:</b></p> <ul style="list-style-type: none"> <li>- TPU Switch</li> <li>- GPU Boost</li> <li>- Auto Tuning</li> </ul> <p><b>Precision Tweaker 2</b></p> <ul style="list-style-type: none"> <li>- vCore: Adjustable CPU voltage at 0.003125V increment</li> <li>- vChipset (NB): Adjustable chipset voltage at 0.01V increment</li> <li>- vDIMM: Adjustable DRAM voltage at 0.01V increment</li> </ul> <p><b>SFS (Stepless Frequency Selection):</b></p> <ul style="list-style-type: none"> <li>- HT frequency tuning from 100MHz up to 550MHz at 1MHz increment</li> <li>- PCIe frequency tuning from 100MHz up to 150MHz at 1MHz increment</li> </ul> <p><b>Overclocking protection:</b></p> <ul style="list-style-type: none"> <li>- ASUS C.P.R. (CPU Parameter Recall)</li> </ul>

(continued on the next page)

## M5A88-M EVO specifications summary

<b>Back panel I/O ports</b>	<ul style="list-style-type: none"> <li>1 x PS/2 Keyboard / Mouse combo port</li> <li>1 x Optical S/PDIF out port</li> <li>1 x HDMI port</li> <li>1 x DVI port</li> <li>1 x D-Sub port</li> <li>1 x eSATA port</li> <li>1 x LAN (RJ-45) port</li> <li>2 x USB 3.0/2.0 ports</li> <li>4 x USB 2.0/1.1 ports</li> <li>8-Channel Audio I/O ports</li> </ul>
<b>Internal connectors</b>	<ul style="list-style-type: none"> <li>1 x Core Unlocker switch</li> <li>1 x TPU switch</li> <li>1 x MemOK! button</li> <li>4 x USB 2.0/1.1 connectors support additional 8 USB 2.0/1.1 ports</li> <li>1 x COM connector</li> <li>5 x Serial ATA 6Gb/s connectors</li> <li>1 x System panel connector</li> <li>1 x LPT connector</li> <li>1 x CPU fan connector</li> <li>1 x Chassis fan connector</li> <li>1 x Power fan connector</li> <li>1 x Front panel audio connector</li> <li>1 x S/PDIF out connector</li> <li>1 x 24-pin EATX power connector</li> <li>1 x 4-pin ATX 12V power connector</li> </ul>
<b>BIOS</b>	16Mb Flash ROM, AMI BIOS, PnP, DMI 2.0, WfM 2.0, ACPI 2.0a, SM BIOS 2.5, ASUS EZ Flash 2, ASUS CrashFree BIOS 3
<b>Manageability</b>	WOL by PME, WOR by PME, WOR by Ring, PXE
<b>Accessories</b>	<ul style="list-style-type: none"> <li>1 x Driver DVD</li> <li>2 x Serial ATA 6Gb/s cables</li> <li>1 x I/O shield</li> <li>1 x User Manual</li> </ul>
<b>Support DVD</b>	<ul style="list-style-type: none"> <li>Drivers</li> <li>ASUS PC Probe II</li> <li>ASUS OverDrive utilities (AOD)</li> <li>ASUS Update</li> <li>Anti-Virus software (OEM version)</li> </ul>
<b>Form factor</b>	uATX form factor: 9.6 in x 9.6 in (24.4 cm x 24.4 cm)

\* Specifications are subject to change without notice.



# Chapter 1

## Product introduction

### 1.1 Welcome!

Thank you for buying an ASUS® M5A88-M 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.

Motherboard	ASUS M5A88-M EVO motherboard
Cables	2 x Serial ATA 6Gb/s cables
Accessories	1 x I/O shield
Application DVD	ASUS motherboard Support DVD
Documentations	User Manual



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

### 1.3 Special features

#### 1.3.1 Product highlights



#### AMD® FX™ / Phenom™ II / Athlon™ II / Sempron™ 100 series CPU support

This motherboard supports AMD® Socket AM3+ multi-core processors with unique L3 cache and delivers better overclocking capabilities with less power consumption. It features dual-channel DDR3 1866 MHz 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® 880G Chipset

The AMD® 880G 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+ / AM3 multi-core CPUs to provide excellent system performance and overclocking capabilities.



### DDR3 2000 (O.C.)/1333/1066 support

This motherboard supports DDR3 memory that features data transfer rates of 2000 (O.C.)/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.



### DVI support

DVI (Digital Visual Interface) provides high visual quality for digital display devices such as LCD monitors. The interface of this motherboard supports dual display output on both HDMI/DVI-D and D-Sub.



### HDMI support

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



### 8-channel high definition audio

The onboard 8-channel HD audio (High Definition Audio, previously codenamed Azalia) CODEC enables high-quality 192KHz/24-bit audio output and jack-detect feature that automatically detects and identifies what types of peripherals are plugged into the audio I/O jacks and notifies users of inappropriate connection, which means there will be no more confusion of Line-in, Line-out, and Mic jacks.



### True Serial ATA 6Gb/s support

ASUS provides extra SATA 6.0 Gb/s ports with enhanced scalability, faster data retrieval, and double the bandwidth of current bus systems.



### S/PDIF out connector at the back panel

This motherboard provides convenient connectivity to external home theater audio systems via the optical S/PDIF (SONY-PHILIPS Digital Interface) out connector at the back panel. The S/PDIF transfers digital audio without converting it to analog format and keeps the best signal quality.



### PCI Express 2.0 support

This motherboard supports PCI Express 2.0 devices for double speed and bandwidth which enhances system performance.



### 100% All High-quality Conductive Polymer Capacitors

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



### Hybrid CrossFireX™ support

ATI Hybrid CrossFireX™ technology greatly boosts graphics performance with an onboard GPU and a discrete graphics GPU.



- 
- Hybrid CrossFireX™ is supported by Windows® 7/Vista OS only.
  - Refer to [www.amd.com](http://www.amd.com) for the discrete GPUs which support Hybrid CrossFireX™.
- 

## 1.3.2 Innovative ASUS features



### ASUS TurboV

Feel the adrenaline rush of real-time OC-now a reality with the ASUS TurboV. This easy OC tool allows you to overclock without exiting or rebooting the OS; and its user-friendly interface makes overclock with just a few clicks away. Moreover, the ASUS OC profiles in TurboV provides the best O.C. settings in different scenarios.



### Auto Tuning

Auto Tuning is an intelligent tool that automates overclocking to achieve a total system level up.



### Core Unlocker

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



### GPU Boost

GPU Boost overclocks the integrated GPU in real time for the best graphics performance. User-friendly UI facilitates flexible frequency and voltage adjustments. Its ability to deliver multiple overclocking profiles also provides rapid and stable system-level upgrades.



### ASUS Anti-Surge Protection

This special design protects expensive devices and the motherboard from damage caused by power surges from switching power supply unit (PSU).



### MemOK!

MemOK! quickly ensures memory boot compatibility. This remarkable memory rescue tool requires a mere push of the button to patch memory issues. MemOK! determines failsafe settings and dramatically improves your system boot success. Get your system up and running in no time.



### Fan Xpert

ASUS Fan Xpert intelligently allows you to adjust 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.



### 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.



### ASUS CrashFree BIOS 3

ASUS CrashFree BIOS 3 is an auto-recovery tool that allows you to restore a corrupted BIOS file using the bundled support DVD or a USB flash disk that contains the BIOS file.



### ASUS O.C. Profile

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



### ASUS MyLogo2™

This feature allows you to convert your favorite photo into a 256-color boot logo for a more colorful and vivid image on your screen. .



### C.P.R. (CPU Parameter Recall)

The BIOS C.P.R. feature automatically restores the CPU default settings when the system hangs due to overclocking failure. C.P.R. eliminates the need to open the system chassis and clear the RTC data. Simply shut down and reboot the system, and the BIOS automatically restores the CPU parameters to their default settings.



### ErP ready

The motherboard is European Union's Energy-related Products (ErP) ready, and ErP requires products to meet certain energy efficiency requirements 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.

## 1.4 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, switch off the ATX power supply and detach its power cord. Failure to do so may cause severe damage to the motherboard, peripherals, or components.
-

## 1.5 Motherboard overview

### 1.5.1 Placement direction

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

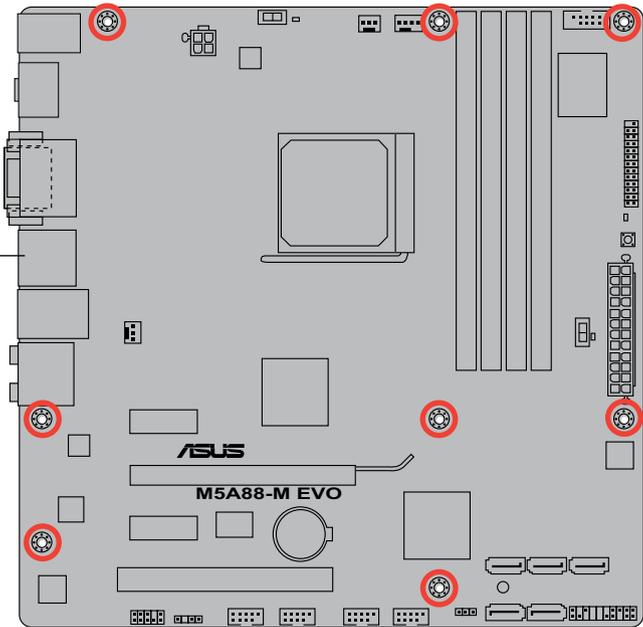
### 1.5.2 Screw holes

Place eight screws into the holes indicated by circles to secure the motherboard to the chassis.

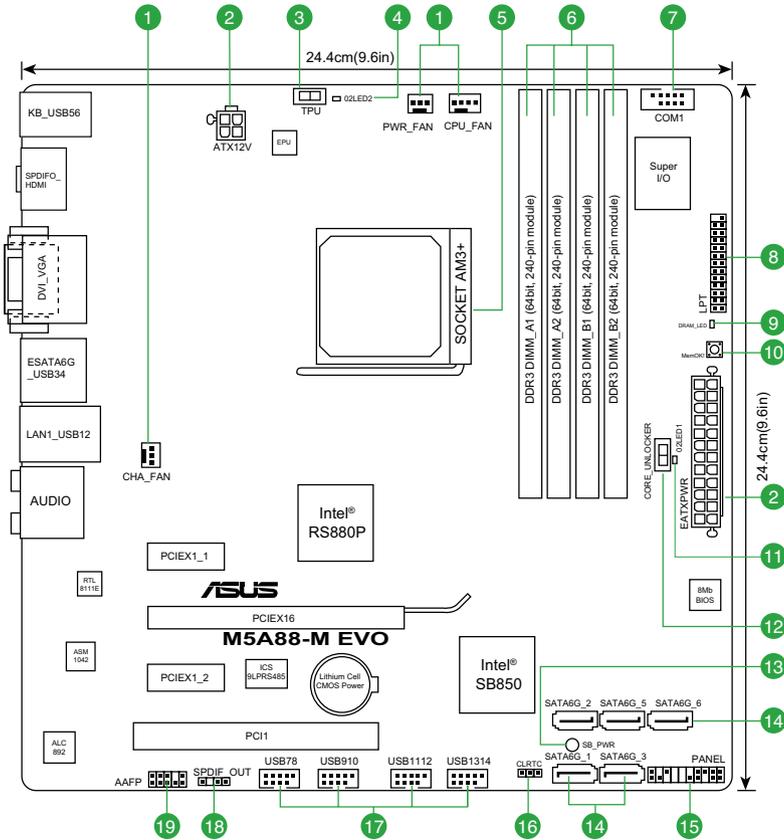


DO NOT overtighten the screws! Doing so can damage the motherboard.

Place this side towards the rear of the chassis.



## 1.5.3 Motherboard layout



## 1.5.4 Layout contents

Connectors/Jumpers/Slots/LED	Page	Connectors/Jumpers/Slots/LED	Page
1. CPU, chassis, and power fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN, 3-pin PWR_FAN)	1-23	11. Core Unlocker LED (O2LED1)	1-29
2. ATX power connectors (24-pin EATXPWR, 4-pin ATX12V)	1-24	12. Core Unlocker Switch	1-31
3. TPU switch	1-31	13. Standby power LED (SB_PWR)	1-28
4. TPU LED (O2LED2)	1-28	14. AMD® SB850 Serial ATA 6.0 Gb/s connectors (7-pin SATA1, SATA2, SATA3, SATA5, SATA6)	1-25
5. AM3+ CPU socket	1-8	15. System panel connector (20-8 pin PANEL)	1-26
6. DDR3 DIMM slots	1-11	16. Clear RTC RAM (3-pin CLRRTC)	1-19
7. Serial port connector (10-1 pin COM1)	1-23	17. USB connectors (10-1 pin USB78, USB910, USB1112, USB1314)	1-27
8. LPT connector (26-1 pin LPT)	1-24	18. Digital audio connector (4-1 pin SPDIF_OUT)	1-25
9. DRAM LED (DRAM_LED)	1-29	19. Front panel audio connector (10-1 pin AAFP)	1-27
10. MemOK! switch	1-30		

## 1.6 Central Processing Unit (CPU)

This motherboard comes with an AM3+ socket designed for FX™ / Phenom™ II / Athlon™ II / Sempron™ 100 series processors.

