

**P7H55D-M
EVO**

ASUS[®]

Motherboard

E5020

First Edition (V1)

December 2009

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Notices

Federal Communications Commission Statement

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

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

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

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



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

Canadian Department of Communications Statement

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

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

REACH

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



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



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

Safety information

Electrical safety

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

Operation safety

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

About this guide

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

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**
This chapter describes the features of the motherboard and the new technology it supports.
- **Chapter 2: Hardware information**
This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the switches, jumpers, and connectors on the motherboard.
- **Chapter 3: BIOS setup**
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.
- **Chapter 4: Software support**
This chapter describes the contents of the support DVD that comes with the motherboard package and the software.

Where to find more information

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

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

Conventions used in this guide

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



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



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



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



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

Typography

Bold text

Indicates a menu or an item to select.

Italics

Used to emphasize a word or a phrase.

<Key>

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

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

<Key1> + <Key2> + <Key3>

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

Example: <Ctrl> + <Alt> +

P7H55D-M EVO specifications summary

| | |
|------------------------|--|
| CPU | <p>LGA1156 socket for Intel® Core™ i7 / Core™ i5 / Core™ i3 Pentium® Processors Supports Intel® Turbo Boost Technology* * The Intel® Turbo Boost Technology support depends on the CPU types. ** Refer to www.asus.com for Intel CPU support list</p> |
| Chipset | Intel® H55 Express Chipset |
| Memory | <p>4 x DIMM, max. 16GB, DDR3 2133(O.C.)* / 1333 / 1066 MHz, non-ECC, un-buffered memory Dual channel memory architecture Supports Intel® Extreme Memory Profile (XMP) * Hyper DIMM support is subject to the physical characteristics of individual CPUs. Some hyper DIMMs only support one DIMM per channel. Refer to the Memory QVL for details. ** Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lists)</p> |
| Expansion slots | <p>1 x PCI Express 2.0 x16 slots 2 x PCI Express x1 slots 1 x PCI slot</p> |
| VGA | <p>Multi-VGA output support: HDMI, DVI-D, and RGB ports Supports HDMI with max. resolution 1920 x 1200 @60Hz Supports DVI with max. resolution 1920 x 1200 @60Hz Supports RGB with max. resolution 2048 x 1536 @75Hz Maximum shared memory of 1748MB</p> |
| Storage | <p>Intel® H55 Express Chipset - 6 x SATA 3.0 Gb/s ports</p> <p>Marvell® 88SE6111 SATA & PATA controller - 1 x Ultra DMA 133/100/66 for up to 2 PATA devices - 1 x External SATA 3.0 Gb/s port (SATA on-the-go)</p> |
| LAN | Realtek® 8112L Gigabit LAN controller featuring AI NET2 |
| USB | <p>NEC USB 3.0 controller - 2 x USB 3.0 ports (blue, at back panel)</p> <p>Intel® H55 Express Chipset - 10 x USB 2.0 ports (6 ports at mid-board, 4 ports at back panel)</p> |
| IEEE 1394 | VIA® VT6315N controller supports 2 x IEEE 1394a ports (one at midboard, one at back panel) |
| Audio | <p>Realtek® 8-channel High Definition Audio CODEC - BD Audio Layer Content Protection - Supports Jack-Detection, Multi-streaming, and Front Panel Jack-Retasking - Optical S/PDIF out port at back I/O - ASUS Noise Filter</p> |

(continued on the next page)

P7H55D-M EVO specifications summary

| | |
|---|--|
| ASUS unique features | ASUS Exclusive Overclocking Features <ul style="list-style-type: none">- TurboV- Turbo Key- GPU Boost ASUS Xtreme Design ASUS Xtreme Phase <ul style="list-style-type: none">- 8+3 Phase Power Design ASUS Exclusive Features <ul style="list-style-type: none">- Express Gate- MemOK!- ASUS EPU ASUS Quiet Thermal Solutions <ul style="list-style-type: none">- ASUS Fanless Design: Stack Cool 3- ASUS Fan Xpert ASUS EZ DIY <ul style="list-style-type: none">- ASUS Q-DIMM- ASUS Q-Connector- ASUS O.C. Profile- ASUS CrashFree BIOS 3- ASUS EZ Flash 2- ASUS MyLogo 2™- Multi-language BIOS |
| ASUS exclusive overclocking features | Precision Tweaker 2 <ul style="list-style-type: none">- vCore: Adjustable CPU voltage at 0.00625V increment- vIMC: Adjustable IMC voltage at 0.02V increment- vDRAM Bus: Adjustable DRAM voltage at 0.02V increment- vPCH: Adjustable PCH voltage at 0.01V increment- vCPU_PLL: Adjustable CPU_PLL voltage at 0.02V increment- iGPU: Adjustable iGPU voltage at 0.0125V increment SFS (Stepless Frequency Selection) <ul style="list-style-type: none">- Internal Base Clock tuning from 80MHz up to 500MHz at 1MHz increment- PCI Express frequency tuning from 100MHz up to 200MHz at 1MHz increment Overclocking protection <ul style="list-style-type: none">- ASUS C.P.R. (CPU Parameter Recall) |

(continued on the next page)

P7H55D-M EVO specifications summary

| | |
|--------------------------------|--|
| Back panel I/O ports | <ul style="list-style-type: none"> 1 x PS/2 keyboard port (purple) 1 x Optical S/PDIF Out port 1 x External SATA port 1 x HDMI out port 1 x DVI-D out port 1 x D-Sub out port 1 x IEEE 1394a port 1 x LAN (RJ-45) port 2 x USB 3.0/2.0 ports (blue) 4 x USB 2.0/1.1 ports 8-channel Audio I/O ports |
| Internal I/O connectors | <ul style="list-style-type: none"> 3 x USB connectors support additional 6 USB ports 1 x IDE connector 6 x SATA 3.0 Gb/s connectors 1 x CPU Fan connector 1 x Chassis Fan connectors (1 x 4-pin) 1 x Power Fan connector 1 x IEEE1394a connector 1 x COM connector 1 x Clear CMOS jumper 1 x S/PDIF Out header 1 x MemOK! button Front panel audio connector 24-pin ATX Power connector 8-pin EATX 12V Power connector System Panel (Q-Connector) |
| BIOS features | <ul style="list-style-type: none"> 64 Mb Flash ROM, SPI, AMI BIOS, PnP, DMI 2.0, WfM 2.0, SM BIOS 2.5, ACPI 2.0a, Multi-language BIOS, ASUS EZ Flash 2, ASUS CrashFree BIOS 3 |
| Manageability | <ul style="list-style-type: none"> WfM 2.0, DMI 2.0, WOL by PME, WOR by PME, PXE |
| Support DVD contents | <ul style="list-style-type: none"> Drivers ASUS Utilities ASUS Update Anti-virus software (OEM version) |
| Form factor | <ul style="list-style-type: none"> 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

1.1 Welcome!

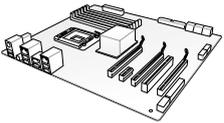
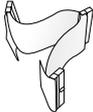
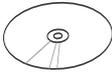
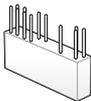
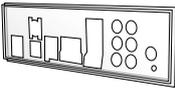
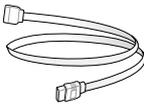
Thank you for buying an ASUS® P7H55D-M EVO motherboard!

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.

| | |
|---|---|
|  |  |
| ASUS P7H55D-M EVO motherboard | 1 x Ultra DMA 133/100/66 cable |
|  |  |
| User guide | Support DVD |
|  |  |
| 1 x 2-in-1 ASUS Q-Connector kit | 1 x ASUS I/O Shield |
|  | |
| 2 x Serial ATA 3.0 Gb/s cables | |



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

1.3 Special features

1.3.1 Product highlights

Intel® LGA1156 Lynnfield / Clarkdale Processor Ready

This motherboard supports the latest Intel® Lynnfield / Clarkdale processors in LGA1156 package, which has memory and PCI Express controller integrated to support 2-channel (4 DIMMs) DDR3 memory and 16 PCI Express 2.0 lanes, enabling higher graphics performance. Moreover, Intel® Clarkdale integrated Graphics Processing Unit (GPU) processors which goes with Intel® H55 chipset with VGA out can bring you to the whole new experience of the next generation VGA performance. It also provides separated 3D, 2D and Video Engines to execute different graphic control in hardware. Refer to page 2-5 for details.

Intel® H55

The Intel® H55 Express Chipset is the latest one-chipset design to support the latest 1156 socket Intel® Core™ i7 / Core™ i5 / Core™ i3 / Pentium® processors. Intel® H55 chipset provides improved performance by utilizing serial point-to-point links, allowing increased bandwidth and stability. Using Intel® Core™ i5 6 Series, Core™ i3 5 Series, and Pentium® CPU with H55 Express Chipset to enjoy the latest Intel integrated graphic performance!

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

The motherboard supports DDR3 memory that features data transfer rates of 2133(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. Refer to page 2-10 for details.

True USB 3.0 Support

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

HDMI support

High-Definition Multimedia Interface (HDMI) is a set of digital video standards that delivers multi-channel 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.

DVI-D Support

DVI (Digital Visual Interface) provides high visual quality of digital display devices such as LCD monitor. The interface of this motherboard supports dual display output: DVI-D/HDMI, VGA/HDMI, or DVI-D/VGA. Refer to page 2-22 for details.

Green ASUS

This motherboard and its packaging comply with the European Union's Restriction on the use of Hazardous Substances (RoHS). This is in line with the ASUS vision of creating environment-friendly and recyclable products/packaging to safeguard consumers' health while minimizing the impact on the environment.

1.3.2 ASUS Exclusive Overclocking Features

TurboV

Feel the adrenaline rush of real-time O.C. – now a reality with the ASUS TurboV. This easy O.C. 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. Refer to page 4-6 for details.

Turbo Key

ASUS Turbo Key allows you to turn the PC power button into a physical overclocking button. After the easy setup, Turbo Key can boost performances without interrupting ongoing work or games, simply through pressing the button Refer to page 4-8 for details.

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. Refer to page 4-7 for details.

1.3.3 ASUS Xtreme Phase

ASUS 8+3 Phase Power Design

Unleashes ultimate memory performances with independent power to core components, while providing fast transient response and stability for the CPU under heavy loading or overclocking modes.

1.3.4 ASUS Exclusive Features

Express Gate

Express Gate is an ASUS exclusive OS that provides you with quick access to the Internet and key applications before entering the Windows® OS. Refer to page 3-37 and 4-10 for details.

MemOK!

Memory compatibility is among the top concerns during computer upgrades. Worry no more. MemOK! is the fastest memory booting solution today. This remarkable memory rescue tool requires nothing but a push of a button to patch memory issues and get your system up and running in no time. The technology is able to determine failsafe settings that can dramatically improve your system booting success. Refer to page 2-21 for details.

ASUS EPU

The new ASUS EPU—the world's first power saving engine, has been upgraded to a new 6 engine version, which provides total system power savings by detecting current PC loadings and intelligently moderating power in real-time. With auto phase switching for components (which includes the CPU, VGA card / integrated GPU, memory, chipset, hard drives and CPU cooler / system fans), the EPU automatically provides the most appropriate power usage via intelligent acceleration and overclocking—helping save power and money. Refer to page 4-9 for details.

1.3.5 ASUS Quiet Thermal Solutions

ASUS Quiet Thermal solution makes system more stable and enhances the overclocking capability.

ASUS Fanless Design—Heat-sink solution

The crystal-shaped heatsink features 0-dB thermal solution that offers users a noiseless PC environment. Not only the beautiful shape upgrades the visual enjoyment for motherboard users, but also the heatsink design lowers the temperature of the chipset and power phase area through high efficient heat-exchange. Combined with usability and aesthetics, the ASUS crystal-shaped heatsink will give users an extremely silent and cooling experience with the elegant appearance!

Fan Xpert

ASUS Fan Xpert intelligently allows you to adjust both the CPU and chassis fan speeds according to different ambient temperatures caused by different climate conditions in different geographic regions and your PC's loading. The built-in variety of useful profiles offer flexible controls of fan speed to achieve a quiet and cool environment. Refer to page 4-5 for details.

1.3.6 ASUS EZ DIY

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

ASUS Q-DIMM

ASUS Q-DIMM enhances your DIY experience by speeding up and simplifying the DIY process!

ASUS Q-Connector

ASUS Q-Connector allows you to easily connect or disconnect the chassis front panel cables to the motherboard. This unique module eliminates the trouble of connecting the system panel cables one at a time and avoiding wrong cable connections. Refer to page 2-35 for details.

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 CrashFree BIOS 3

ASUS CrashFree BIOS 3 allows you to restore corrupted BIOS data from a USB flash disk containing the BIOS file. This protection eliminates the need to buy a replacement ROM chip.

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. Refer to page 3-4 for details.

Chapter 2

2.1 Before you proceed

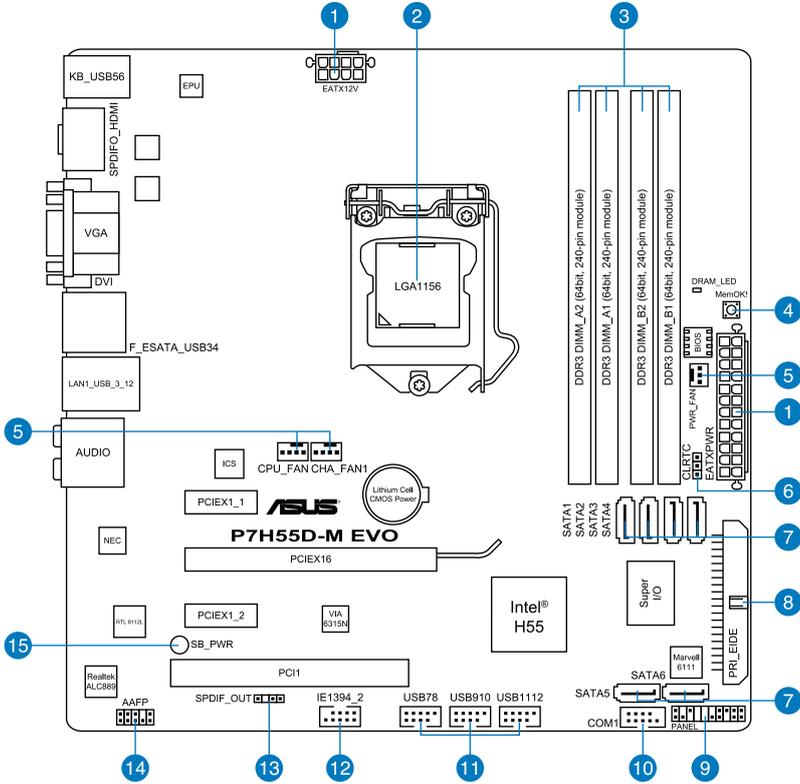
Take note of the following precautions before you install motherboard components or change any motherboard settings.