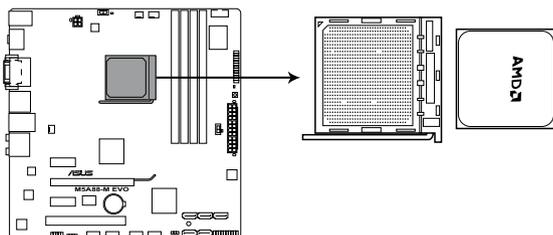


The AM3+ socket has a different pinout from the AM2+/AM2 socket. Ensure that you use a CPU designed for the AM3+ socket. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the pins and damaging the CPU!

### 1.6.1 Installing the CPU

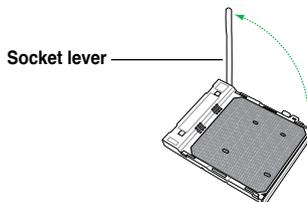
To install a CPU:

1. Locate the CPU socket on the motherboard.



**M5A88-M EVO CPU socket AM3+**

2. Press the lever sideways to unlock the socket, then lift it up to a 90°-100° angle.

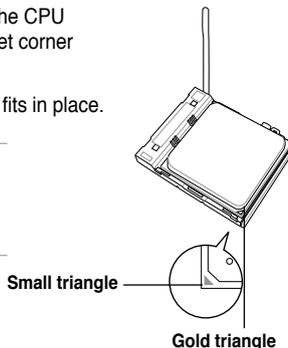


Ensure that the socket lever is lifted up to a 90°-100° angle; otherwise, the CPU will not fit in completely.

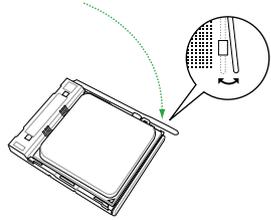
3. Position the CPU above the socket such that the CPU corner with the gold triangle matches the socket corner with a small triangle.
4. Carefully insert the CPU into the socket until it fits in place.



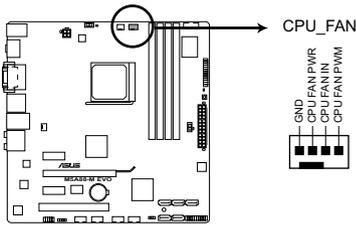
The CPU fits only in one correct orientation. DO NOT force the CPU into the socket to prevent bending the pins and damaging the CPU!



- When the CPU is in place, push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.
- Install a CPU heatsink and fan following the instructions that comes with the heatsink package. You can also refer to section **1.6.2 Installing heatsink and fan** for instructions.



- Connect the CPU fan cable to the CPU\_FAN connector on the motherboard.



**M5A88-M EVO CPU fan connector**



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

## 1.6.2 Installing the heatsink and fan



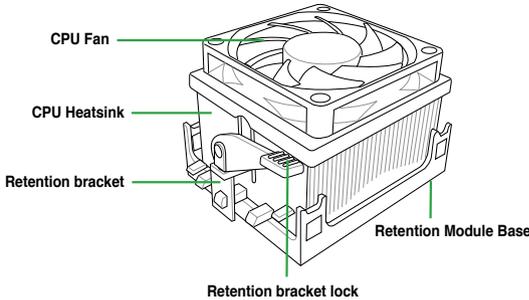
Ensure that you use only AMD-certified heatsink and fan assembly.

To install the CPU heatsink and fan:

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

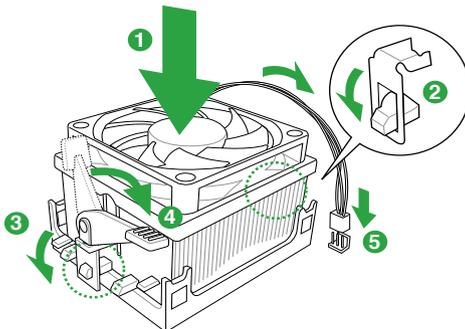


- The retention module base is already installed on the motherboard upon purchase.
- You do not have to remove the retention module base when installing the CPU or installing other motherboard components.
- If you purchased a separate CPU heatsink and fan assembly, ensure that a Thermal Interface Material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



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

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



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



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

- Push down the retention bracket lock on the retention mechanism to secure the heatsink and fan to the module base.
- When the fan and heatsink assembly is in place, connect the CPU fan cable to the connector on the motherboard labeled CPU\_FAN.

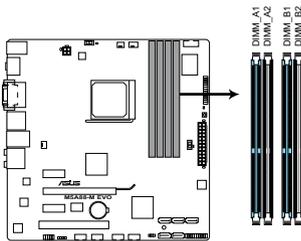


DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

## 1.7 System memory

### 1.7.1 Overview

This motherboard comes with four Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets. A DDR3 module has the same physical dimensions as a DDR2 DIMM but is notched differently to prevent installation on a DDR2 DIMM socket. DDR3 modules are developed for better performance with less power consumption. The figure illustrates the location of the DDR3 DIMM sockets:



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

**M5A88-M EVO 240-pin DDR3 DIMM sockets**

## 1.7.2 Memory configurations

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



- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- We recommend that you install the memory modules from the blue slots for better overclocking capability.
- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.
- Due to CPU specification, AMD® 100 and 200 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 MHz 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:
  - Install a maximum of 3GB system memory if you are using a 32-bit Windows® OS.
  - Use a 64-bit Windows® OS if you want to install 4GB or more memory on the motherboard.
- This motherboard does not support DIMMs made up of 256 megabits (Mb) chips or less.



- 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 2.4 **Ai Tweaker menu** for manual memory frequency adjustment.
- For system stability, use a more efficient memory cooling system to support a full memory load (2 DIMMs) or overclocking condition.

## M5A88-M EVO Motherboard Qualified Vendors Lists (QVL)

### DDR3-2000(O.C.)MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
Apacer	78.AAGD5.9KD(XMP)	6GB (3 x 2GB)	DS	-	-	9-9-9-27	1.65V	*		
G.SKILL	F3-16000CL9D-4GBFLS(XMP)	4GB (2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*		
G.SKILL	F3-16000CL9D-4GBTD(XMP)	4GB (2 x 2GB)	DS	-	-	9-9-9-27	1.65V	*		
G.SKILL	F3-16000CL6T-6GBPIS(XMP)	6GB (3x 2GB)	DS	-	-	6-9-6-24	1.65V	*		
KINGSTON	KHX2000C9AD3T1K2/4GX(XMP)	4GB ( 2x 2GB )	DS	-	-	-	1.65V	*		
KINGSTON	KHX2000C9AD3W1K2/4GX(XMP)	4GB ( 2x 2GB )	DS	-	-	-	1.65V	*		
Kingston	KHX2000C9AD3T1K3/6GX(XMP)	4GB (2 x 2GB)	DS	-	-	9	1.65V	*		
KINGSTON	KHX2000C9AD3W1K3/6GX(XMP)	6GB ( 3x 2GB )	DS	-	-	-	1.65V	*		
KINGSTON	KHX2000C9AD3T1K3/6GX(XMP)	6GB (3x 2GB)	DS	-	-	-	1.65V	*		
OCZ	OCZ3XTEP2000C9L4V4K	4GB (2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*		
PATRIOT	PVT36G2000LLK	6GB (3 x 2GB)	DS	-	-	8-8-8-24	1.65V	*		

## DDR3-1866MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
A-Data	AX3U1866PB2G8-DP2(XMP)	2GB	DS	-	-	8-8-8-24	1.55V-1.75V	*	*	*
CORSAIR	CMT4GX3M2A1866C9(XMP)	4GB (2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	CMT6GX3MA1866C9(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
KINGSTON	KHX1866C9D3T1K3/3GX(XMP)	3GB(3 x 1GB)	SS	-	-	-	1.65V	*	*	*
KINGSTON	KHX1866C9D3T1K3/6GX(XMP)	6GB(3 x 2GB)	DS	-	-	-	1.65V	*	*	*
OCZ	OCZ3P1866C9LV6GK	6GB(3 x 2GB)	DS	-	-	9-9-9-28	1.65V	*	*	*

## DDR3-1600MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
A-Data	AD31600E001GM(O)U3K	3GB(3 x 1GB)	SS	-	-	8-8-8-24	1.65V-1.85V	*	*	*
CORSAIR	TR3X3G1600C8D(XMP)	3GB(3 x 1GB)	SS	-	-	8-8-8-24	1.65V	*	*	*
CORSAIR	CMP4GX3M2A1600C8(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
CORSAIR	CMT4GX3M2A1600C8(XMP)	4GB(2 x 2GB)	DS	-	-	6-6-6-20	1.65V	*	*	*
CORSAIR	CMT4GX3M2A1600C7(XMP)	4GB(2 x 2GB)	DS	-	-	7-7-7-20	1.65V	*	*	*
CORSAIR	CMX4GX3M2A1600C9(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	CMX4GX3M2A1600C9(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	TR3X6G1600C8 G(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
CORSAIR	TR3X6G1600C8D G(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
CORSAIR	TR3X6G1600C9 G(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	CMX8GX3M4A1600C9(XMP)	8GB(4 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
Crucial	BL25664BN1608.16FF(XMP)	6GB(3 x 2GB)	DS	-	-	-	-	*	*	*
G.SKILL	F3-12800CL9D-2GBNQ(XMP)	2GB(2 x 1GB)	SS	-	-	9-9-9-24	1.5V~1.6V	*	*	*
G.SKILL	F3-12800CL7D-4GBRH(XMP)	4GB(2 x 2GB)	SS	-	-	7-7-7-24	1.6V	*	*	*
G.SKILL	F3-12800CL7D-4GBECO(XMP)	4GB(2 x 2GB)	DS	-	-	7-7-8-24	XMP 1.35V	*	*	*
G.SKILL	F3-12800CL7D-4GBRM(XMP)	4GB(2 x 2GB)	DS	-	-	7-8-7-24	1.6V	*	*	*
G.SKILL	F3-12800CL8D-4GBRM(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.60V	*	*	*
G.SKILL	F3-12800CL9D-4GBECO(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	XMP 1.35V	*	*	*
G.SKILL	F3-12800CL9D-4GBRL(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.5V	*	*	*
G.SKILL	F3-12800CL9T-6GBNQ(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.5V~1.6V	*	*	*
G.SKILL	F3-12800CL7D-8GBRH(XMP)	8GB(2 x 4GB)	DS	-	-	7-8-7-24	1.6V	*	*	*
G.SKILL	F3-12800CL8D-8GBECO(XMP)	8GB(2 x 4GB)	DS	-	-	8-8-8-24	XMP 1.35V	*	*	*
G.SKILL	F3-12800CL9D-8GBRL(XMP)	8GB(2 x 4GB)	DS	-	-	9-9-9-24	1.5V	*	*	*
GEIL	GET316GB1600C9QC(XMP)	16GB ( 4x 4GB )	DS	-	-	9-9-9-28	1.6V	*	*	*
GEIL	GV34GB1600C8DC(XMP)	2GB	DS	-	-	8-8-8-28	1.6V	*	*	*
Kingmax	FLGD45F-B8MF7 MAEH(XMP)	1GB	SS	-	-	7	-	*	*	*
KINGMAX	FLGE85F-B8KJ9A FEIS(XMP)	2GB	DS	-	-	-	-	*	*	*
Kingmax	FLGE85F-B8MF7 MEEH(XMP)	2GB	DS	-	-	7	-	*	*	*
KINGSTON	KHX1600C9D3K3/12GX(XMP)	12GB(3x4GB)	DS	-	-	9-9-9-27	1.65V	*	*	*
KINGSTON	KVR1600D3N11/2G-ES	2GB	DS	KTC	D1288 JPNPD LD9U	11-11-11-28	1.35V-1.5V	*	*	*
KINGSTON	KHX1600C7D3K2/4GX(XMP)	4GB ( 2x 2GB )	DS	-	-	-	1.65V	*	*	*
Kingston	KHX1600C8D3K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	8	1.65V	*	*	*
Kingston	KHX1600C8D3T1K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	8	1.65V	*	*	*
Kingston	KHX1600C9D3K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	9	1.65V	*	*	*
Kingston	KHX1600C9D3L2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	9	XMP 1.35V	*	*	*
KINGSTON	KHX1600C9D3X2K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-27	1.65V	*	*	*
KINGSTON	KHX1600C9D3T1K3/6GX(XMP)	6GB ( 3x 2GB )	DS	-	-	-	1.65V	*	*	*
Kingston	KHX1600C9D3K3/6GX(XMP)	6GB(3 x 2GB)	DS	-	-	9	1.65V	*	*	*
OCZ	OCZ3G1600LV3GK	3GB(3 x 1GB)	SS	-	-	8-8-8-24	1.65V	*	*	*
OCZ	OCZ3G16004GK	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.7V	*	*	*
OCZ	OCZ3G1600LV4GK	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
OCZ	OCZ3OB1600LV4GK	4GB(2 x 2GB)	DS	-	-	-	1.65V	*	*	*
OCZ	OCZ3P1600LV4GK	4GB(2 x 2GB)	DS	-	-	7-7-7-24	1.65V	*	*	*
OCZ	OCZ3G1600LV6GK	6GB(3 x 2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
Super Talent	WA1600UX6G9	6GB(3 x 2GB)	DS	-	-	9	-	*	*	*

## DDR3-1333MHz capability

Vendors	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
A-Data	AD31333001GOU	1GB	SS	A-Data	AD30908C8D-151C E0906	-	-	*	*	*
A-Data	AD31333G001GOU	3GB(3 x 1GB)	SS	-	-	8-8-8-24	1.65-1.85V	*	*	*
A-Data	AD31333002GOU	2GB	DS	A-Data	AD30908C8D-151C E0903	-	-	*	*	*
A-Data	AD31333G002GMU	2GB	DS	-	-	8-8-8-24	1.65-1.85V	*	*	*
Apacer	78.A1GC6.9L1	2GB	DS	APACER	AM5D5808DEWSBG	-	-	*	*	*
Apacer	78.A1GC6.9L1	2GB	DS	Apacer	AM5D5808FEQSBG	9	-	*	*	*
CORSAIR	CM3X1024-1333C9	1GB	SS	-	-	9-9-9-24	1.60V	*	*	*
CORSAIR	TWIN3X2048-1333C9D HX G	2GB(2 x 1GB)	SS	-	-	9-9-9-24	1.50V	*	*	*
CORSAIR	TR3X3G1333C9 G	3GB(3 x 1GB)	SS	-	-	9-9-9-24	1.50V	*	*	*
CORSAIR	TR3X3G1333C9 G	3GB(3 x 1GB)	SS	-	-	9-9-9-24	1.50V	*	*	*
CORSAIR	CMD24GX3M6A1333C9 (XMP)	24GB (6x4GB)	DS	-	-	9-9-9-24	1.60V	*	*	*
CORSAIR	TW3X4G1333C9D G	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.50V	*	*	*
CORSAIR	TW3X4G1333C9DHX G	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.50V	*	*	*
CORSAIR	CMX8GX3M4A1333C9	8GB(4 x 2GB)	DS	-	-	9-9-9-24	1.50V	*	*	*
Crucial	CT12864BA1339.8FF	1GB	SS	Micron	9FF22D9KPT	9	-	*	*	*
Crucial	CT12872BA1339.9FF	1GB	SS	Micron	91F22D9KPT(ECC)	9	-	*	*	*
Crucial	CT25664BA1339.16FF	2GB	DS	Micron	9KF27D9KPT	9	-	*	*	*
Crucial	CT25672BA1339.18FF	2GB	DS	Micron	91F22D9KPT(ECC)	9	-	*	*	*
Crucial	BL25664BN1337.16FF (XMP)	6GB(3 x 2GB)	DS	-	-	7-7-7-24	1.65V	*	*	*
ELPIDA	EBJ10UE8EFD0-DJ-F	1GB	SS	ELPIDA	J1108EDSE-DJ-F	-	1.35V(low voltage)	*	*	*
ELPIDA	EBJ21UE8EFD0-DJ-F	2GB	DS	ELPIDA	J1108EDSE-DJ-F	-	1.35V(low voltage)	*	*	*
G.SKILL	F3-10600CL8D-2GBHK(XMP)	1GB	SS	G.SKILL	-	-	-	*	*	*
G.SKILL	F3-10666CL7T-3GBPK(XMP)	3GB(3 x 1GB)	SS	-	-	7-7-7-18	1.5-1.6V	*	*	*
G.SKILL	F3-10666CL8D-4GBECO(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-24	XMP 1.35V	*	*	*
G.SKILL	F3-10666CL7T-6GBPK(XMP)	6GB(3 x 2GB)	DS	-	-	7-7-7-18	1.5-1.6V	*	*	*
G.SKILL	F3-10666CL7D-8GBRH(XMP)	8GB(2 x 4GB)	DS	-	-	7-7-7-21	1.5V	*	*	*
GEIL	GET316GB1333C9QC	16GB ( 4x 4GB )	DS	-	-	9-9-9-24	1.5V	*	*	*
GEIL	GV32GB1333C9DC	2GB(2 x 1GB)	DS	-	-	9-9-9-24	1.5V	*	*	*
GEIL	GV34GB1333C9DC	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.5V	*	*	*
Hynix	HMT112U6TFR8A-H9	1GB	SS	HYNIX	H5TC1G83TFRH9A	-	1.35V(low voltage)	*	*	*
HYNIX	HMT325U6BFR8C-H9	2GB	SS	HYNIX	H5TQ2G83BFRH9C	-	-	*	*	*
Hynix	HMT125U6TFR8A-H9	2GB	DS	HYNIX	H5TC1G83TFRH9A	-	1.35V(low voltage)	*	*	*
HYNIX	HMT351U6BFR8C-H9	4GB	DS	HYNIX	H5TQ2G83BFRH9C	-	-	*	*	*
KINGMAX	FLFD45F-B8KL9 NAES	1GB	SS	KINGMAX	KKB8FNWBFGNX-27A	-	-	*	*	*
KINGMAX	FLFE85F-C8KF9 CAES	2GB	SS	KINGMAX	KFC8FMFXF-DXX-15A	-	-	*	*	*
KINGMAX	FLFE85F-C8KM9 NAES	2GB	SS	KINGMAX	KFC8FNMXF-BXX-15A	-	-	*	*	*
KINGMAX	FLFE85F-B8KL9 NEES	2GB	DS	KINGMAX	KKB8FNWBFGNX-26A	-	-	*	*	*
KINGMAX	FLFF65F-C8KM9 NEES	4GB	DS	KINGMAX	KFC8FNMXF-BXX-15A	-	-	*	*	*
Kingston	KVR1333D3N9/1G	1GB	SS	ELPIDA	J1108BDBG-DJ-F	9	1.5V	*	*	*
KINGSTON	KVR1333D3N9/2G(矮版)	2GB	SS	HYNIX	H5TQ2G83AFRH9C	9	-	*	*	*
KINGSTON	KVR1333D3N9/2G(矮版)	2GB	DS	ELPIDA	J1108BDBG-DJ-F	9	1.5V	*	*	*
Kingston	KVR1333D3N9/2G	2GB	DS	KTC	D1288JPNPDL9UJ	9	1.5V	*	*	*
Kingston	KVR1333D3N9/2G	2GB	DS	ELPIDA	J1108BDBE-DJ-F	9	1.5V	*	*	*
Kingston	KHX1333C7D3K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	7	1.65V	*	*	*
Kingston	KHX1333C9D3UK2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	9	XMP 1.25V	*	*	*

(continued on the next page)

## DDR3-1333MHz capability

Vendors	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMM	4 DIMM
KINGSTON	KVR1333D3N9/4G(矮版)	4GB	DS	HYNIX	H5TQ2G83AFRH9C	9	1.5V	*	*	*
KINGSTON	KVR1333D3N9/4G	4GB	DS	Hynix	H5TQ2G83AFR	-	-	*	*	*
MICRON	MT4JTF12864AZ-1G4D1	1GB	SS	MICRON	QJ12D9LGG	-	-	*	*	*
Micron	MT8JTF12864AZ-1G4F1	1GB	SS	Micron	9FF22D9KPT	9	-	*	*	*
Micron	MT9JSF12872AZ-1G4F1	1GB	SS	Micron	91F22D9KPT(ECC)	9	-	*	*	*
MICRON	MT8JTF25664AZ-1G4D1	2GB	SS	MICRON	QJ12D9LGG	-	-	*	*	*
Micron	MT16JTF25664AZ-1G4F1	2GB	DS	Micron	9KF27D9KPT	9	-	*	*	*
Micron	MT18JSF25672AZ-1G4F1	2GB	DS	Micron	91F22D9KPT(ECC)	9	-	*	*	*
MICRON	MT16JTF51264AZ-1G4D1	4GB	DS	MICRON	OLD22D9LGG	-	-	*	*	*
OCZ	OCZ3F13334GK	4GB(2 x 2GB)	DS	-	-	9-9-9-20	1.7V	*	*	*
OCZ	OCZ3G1333LV4GK	4GB(2 x 2GB)	DS	-	-	9-9-9-20	1.65V	*	*	*
OCZ	OCZ3P1333LV4GK	4GB(2 x 2GB)	DS	-	-	7-7-7-20	1.65V	*	*	*
OCZ	OCZ3X13334GK(XMP)	4GB(2 x 2GB)	DS	-	-	7-7-7-20	1.75V	*	*	*
OCZ	OCZ3G1333LV6GK	6GB(3 x 2GB)	DS	-	-	9-9-9-20	1.65V	*	*	*
OCZ	OCZ3P1333LV6GK	6GB(3 x 2GB)	DS	-	-	7-7-7-20	1.65V	*	*	*
OCZ	OCZ3X1333LV6GK(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8-20	1.60V	*	*	*
OCZ	OCZ3RPR1333C9LV8GK	8GB (2x 4GB)	DS	-	-	9-9-9-20	1.65V	*	*	*
PSC	AL7F8G73D-DG1	1GB	SS	PSC	A3P1GF3DGF	8-8-8-24	1.5V	*	*	*
PSC	AL7F8G73F-DJ2	1GB	SS	PSC	A3P1GF3FGF	-	-	*	*	*
PSC	AL8F8G73D-DG1	2GB	DS	PSC	A3P1GF3DGF	8-8-8-24	1.5V	*	*	*
PSC	AL8F8G73F-DJ2	2GB	DS	PSC	A3P1GF3FGF	-	-	*	*	*
SAMSUNG	M378B2873FHS-CH9	1GB	SS	SAMSUNG	K4B1G0846F	-	-	*	*	*
SAMSUNG	M391B2873DZ1-CH9	1GB	SS	Samsung	K4B1G0846D-HCH9(ECC)	-	-	*	*	*
SAMSUNG	M378B5673FH0-CH9	2GB	DS	SAMSUNG	K4B1G0846F	-	-	*	*	*
SAMSUNG	M391B5673DZ1-CH9	2GB	DS	Samsung	K4B1G0846D-HCH9(ECC)	-	-	*	*	*
SAMSUNG	M378B5273CH0-CH9	4GB	DS	SAMSUNG	K4B2G0846C	-	-	*	*	*
Super Talent	W1333UA1GH	1GB	SS	HYNIX	H5TQ1G83TFR	9	-	*	*	*
Super Talent	W1333X2G8(XMP)	1GB	SS	-	-	8	-	*	*	*
Super Talent	W1333UB2GS	2GB	DS	Samsung	K4B1G0846F	9	-	*	*	*
Super Talent	W1333UB4GS	4GB	DS	Samsung	K4B2G0846C	-	-	*	*	*
Super Talent	W1333UX6GM	6GB(3x 2GB)	DS	Micron	0BF27D9KPT	9-9-9-24	1.5V	*	*	*
Transcend	TS256MLK64V3U	2GB	DS	Micron	9GF27D9KPT	-	-	*	*	*
Century	PC3-10600 DDR3-1333 9-9-9	1GB	SS	Micron	8FD22D9JNM	-	-	*	*	*
Century	PC3-10600 DDR3-1333 9-9-9	2GB	DS	Micron	8DD22D9JNM	-	-	*	*	*
Elixir	M2F2G64CB88B7N-CG	2GB	SS	Elixir	N2CB2G80BN-CG	-	-	*	*	*
Elixir	M2Y2G64CB8HA9N-CG	2GB	DS	-	-	7-7-7-20	-	*	*	*
Elixir	M2Y2G64CB8HC9N-CG	2GB	DS	Elixir	-	-	-	*	*	*
Elixir	M2F4G64CB8HB5N-CG	4GB	DS	Elixir	N2CB2G80BN-CG	-	-	*	*	*
KINGSHARE	KSRPCD313332G	2GB	DS	PATRIOT	PM128M8D385-15	-	-	*	*	*
Kingtiger	2GB DIMM PCS-10666	2GB	DS	Samsung	SEC 904 HCH9 K4B1G0846D	-	-	*	*	*
Kingtiger	KTG2G1333PG3	2GB	DS	-	-	-	-	*	*	*
PATRIOT	PSD31G13332H	1GB	DS	-	-	9	-	*	*	*
PATRIOT	PSD31G13332	1GB	DS	Patriot	PM64M8D38U-15	-	-	*	*	*
PATRIOT	PSD32G13332H	2GB	DS	-	-	-	-	*	*	*
RAMAXEL	RMR1870ED4E8F-1333	2GB	DS	ELPIDA	J1108BDBG-DJ-F	-	-	*	*	*
SILICON POWER	SP001GBLTU133S01	1GB	SS	NANYA	NT5CB128M8AN-CG	9	-	*	*	*
SILICON POWER	SP001GBLTU133S02	1GB	SS	elixir	N2CB1680AN-C6	9	-	*	*	*
SILICON POWER	SP002GBLTU133S02	2GB	DS	elixir	N2CB1680AN-C6	9	-	*	*	*
TAKEMS	TMS1GB364D081-107EY	1GB	SS	-	-	7-7-7-20	1.5V	*	*	*
TAKEMS	TMS1GB364D081-138EY	1GB	SS	-	-	8-8-8-24	1.5V	*	*	*
TAKEMS	TMS2GB364D081-107EY	2GB	DS	-	-	7-7-7-20	1.5V	*	*	*
TAKEMS	TMS2GB364D081-138EY	2GB	DS	-	-	8-8-8-24	1.5V	*	*	*
TAKEMS	TMS2GB364D082-138EW	2GB	DS	-	-	8-8-8-24	1.5V	*	*	*
UMAX	E41302GP0-73BDB	2GB	DS	UMAX	U2S24D30TP-13	-	-	*	*	*
V-Color	TD2G16C9-Z8	2GB	DS	HYNIX	H5TQ1G83AFP	-	-	*	*	*
WINTEC	3WV531333-2G-CNR	2GB	DS	AMPO	AM3420803-13H	-	-	*	*	*