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

2.2 Motherboard overview

2.2.1 Motherboard layout



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

2.2.2 Layout contents

| Connectors/Jumpers/Slots | Page |
|--|------|
| 1. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V) | 2-33 |
| 2. LGA1156 CPU Socket | 2-5 |
| 3. DDR3 DIMM slots | 2-10 |
| 4. MemOK! switch | 2-21 |
| 5. CPU, chassis, and power fan connectors (4-pin CPU_FAN, 4-pin CHA_FAN1, 3-pin PWR_FAN) | 2-31 |
| 6. Clear RTC RAM (3-pin CLRTC) | 2-20 |
| 7. Intel® H55 Serial ATA 3.0 Gb/s connectors (7-pin SATA1–6 [blue]) | 2-28 |
| 8. IDE connector (40-1 pin PRI_EIDE) | 2-27 |
| 9. System panel connector (20-8 pin PANEL) | 2-34 |
| 10. Serial port connector (10-1 pin COM1) | 2-29 |
| 11. USB connectors (10-1 pin USB78, USB910, USB1112) | 2-30 |
| 12. IEEE 1394a port connector (10-1 pin IE1394_2) | 2-29 |
| 13. Digital audio connector (4-1 pin SPDIF_OUT) | 2-32 |
| 14. Front panel audio connector (10-1 pin AAFP) | 2-32 |
| 15. Standby power LED (SB_PWR) | 2-36 |

2.2.3 Placement direction

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

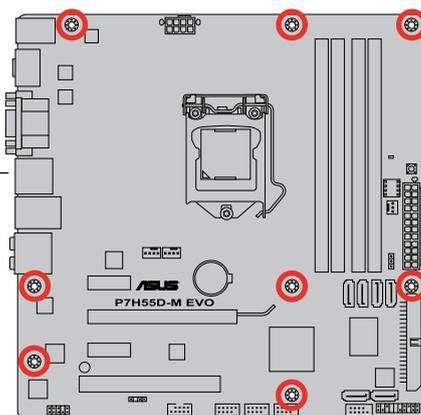
2.2.4 Screw holes

Place 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



2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1156 socket designed for the Intel® Core™ i7 / Core™ i5 / Core™ i3 / Pentium® processor.



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

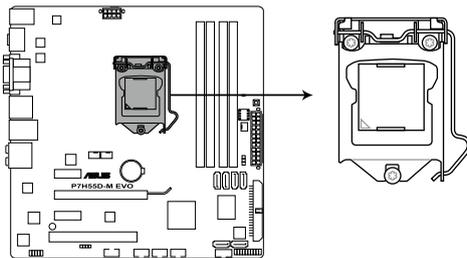


- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if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

2.3.1 Installing the CPU

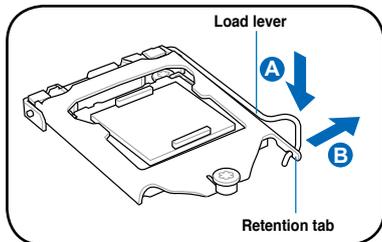
To install a CPU:

1. Locate the CPU socket on the motherboard.



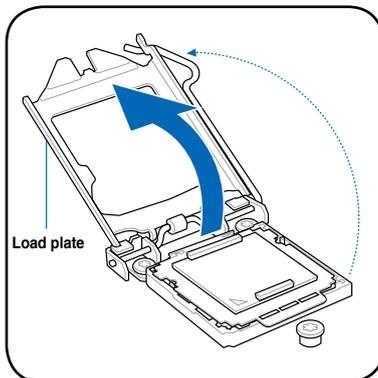
P7H55D-M EVO CPU LGA1156

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

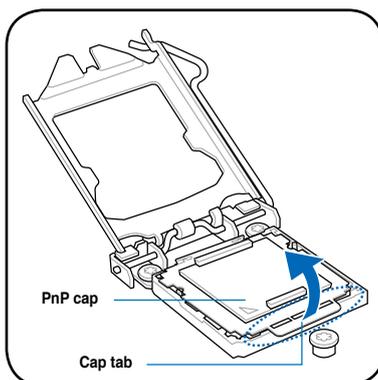


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

3. Lift the load lever in the direction of the arrow until the load plate is completely lifted.



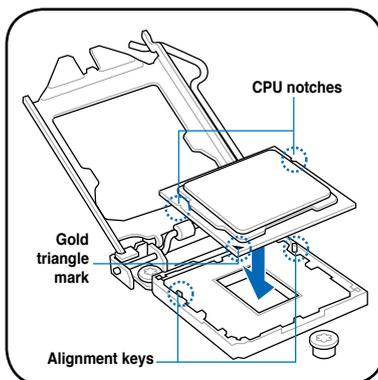
4. Remove the PnP cap from the CPU socket by lifting the tab only.



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



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



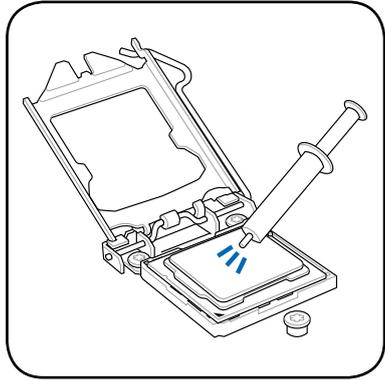
6. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.



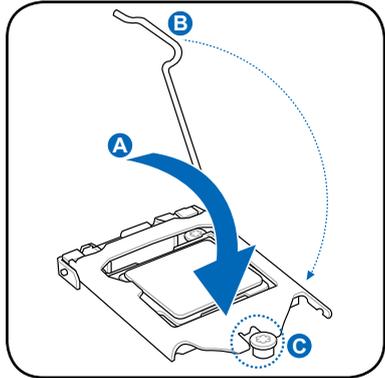
Some heatsinks come with pre-applied thermal paste. If so, skip this step.



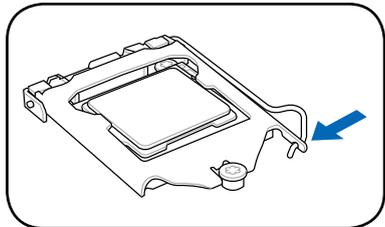
The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately, and seek professional medical help.



7. Close the load plate (A), and then push down the load lever (B), ensuring that the front edge of the load plate slides under the retention lock (C).



8. Insert the load lever under the retention tab.



2.3.2 Installing the CPU heatsink and fan

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



- When you buy a boxed Intel® processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, ensure that you use only Intel®-certified multi-directional heatsink and fan.
- Your Intel® LGA1156 heatsink and fan assembly comes in a push-pin design and does not require any tool to install.
- Use an LGA1156-compatible CPU heatsink and fan assembly only. The LGA1156 socket is incompatible with the LGA775 and LGA1366 sockets in size and dimension.



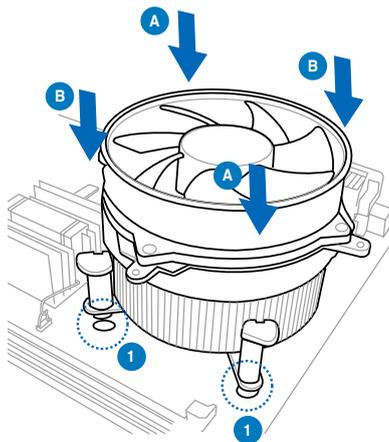
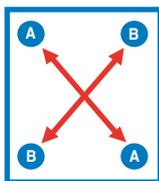
If you purchased a separate CPU heatsink and fan assembly, ensure that the Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.



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

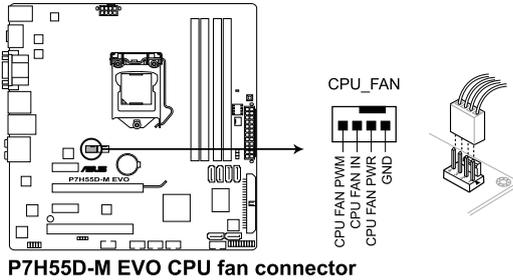
To install the CPU heatsink and fan:

1. Place the heatsink on top of the installed CPU, ensuring that the four fasteners match the holes on the motherboard.
2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.



Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

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

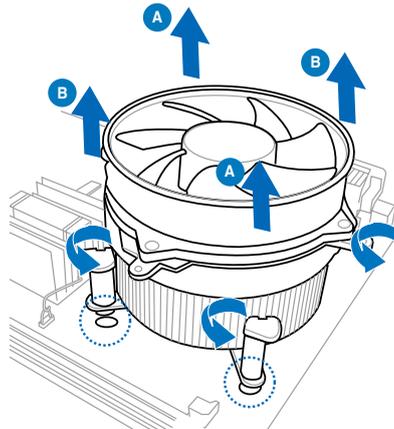
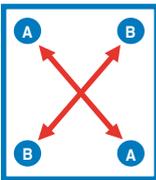


DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

2.3.3 Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

1. Disconnect the CPU fan cable from the connector on the motherboard.
2. Rotate each fastener counterclockwise.
3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.



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

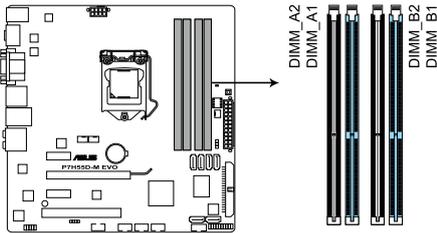
2.4 System memory

2.4.1 Overview

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

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

The figure illustrates the location of the DDR3 DIMM sockets:



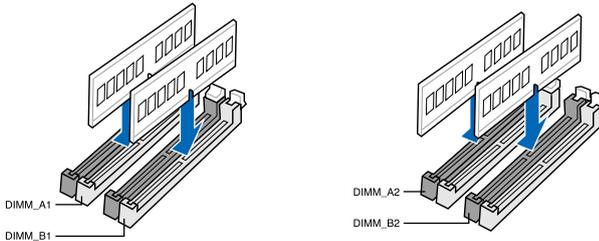
P7H55D-M EVO 240-pin DDR3 DIMM sockets

Recommended memory configurations

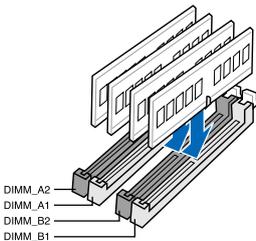
One DIMM:

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

Two DIMMs (dual-channel operation):



Four DIMMs (dual-channel operation):



2.4.2 Memory configurations

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



- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- Based on Intel specification, you can only install one X.M.P. DIMM per channel.
- According to Intel CPU spec, DIMM voltage below 1.65V is recommended to protect the CPU.
- According to Intel CPU spec, CPUs with a core frequency of 2.66G support the maximum DIMM frequency of up to DDR3-1333. To use DIMMs of a higher frequency with a 2.66G CPU, enable the **DRAM O.C. Profile** feature in BIOS. Refer to section **3.5.1 Ai Overclock Tuner** for details.
- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.
- Due to the memory address limitation on 32-bit Windows OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you do any of the following:
 - Use a maximum of 3GB system memory if you are using a 32-bit Windows OS.
 - Install a 64-bit Windows OS when you want to install 4GB or more on the motherboard.For more details, refer to the Microsoft® support site at <http://support.microsoft.com/kb/929605/en-us>.
- This motherboard does not support DIMMs made up of 512Mb (64MB) chips or less (Memory chip capacity counts in Megabit, 8 Megabit/Mb = 1 Megabyte/MB).



- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, refer to section **3.5 Ai Tweaker menu** for manual memory frequency adjustment.
- For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.

P7H55D-M EVO Motherboard Qualified Vendors Lists (QVL) DDR3-1333 MHz capability

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|---------|--|------------------|-----------|------------|--------------------|---------------|-----------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| A-DATA | AD3133301GOU | 1GB | SS | A-DATA | AD30908C8D-15IG | - | - | * | * | * |
| A-DATA | AD31333002GOU | 2GB | DS | A-DATA | AD30908C8D-15IG | - | - | * | * | * |
| A-DATA | AD3U1333B2G9-2 | 2GB | DS | A-DATA | AD30908C8D-15IG | - | - | * | * | * |
| A-DATA | AX3U1333PB2G7-2P | 4GB (2 x 2GB) | DS | - | - | 7-7-7-20 | 1.65-1.85 | * | * | * |
| A-DATA | AD3U1333C4G9-B | 4GB | DS | Hynix | H5TQ2G83AFRH9C | 1333-9-9-9-24 | - | * | * | * |
| A-DATA | AD31333E002G0U | 6GB (3 x 2GB) | DS | - | - | 7-7-7-20 | 1.65-1.85 | * | * | * |
| A-DATA | AX3U1333PB2G7-3P | 6GB (3 x 2GB) | DS | - | - | 7-7-7-20 | 1.65-1.85 | * | * | * |
| CORSAIR | TR3X3G1333C9 (Ver2.1) | 3GB (3 x 1GB) | SS | - | - | 9-9-9-24 | 1.5 | * | * | * |
| CORSAIR | CM3X1024-1333C9DHX | 1GB | DS | - | - | - | 1.1 | * | * | * |
| CORSAIR | BoxP/N:TWIN3X2048-1333C9 (CM3X1024-1333C9)Ver1.1 | 2GB (2 x 1GB) | DS | - | - | 9-9-9-24 | 1.70 | * | * | * |
| CORSAIR | CM3X2G1333C9 | 2GB | DS | - | - | 9-9-9-24 | 1.5 | * | * | * |
| CORSAIR | BoxP/N:TW3X4G1333C9DHX (CM3X2048-1333C9DHX)Ver3.2 | 4GB (2 x 2GB) | DS | - | - | 9-9-9-24 | 1.70 | * | * | * |
| CORSAIR | TR3X6G1333C9 (Ver2.1) | 6GB (3 x 2GB) | DS | - | - | 9-9-9-24 | 1.5 | * | * | * |
| CORSAIR | CMX8GX3M4A1333C9 | 8GB (4 x 2GB) | DS | - | - | 9-9-9-24 | 1.5 | * | * | * |
| Crucial | CT12864BA1339.8FF | 1GB | SS | MICRON | D9KPT | 9 | - | * | * | * |
| Crucial | CT12864BA1339.8SFD | 1GB | SS | MICRON | MT8JF12864AY-1G4D1 | - | - | * | * | * |
| Crucial | CT12872BA1339.9FF | 1GB | SS | MICRON | D9KPT(ECC) | 9 | - | * | * | * |
| Crucial | BL25664BN1337.16FF(XMP) | 2GB | DS | - | - | 7-7-7-24 | 1.65 | * | * | * |
| Crucial | CT25664BA1339.16FF | 2GB | DS | MICRON | D9KPT | 9 | - | * | * | * |
| Crucial | CT25664BA1339.16SFD | 2GB | DS | MICRON | D9JNM | - | - | * | * | * |
| Crucial | CT25672BA1339.18FF | 2GB | DS | MICRON | D9KPT(ECC) | 9 | - | * | * | * |
| Crucial | BL25664BA1336.16SFB1 | 4GB (2 x 2GB) | DS | NA | - | 6-6-6-20 | 1.8 | * | * | * |
| ELPIDA | EBJ10UE8BAW0-DJ-E | 1GB | SS | ELPIDA | J1108BABG-DJ-E | 9 | - | * | * | * |
| ELPIDA | EBJ10UE8BDF0-DJ-F | 1GB | SS | ELPIDA | J1108BDSE-DJ-F | - | - | * | * | * |
| ELPIDA | EBJ10UE8EDF0-DJ-F | 1GB | SS | ELPIDA | J1108EDSE-DJ-F | - | - | * | * | * |
| ELPIDA | EBJ21UE8BAW0-DJ-E | 2GB | DS | ELPIDA | J1108BABG-DJ-E | 9 | - | * | * | * |
| ELPIDA | EBJ21UE8BDF0-DJ-F | 2GB | DS | ELPIDA | J1108BDSE-DJ-F | - | - | * | * | * |
| ELPIDA | EBJ21UE8EDF0-DJ-F | 2GB | DS | ELPIDA | J1108EDSE-DJ-F | - | - | * | * | * |
| G.SKILL | F3-10600CL7D-2GBPI | 2GB (2 x 1GB) | SS | - | - | - | 1.65 | * | * | * |
| G.SKILL | F3-10600CL8D-2GBHK | 2GB (2 x 1GB) | SS | - | - | - | 1.65 | * | * | * |
| G.SKILL | F3-10666CL7T-6GBPK(XMP) | 2GB | DS | - | - | 7-7-7-18 | 1.5-1.6 | * | * | * |
| G.SKILL | F3-10666CL7D-4GBPI(XMP) | 4GB (2 x 2GB) | DS | - | - | 7-7-7-21 | 1.5 | * | * | * |
| G.SKILL | F3-10666CL7D-4GBRH(XMP) | 4GB (2 x 2GB) | DS | - | - | 7-7-7-21 | 1.5 | * | * | * |
| G.SKILL | F3-10666CL8D-4GBHK(XMP) | 4GB (2 x 2GB) | DS | - | - | 8-8-8-21 | 1.5-1.6 | * | * | * |
| G.SKILL | F3-10666CL8D-4GBRM(XMP) | 4GB (2 x 2GB) | DS | - | - | 8-8-8-21 | 1.5-1.6 | * | * | * |

P7H55D-M EVO Motherboard Qualified Vendors Lists (QVL) DDR3-1333 MHz capability (cont.)