- 
- Due to CPU spec., AMD® 100 and 200 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 MHz or higher frequency DIMMs.
- 



**SS: Single-sided / DS: Double-sided**

**DIMM support:**

- **A\*:** Supports one module inserted into either slot as single-channel memory configuration.
  - **B\*:** Supports two pairs of modules inserted into both the blue and the black slots as two pairs of dual-channel memory configuration.
- 



When using a DDR3 2000 MHz memory module, ensure to install it on the A1 slot for better overclocking capability.

---



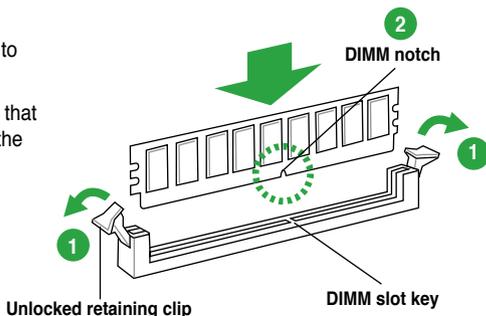
- The memory QVL lists are for AM3 CPU only.
  - Visit the ASUS website at [www.asus.com](http://www.asus.com) for the latest QVL for AM3+ CPU.
-

### 1.7.3 Installing a DIMM



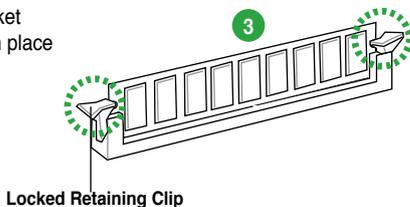
Unplug the power supply before adding or removing DIMMs or other system components. Failure to do so can cause severe damage to both the motherboard and the components.

1. Press the retaining clips outward to unlock a DIMM socket.
2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



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

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



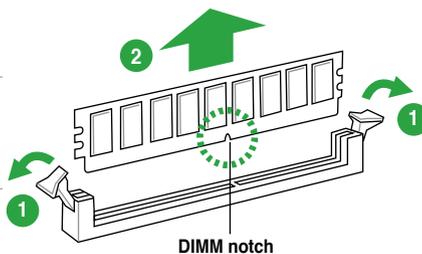
### 1.7.4 Removing a DIMM

To remove a DIMM:

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



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



2. Remove the DIMM from the socket.

## 1.8 Expansion slots

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



---

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

---

### 1.8.1 Installing an expansion card

To install an expansion card:

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

### 1.8.2 Configuring an expansion card

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

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



---

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

---

### 1.8.3 PCI slot

The PCI slot supports cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications.

### 1.8.4 PCI Express x1 slots

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

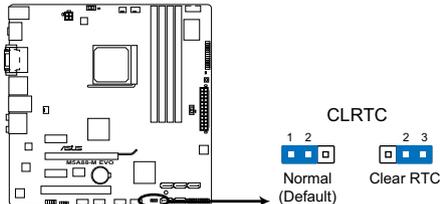
### 1.8.5 PCI Express x16 slot

This motherboard supports a PCI Express x16 graphics slot that complies with the PCI Express specifications.

## 1.9 Jumpers

### Clear RTC RAM (CLRRTC)

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.



#### M5A88-M 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 **<Del>** key during the boot process and enter BIOS setup to reenter data.



---

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

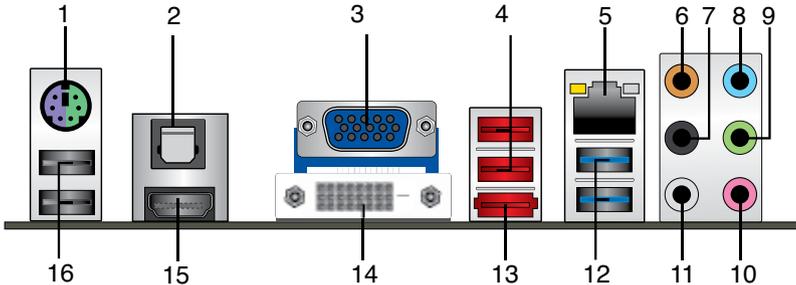
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- If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.
  - You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the CPU Parameter Recall (C.P.R) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.
-

# 1.10 Connectors

## 1.10.1 Rear panel ports

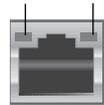


1. **PS/2 Keyboard / Mouse Combo port.** This port is for a PS/2 keyboard or PS/2 mouse.
2. **Optical S/PDIF\_OUT port.** This port connects to an external audio output device via an optical S/PDIF cable.
3. **VGA port.** This 15-pin port is for a VGA monitor or other VGA-compatible devices.
4. **USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are for USB 2.0 devices.
5. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub.

### LAN port LED indications

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

ACT/LINK SPEED  
LED LED



LAN port

6. **Center / Subwoofer port (orange).** This port connects the center/subwoofer speakers.
7. **Rear Speaker Out port (black).** This port connects the rear speakers in a 4-channel, 6-channel, or 8-channel audio configuration.
8. **Line In port (light blue).** This port connects to the tape, CD, DVD player, or other audio sources.
9. **Line Out port (lime).** This port connects to a headphone or a speaker. In the 4, 6, and 8-channel configurations, the function of this port becomes Front Speaker Out.
10. **Microphone port (pink).** This port connects to a microphone.
11. **Side Speaker Out port (gray).** This port connects the side speaker in an 8-channel audio configuration.



Refer to the audio configuration table on the next page for the function of the audio ports in 2, 4, 6, or 8-channel configuration.

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

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



Ensure the audio device of sound playback is Realtek High Definition Audio (the name may be different based on the OS). Go to Start > Control Panel > Sounds and Audio Devices > Sound Playback to configure the settings.

- USB 3.0 ports 1 and 2.** These two 9-pin Universal Serial Bus (USB) ports connect to USB 3.0/2.0 devices.
- ESATA6G port.** This port is for an extra SATA6G device.
- DVI-D port.** This port is for any DVI-D compatible device and is HDCP compliant allowing playback of HD DVD, Blu-ray, and other protected content.
- HDMI port.** This port is for a High-Definition Multimedia Interface (HDMI) connector, and is HDCP compliant allowing playback of HD DVD, Blu-ray, and other protected content.



### Dual display output support

- This table indicates that whether the following dual display outputs are supported on your motherboard:

Dual display outputs	Supported	Not supported
DVI + D-Sub	•	
DVI + HDMI		•
HDMI + D-Sub	•	

- During POST, only the monitor connected to the D-Sub port has display. The dual display function works only under Windows.



### Playback of Blu-ray discs

- For better playback quality, we recommend that you follow the system requirements listed below.

Suggested list	
CPU	AMD® Phenom™ II x4 805
DIMM	DDR3 1333 2G x 2
BIOS setup	Frame Buffer Size – 256MB or higher

File format	Best resolution	
	Windows® Vista	Windows® 7
Non-protected clips	1920 x 1080p	1920 x 1080p
Blu-ray	1920 x 1080p	1920 x 1080p



## Blu-ray Playback Support:

AMD® 880G models' onboard graphics do not support Blu-ray playback under 32-bit / 64-bit Windows® XP operating system.

To support Blu-ray playback on AMD® 880G models, do either of the following:

- When you are using the onboard graphics, upgrade your operating system to Windows® Vista or later versions.
- Under Windows® XP, install a discrete graphics card with Blu-ray playback support and connect your display device to it.

Refer to the table below for the Blu-ray playback support system lists for AMD® 880G models.

	Desktop	Mobile
CPU	2.8 GHz AMD Phenom™ II 925 Quad Core (2.0 GHz HT3)	2.4 GHz AMD Turion™ II Ultra M600 (1.8 GHz HT3)
	2.3 GHz AMD Athlon™ II 405e Tri Core (1.8 GHz HT3)	2.0 GHz AMD Athlon™ II M300 (1.6 GHz HT3)
	2.0 GHz AMD Athlon™ II Dual Core (1.8 GHz HT3)	2.0 GHz AMD Sempron™ M100 (1.6 GHz HT3)
System Memory	2GB (DDR3-1066 and DDR3-1333)	2GB (DDR2-800 and DDR2-667)
UMA Size	256 MBs	256 MBs
Graphics Engine	500 MHz	500 MHz
Driver Version	8.63 RC1	8.61 RC2
SBIOS Version	ET80520a	EBA0325b
Operating System	Microsoft Vista RTM (32-bit)	Microsoft Vista RTM (32-bit)
Power Mode	Performance Mode	Balanced or Performance Mode

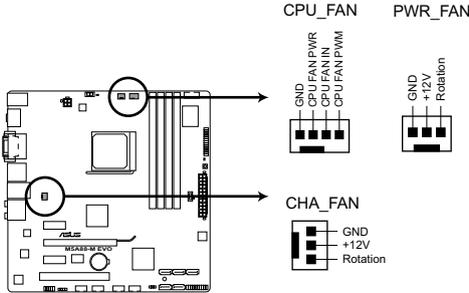
\* Visit the AMD® website at [www.amd.com](http://www.amd.com) for the latest system lists.

16. **USB 2.0 ports 5 and 6.** These two 4-pin Universal Serial Bus (USB) ports connect to USB 2.0/1.1 devices.

## 1.10.2 Internal connectors

### 1. CPU, chassis, and power fan connectors (4-pin CPU\_FAN; 3-pin CHA\_FAN; 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.



**M5A88-M EVO fan connectors**



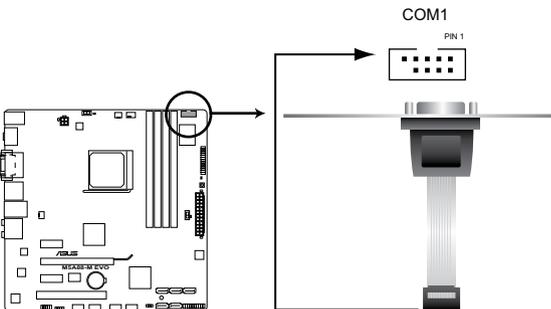
DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors.

### 2. Serial port connector (10-1 pin COM1)

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



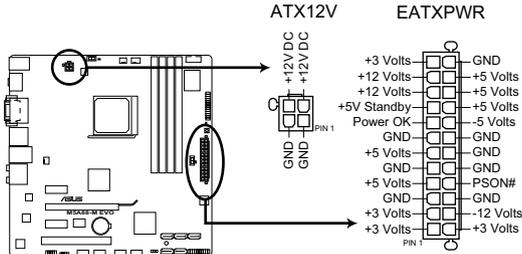
The serial port module is purchased separately.



**M5A88-M EVO Serial port (COM1) connector**

### 3. ATX power connectors (24-pin EATXPWR, 4-pin ATX12V)

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



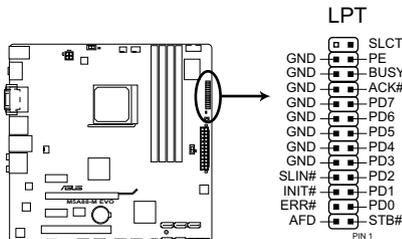
**M5A88-M EVO ATX power connectors**



- 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 300 W.
- Do not forget to connect the 4-pin ATX12 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.

### 4. LPT connector (26-1 pin LPT)

The LPT (Line Printing Terminal) connector supports devices such as a printer. LPT standardizes as IEEE 1284, which is the parallel port interface on IBM PC-compatible computers.

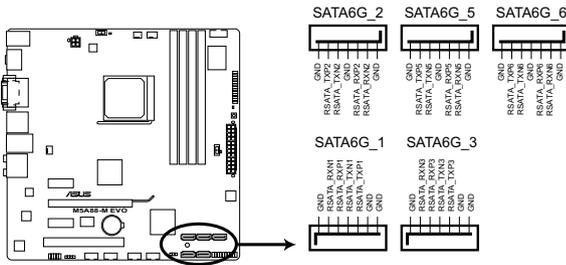


**M5A88-M EVO Parallel Port Connector**

## 5. AMD® SB850 Serial ATA Serial ATA 6.0 Gb/s connectors (7-pin SATA 1/2/3/5/6)

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

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



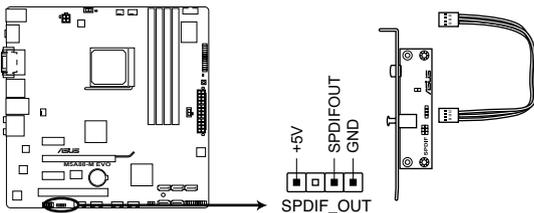
**M5A88-M EVO Intel® SATA 6.0Gb/s connectors**



- These connectors are set to IDE mode by default. In IDE mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the type of the SATA connectors to [RAID] in the BIOS. See section 3.4.2 SATA Configuration for details.
- You must install Windows® XP Service Pack 2 or later version before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP2 or later version.
- When using hot-plug and NCQ, set the type of the SATA connectors to [AHCI] in the BIOS. See section 2.3.4 SATA Configuration for details.

## 6. Digital audio connector (4-1 pin SPDIF\_OUT)

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



**M5A88-M EVO Digital audio connector**



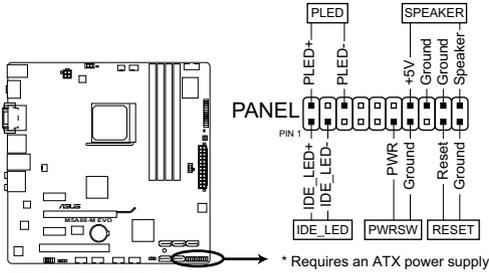
Ensure that the audio device of Sound playback is **Realtek High Definition Audio (the name may be different based on the OS)**. Go to **Start > Control Panel > Sounds and Audio Devices > Sound Playback** to configure the setting.



The S/PDIF module is purchased separately.

## 7. System panel connector (20-8 pin PANEL)

This connector supports several chassis-mounted functions.



### M5A88-M 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)**

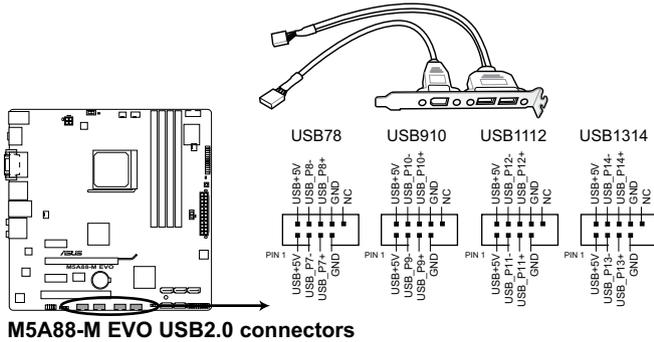
This connector is for the system power button.

- **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.

## 8. USB connectors (10-1 pin USB78, 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 480Mbps connection speed.



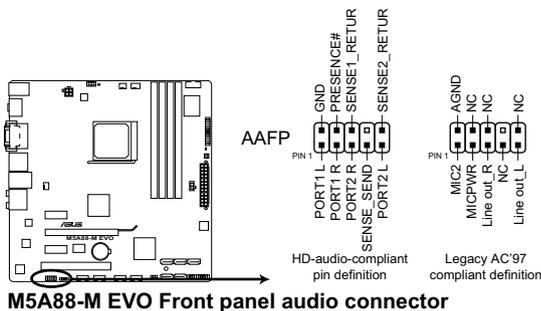
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



The USB 2.0 module is purchased separately.

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

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

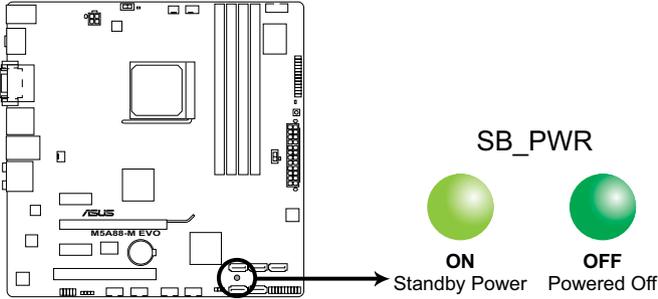


- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard high-definition audio capability.
- If you want to connect a high definition front panel audio module to this connector, set the **Front Panel Select** item in the BIOS to **[HD Audio]**. See section 2.5.3 **Onboard Devices Configuration** for details.
- The front panel audio I/O module is purchased separately.

## 1.11 Onboard LEDs

### 1. Standby Power

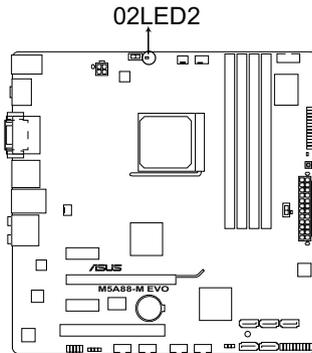
The motherboard comes with a standby power LED that lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows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



### M5A88-M EVO Onboard LED

### 2. TPU LED

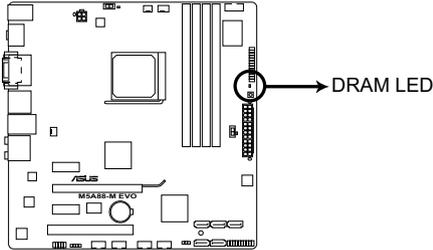
The TPU LED lights when the TPU switch is turned to **Enable**.



### M5A88-M EVO TPU LED

### 3. DRAM LED

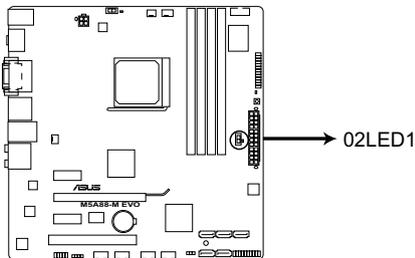
DRAM LED checks the DRAM in sequence during motherboard booting process. If an error is found, the LED next to the error device will continue lighting until the problem is solved. This user-friendly design provides an intuitional way to locate the root problem within a second.



**M5A88-M EVO DRAM LED**

### 4. Core Unlocker LED

The Core Unlocker LED lights when the Core Unclocker switch is turned to **Enable**.



**M5A88-M EVO Core Unlocker LED**



---

The Core Unlocker LED keeps on lighting even though the ASUS Core Unlocker item in the BIOS menu is set to [Disabled].

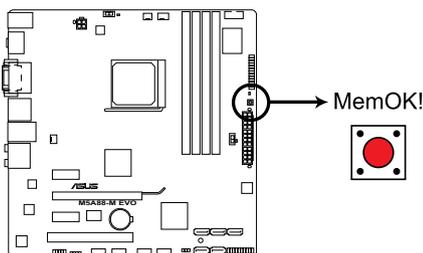
---

## 1.12 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.



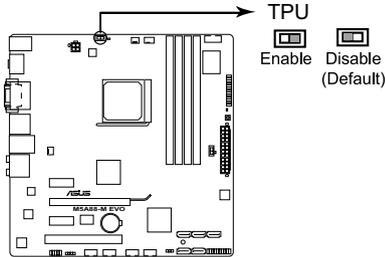
### M5A88-M EVO MemOK! switch



- Refer to section **1.11 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](http://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](http://www.asus.com) after using the MemOK! function.

## 2. TPU switch

This switch allows you to enable or disable the TPU function.



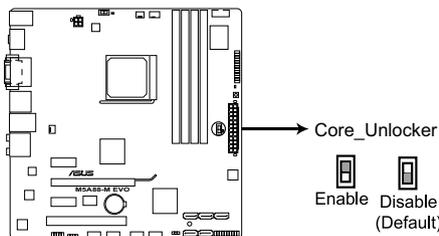
### M5A88-M EVO TPU switch



- The TPU LED (02LED2) near the TPU switch lights when the switch setting is turned to **Enable**.
- If you clear the CMOS or load the BIOS setup defaults, the related overclocking items in the BIOS menu follow the current setting of the TPU switch.
- 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 features in the TurboV EVO application, adjust the BIOS settings, or enable the TPU function at the same time. However, the system will use the last setting you have made.

## 3. Core\_Unlocker switch

This switch allows you to enable or disable the Core\_Unlocker function.



### M5A88-M EVO Core Unlocker switch

## 1.13 Software support

### 1.13.1 Installing an operating system

This motherboard supports Windows® XP / Vista / 7 Operating Systems (OS). Always install the latest OS version and corresponding updates to maximize the features of your hardware.



- Motherboard settings and hardware options vary. Refer to your OS documentation for detailed information.
- Ensure that you install Windows® XP Service Pack 3 or later versions / Windows® Vista Service Pack 1 or later versions before installing the drivers for better compatibility and system stability.

### 1.13.2 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](http://www.asus.com) for updates.

#### To run the Support DVD

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



The following screen is for reference only.



Click an icon to display Support DVD/motherboard information

Click an item to install



If Autorun is NOT enabled on 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.

# Chapter 2

## BIOS information

### 2.1 Managing and updating your BIOS



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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 utility.

---

#### 2.1.1 ASUS Update utility

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



- 
- ASUS Update requires an Internet connection either through a network or an Internet Service Provider (ISP).
  - This utility is available in the support DVD that comes with the motherboard package.
- 

#### Installing ASUS Update

To install ASUS Update:

1. Place the support DVD into the optical drive.
2. Click the **Utilities** tab, then click **ASUS Update**.
3. Follow the onscreen instructions to complete the installation.



---

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

---

#### Updating the BIOS

To update the BIOS:

1. From the Windows® desktop, click **Start > Programs > ASUS > ASUS Update > ASUS Update** to launch the ASUS Update utility.
2. From the dropdown list, select either of the following methods:

##### *Updating from the Internet*

- a. Select **Update BIOS from the Internet**, then click **Next**.
- b. Select the ASUS FTP site nearest you to avoid network traffic, or click **Auto Select** then click **Next**.
- c. From the FTP site, select the BIOS version that you want to download then click **Next**.



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

#### *Updating from a BIOS file*

- a. Select **Update BIOS from a file**, then click **Next**.
  - b. Locate the BIOS file from the **Open** window, then click **Open**.
3. Follow the onscreen instructions to complete the updating process.

## 2.1.2 ASUS EZ Flash 2

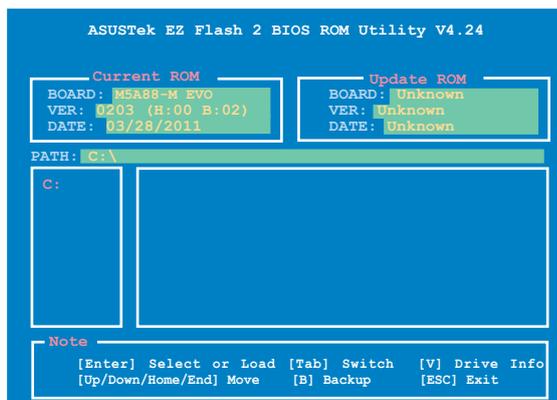
The ASUS EZ Flash 2 feature allows you to update the BIOS without using an OS-based utility.



Before you start using this utility, download the latest BIOS file from the ASUS website at [www.asus.com](http://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, then launch EZ Flash 2 in either of these two ways:
  - Press **<Alt> + <F2>** during POST.
  - Enter the BIOS setup program. Go to the **Tools** menu to select **EZ Flash 2** and press **<Enter>** to enable it.Press **<Tab>** to switch between drives until the correct BIOS file is found.



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



- 
- This function supports USB flash disks 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!
- 

### 2.1.3 ASUS CrashFree BIOS 3

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



- 
- Before using this utility, rename the BIOS file in the removable device into **M5A88MEV.ROM**.
  - The BIOS file in the support DVD may not be the latest version. Download the latest BIOS file from the ASUS website at [www.asus.com](http://www.asus.com).
  - The removable devices that ASUS CrashFree BIOS 3 supports vary with motherboard models. For motherboards without the floppy connector, prepare a USB flash disk before using this utility.
- 

### Recovering the BIOS

To recover the BIOS:

1. Turn on the system.
2. Insert the support DVD to the optical drive or the removable device that contains the BIOS file to the USB port or to the floppy disk drive, if supported.
3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.
4. Turn off the system after the utility completes the updating process and turn on again.