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|--------------|----------------------|------------------|-----------|------------|--------------------|----------|---------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| G.SKILL | F3-10666CL9T-6GBNQ | 6GB (3 x 2GB) | DS | - | - | 9-9-9-24 | 1.5 | * | * | * |
| GEIL | GG34GB1333C9DC | 4GB (2 x 2GB) | DS | GEIL | GL1L128M88BA12N | 9-9-9-24 | 1.3 | * | * | * |
| GEIL | GV34GB1333C7DC | 4GB (2 x 2GB) | DS | - | - | 7-7-7-24 | 1.5 | * | * | * |
| Hynix | HMT112U6BFR8C-H9 | 1GB | SS | Hynix | H5TQ1G83BFR | 9 | - | * | * | * |
| Hynix | HMT125U6BFR8C-H9 | 2GB | DS | Hynix | H5TQ1G83BFR | 9 | - | * | * | * |
| Hynix | HMT125U6BFR8C-H9 | 2GB | DS | Hynix | H5TQ1G83BFRH9C | 9 | - | * | * | * |
| KINGSTON | KVR1333D3N9/2G | 2GB | DS | Qimonda | IDSH1G-03A1F1C-13H | 9 | 1.5 | * | * | * |
| KINGSTON | KVR1333D3N9/4G | 4GB | DS | SAMSUNG | K4B2G0846B-HCH9 | 9 | 1.5 | * | * | * |
| MICRON | MT8JTF12864AZ-1G4F1 | 1GB | SS | MICRON | 9FF22 D9KPT | 9 | - | * | * | * |
| MICRON | MT8JTF12864AZ-1G4F1 | 1GB | SS | MICRON | D9KPT | 9 | - | * | * | * |
| MICRON | MT9JSF12872AZ-1G4F1 | 1GB | SS | MICRON | D9KPT(ECC) | 9 | - | * | * | * |
| MICRON | MT16JF25664AZ-1G4F1 | 2GB | DS | MICRON | D9KPT | 9 | - | * | * | * |
| MICRON | MT16JF25664AZ-1G4F1 | 2GB | DS | MICRON | 9FF22 D9KPT | 9 | - | * | * | * |
| MICRON | MT18JSF25672AZ-1G4F1 | 2GB | DS | MICRON | D9KPT(ECC) | 9 | - | * | * | * |
| OCZ | OCZ3RPX1333EB2GK | 2GB (2 x 1GB) | SS | NANYA | - | 6-5-5 | 1.85 | * | * | * |
| OCZ | OCZ3G1333LV3GK | 3GB (3 x 1GB) | SS | - | - | 9-9-9 | 1.65 | * | * | * |
| OCZ | OCZ3P1333LV3GK | 3GB (3 x 1GB) | SS | - | - | 7-7-7 | 1.65 | * | * | * |
| OCZ | OCZ3P13332GK | 1GB | DS | - | - | 7-7-7-20 | - | * | * | * |
| OCZ | OCZ3G1333ULV4GK | 4GB (2 x 2GB) | DS | - | - | 8-8-8 | 1.65 | * | * | * |
| OCZ | OCZ3P13334GK | 4GB (2 x 2GB) | DS | - | - | 7 | 1.8 | * | * | * |
| OCZ | OCZ3RPX1333EB4GK | 4GB (2 x 2GB) | DS | - | - | - | 1.85 | * | * | * |
| OCZ | OCZ3G1333LV6GK | 6GB (3 x 2GB) | DS | - | - | 9-9-9 | 1.65 | * | * | * |
| OCZ | OCZ3P1333LV6GK | 6GB (3 x 2GB) | DS | - | - | 7-7-7 | 1.65 | * | * | * |
| OCZ | OCZX1333LV6GK(XMP) | 6GB (3 x 2GB) | DS | NA | - | 8-8-8 | 1.6 | * | * | * |
| PSC | AL7F8G73D-DG1 | 1GB | SS | PSC | A3P1GF3DGF | - | - | * | * | * |
| PSC | AL8F8G73D-DG1 | 2GB | DS | PSC | A3P1GF3DGF | - | - | * | * | * |
| SAMSUNG | M378B2873DZ1-CH9 | 1GB | SS | SAMSUNG | K4B1G0846D | 9 | - | * | * | * |
| SAMSUNG | M378B2873EH1-CH9 | 1GB | SS | SAMSUNG | K4B1G0846E | - | - | * | * | * |
| SAMSUNG | M391B2873DZ1-CH9 | 1GB | SS | SAMSUNG | K4B1G0846D(ECC) | 9 | - | * | * | * |
| SAMSUNG | M378B5673DZ1-CH9 | 2GB | DS | SAMSUNG | K4B1G0846D | 9 | - | * | * | * |
| SAMSUNG | M378B5673EH1-CH9 | 2GB | DS | SAMSUNG | K4B1G0846E | - | - | * | * | * |
| SAMSUNG | M391B5673DZ1-CH9 | 2GB | DS | SAMSUNG | K4B1G0846D(ECC) | 9 | - | * | * | * |
| SAMSUNG | M378B5273BH1-CH9 | 4GB | DS | SAMSUNG | K4B2G0846B-HCH9 | 9 | - | * | * | * |
| Super Talent | W1333UX2GB(XMP) | 2GB (2 x 1GB) | SS | - | - | 8 | 1.8 | * | * | * |

P7H55D-M EVO Motherboard Qualified Vendors Lists (QVL) DDR3-1333 MHz capability (cont.)

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|---------------|---------------------|------------------|-----------|------------|-----------------|----------|---------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| Transcend | TS128MLK64V3U | 1GB | SS | SAMSUNG | K4B1G0846D | 9 | - | * | * | * |
| Transcend | TS256MLK64V3U | 2GB | DS | SAMSUNG | K4B1G0846D | 9 | - | * | * | |
| Asint | SLY3128M8-EDJ | 1GB | SS | Asint | DDRIII1208-DJ | - | - | * | * | * |
| Asint | SLY3128M8-EDJE | 1GB | SS | ELPIDA | J1108BASE-DJ-E | - | - | * | * | |
| Asint | SLZ3128M8-EDJ | 2GB | DS | Asint | DDRIII1208-DJ | - | - | * | * | |
| Asint | SLZ3128M8-EDJE | 2GB | DS | ELPIDA | J1108BASE-DJ-E | - | - | * | * | |
| ASUS | N/A | 1GB | DS | - | - | - | - | * | * | |
| ATP | AQ28M64A8BJH9S | 1GB | SS | SAMSUNG | K4B1G0846E | - | - | * | * | * |
| ATP | AQ28M72D8BJH9S | 1GB | SS | SAMSUNG | K4B1G0846D(ECC) | - | - | * | * | |
| ATP | AQ56M64B8BJH9S | 2GB | DS | SAMSUNG | K4B1G0846D | - | - | * | * | * |
| ATP | AQ56M72E8BJH9S | 2GB | DS | SAMSUNG | K4B1G0846D(ECC) | - | - | * | * | * |
| BUFFALO | FSX1333D3G-1G | 1GB | SS | - | - | - | - | * | * | * |
| BUFFALO | FSH1333D3G-T3G(XMP) | 3GB (3 x 1GB) | SS | - | - | 7-7-7-20 | - | * | * | |
| BUFFALO | FSX1333D3G-2G | 2GB | DS | - | - | - | - | * | | |
| EK Memory | EKM324L28BP8-113 | 4GB (2 x 2GB) | DS | - | - | 9 | - | * | * | |
| Elixir | M2Y2G64CB8HA9N-CG | 2GB | DS | - | - | - | - | * | | * |
| Patriot | PDC32G1333LLK | 1GB | SS | PATRIOT | - | 7 | 1.7 | * | * | |
| Patriot | PVT33G1333ELK | 3GB (3 x 1GB) | SS | - | - | 9-9-9-24 | 1.65 | * | * | |
| Patriot | PVS34G1333ELK | 4GB (2 x 2GB) | DS | - | - | 9-9-9-24 | 1.5 | * | * | |
| Patriot | PVS34G1333LLK | 4GB (2 x 2GB) | DS | - | - | 7-7-7-20 | 1.7 | * | * | |
| Patriot | PVT36G1333ELK | 6GB (3 x 2GB) | DS | - | - | 9-9-9-24 | 1.65 | * | * | * |
| Silicon Power | SP001GBLTU1333S01 | 1GB | SS | NANYA | NT5CB128M8AN-CG | - | - | * | * | * |
| Silicon Power | SP001GBLTU1333S02 | 1GB | SS | S-POWER | I0YT3E0 | 9 | - | * | * | * |
| Silicon Power | SP002GBLTU1333S02 | 2GB | DS | S-POWER | I0YT3E0 | 9 | - | * | | |

P7H55D-M EVO Motherboard Qualified Vendors Lists (QVL) DDR3-1066 MHz capability

| Vendor | Part No. | Size | SS/ DS | Chip Brand | Chip NO. | Timing | Voltage | DIMM socket support (Optional) | | |
|-----------|-----------------------|------|-----------|------------|--------------------|--------|---------|-----------------------------------|--------|--------|
| | | | | | | | | 1 DIMM | 2 DIMM | 4 DIMM |
| Crucial | CT12864BA1067.8FF | 1GB | SS | MICRON | D9KPT | 7 | - | * | * | * |
| Crucial | CT12864BA1067.8SFD | 1GB | SS | MICRON | D9JNL | 7 | - | * | * | * |
| Crucial | CT12872BA1067.9FF | 1GB | SS | MICRON | D9KPT(ECC) | 7 | - | * | * | * |
| Crucial | CT25664BA1067.16FF | 2GB | DS | MICRON | D9KPT | 7 | - | * | * | * |
| Crucial | CT25664BA1067.16SFD | 2GB | DS | MICRON | D9JNL | 7 | - | * | * | * |
| Crucial | CT25672BA1067.18FF | 2GB | DS | MICRON | D9KPT(ECC) | 7 | - | * | * | * |
| ELPIDA | EBJ10UE8BAW0-AE-E | 1GB | SS | ELPIDA | J1108BABG-DJ-E | 7 | - | * | * | * |
| ELPIDA | EBJ10UE8EDF0-AE-F | 1GB | SS | ELPIDA | J1108EDSE-DJ-F | - | - | * | * | * |
| ELPIDA | EBJ11UD8BAFA-AG-E | 1GB | DS | ELPIDA | J5308BASE-AC-E | 8 | - | * | * | * |
| ELPIDA | EBJ21UE8BAW0-AE-E | 2GB | DS | ELPIDA | J1108BABG-DJ-E | 7 | - | * | * | * |
| ELPIDA | EBJ21UE8EDF0-AE-F | 2GB | DS | ELPIDA | J1108EDSE-DJ-F | - | - | * | * | * |
| Hynix | HMT112U6AFP8C-G7N0 | 1GB | SS | HYNIX | H5TQ1G83AFP7C | 7 | - | * | * | * |
| Hynix | HYMT112U64ZNF8-G7 | 1GB | SS | HYNIX | HY5TQ1G831ZNFP-G7 | 7 | - | * | * | * |
| Hynix | HMT125U6AFP8C-G7N0 | 2GB | DS | HYNIX | H5TQ1G83AFP7C | 7 | - | * | * | * |
| Hynix | HYMT125U64ZNF8-G7 | 2GB | DS | HYNIX | HY5TQ1G831ZNFP-G7 | 7 | - | * | * | * |
| KINGSTON | KVR1066D3N7/1G | 1GB | SS | KINGSTON | D1288JEKAPA7U | 7 | 1.5 | * | * | * |
| KINGSTON | KVR1066D3N7/2G | 2GB | DS | KINGSTON | D1288JEKAPA7U | 7 | 1.5 | * | * | * |
| KINGSTON | KVR1066D3N7/2G | 2GB | DS | ELPIDA | J1108BABG-DJ-E | - | 1.5 | * | * | * |
| KINGSTON | KVR1066D3N7/4G | 4GB | DS | SAMSUNG | K4B2G0846B-HCF8 | - | 1.5 | * | * | * |
| MICRON | MT8JTF12864AY-1G1D1 | 1GB | SS | MICRON | 7VD22 | 7 | - | * | * | * |
| MICRON | MT8JTF12864AZ-1G1F1 | 1GB | SS | MICRON | 8ZF22 D9KPV | 7 | - | * | * | * |
| MICRON | MT8JTF12864AZ-1G1F1 | 1GB | SS | MICRON | D9KPT | 7 | - | * | * | * |
| MICRON | MT8J9SF12872AZ-1G1F1 | 1GB | SS | MICRON | D9KPT(ECC) | 7 | - | * | * | * |
| MICRON | MT16JTF25664AY-1G1D1 | 2GB | DS | MICRON | 7VD22 | 7 | - | * | * | * |
| MICRON | MT16JTF25664AZ-1G1F1 | 2GB | DS | MICRON | 8ZF22 D9KPV | 7 | - | * | * | * |
| MICRON | MT16JTF25664AZ-1G1F1 | 2GB | DS | MICRON | D9KPT | 7 | - | * | * | * |
| MICRON | MT18J9SF25672AZ-1G1F1 | 2GB | DS | MICRON | D9KPT(ECC) | 7 | - | * | * | * |
| SAMSUNG | M378B5273BH1-CF8 | 4GB | DS | SAMSUNG | K4B2G0846B-HCF8 | 8 | 1.5 | * | * | * |
| Transcend | TS256MLK64V1U | 2GB | DS | ELPIDA | J1108BABG-AE-E | 7 | - | * | * | * |
| Asint | SLY3128M8-EAE | 1GB | SS | Asint | DDRIII1208-E | - | - | * | * | * |
| Asint | SLZ3128M8-EAE | 2GB | DS | Asint | DDRIII1208-E | - | - | * | * | * |
| Elixir | M2Y2G64CB8HA9N-BE | 2GB | DS | - | - | - | - | * | * | * |
| WINTEC | 3DU3191A-10 | 1GB | DS | Qimonda | IDSH51-03A1F1C-10F | 7 | - | * | * | * |



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

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



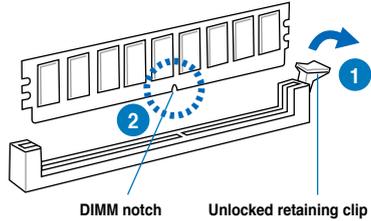
- ASUS exclusively provides hyper DIMM support function.
- Hyper DIMM support is subject to the physical characteristics of individual CPUs.
- Based on Intel specification, you can only install one X.M.P. DIMM per channel.
- According to Intel CPU spec, CPUs with a core frequency of 2.66G support the maximum DIMM frequency of up to DDR3-1333. To use DIMMs of a higher frequency with a 2.66G CPU, enable the **DRAM O.C. Profile** feature in BIOS. Refer to section **3.5.1 Ai Overclock Tuner** for details.
- Visit the ASUS website for the latest QVL.

2.4.3 Installing a DIMM



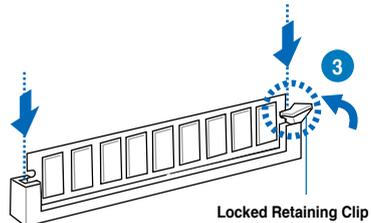
Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

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



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

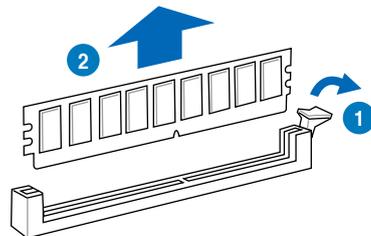
3. Hold the DIMM by both of its ends, then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place, and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.



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

2.4.4 Removing a DIMM

1. Press the retaining clip outward to unlock the DIMM.
2. Remove the DIMM from the socket.



2.5 Expansion slots

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



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

2.5.1 Installing an expansion card

To install an expansion card:

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

2.5.2 Configuring an expansion card

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

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



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

2.5.3 Interrupt assignments

Standard interrupt assignments

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

* These IRQs are usually available for PCI devices.

IRQ assignments for this motherboard

| | A | B | C | D | E | F | G | H |
|-------------------------|--------|--------|--------|--------|---|---|--------|--------|
| PCIe x16_1 | shared | – | – | – | – | – | – | – |
| PCIe x1_1 | shared | – | – | – | – | – | – | – |
| PCIe x1_2 | – | shared | – | – | – | – | – | – |
| PCI_1 | shared | – | – | – | – | – | – | – |
| LAN | – | shared | – | – | – | – | – | – |
| USB 2.0 Controller 1 | – | – | – | – | – | – | – | shared |
| USB 2.0 Controller 2 | shared | – | – | – | – | – | – | – |
| USB 3.0 Controller | – | – | – | shared | – | – | – | – |
| Marvell 6111 Controller | shared | – | – | – | – | – | – | – |
| SATA Host Controller | – | – | shared | – | – | – | – | – |
| 1394 Controller | – | – | shared | – | – | – | – | – |
| HD Audio | – | – | – | – | – | – | shared | – |

2.5.4 PCI slot

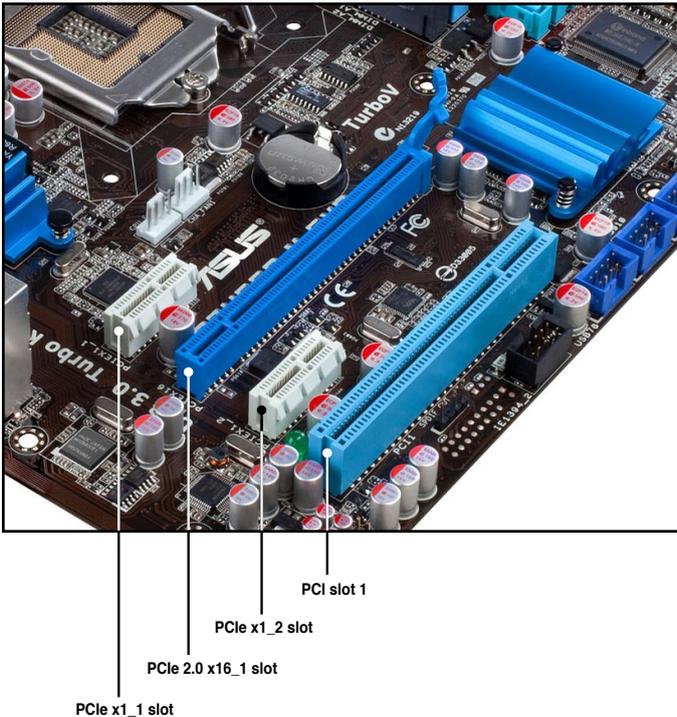
The PCI slot supports cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications. Refer to the figure below for the location of the slot.

2.5.5 PCI Express x1 slots

This motherboard supports PCI Express x1 network cards, SCSI cards and other cards that comply with the PCI Express specifications. Refer to the figure below for the location of the slots.

2.5.6 PCI Express 2.0 x16 slot

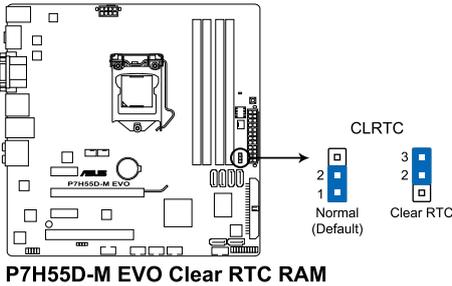
This motherboard has one PCI Express 2.0 x16 slot that supports PCI Express x16 2.0 graphic card complying with the PCI Express specifications. Refer to the figure below for the location of the slot.



2.6 Jumper

Clear RTC RAM (3-pin 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.



P7H55D-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 key during the boot process and enter BIOS setup to re-enter data.



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



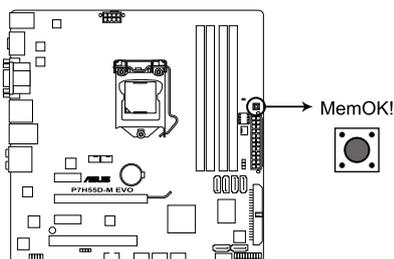
- If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.
 - You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the C.P.R.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

2.7 Onboard switch

The onboard switch allows 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.

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.



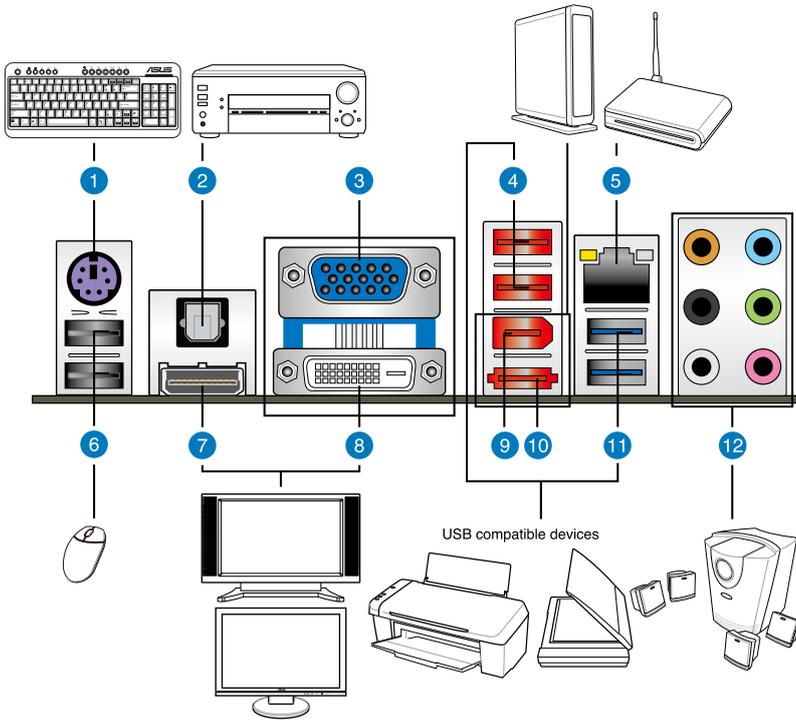
P7H55D-M EVO MemOK! switch



- Refer to section **2.9 Onboard LEDs** for the exact location of the DRAM_LED.
- The DRAM_LED also lights when the DIMM is not properly installed. Turn off the system and reinstall the DIMM before using the MemOK! function.
- The MemOK! switch does not function under Windows® OS environment.
- During the tuning process, the system loads and tests failsafe memory settings. It takes about 30 seconds for the system to test one set of failsafe settings. If the test fails, the system reboots and test the next set of failsafe settings. The blinking speed of the DRAM_LED increases, indicating different test processes.
- Due to memory tuning requirement, the system automatically reboots when each timing set is tested. If the installed DIMMs still fail to boot after the whole tuning process, the DRAM_LED lights continuously. Replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) in this user manual or on the ASUS website at www.asus.com.
- If you turn off the computer and replace DIMMs during the tuning process, the system continues memory tuning after turning on the computer. To stop memory tuning, turn off the computer and unplug the power cord for about 5–10 seconds.
- If your system fail to boot due to BIOS overclocking, press the MemOK! switch to boot and load BIOS default settings. A message will appear during POST reminding you that the BIOS has been restored to its default settings.
- We recommend that you download and update to the latest BIOS version from the ASUS website at www.asus.com after using the MemOK! function.

2.8 Connectors

2.8.1 Rear panel connectors



Rear panel connectors

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

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

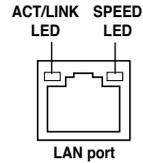
***: Refer to the notes and troubleshooting on monitor overscan / underscan problem on the next pages.



DO NOT insert a different connector to the external SATA port.

* LAN port LED indications

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



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

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



- This motherboard comes with multiple VGA output that features desktop extension on two monitors. You can connect two monitors to any two of the onboard VGA, DVI-D, and HDMI ports. Note that DVI-D/HDMI dual output works in OS environment only and that during POST or BIOS setup, only DVI-D output is valid.
- Due to the Intel® VGA driver issue, the Windows® Display Settings menu may offer some resolution options that your monitor does not support. When you set a resolution not supported by your monitor, it will black out. If this happens, wait 15 seconds for the system to return to its original setting or restart the system and press F8 to enter Safe Mode. In Safe Mode, change the display setting to 800 x 600, and then restart the system to adjust the monitor resolution from the Windows® Display Settings menu.
- Due to the Intel® driver issue, some monitor resolution settings will lead to monitor overscan or underscan. Refer to the next page for the troubleshooting on monitor overscan/underscan problem
- **Playback of Blu-Ray Discs**
The speed and bandwidth of the CPU/Memory, DVD player, and drivers will affect the playback quality. Following is a configuration example for your reference. Using the CPU/Memory of higher speed and bandwidth with the higher-version DVD player and drivers will upgrade the playback quality.
 - To play Blu-Ray Disc, make sure to use an HDCP compliant monitor.
 - You can only play Blu-Ray Disc under Windows® Vista™ / 7™ OS.

Troubleshooting on monitor overscan / underscan problem

1. Install **Intel Graphics Accelerator Driver** from the motherboard support DVD.
2. From the Windows® notification area, double-click the **Intel(R) Graphics Media Accelerator Driver** icon and click **Graphics Properties**.



3. Click **Display > General Settings** and select a **Resolution**. Click **Apply**.

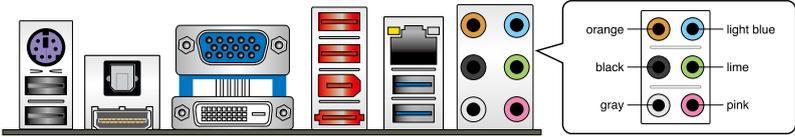


4. Or you can click **Display > General Settings > Scaling > Customize Aspect Ratio**. Move the **Horizontal Scaling** and **Vertical Scaling** sliders and then click **Apply**.



2.8.2 Audio I/O connections

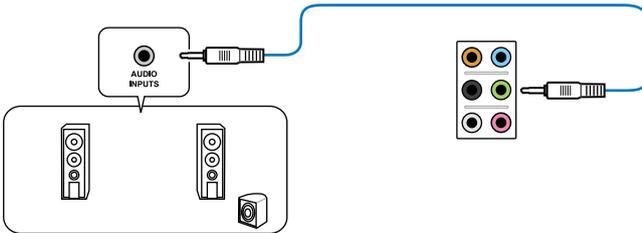
Audio I/O ports



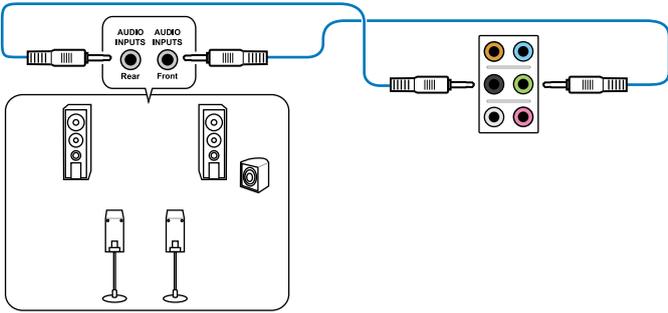
Connect to Headphone and Mic



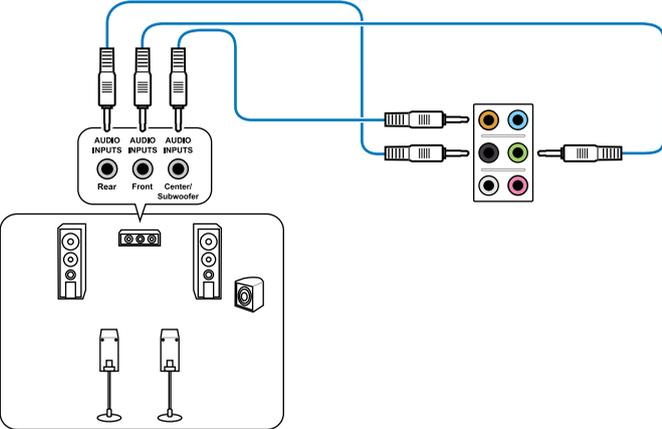
Connect to Stereo / 2.1-channel Speakers