---

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

---



---

Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit menu. Refer to section **2.9 Exit menu** for details.

---

## 2.1.4 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.

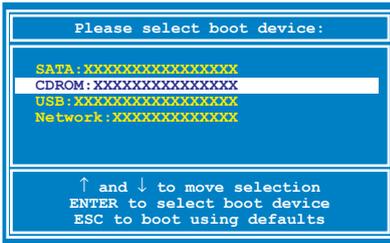


- NTFS is not supported under DOS environment. Do not save the BIOS file and BIOS Updater to a hard disk drive or USB flash drive in NTFS format.
- Do not save the BIOS file to a floppy disk due to low disk capacity.

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.

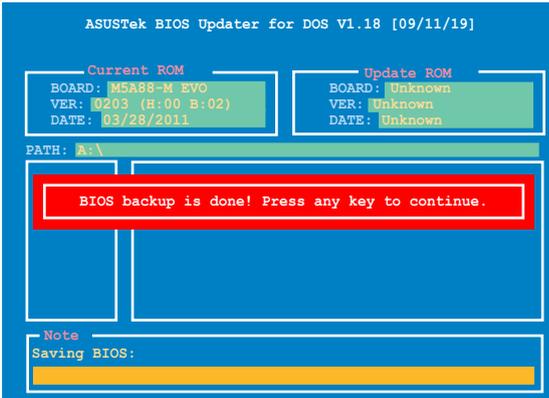
1. At the FreeDOS prompt, type `bupdater /o[filename]` and press <Enter>.

```
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.



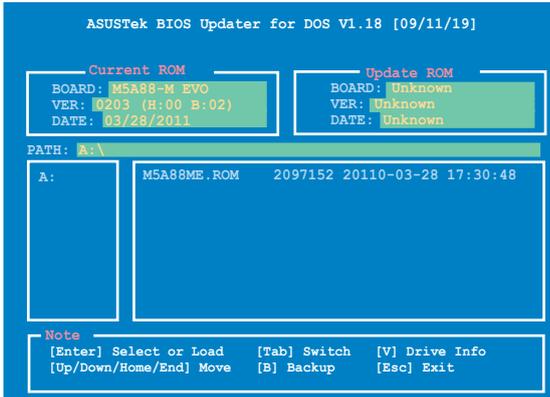
## Updating the BIOS file

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 Setup Defaults** item under the **Exit BIOS menu**. See section 2.9 **Exit Menu**.
- Ensure to connect all SATA hard disk drives after updating the BIOS file if you have disconnected them.

## 2.2 BIOS setup program

Use the BIOS Setup program to update the BIOS or configure its parameters. The BIOS screens include navigation keys and brief online help to guide you in using the BIOS Setup program.

### Entering BIOS Setup at startup

To enter BIOS Setup at startup:

- Press <Delete> during the Power-On Self Test (POST). If you do not press <Delete>, POST continues with its routines.

### Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+<Del> simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.



Using the **power button**, **reset button**, or the <Ctrl>+<Alt>+<Del> keys to force reset from a running operating system can cause damage to your data or system. We recommend that you always shut down the system properly from the operating system.

---



- The default BIOS settings for this motherboard apply to most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. See section 2.9 **Exit Menu**.
  - The BIOS setup screens in this chapter are for reference only. They may not exactly match what you see on your screen.
  - Visit the ASUS website at [www.asus.com](http://www.asus.com) to download the latest BIOS file for this motherboard.
-

## 2.2.1 BIOS menu screen

The screenshot shows the BIOS menu screen for an M5A88-M EVO BIOS Setup. The menu bar at the top includes Main, Ai Tweaker, Advanced, Power, Boot, Tools, Exit, and Version 0203. The main settings area is divided into several sections: System Time (19:34:30, Tue 01/08/2002), SATA6G ports (SATA6G\_1 to SATA6G\_6, all [Not Detected]), and System Information. A general help section on the right provides instructions on using [ENTER], [TAB], [SHIFT-TAB], [+], and [-] to navigate and configure. A navigation keys section at the bottom right lists keys for selecting screens, items, fields, and exiting. The bottom of the screen displays the version number v02.61 and copyright information for American Megatrends, Inc.

Labels in the image:

- Menu items: Main, Ai Tweaker, Advanced, Power, Boot, Tools, Exit
- Menu bar: M5A88-M EVO BIOS Setup, Version 0203
- Configuration fields: System Time, System Date, SATA6G\_1, SATA6G\_2, SATA6G\_3, ESATA6G, SATA6G\_5, SATA6G\_6, SATA Configuration, System Information
- General help: Use [ENTER], [TAB] or [SHIFT-TAB] to select a field. Use [+] or [-] to configure system Time.
- Submenu items: SATA6G\_1, SATA6G\_2, SATA6G\_3, ESATA6G, SATA6G\_5, SATA6G\_6, SATA Configuration, System Information
- Navigation keys: Select Screen, Select Item, Change Field, Select Field, General Help, Save and Exit, Exit

## 2.2.2 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
- Power** For changing the advanced power management (APM) configuration
- Boot** For changing the system boot configuration
- Tools** For configuring options for special functions
- Exit** For selecting the exit options and loading default settings.

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

## 2.2.3 Navigation keys

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



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

## 2.2.4 Menu items

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

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

## 2.2.5 Submenu items

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

## 2.2.6 Configuration fields

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

A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press **<Enter>** to display a list of options. Refer to **2.2.7 Pop-up window**.

## 2.2.7 Pop-up window

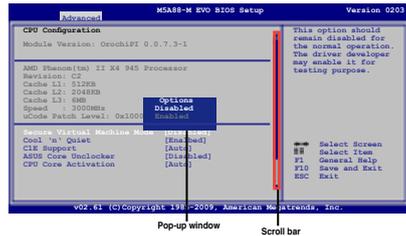
Select a menu item then press **<Enter>** to display a pop-up window with the configuration options for that item.

## 2.2.8 Scroll bar

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

## 2.2.9 General help

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

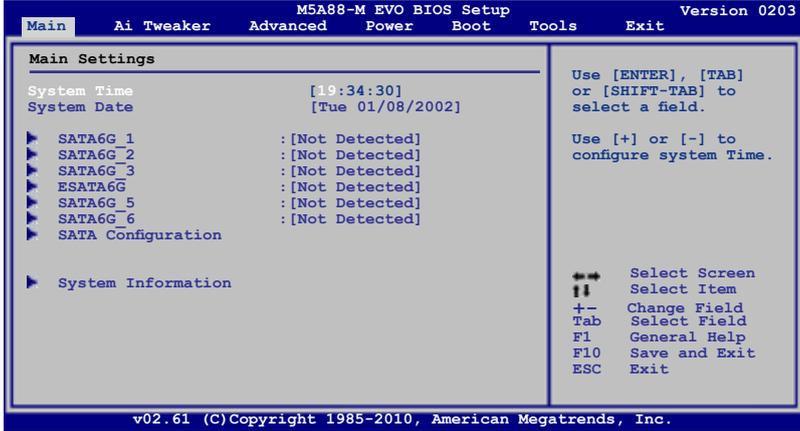


## 2.3 Main menu

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



Refer to section 2.2.1 BIOS menu screen for information on the menu screen items and how to navigate through them.



### 2.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

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

Allows you to set the system date.

### 2.3.3 SATA6G 1~6

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

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

#### Type [Auto]

Selects the type of SATA drive. Setting this item to **[Auto]** allows automatic selection of the appropriate SATA device type. Select **[CDROM]** if you are specifically configuring a CD-ROM drive. Select **[ARMD]** (ATAPI Removable Media Device) if your device is either a ZIP, LS-120, or MO drive. Configuration options: [Not Installed] [Auto] [CDROM] [ARMD]



This item only appears in the **SATA5/6** menu.

### **LBA/Large Mode [Auto]**

Enables or disables the LBA mode. Setting this item to **[Auto]** enables the LBA mode if the device supports this mode, and if the device was not previously formatted with LBA mode disabled. Configuration options: [Disabled] [Auto]

### **Block (Multi-Sector Transfer) M [Auto]**

Enables or disables data multi-sectors transfers. When this item is set to **[Auto]**, the data transfer from and to the device occurs multiple sectors at a time if the device supports multi-sector transfer feature. When this item is set to **[Disabled]**, the data transfer from and to the device occurs one sector at a time. Configuration options: [Disabled] [Auto]

### **PIO Mode [Auto]**

Selects the PIO mode. Configuration options: [Auto] [0] [1] [2] [3] [4]

### **DMA Mode [Auto]**

Selects the DMA mode. Configuration options: [Auto]

### **SMART Monitoring [Auto]**

Sets the Smart Monitoring, Analysis, and Reporting Technology.

Configuration options: [Auto] [Disabled] [Enabled]

### **32Bit Data Transfer [Enabled]**

Enables or disables 32-bit data transfer. Configuration options: [Disabled] [Enabled]

## **2.3.4 SATA Configuration**

The **SATA Configuration** menu allows you to configure your storage devices. Select an item then press **<Enter>** to display the submenu.

### **OnChip SATA Channel [Enabled]**

Enables or disables onboard channel SATA port. Configuration options: [Disabled] [Enabled]



---

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

---

#### SATA Port1 - Port4 [IDE]

Allows you to set the SATA configuration.

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



- When this item is 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.
- 

#### SATA Port5 - Port6 [IDE]

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



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

---

## 2.3.5 System Information

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

### **BIOS Information**

Displays the auto-detected BIOS information.

### **Processor**

Displays the auto-detected CPU specification.

### **System Memory**

Displays the auto-detected system memory.

## 2.4 Ai Tweaker menu

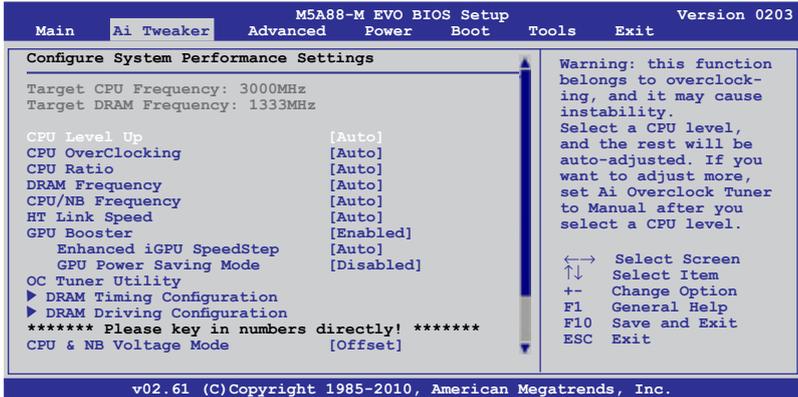
The Ai Tweaker menu items allow you to configure overclocking-related items.



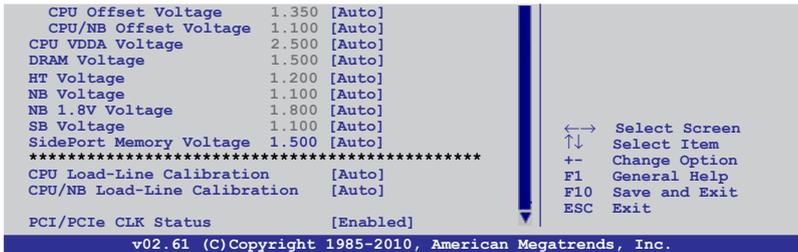
Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction.



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



Scroll down to display the following items:



## 2.4.1 CPU OverClocking [Auto]

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

Manual	Allows you to individually set overclocking parameters.
Auto	Loads the optimal settings for the system.
D.O.C.P	Allows you to select a DRAM O.C. profile, and the related parameters will be adjusted automatically.
Overclock Profile	Allows you to select an overclocking profile.



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

### CPU/HT Reference Clock (MHz) [XXX]

This item appears only when you set the **CPU OverClocking** item to [Manual] and displays the frequency sent by the clock generator to the system bus and PCI bus. Use the <+> and <-> keys to adjust the CPU Bus frequency. You can also key in the desired frequency using the numeric keypad. The values range from 100MHz to 550MHz.

### **PCIe Frequency [XXX]**

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

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

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

### **Profile Info : xxxxMHz-x-x-x-xx**

This item appears only when you set the **CPU OverClocking** item to [D.O.C.P.] and displays the current DRAM profile information. The profile information varies according to the **DRAM O.C. Profile** you have selected.

### **Overclock Options [Auto]**

This item appears only when you set the **CPU OverClocking** item to [Overclock Profile] and allows you to select an overclocking profile. Configuration options: [Auto] [Overclock 2%] [Overclock 5%] [Overclock 8%] [Overclock 10%]

## 2.4.2 CPU Ratio [Auto]

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



---

The following two items only appear when you install a 6-core CPU.

---

### AMD Turbo CORE technology [Enabled]

Enables or disables the AMD Turbo Core technology. Configuration options: [Disabled] [Enabled]

### Turbo CORE Ratio [Auto]

Sets the Turbo Core ratio. Use the <+> / <-> keys to adjust the ratio. The valid value ranges vary depending on your CPU model. Configuration options: [Auto]

## 2.4.3 DRAM Frequency [Auto]

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



---

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

---

## 2.4.4 CPU/NB Frequency [Auto]

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

## 2.4.5 HT Link Speed [Auto]

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

## 2.4.6 GPU Booster [Enabled]

GPU Booster accelerates the integrated GPU for extreme graphics performance. Configuration options: [Enabled] [Disabled]

### *Enhanced iGPU Speedstep [Auto]*

This item appears only when you set the **GPU Booster** item to [Enabled] and allows you to select a profile to set iGPU auto-optimization frequency range. Configuration options: [Auto] [Turbo] [Extreme] [Manual]

### *GPU Power Saving Mode [Disabled]*

This item appears only when you set the **GPU Booster** item to [Enabled] and allows you to reduce iGPU power consumption in Idle Mode. Configuration options: [Enabled] [Disabled]

### *GPU Engine Clock [700]*

This item appears only when you set the **GPU Booster** item to [Disabled], or set the **GPU Booster** item to [Enabled] and **Enhanced iGPU SpeedSet** to [Manual] for fixed GPU Engine Clock. Use the <+> and <-> keys to adjust the value. You can also key in the desired value using the numeric keypad. The values range from 200MHz to 2000MHz.

## 2.4.7 OC Tuner Utility

Allows you to use OC Tuner Utility. Configuration options: [OK] [Cancel]

## 2.4.8 DRAM Timing Configuration



---

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

---

### **DRAM CAS# Latency [Auto]**

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

### **DRAM RAS# to CAS# Delay [Auto]**

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

### **DRAM RAS# PRE Time [Auto]**

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

### **DRAM RAS# ACT Time [Auto]**

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

### **DRAM READ to PRE Time [Auto]**

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

### **DRAM Row Cycle Time [Auto]**

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

### **DRAM WRITE Recovery Time [Auto]**

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

### **DRAM RAS# to RAS# Delay [Auto]**

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

### **DRAM READ to WRITE Delay [Auto]**

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

### **DRAM WRITE to READ Delay(DD) [Auto]**

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

### **DRAM WRITE to READ Delay(SD) [Auto]**

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

### **DRAM WRITE to WRITE Timing [Auto]**

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

### **DRAM READ to READ Timing [Auto]**

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

### **DRAM REF Cycle Time [Auto]**

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

### **DRAM Refresh Rate [Auto]**

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

## DRAM Command Rate [Auto]

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

### 2.4.9 DRAM Driving Configuration



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

#### CKE drive strength [Auto]

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

#### CS/ODT drive strength [Auto]

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

#### ADDR/CMD drive strength [Auto]

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

#### MEMCLK drive strength [Auto]

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

#### Data drive strength [Auto]

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

#### DQS drive strength [Auto]

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

#### Processor ODT [Auto]

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



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

### 2.4.10 CPU & NB Voltage Mode [Offset]

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

#### CPU Offset Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Offset] and allows you to set the CPU Offset voltage. The values range from 0.003125V to 0.500000V with a 0.003125V interval.

#### CPU/NB Offset Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Offset] and allows you to set the CPU/NB Offset voltage. The values range from 0.003125V to 0.500000V with a 0.003125V interval.

#### CPU Voltage [Auto]

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

## **CPU/NB Voltage [Auto]**

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

### **2.4.11 CPU VDDA Voltage [Auto]**

Allows you to set the CPU VDDA voltage. The values range from 2.50V to 2.80V with a 0.10V interval.

### **2.4.12 DRAM Voltage [Auto]**

Allows you to set the DRAM voltage. The values range from 1.35000V to 2.44000V with a 0.01000V interval.

### **2.4.13 HT Voltage [Auto]**

Allows you to set the HyperTransport voltage. The values range from 1.20000V to 1.40000V with a 0.01000V interval.

### **2.4.14 NB Voltage [Auto]**

Allows you to set the Northbridge voltage. The values range from 1.10000V to 1.73000V with a 0.01000V interval.

### **2.4.15 NB 1.8V Voltage [Auto]**

Allows you to set the Northbridge 1.8V voltage. The values range from 1.80V to 1.90V with a 0.10V interval.

### **2.4.16 SB Voltage [Auto]**

Allows you to set the Southbridge voltage. The values range from 1.10V to 1.40V with a 0.10V interval.

### **2.4.17 SidePort Memory Voltage [Auto]**

Allows you to set the sideport memory voltage. The values range from 1.50V to 1.80V with a 0.10V interval.

### **2.4.18 CPU Load-Line Calibration [Auto]**

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

### **2.4.19 CPU/NB Load-Line Calibration [Auto]**

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

### **2.4.20 PCI/PCIe CLK Status [Enabled]**

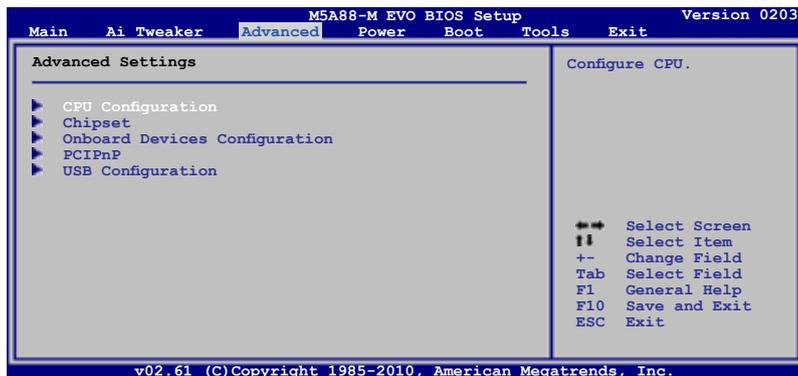
Allows you to enable or disable clock for PCI/PCIe slot. Configuration options: [Disabled] [Enabled]

## 2.5 Advanced menu

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



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



### 2.5.1 CPU Configuration

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

#### **Secure Virtual Machine Mode [Disabled]**

Enables or disables Secure Virtual Machine Mode (SVM) Configuration options: [Disabled] [Enabled]

#### **Cool 'n' Quiet [Enabled]**

Enables or disables the AMD Cool 'n' Quiet technology. Configuration options: [Enabled] [Disabled]

#### **C1E Support [Auto]**

Enables or disables the CPU Enhanced Halt (C1E) function, a CPU power-saving function in system halt state. When this item is enabled, the CPU core frequency and voltage will be reduced during the system halt state to decrease power consumption.

Configuration options: [Disabled] [Enabled]

#### **ASUS Core Unlocker [Disabled]**

Enables or disables the ASUS Core Unlocker function. Configuration options: [Disabled] [Enabled]

#### **CPU Core Activation [Auto]**

Allows you to set CPU Core Activation. Configuration options: [Auto] [Manual]

##### 2nd Core [On]

This item appears only when you set the **CPU Core Activation** item to [Manual] and allows you to activate the second CPU core. Configuration options: [On] [Off]

### 3rd Core [On]

This item appears only when you set the **CPU Core Activation** item to [Manual] and allows you to activate the third CPU core. Configuration options: [On] [Off]

### 4th Core [On]

This item appears only when you set the **CPU Core Activation** item to [Manual] and allows you to activate the fourth CPU core. Configuration options: [On] [Off]

## 2.5.2 Chipset

### NorthBridge Configuration

#### DRAM Controller Configuration

##### Bank Interleaving [Auto]

Allows you to enable the bank memory interleaving. Configuration options: [Disabled] [Auto]

##### Node Interleaving [Disabled]

Allows you to enable the node memory interleaving. Configuration options: [Disabled] [Auto]

##### Channel Interleaving [Auto]

Allows you to enable the channel memory interleaving. Configuration options: [Disabled] [Auto]

##### CS Sparing Enable [Disabled]

Allows you to reserve a spare memory rank in each node. Configuration options: [Enabled] [Disabled]

##### Bank Swizzle Mode [Enabled]

Allows you to enable or disable bank swizzle mode. Configuration options: [Disabled] [Enabled]

#### ECC Configuration

##### ECC Mode [Disabled]

Enables or disables the DRAM ECC that allows the hardware to report and correct memory errors automatically. Configuration options: [Disabled] [Basic] [Good] [Super] [Max] [User]

#### Internal Graphics

##### Primary Video Controller [GFX0-GPP-IGFX-PCI]

Allows you to set the primary display adapter. Configuration options: [GFX0-GPP-IGFX-PCI] [GPP-GFX0-IGFX-PCI] [PCI-GFX0-GPP-IGFX] [IGFX-GFX0-GPP-PCI]

##### Internal Graphics Mode [UMA+SIDEPORT]

Selects the internal graphics mode. Configuration options: [Disabled] [UMA] [SIDE PORT] [UMA+SIDEPORT]

##### UMA Frame Buffer Size [Auto]

This item appears only when you set the **Internal Graphics Mode** item to [UMA] or [UMA+SIDEPORT]. Configuration options: [Auto] [32MB] [64MB] [128MB] [256MB] [512MB]

*SIDEPORT Clock Speed [DDR3-1333MHz]*

This item appears only when you set the **Internal Graphics Mode** item to [SIDEPORT] or [UMA+SIDEPORT]. Configuration options: [DDR3-1333MHz] [DDR3-1400MHz] [DDR3-1430MHz] [DDR3-1460MHz] [DDR3-1490MHz] [DDR3-1520MHz] [DDR3-1550MHz] [DDR3-1580MHz] [DDR3-1610MHz] [DDR3-1640MHz] [DDR3-1670MHz] [DDR3-1700MHz] [DDR3-1730MHz] [DDR3-1760MHz] [DDR3-1790MHz] [DDR3-1820MHz]

**UMA-SP Interleave Mode [Auto]**

Allows you to select the UMA-SP Interleave Mode. Configuration options: [Auto] [Coarse] [fine]

**Frame Buffer Location [Above 4G]**

Allows you to select the FB Location. Configuration options: [Below 4G] [Above 4G]

**AMD HDMI Audio [Enabled]**

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

## 2.5.3 Onboard Devices Configuration

**Serial Port1 Address [3F8/IRQ4]**

Selects the Serial Port1 base address. Configuration options: [Disabled] [3F8/IRQ4] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

**Parallel Port Address [378]**

Selects the Parallel Port base addresses. Configuration options: [Disabled] [378] [278] [3BC]

**Parallel Port Mode [Normal]**

Selects the Parallel Port mode. Configuration options: [Normal] [EPP] [ECP] [EPP+ECP]

*Parallel Port IRQ [IRQ7]*

Allows BIOS to select the Parallel Port IRQ. Configuration options: [IRQ5] [IRQ7]

**HDAudio Controller [Enabled]**

Enables or disables the high definition audio controller. Configuration options: [Disabled] [Enabled]

*Front Panel Select [HD Audio]*

Selects the front panel type. Configuration options: [AC97] [HD Audio]

**OnBoard LAN Controller [Enabled]**

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

*OnBoard LAN Boot ROM [Disabled]*

Enables or disables the Onboard LAN Boot ROM. Configuration options: [Disabled] [Enabled]

**USB3.0 Controller [Enabled]**

Enables or disables the USB3.0 controller. Configuration options: [Disabled] [Enabled]

## 2.5.4 PCIPnP

The **PCI PnP** menu items allow you to change the advanced settings for PCI/PnP devices. The menu includes setting IRQ and DMA channel resources for either PCI/PnP or legacy ISA devices and setting the memory size block for legacy ISA devices.



---

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

---

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

When this item is set to **[No]**, BIOS configures all the devices in the system. When this item is set to **[Yes]** and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot. Configuration options: [No] [Yes]

## 2.5.5 USB Configuration

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



---

The Module Version and USB Devices Enabled items show the auto-detected values. If no USB device is detected, the item shows **None**.

---

### USB Functions [Enabled]

Enables or disables the USB functions. Configuration options: [Disabled] [Enabled]

### Legacy USB Support [Auto]

Enables or disables support for Legacy USB storage devices including USB flash drives and USB hard drives. Setting this item to **[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. Configuration options: [Disabled] [Enabled] [Auto]