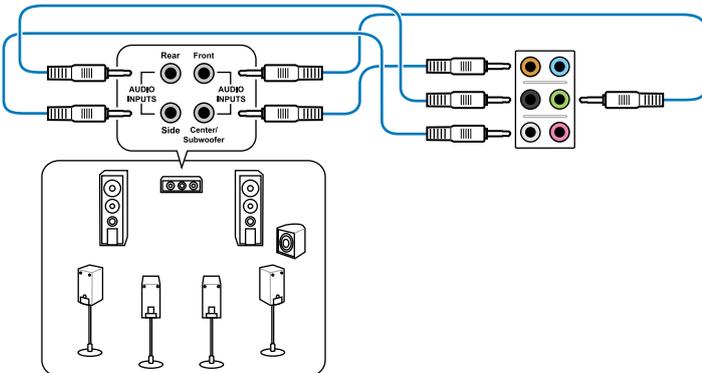
Connect to 4.1 channel Speakers



Connect to 5.1 channel Speakers



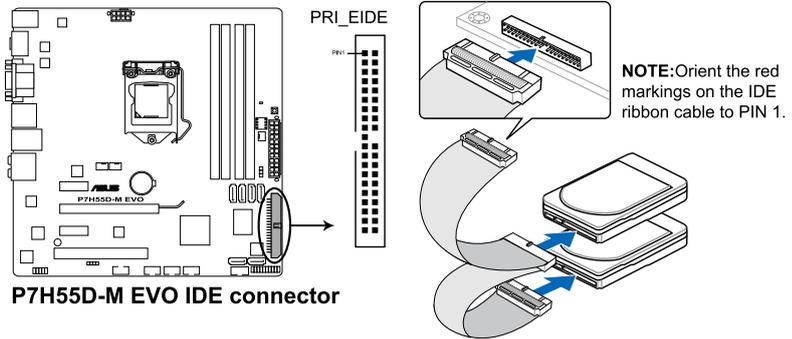
Connect to 7.1 channel Speakers



2.8.3 Internal connectors

1. IDE connector (40-1 pin PRI_EIDE)

The onboard IDE connector is for the Ultra DMA 133/100/66 signal cable. There are three connectors on each Ultra DMA 133/100/66 signal cable: blue, black, and gray. Connect the blue connector to the motherboard's IDE connector, then select one of the following modes to configure your device.



| | Drive jumper setting | Mode of device(s) | Cable connector |
|---------------|------------------------|-------------------|-----------------|
| Single device | Cable-Select or Master | - | Black |
| Two devices | Cable-Select | Master | Black |
| | | Slave | Gray |
| | Master | Master | Black or gray |
| Slave | Slave | | |



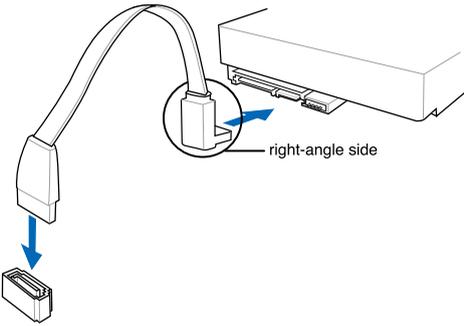
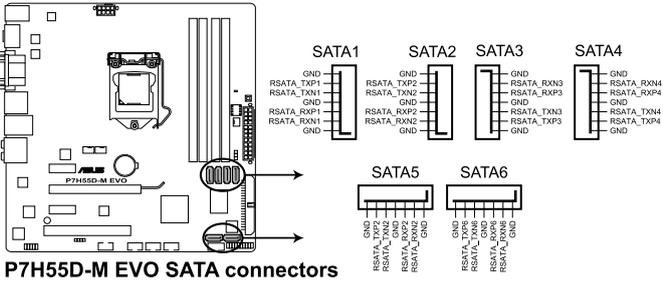
- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra DMA 133/100/66 IDE devices.



If any device jumper is set as "Cable-Select", ensure that all other device jumpers have the same setting.

2. Intel® H55 Serial ATA connectors (7-pin SATA 1-6 [blue])

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



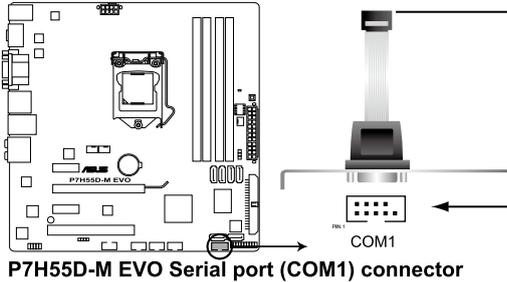
NOTE: Connect the right-angle side of SATA signal cable to SATA device.
Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.



You must install Windows® XP Service Pack 2 or later version before using Serial ATA hard disk drives.

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

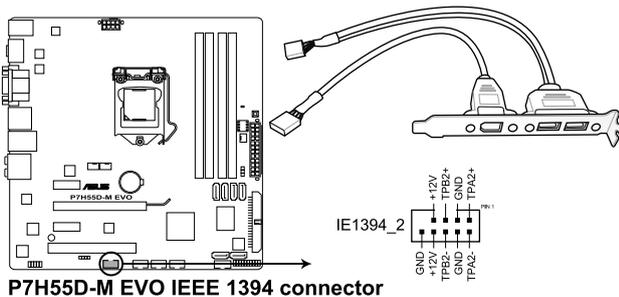
This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.



The COM module is purchased separately.

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

This connector is for an IEEE 1394a port. Connect the IEEE 1394a module cable to this connector, then install the module to a slot opening at the back of the system chassis.



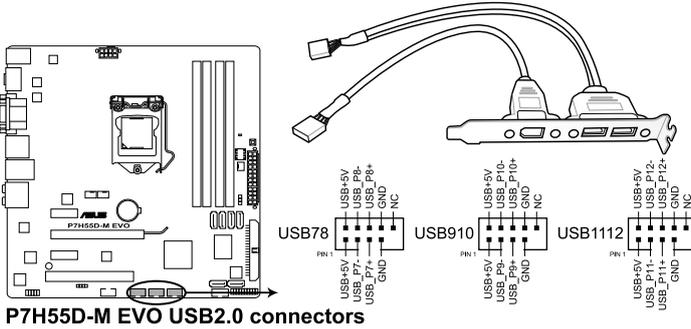
Never connect a USB cable to the IEEE 1394a connector. Doing so will damage the motherboard!



The IEEE 1394a module is purchased separately.

5. USB connectors (10-1 pin USB78; USB910; USB1112)

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



P7H55D-M EVO USB2.0 connectors



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



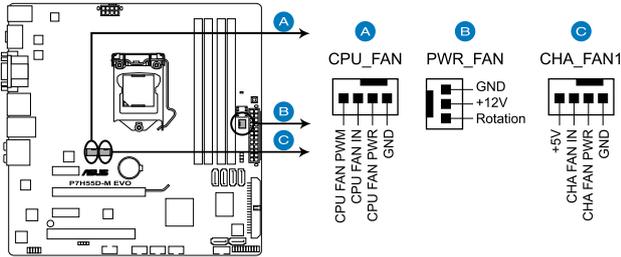
You can connect the front panel USB cable to the ASUS Q-Connector (USB, blue) first, and then install the Q-Connector (USB) to the USB connector onboard if your chassis supports front panel USB ports.



The USB module is purchased separately.

**6. CPU, chassis, and power fan connectors
(4-pin CPU_FAN; 4-pin CHA_FAN1; 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.



P7H55D-M EVO Fan connectors



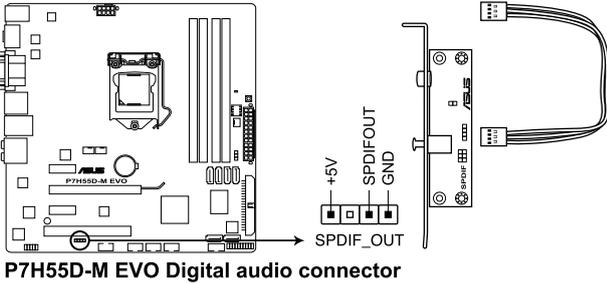
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



- The CPU_FAN connector supports the CPU fan of maximum 2A (24 W) fan power.
- Only the CPU_FAN and CHA_FAN1 connectors support the ASUS Fan Xpert feature.

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

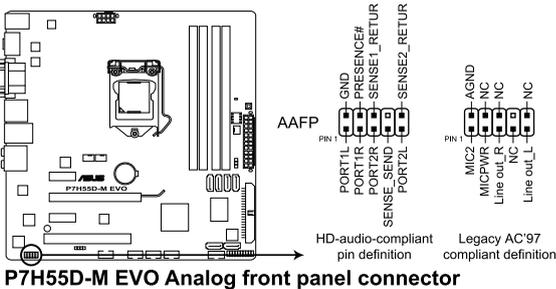
This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port. Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis.



The S/PDIF module is purchased separately.

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

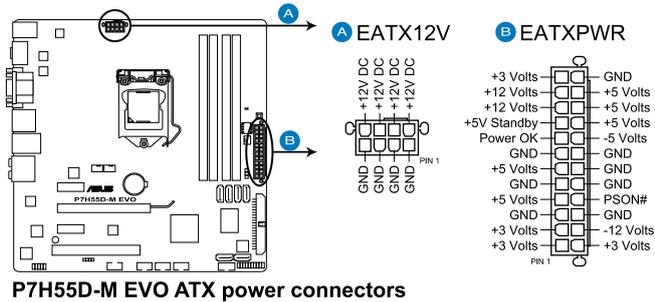
This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.



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

9. ATX power connectors (24-pin EATXPWR; 8-pin EATX12V)

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

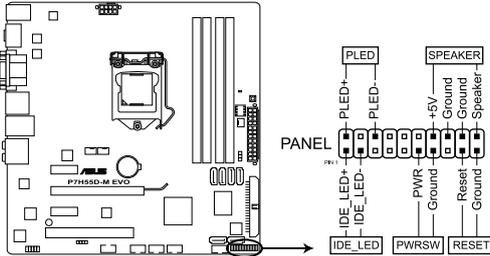


- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 350 W.
- Do not forget to connect the 8-pin EATX12 V power plug; otherwise, the system will not boot.
- We recommend that you use a PSU with higher power output when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- If you are uncertain about the minimum power supply requirement for your system, refer to the Recommended Power Supply Wattage Calculator at <http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us> for details.

| PSU suggested list | | |
|-------------------------|------------------------|-----------------------------|
| Seventeam ST-522HLP | T.C. STAR D420 | CoolerMaster RS-750 |
| Seventeam ST550EAJ-05F | OCZ ELITEXSTREAM 1000 | CWT PSH650V-D |
| ASUS P-50GA | Seasonic SS-900HP | CWT PSH750V-D |
| ASUS P-55GA | Snake PSH850V | Delta GPS-350AB |
| ASUS U-65GA | Silverstone SST-ST85F | EnerMAX EG495AX-VE (E)(24P) |
| ASUS U-75HA | Silverstone ZM1200M | EnerMAX ELT500AWT |
| AXE-AA1000U-C | Tagan TG1100-U33 | FSP FSP500-60GLN |
| Be quiet P6-PRO-850W | Thermaltake W0132RE | Gigabyte M550A-D1 |
| Be quiet BN077 | Thermaltake W0133RU | Gigabyte P610A-C1 |
| CoolerMaster RS-850EMBA | Thermaltake W0171 | GoldenField ATX-S398 |
| Corsair CMPSU-620HX | AcBel API4PC24 | GoldenField ATX-S550 |
| Corsair HX1000W | Aelta GPS-550AB | I-cuteAP-600S |
| EnerMAX EGX1000EWL | Be quiet BN073 | OCZ OCZ780MXS |
| HECHUAN ST-ATX330 | CoolerMaster RS-650 | Seasonic SS-351HT |
| Seasonic SS-460HS | Seventeam ST-420BKP | Thermaltake TWV500W-AP |
| Seasonic SS-500GB | Snake PSH500V | Thermaltake PUREPower-600AP |
| Seasonic SS-500HM | Silverstone SST-ST50EF | Zippy HP2-6500PE (G1) |
| Seasonic SS-550HT | Silverstone PSU ST56ZF | Zippy PSL6720P |
| Seasonic SS-600HT | | |

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

This connector supports several chassis-mounted functions.



P7H55D-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. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

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

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

2.8.4. ASUS Q-Connector (system panel)

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

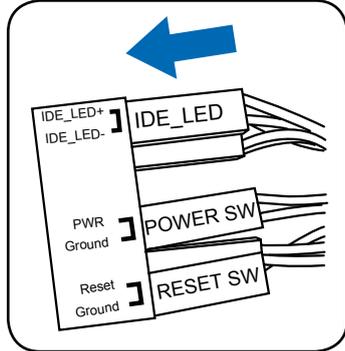
To install the ASUS Q-Connector:

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

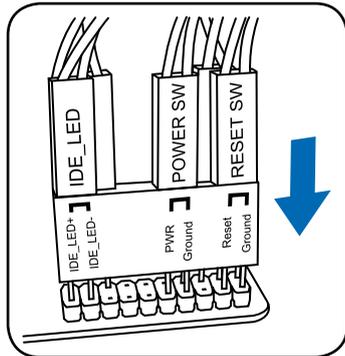
Refer to the labels on the Q-Connector to know the detailed pin definitions, and then match them to their respective front panel cable labels.



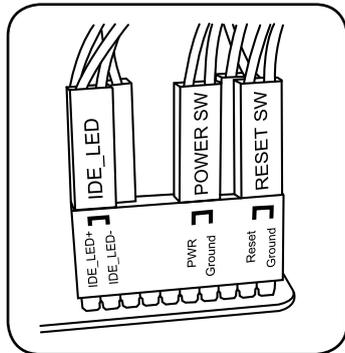
The labels on the front panel cables may vary depending on the chassis model.



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



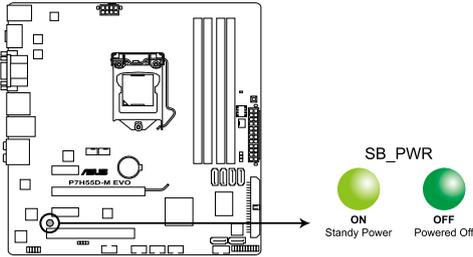
3. The front panel functions are now enabled. The figure shows the Q-Connector is properly installed on the motherboard.



2.9 Onboard LEDs

1. Standby Power LED

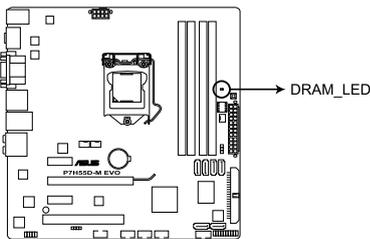
The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration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



P7H55D-M EVO Onboard LED

2. 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 intuitive way to locate the root problem within a second.



P7H55D-M EVO DRAM LED

2.10 Starting up for the first time

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

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

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

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

2.11 Turning off the computer

While the system is ON, pressing the power switch for less than four seconds puts the system on sleep mode or soft-off mode, depending on the BIOS setting. Pressing the power switch for more than four seconds lets the system enter the soft-off mode regardless of the BIOS setting. Refer to section **3.7 Power menu** in Chapter 3 for details.