### USB 2.0 Controller Mode [HiSpeed]

Configures the USB 2.0 controller in HiSpeed (480Mbps) mode or FullSpeed (12Mbps) mode. Configuration options: [FullSpeed] [HiSpeed]



---

The following items only appear when a USB storage device is plugged in.

---

## USB Mass Storage Device Configuration

### USB Mass Storage Reset Delay [20 Sec]

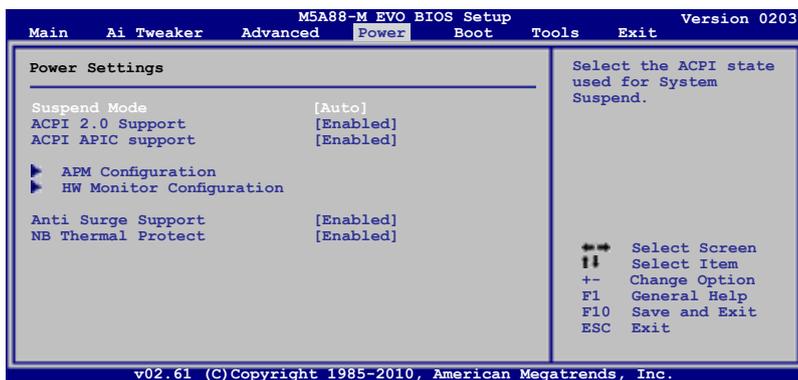
Sets the maximum time that the BIOS waits for the USB storage device to initialize. Configuration options: [10 Sec] [20 Sec] [30 Sec] [40 Sec]

#### *Emulation Type [Auto]*

Allows you to set the emulation type. Configuration options: [Auto] [Floppy] [Forced FDD] [Hard Disk] [CDROM]

## 2.6 Power menu

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



### 2.6.1 Suspend Mode [Auto]

Selects the Advanced Configuration and Power Interface (ACPI) state to be used for system suspend. Configuration options: [S1 (POS) Only] [S3 Only] [Auto]

### 2.6.2 ACPI 2.0 Support [Enabled]

Enables or disables the Advanced Configuration and Power Interface (ACPI) 2.0 support. Configuration options: [Disabled] [Enabled]

### 2.6.3 ACPI APIC Support [Enabled]

Enables or disables the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC). When this item is set to **[Enabled]**, the ACPI APIC table pointer is included in the RSDT pointer list. Configuration options: [Disabled] [Enabled]

### 2.6.4 APM Configuration

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

When this item set to **[Power Off]**, the system goes into off state after an AC power loss. When this item set to **[Power On]**, the system goes on after an AC power loss. When this item set to **[Last State]**, the system goes into either off or on state, whatever the system state was before the AC power loss. Configuration options: [Power Off] [Power On] [Last State]

#### Power on From S5 By PME# [Disabled]

Enables or disables PME wake from sleep states. Configuration options: [Disabled] [Enabled]

#### Power on From S5 By Ring [Disabled]

Enables or disables ring to generate a wake event. Configuration options: [Disabled] [Enabled]

### **Power on By PS/2 Keyboard [Disabled]**

Enables or disables PS/2 Keyboard to generate a wake event.  
Configuration options: [Disabled] [Space Bar] [Power Key] [Ctrl - Esc]

### **Power on From S5 By RTC Alarm [Disabled]**

Enables or disables RTC to generate a wake event. Configuration options: [Disabled]  
[Enabled]

## **2.6.5 HW Monitor Configuration**

### **CPU / MB Temperature [xxx°C/xxx°F] or [Ignored]**

The onboard hardware monitor automatically detects and displays the motherboard and CPU temperatures. Select **[Ignored]** if you do not want the detected temperatures to be displayed.

### **CPU Fan Speed [xxxxRPM] or [Ignored] / [N/A]**

### **Chassis Fan Speed [xxxxRPM] or [Ignored] / [N/A]**

### **Power Fan Speed [xxxxRPM] or [Ignored] / [N/A]**

The onboard hardware monitor automatically detects and displays the CPU / Chassis / Power fan speeds in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows N/A. Select **[Ignored]** if you do not wish to display the detected speed.

### **VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage [xx.xxxV] or [Ignored]**

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select **[Ignored]** if you do not want the detected voltage to be displayed.

### **CPU / Chassis Q-Fan Function [Enabled]**

Enables or disables the CPU / Chassis Q-Fan control feature. Configuration options:  
[Disabled] [Enabled]



---

The following item appears only when you set **CPU / Chassis Q-Fan Function** to [Enabled].

---

### **CPU / Chassis Fan Speed Low Limit [200 RPM]**

Allows you to manually set a lower limit for the CPU / Chassis fan speed. If the CPU / Chassis fan speed is below the specified limit, the system sends out warning beeps. Configuration options: [500 RPM] [400 RPM] [300 RPM] [200 RPM] [100 RPM] [Ignored]

### **CPU / Chassis Q-Fan Mode [Standard]**

This item appears only when you enable the **CPU / Chassis Q-Fan Function** feature and allows you to set the appropriate performance level of the CPU / Chassis fan.

- |            |   |
|------------|---|
| [Standard] | Sets to [Standard] to make the CPU / Chassis fan automatically adjust depending on the CPU / Chassis temperature. |
| [Silent]   | Sets to [Silent] to minimize the fan speed for quiet CPU / Chassis fan operation.                                 |
| [Turbo]    | Set to [Turbo] to achieve maximum CPU / Chassis fan speed.  |
| [Manual]   | Allows you to individually set the CPU / Chassis fan parameters.  |

## **2.6.6 Anti Surge Support [Enabled]**

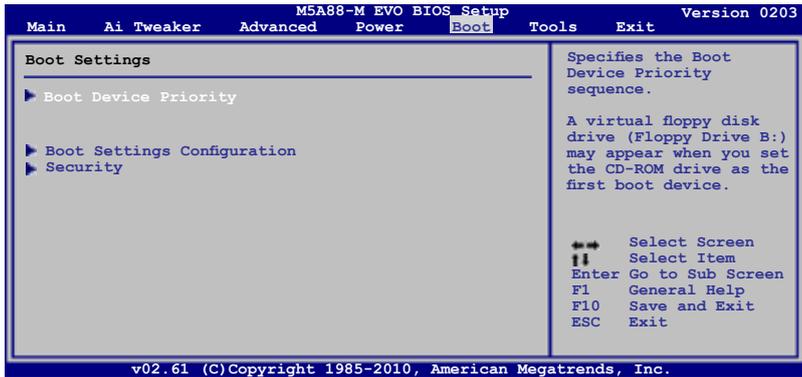
Enables or disables the Anti Surge support. Configuration options: [Disabled] [Enabled]

## 2.6.7 NB Thermal Protect [Enabled]

Allows you to enable or disable NB Thermal Protect. If set to **[Enabled]**, the system will shut down when the temperature of NB is over 95°C to protect the NB chipset. Configuration options: [Enabled] [Disabled]

## 2.7 Boot menu

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



### 2.7.1 Boot Device Priority

#### 1st ~ xxth Boot Device [xxx Drive]

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Configuration options: [Removable Dev.] [Hard Drive] [ATAPI CD-ROM] [Disabled]



- 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 **<F5>** when ASUS Logo appears.
  - Press **<F8>** after POST.

### 2.7.2 Boot Settings Configuration

#### Quick Boot [Enabled]

Enabling this item allows the BIOS to skip some power on self tests (POST) while booting to decrease the time needed to boot the system. When this item is set to **[Disabled]**, BIOS performs all the POST items. Configuration options: [Disabled] [Enabled]

#### Full Screen Logo [Enabled]

Enables or disables the full screen logo display feature. Configuration options: [Disabled] [Enabled]



Set this item to **[Enabled]** to use the ASUS MyLogo2™ feature.

### AddOn ROM Display Mode [Force BIOS]

Sets the display mode for option ROM. Configuration options: [Force BIOS] [Keep Current]

### Bootup Num-Lock [On]

Selects the power-on state for the NumLock. Configuration options: [Off] [On]

### Wait for 'F1' If Error [Enabled]

When this item is set to [Enabled], the system waits for the F1 key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]

### Hit 'DEL' Message Display [Enabled]

When this item is set to [Enabled], the system displays the message **Press DEL to run Setup** during POST. Configuration options: [Disabled] [Enabled]

## 2.7.3 Security

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

### Change Supervisor Password

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

To set a Supervisor Password:

1. Select the **Change Supervisor Password** item and press <Enter>.
2. In the password box, key in a password containing up to six letters or numbers, or both, then press <Enter>.
3. Confirm the password when prompted.

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

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

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



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If you forget your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section 1.9 **Jumpers** for information on how to erase the RTC RAM.

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

### User Access Level [Full Access]

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

**No Access** prevents user access to the Setup utility.

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

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

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

## Change User Password

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

To set a User Password:

1. Select the **Change User Password** item and press **<Enter>**.
2. In the password box, key in a password containing up to six letters or numbers, or both, then press **<Enter>**.
3. Confirm the password when prompted.

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

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

## Clear User Password

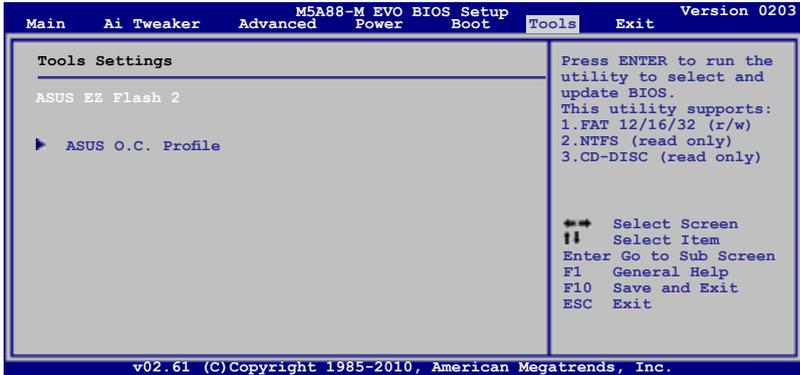
Select this item to clear the user password.

## Password Check [Setup]

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

## 2.8 Tools menu

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



### 2.8.1 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.

### 2.8.2 ASUS O.C. Profile

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

#### Add Your CMOS Profile

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

#### Load CMOS Profiles.

Allows you to load the previous BIOS settings saved in the BIOS Flash. Press **<Enter>** to load the file.

#### Start O.C. Profile

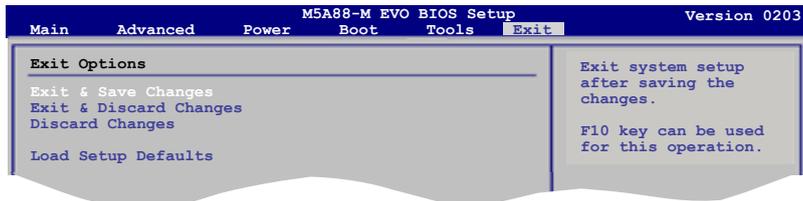
Allows you to run the utility to save and load CMOS. Press **<Enter>** to run the utility.



- 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 the system boot failure!
- We recommend that you update the BIOS file only coming from the same memory/CPU configuration and BIOS version.
- Only the CMO file can be loaded.

## 2.9 Exit menu

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



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

### Exit & Save Changes

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

### Exit & Discard Changes

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

### Discard Changes

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

### Load Setup Defaults

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



# ASUS contact information

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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(a)



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 : M5A88-M 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 : Apr. 14, 2011

# EC Declaration of Conformity



We, the undersigned,

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

declare the following apparatus:

Product name : **MotherBoard**  
Model name : **M5A88-M EVO**

conform with the essential requirements of the following directives:

**2004/108/EC-EMC Directive**  
 EN 55022:1989+A1:2007+ A2:2005  
 EN 61000-3-2:2006  
 EN 55013:2001+A1:2003+A2:2006  
 EN 55020:2007

**1989/5/EC-R & TTE Directive**

EN 300 328 V1.7.1(2006-05)  
 EN 300 440 V1.4.1(2006-05)  
 EN 300 511 V9.0.2(2003-03)  
 EN 301 988-1 V3.2.1(2007-05)  
 EN 301 988-2 V3.2.1(2007-05)  
 EN 302 544-2 V1.1.1(2009-01)  
 EN 50360:2001  
 EN 50361:2002  
 EN 50362:2002  
 EN 301 488-1 V1.8.1(2006-04)  
 EN 301 488-3 V1.4.1(2006-08)  
 EN 301 488-4 V1.3.1(2005-11)  
 EN 301 489-7 V1.3.1(2005-11)  
 EN 301 489-9 V1.4.1(2007-11)  
 EN 301 489-10 V2.1.1(2009-05)  
 EN 302 326-1 V1.2.2(2007-06)  
 EN 302 326-3 V1.3.1(2007-09)  
 EN 301 357-2 V1.3.1(2006-05)  
 EN 302 382 V1.1.1(2009-01)

**2006/95/EC-LVD Directive**

EN 60950-1:2006  
 EN 60950-1:2006+A11:2009  
 EN 60065:2002+A1:2006+A11:2008

**2009/125/EC-EP Directive**

Regulation (EC) No. 1275/2008  
Regulation (EC) No. 278/2009  
 EN 62301:2005

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

Ver. 10/04

**CE marking**



(EC conformity marking)

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

Signature : \_\_\_\_\_

Declaration Date: **Apr. 14, 2011**  
Year to begin affixing CE marking: **2011**