Chapter 3

3.1 Knowing BIOS

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

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



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

3.2 Updating BIOS

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



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

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

1. **ASUS Update:** Updates the BIOS in Windows® environment.
2. **ASUS EZ Flash 2:** Updates the BIOS using a USB flash drive.
3. **ASUS CrashFree BIOS 3 utility:** Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.
4. **ASUS BIOS Updater:** Updates and backups the BIOS in DOS environment using the motherboard support DVD and a USB flash disk drive.

Refer to the corresponding sections for details on these utilities.



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

3.2.1 ASUS Update utility

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

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

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



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

Installing ASUS Update

To install ASUS Update:

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

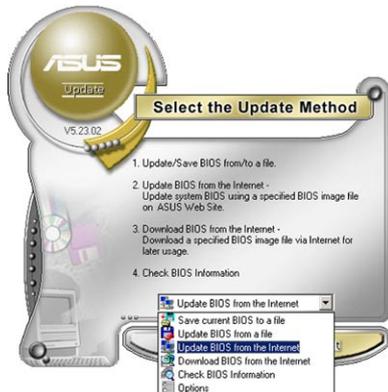
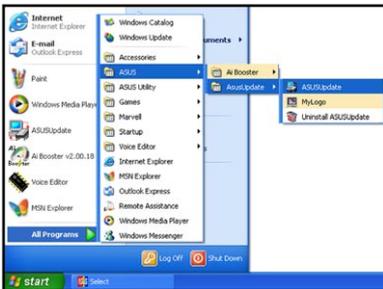


Quit all Windows® applications before you update the BIOS using this utility.

Updating the BIOS through the Internet

To update the BIOS through the Internet:

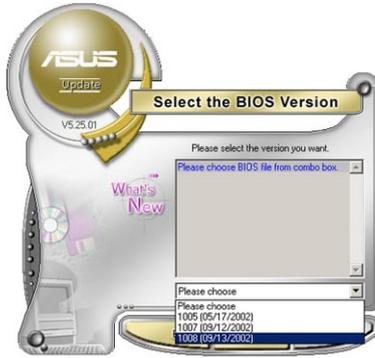
1. From the Windows® desktop, click **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate**. The ASUS Update main window appears.
2. Select **Update BIOS from the Internet** from the drop-down menu, and then click **Next**.



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



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



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

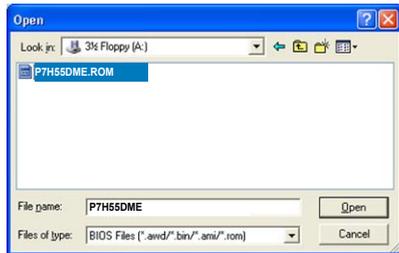
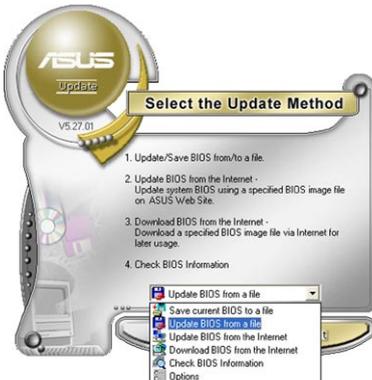


The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.

Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

1. From the Windows® desktop, click **Start > Programs > ASUS > Start > ASUSUpdate > ASUSUpdate**. The ASUS Update main window appears.
2. Select **Update BIOS from a file** from the dropdown menu, then click **Next**.
3. Locate the BIOS file from the Open window, then click **Open**.
4. Follow the onscreen instructions to complete the update process.



Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit menu. See section 3.10 **Exit Menu** for details.

3.2.2 ASUS EZ Flash 2 utility

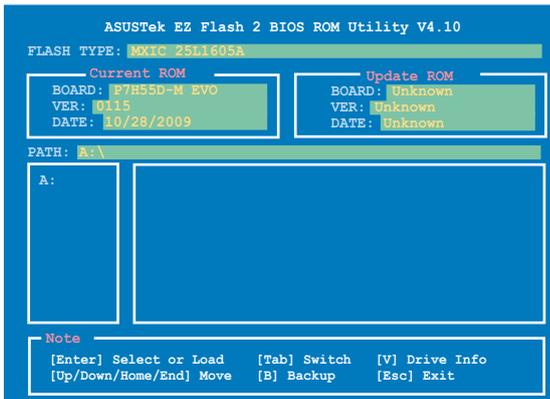
The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use a bootable floppy disk or an OS-based utility.



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

To update the BIOS using EZ Flash 2:

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



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



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



Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. See section 3.10 **Exit Menu** for details.

3.2.3 ASUS CrashFree BIOS 3 utility

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



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

Recovering the BIOS

To recover the BIOS:

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



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

3.2.4 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.

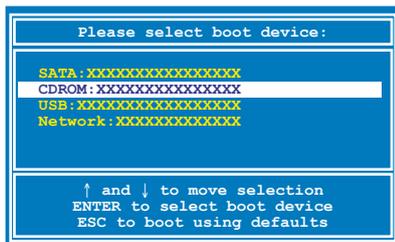


- NTFS is not supported under DOS environment. Do not save the BIOS file and BIOS Updater to a hard disk drive or USB flash drive in NTFS format.
- Do not save the BIOS file to a floppy disk due to low disk capacity.

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).

```
Welcome to FreeDOS (http://www.freedos.org)!  
C:\>d:  
D:\>
```

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.

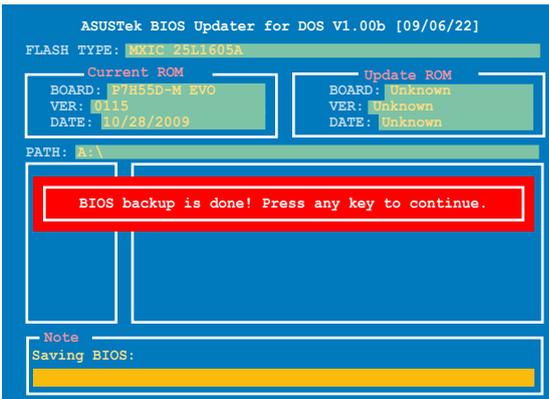
1. At the FreeDOS prompt, type `bupdater /o [filename]` and press <Enter>.

```
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.



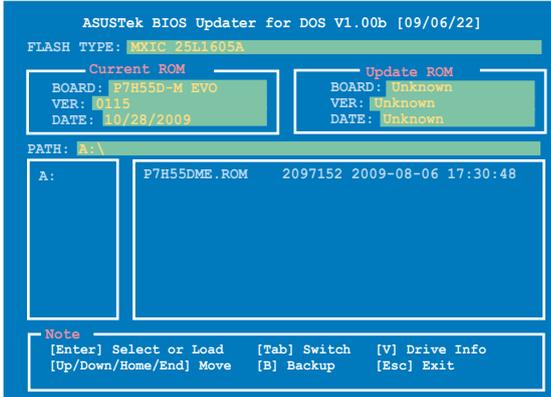
Updating the BIOS file

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 Chapter 3 of your motherboard user manual for details.
- Ensure to connect all SATA hard disk drives after updating the BIOS file if you have disconnected them.

3.3 BIOS setup program

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

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

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



- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. See section 3.10 **Exit Menu** for details.
- If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See section 2.6 **Jumper** for details.

3.3.1 BIOS menu screen

The screenshot shows the BIOS Setup Utility menu screen. At the top, there is a menu bar with items: Main, Ai Tweaker, Advanced, Power, Boot, Tools, and Exit. The main area is divided into three columns. The left column contains 'System Time', 'System Date', and 'Language' under the 'Main' menu item, and a list of SATA ports (SATA1 to SATA6) and 'Storage Configuration' and 'System Information' under the 'Advanced' menu item. The middle column shows configuration fields for 'Time' (13:51:25), 'Date' (Wed 11/04/2009), 'Language' (English), and 'HDD' (HDT722516DLA380). The right column contains 'General help' text and a list of navigation keys: Select Screen, Select Item, Change Field, Select Field, General Help, Save and Exit, and Exit. Labels with arrows point to these elements: 'Menu items' points to the top bar, 'Menu bar' points to the top bar, 'Configuration fields' points to the middle column, 'General help' points to the right column, 'Submenu items' points to the left column, and 'Navigation keys' points to the bottom right of the screen.

3.3.2 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 |

3.3.3 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.



The navigation keys may differ from one screen to another.

3.3.4 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.

3.3.5 Submenu items

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

3.3.6 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.

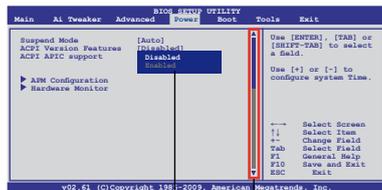
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options. Refer to **3.3.7 Pop-up window**.

3.3.7 Pop-up window

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

3.3.8 Scroll bar

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



Scroll bar
Pop-up window

3.3.9 General help

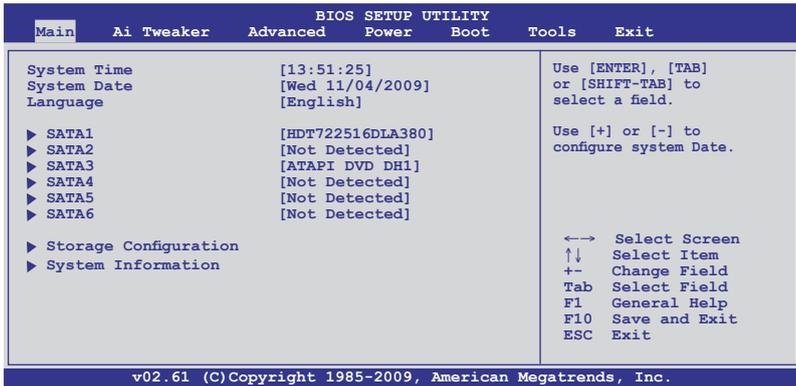
At the top right corner of the menu screen is a brief description of the selected item.

3.4 Main menu

When you enter the BIOS Setup program, the Main menu screen appears, giving you an overview of the basic system information. Select an item and press <Enter> to display the submenu.

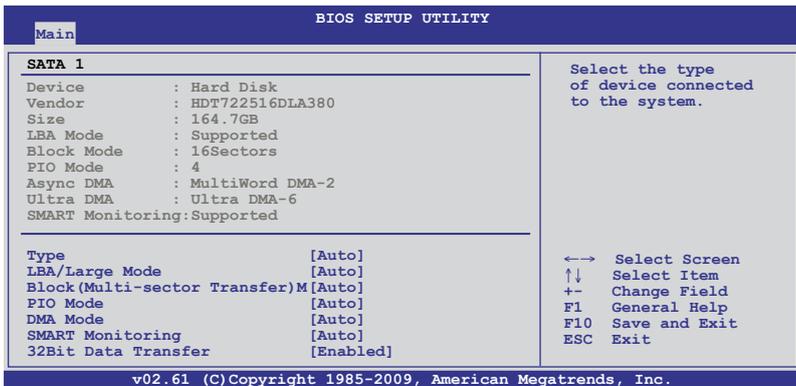


Refer to **section 3.3.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.



3.4.1 SATA 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 and press <Enter> to display the SATA device information.



The BIOS automatically detects the values of 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 **N/A** if no SATA device is installed in the system.

Type [Auto]

Allows you to select the type of device installed.

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



This item appears in **SATA1-4** only.

LBA/Large Mode [Auto]

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

Block (Multi-Sector Transfer) M [Auto]

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

PIO Mode [Auto]

- [Auto] Allows automatic selection of the PIO (Programmed input/output) modes, which correspond to different data transfer rates.
- [0] [1] [2] [3] [4] Sets the PIO mode to Mode 0, 1, 2, 3, or 4.

DMA Mode [Auto]

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

The DMA mode consists of SDMA (single-word DMA), MDMA (multi-word DMA), and UDMA (Ultra DMA). Setting to [Auto] allows automatic selection of the DMA mode.

SMART Monitoring [Auto]

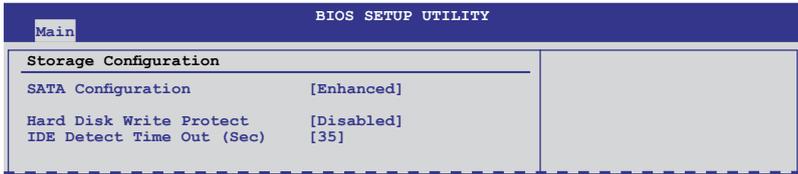
- [Auto] Allows automatic selection of the S.M.A.R.T (Smart Monitoring, Analysis, and Reporting Technology).
- [Enabled] Enables the S.M.A.R.T feature.
- [Disabled] Disables the S.M.A.R.T feature.

32Bit Data Transfer [Enabled]

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

3.4.2 Storage Configuration

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



SATA Configuration [Enhanced]

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

Hard Disk Write Protect [Disabled]

[Enabled] Enables device write protection. This function will be effective only if the device is accessed through BIOS.

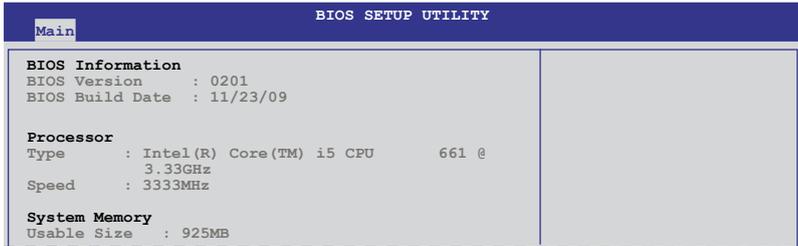
[Disabled] Disables this function.

IDE Detect Time Out (Sec) [35]

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

3.4.3 System Information

This menu gives you an overview of the general system specifications. The BIOS automatically detects the BIOS information, CPU specification, and system memory in this menu.



3.5 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.

| BIOS SETUP UTILITY | | Tools | | Exit | | |
|---|------------|----------|-------|--|--|--|
| Main | Ai Tweaker | Advanced | Power | Boot | | |
| Configure System Performance Settings | | | | | | |
| Ai Overclock Tuner | [Auto] | | | Warning: this function belongs to overclocking, and it may cause instability. Select a CPU level, and the rest will be auto-adjusted. If you want to adjust more, set Ai Overclock Tuner to Manual after you select a CPU level. ←→ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit | | |
| CPU Ratio Setting | [Auto] | | | | | |
| Intel(R) SpeedStep(TM) Tech | [Enabled] | | | | | |
| Intel(R) TurboMode Tech | [Enabled] | | | | | |
| Xtreme Phase Full Power Mode | [Auto] | | | | | |
| DRAM Frequency | [Auto] | | | | | |
| QPI Frequency | [Auto] | | | | | |
| ▶ DRAM Timing Control | | | | | | |
| CPU Differential Amplitude | [Auto] | | | | | |
| CPU Clock Skew | [Auto] | | | | | |
| ***** Please key in numbers directly! ***** | | | | | | |
| CPU Voltage Mode | [Offset] | | | | | |
| Offset Voltage | [Auto] | | | | | |
| IMC Voltage | [Auto] | | | | | |
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Scroll down to display the following items:

| | | | | | | | |
|---|--------|--|--|--|--|--|--|
| DRAM Voltage | [Auto] | | | ←→ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit | | | |
| CPU PLL Voltage | [Auto] | | | | | | |
| PCH Voltage | [Auto] | | | | | | |
| iGPU Voltage | [Auto] | | | | | | |
| ***** | | | | | | | |
| Load-Line Calibration | [Auto] | | | | | | |
| CPU Spread Spectrum | [Auto] | | | | | | |
| PCIE Spread Spectrum | [Auto] | | | | | | |
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3.5.1 Ai Overclock Tuner [Auto]

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

| | |
|----------------|---|
| Manual | Allows you to individually set overclocking parameters. |
| Auto | Loads the optimal settings for the system. |
| D.O.C.P | Overclocks DRAM frequency by adjusting BCLK frequency. |
| X.M.P. | If you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to set the profiles supported by your memory modules for optimizing the system performance. |



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

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

This item appears only when you set the **Ai Overclock Tuner** item to [D.O.C.P.] and allows you to select a DRAM O.C. profile, which applies different settings to DRAM frequency, DRAM timing and DRAM voltage. Configuration options: [DDR3-1600MHz] [DDR3-1800MHz] [DDR3-1866MHz] [DDR3-2000MHz] [DDR3-2133MHz] [DDR3-2200MHz]

| DRAM Frequency (MHz) | Lynnfield CPU Frequency (GHz) | | | Clarkdale CPU Frequency (GHz) | |
|----------------------|-------------------------------|----------|----------|-------------------------------|----------|
| | 2.66 | 2.8 | 2.93 | 2.8 | Others |
| 1333 | Auto | Auto | Auto | D.O.C.P. | Auto |
| 1600 | D.O.C.P. | Auto | Auto | D.O.C.P. | D.O.C.P. |
| Above 1600 | D.O.C.P. | D.O.C.P. | D.O.C.P. | N/A | N/A |



- When using DIMMs with a frequency higher than the Intel® CPU spec, use this ASUS exclusive **DRAM O.C. Profile** function to overclock the DRAM.
- Adjust BCLK frequency to obtain a better performance after applying the D.O.C.P function.

eXtreme Memory Profile [High Performance]

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

- [Disabled] You are not allowed to select the memory profile.
[High Performance] Allows your memory to work in high performance.
[High Frequency] Allows your memory to work in high frequency.



To obtain the best performance of the X.M.P. DIMM or 1600MHz DIMM, install only one DIMM on each memory channel.

3.5.2 CPU Ratio Setting [Auto]

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

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

- [Enabled] The CPU speed is controlled by the operating system.
[Disabled] The CPU runs at its default speed.

3.5.4 Intel(R) TurboMode Tech [Enabled]

- [Enabled] Allows processor cores to run faster than marked frequency in specific condition.
[Disabled] Disables this function.



- This item appears only if you set the **CPU Ratio Setting** item to [Auto].
- Intel® Turbo Mode function support depends on CPU types.

3.5.5 Xtreme Phase Full Power Mode [Auto]

[Auto]

Automatic configuration.

[Enabled]

Enables Full Power Mode to ensure the best CPU overclocking performance.



The following two items appear only when you set the **Ai Overclock Tuner** item to [Manual], [D.O.C.P.] or [X.M.P.].

3.5.6 BCLK Frequency [XXX]

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

3.5.7 PCIE Frequency [XXX]

Allows you to set the PCI Express frequency. Use the <+> and <-> keys to adjust the PCIE frequency. You can also key in the desired value using the numeric keypad. The values range from 100 to 200.

3.5.8 DRAM Frequency [Auto]

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



According to Intel CPU spec, CPUs with a core frequency of 2.66G support the maximum DIMM frequency of up to DDR3 1333. To use DIMMs of a higher frequency with a 2.66G CPU, enable the **DRAM O.C. Profile** feature in BIOS. Refer to section 3.5.1 **Ai Overclock Tuner** for details.



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

3.5.9 QPI Frequency [Auto]

Allows you to set the QPI frequency.

3.5.10 DRAM Timing Control

The items in this menu allow you to set the DRAM timing control features.



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

1st Information: 7-7-7-20-4-60-8-5-20

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

DRAM CAS# Latency [Auto]

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

DRAM RAS# to CAS# Delay [Auto]

Configuration options: [Auto] [3 DRAM Clock] [4 DRAM Clock] – [14 DRAM Clock] [15 DRAM Clock]

DRAM RAS# PRE Time [Auto]

Configuration options: [Auto] [3 DRAM Clock] [4 DRAM Clock] – [14 DRAM Clock] [15 DRAM Clock]

DRAM RAS# ACT Time [Auto]

Configuration options: [Auto] [3 DRAM Clock] [4 DRAM Clock] – [30 DRAM Clock] [31 DRAM Clock]

DRAM RAS# to RAS# Delay [Auto]

Configuration options: [Auto] [1 DRAM Clock] – [7 DRAM Clock]

DRAM REF Cycle Time [Auto]

Configuration options: [Auto] [48 DRAM Clock] [60 DRAM Clock] [72 DRAM Clock] [82 DRAM Clock] [88 DRAM Clock] [90 DRAM Clock] [100 DRAM Clock] [110 DRAM Clock] [114 DRAM Clock] [118 DRAM Clock] [122 DRAM Clock] [126 DRAM Clock] [130 DRAM Clock] [134 DRAM Clock] [138 DRAM Clock] [142 DRAM Clock] [150 DRAM Clock] [160 DRAM Clock] [170 DRAM Clock] [180 DRAM Clock] [190 DRAM Clock] [200 DRAM Clock]

DRAM WRITE Recovery Time [Auto]

Configuration options: [Auto] [1 DRAM Clock] – [18 DRAM Clock]

DRAM READ to PRE Time [Auto]

Configuration options: [Auto] [3 DRAM Clock] – [15 DRAM Clock]

DRAM FOUR ACT WIN Time [Auto]

Configuration options: [Auto] [1 DRAM Clock] – [63 DRAM Clock]

DRAM Timing Mode [Auto]

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

DRAM WRITE to READ Delay(DR) [Auto]

Configuration options: [Auto] [1 DRAM Clock] – [8 DRAM Clock]

DRAM WRITE to READ Delay(SR) [Auto]

Configuration options: [Auto] [10 DRAM Clock] – [22 DRAM Clock]

DRAM READ to WRITE Delay(S/D) [Auto]

Configuration options: [Auto] [2 DRAM Clock] – [14 DRAM Clock]

DRAM READ to READ Delay(DR) [Auto]

Configuration options: [Auto] [2 DRAM Clock] – [9 DRAM Clock]

DRAM READ to READ Delay(SR) [Auto]

Configuration options: [Auto] [4 DRAM Clock] [6 DRAM Clock]

DRAM WRITE to WRITE Delay(DR) [Auto]

Configuration options: [Auto] [2 DRAM Clock] – [9 DRAM Clock]

DRAM WRITE to WRITE Delay(SR) [Auto]

Configuration options: [Auto] [4 DRAM Clock] [6 DRAM Clock]

3.5.11 CPU Differential Amplitude [Auto]

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

3.5.12 CPU Clock Skew [Auto]

Adjusting this item may help enhancing BCLK overclocking ability.
Configuration options: [Auto] [Normal] [Delay 100ps]–[Delay 1500ps]



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

3.5.13 CPU Voltage Mode [Offset]

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

Offset Voltage [Auto]

This item appears only when you set the **CPU Voltage Mode** item to [Offset] and allows you to set the Offset voltage. The values range from 0.00625V to 0.50000V with a 0.00625V interval.

Offset Sign [-]

This item appears only when you set the **Offset Voltage** item to a value other than [Auto].

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

Fixed Voltage [Auto]

This item appears only when you set the **CPU Voltage Mode** item to [Manual] and allows you to set a fixed CPU voltage. The values range from 0.85V to 1.7V with a 0.00625V interval.



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

3.5.14 IMC Voltage [Auto]

Allows you to set the CPU Integrated Memory Controller voltage. The values range from 1.1V to 1.9V with a 0.02V interval.

3.5.15 DRAM Voltage [Auto]

Allows you to set the DRAM voltage. The values range from 1.20V to 2.2V with a 0.02V interval.



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

3.5.16 CPU PLL Voltage [Auto]

Allows you to set the CPU PLL voltage. The values range from 1.8V to 2.2V with a 0.02V interval.

3.5.17 PCH Voltage [Auto]

Allows you to set the Platform Controller Hub voltage. The values range from 1.05V to 2.0V with a 0.01V interval.



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

3.5.18 iGPU Voltage [Auto]

Allows you to set the integrated GPU voltage. The values range from 0.5V to 1.75V with a 0.0125V interval.

3.5.19 Load-Line Calibration [Auto]

[Auto] BIOS automatically adjusts the voltage.
[Disabled] Follows the Intel specifications.
[Enabled] Improves the CPU Vdroop directly.

3.5.20 CPU Spread Spectrum [Auto]

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

3.5.21 PCIE Spread Spectrum [Auto]

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

3.6 Advanced menu

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



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

| BIOS SETUP UTILITY | | | | | | |
|---|------------|-----------------------|--|------|-------|------|
| Main | Ai Tweaker | Advanced | Power | Boot | Tools | Exit |
| <ul style="list-style-type: none"> ▶ CPU Configuration ▶ Uncore Configuration ▶ Onboard Devices Configuration ▶ USB Configuration ▶ PCIPnP | | Intel VT-d [Disabled] | Configure CPU. | | | |
| | | | ←→ Select Screen ↑↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit | | | |
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3.6.1 CPU Configuration

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



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

| BIOS SETUP UTILITY | | |
|---|--|--|
| Advanced | | |
| Configure advanced CPU settings Module Version:01.07 | | Sets the ratio between CPU Core Clock and the FSB Frequency. NOTE: If an invalid ratio is set in CMOS then actual and setpoint values may differ. |
| Manufacturer: Intel Brand String: Intel(R) Core(TM) i5 CPU 661 Frequency : 3.33GHz BCLK Speed : 133MHz Cache L1 : 128 KB Cache L2 : 512 KB Cache L3 : 4096 KB Ratio Status: Unlocked (Min:09, Max:25) Ratio Actual Value: 25 CPUID : 20652 | | NOTE: Please key in ratio numbers directly |
| CPU Ratio Setting [Auto] C1E Support [Enabled] Hardware Prefetcher [Enabled] Adjacent Cache Line Prefetch [Enabled] Max CPUID Value Limit [Disabled] Intel(R) Virtualization Tech [Enabled] | | ←→ Select Screen ↑↓ Select Item F1 General Help F10 Save and Exit ESC Exit |

Scroll down to display the following items:

| | |
|--------------------------------|------------|
| CPU TM function | [Enabled] |
| Execute-Disable Bit Capability | [Enabled] |
| Intel(R) HT Technology | [Enabled] |
| Active Processor Cores | [All] |
| A20M | [Disabled] |
| Intel(R) SpeedStep(TM) Tech | [Enabled] |
| Intel(R) TurboMode Tech | [Enabled] |
| Intel(R) C-STATE Tech | [Enabled] |
| C State package limit setting | [Auto] |

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CPU Ratio Setting [Auto]

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

C1E Support [Enabled]

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

[Disabled] Disables this function.

Hardware Prefetcher [Enabled]

[Enabled] The processor fetches data and instructions from the memory into the cache that are likely to be required in the near future. This reduces the latency associated with memory reads.

[Disabled] Disables this function.

Adjacent Cache Line Prefetch [Enabled]

[Enabled] The processor fetches the currently requested cache line, as well as the subsequent cache line. This reduces the cache latency by making the next cache line immediately available if the processor requires it as well.

[Disabled] The processor fetches only the currently requested cache line.

Max CPUID Value Limit [Disabled]

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

[Disabled] Disables this function.

Intel(R) Virtualization Tech [Enabled]

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

[Disabled] Disables this function.

CPU TM function [Enabled]

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

[Disabled] Disables this function.

Execute Disable Bit Capability [Enabled]

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

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

Intel(R) HT Technology [Enabled]

The Intel Hyper-Threading Technology allows a hyper-threading processor to appear as two logical processors to the operating system, allowing the operating system to schedule two threads or processes simultaneously.

[Enabled] Two threads per activated core are enabled.

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

Active Processor Cores [All]

Allows you to choose the number of CPU cores to activate in each processor package.
Configuration options: [All] [1] [2]

A20M [Disabled]

[Enabled] Allows Legacy OSES to be compatible with APs.

[Disabled] Disables this function.

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

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

[Disabled] The CPU runs at its default speed.

Intel(R) TurboMode Tech [Enabled]

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

[Disabled] Disables this function.



Intel® Turbo Mode function support depends on CPU types.

Intel(R) C-STATE Tech [Enabled]

The Intel® C-State Technology allows the CPU to save more power under idle mode.

[Enabled] Enable this item only when you install a C-State Technology-supported CPU.

[Disabled] Disables this function.

C State package limit setting [Auto]

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

3.6.2 Uncore Configuration

The Uncore Configuration menu allows you to change the advanced chipset settings.

The screenshot shows the BIOS Setup Utility interface. At the top, it says "BIOS SETUP UTILITY" and "Advanced". The main menu is titled "Uncore Configuration". Below this, there are several settings:

- IMC Type : Clarkdale
- Memory Remap Feature [Enabled]
PCI MMIO Allocation: 4GB To 3072MB
- Initiate Graphic Adapter [PEG/PCI]
- iGPU Graphics Mode Select [Enabled, 32MB]
- iGPU Frequency [Auto]
Current iGPU Frequency: 900 MHz
- DVMT/FIXED Memory [256MB]

On the right side of the screen, there are two explanatory notes:

- ENABLE:** Allow remapping of overlapped PCI memory above the total physical memory.
- DISABLE:** Do not allow remapping of memory.

Memory Remap Feature [Enabled]

[Disabled] Do not allow remapping of memory.

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

Initate Graphic Adapter [PEG/PCI]

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

iGPU Graphics Mode Select [Enabled, 32MB]

Allows you to decide whether to use the integrated GPU and select the amount of memory used by the integrated GPU.
Configuration options: [Enabled, 32MB] [Enabled, 64MB] [Enabled, 128MB]

iGPU Frequency [Auto]

Allows you to adjust the integrated GPU frequency.
Configuration options: [Auto] [133 MHz] [167 MHz] – [1467 MHz] [1500 MHz]

DVMT/FIXED Memory [256MB]

Allows you to allocate a fixed amount of system memory as graphics memory.
Configuration options: [128MB] [256MB] [Maximum DVMT]



The [Maximum DVMT] option appears only when you install DIMM modules more than 1 GB.



This motherboard supports Intel® DVMT 5.0 Technology whose maximum graphics memory size in total varies with the system memory size in total and the operating system. Refer to the following table for details.

| System Memory | Maximum Total Graphics Memory | |
|----------------|-------------------------------|----------------------|
| | Windows® XP | Windows® Vista™ / 7™ |
| 1GB to < 1.5GB | 512MB | 365MB |
| 1.5GB to < 2GB | 768MB | 808MB |
| 2GB to < 3GB | 1024MB | 877MB |
| 3GB to < 4GB | – | 1389MB |
| 4GB and above | – | 1748MB |

3.6.3 Onboard Devices Configuration

| BIOS SETUP UTILITY | | |
|-------------------------------|------------|----------|
| Advanced | | |
| Onboard Devices Configuration | | Options |
| HDA Controller | [Enabled] | Enabled |
| Front Panel Type | [HD Audio] | Disabled |
| SPDIF OUT Mode Setting | [SPDIF] | |
| Realtek LAN | [Enabled] | |
| LAN Boot ROM | [Disabled] | |
| Onboard 1394 Controller | [Enabled] | |
| Marvell Storage Controller | [Enabled] | |
| Serial Port1 Address | [3F8/IRQ4] | |

HDA Controller [Enabled]

[Enabled] Enables the High Definition Audio Controller.

[Disabled] Disables the controller.



The following three items appear only when you set the **HDA Controller** item to [Enabled].

Front Panel Type [HD Audio]

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

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

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

SPDIF OUT Mode Setting [SPDIF]

If your graphics card has HDMI output and needs to use SPDIF signal from the SPDIF_Out header, you need to set to **HDMI** for HDMI audio output.

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

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

Realtek LAN [Enabled]

[Enabled] Enables the Realtek LAN controller.

[Disabled] Disables the controller.

LAN Boot ROM [Disabled]

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

[Enabled] Enables the Realtek Gigabit LAN Boot ROM.

[Disabled] Disables the LAN Boot ROM.

Onboard 1394 Controller [Enabled]

[Enabled] Enables the onboard IEEE 1394a controller.

[Disabled] Disables the controller.

Marvell Storage Controller [Enabled]

[Enabled] Enables the Marvell storage controller.

[Disabled] Disables the controller.

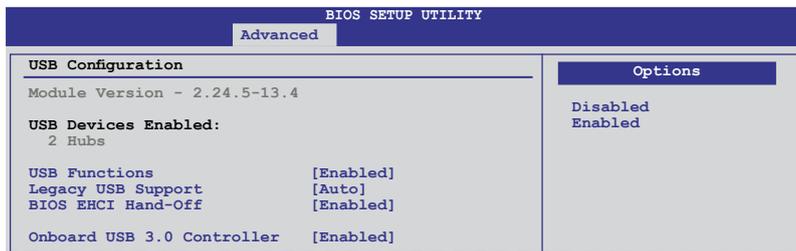
Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.

Configuration options: [Disabled] [3F8/IRQ4] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

3.6.4 USB Configuration

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



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

USB Functions [Enabled]

[Enabled] Enables the USB Host Controllers.

[Disabled] Disables the controllers.



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

Legacy USB Support [Auto]

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

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

[Disabled] Disables the function.

BIOS EHCI Hand-off [Enabled]

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

[Disabled] Disables the function.

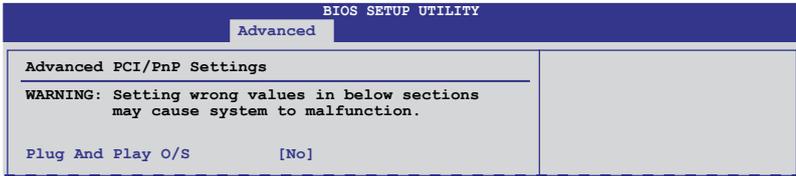
Onboard USB 3.0 Controller [Enabled]

[Enabled] Enables the USB 3.0 controller.

[Disabled] Disables the controller.

3.6.5 PCIPnP

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



Plug And Play O/S [No]

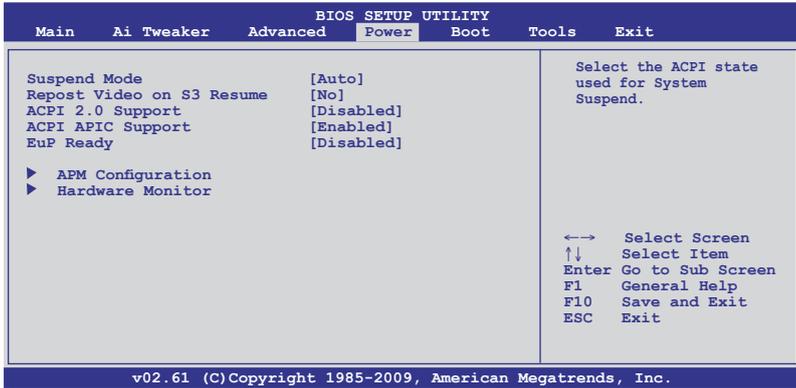
- [Yes] When set to [Yes] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot.
- [No] When set to [No], BIOS configures all the devices in the system.

3.6.6 Intel VT-d [Disabled]

- [Disabled] Disables the Intel Virtualization Technology for Directed I/O.
- [Enabled] Enables the Intel Virtualization Technology for Directed I/O.

3.7 Power menu

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



3.7.1 Suspend Mode [Auto]

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

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

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

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

3.7.2 Repost Video on S3 Resume [No]

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

[No] The system will not invoke VGA BIOS POST on S3/STR resume.

[Yes] The system invokes VGA BIOS POST on S3/STR resume.

3.7.3 ACPI 2.0 Support [Disabled]

[Disabled] The system will not add additional tables as per ACPI 2.0 specifications.

[Enabled] The system adds additional tables as per ACPI 2.0 specifications.

3.7.4 ACPI APIC Support [Enabled]

[Disabled] The system disables the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC).

[Enabled] The ACPI APIC table pointer is included in the RSDT pointer list.

3.7.5 EuP Ready [Disabled]

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

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

3.7.6 APM Configuration



Restore On AC Power Loss [Power Off]

- [Power On] The system goes into on state after an AC power loss.
- [Power Off] The system goes into off state after an AC power loss.
- [Last State] The system goes into either off or on state, whatever the system state was before the AC power loss.

Power On By RTC Alarm [Disabled]

- [Disabled] Disables RTC to generate a wake event.
- [Enabled] When set to [Enabled], the items **RTC Alarm Date (Days)** and **System Time** will become user-configurable with set values.

Power On By External Modems [Disabled]

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



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

Power On By PCI Devices [Disabled]

- [Disabled] Disables the PME to wake up from S5 by PCI devices.
- [Enabled] Allows you to turn on the system through a PCI LAN or modem card. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

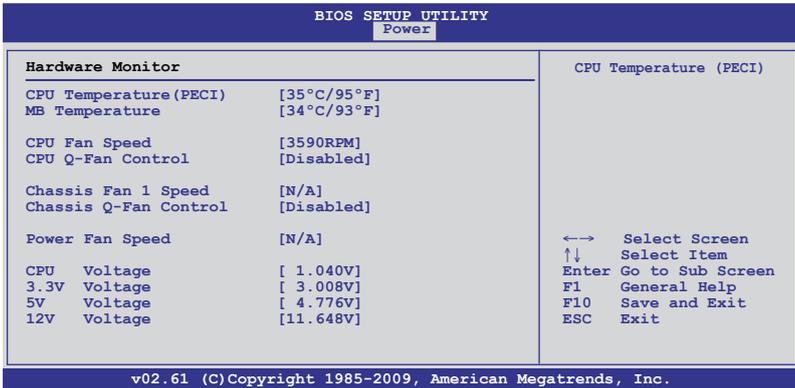
Power On By PCIE Devices [Disabled]

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

Power On By PS/2 Keyboard [Disabled]

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

3.7.7 Hardware Monitor



CPU Temperature(PECI) / MB Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the CPU and motherboard temperatures. Select **Ignored** if you do not wish to display the detected temperatures.

CPU Fan Speed [xxxxRPM] or [Ignored] / [N/A] Chassis Fan 1 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, and power fan speed 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.

CPU Q-Fan Control [Disabled]

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

CPU Fan Profile [Standard]

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

- [Standard] Sets to [Standard] to make the CPU fan automatically adjust depending on the CPU temperature.
- [Silent] Sets to [Silent] to minimize the fan speed for quiet CPU fan operation.
- [Turbo] Sets to [Turbo] to achieve maximum CPU fan speed.
- [Manual] Sets to [Manual] to assign detailed fan speed control parameters.



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

CPU Upper Temperature [70°C/158°F]

Sets the upper limit of the CPU temperature.
Configuration options: [40°C/104°F] [50°C/122°F] [60°C/140°F] [70°C/158°F] [80°C/176°F] [90°C/194°F]

CPU Fan Max. Duty Cycle [100%]

Sets the maximum CPU fan duty cycle. When the CPU temperature reaches the upper limit, the CPU fan will operate at the maximum duty cycle.

Configuration options: [20%] [30%] [40%] [50%] [60%] [70%] [80%] [90%] [100%]

CPU Lower Temperature [40°C/104°F]

Displays the lower limit of the CPU temperature.

CPU Fan Min. Duty Cycle [20%]

Sets the minimum CPU fan duty cycle. When the CPU temperature is under 40°C/104°F, the CPU fan will operate at the minimum duty cycle.

Configuration options: [00%] [10%] [20%] [30%] [40%] [50%] [60%] [70%] [80%] [90%] [100%]

Chassis Q-Fan Control [Disabled]

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

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

Chassis Fan Profile [Standard]

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

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

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

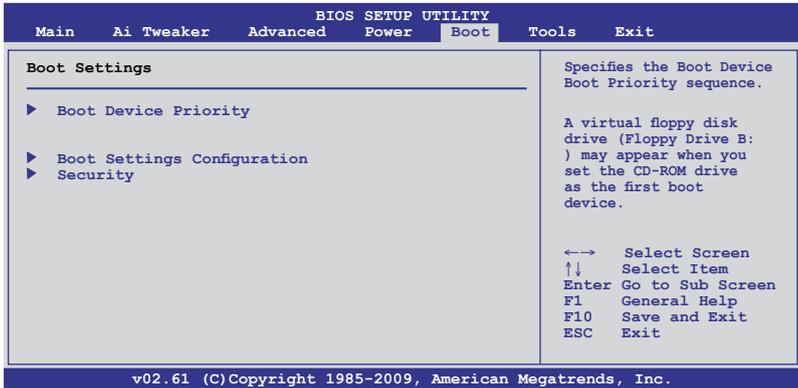
[Turbo] Sets to [Turbo] to achieve maximum chassis fan speed.

CPU Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select **Ignored** if you do not want to detect this item.

3.8 Boot menu

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



3.8.1 Boot Device Priority



1st – xxth Boot Device [Removable Dev.]

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.

3.8.2 Boot Settings Configuration

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

Quick Boot [Enabled]

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

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

Full Screen Logo [Enabled]

[Enabled] Enables the full screen logo display feature.

[Disabled] Disables the full screen logo display feature.



Set this item to [Enabled] to use the ASUS MyLogo 2™ feature.

AddOn ROM Display Mode [Force BIOS]

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

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

Bootup Num-Lock [On]

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

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

Wait For 'F1' If Error [Enabled]

[Disabled] Disables this function.

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

Hit 'DEL' Message Display [Enabled]

[Disabled] Disables this function.

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

3.8.3 Security

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



Change Supervisor Password

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

To set a Supervisor Password:

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

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

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

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



If you have forgotten your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section 2.7.1 **Rear panel connectors** for information on how to erase the RTC RAM.

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



User Access Level [Full Access]

This item allows you to select the access restriction to the Setup items.

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

Change User Password

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

To set a User Password:

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

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

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

Clear User Password

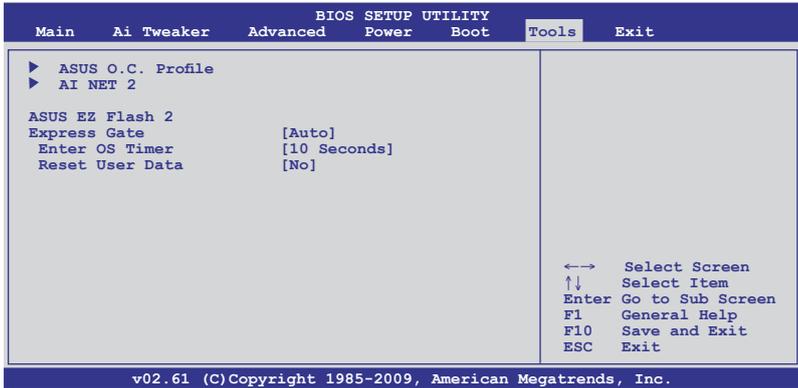
Select this item to clear the user password.

Password Check [Setup]

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

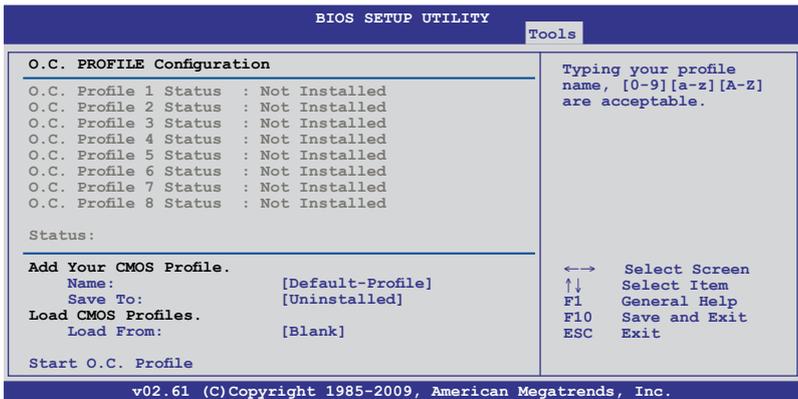
3.9 Tools menu

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



3.9.1 ASUS O.C. Profile

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



Add Your CMOS Profile

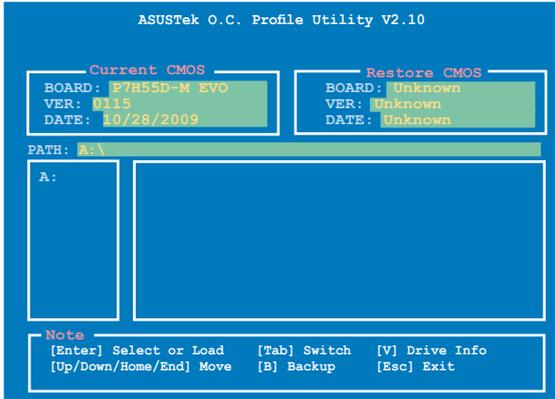
Allows you to save the current BIOS file to the BIOS Flash. In the Name sub-item, key in your profile name and press <Enter>, and then choose a profile number to save your CMOS settings in the **Save to** sub-item.

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.

3.9.2 AI NET 2



Check Realtek LAN cable [Disabled]

- [Disabled] BIOS will not check the Realtek LAN cable during the Power-On Self-Test (POST).
- [Enabled] BIOS checks the Realtek LAN cable during the Power-On Self-Test (POST).

3.9.3 ASUS EZ Flash 2

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



For more details, refer to **section 3.2.2 ASUS EZ Flash 2 utility**.

3.9.4 Express Gate [Auto]

Allows you to enable or disable the ASUS Express Gate feature. The ASUS Express Gate feature is a unique instant-on environment that provides quick access to the Internet browser and Skype. Configuration options: [Enabled] [Disabled] [Auto]

Enter OS Timer [10 Seconds]

Sets countdown duration that the system waits at the Express Gate's first screen before starting Windows or other installed OS. Choose [Prompt User] to stay at the first screen of Express Gate for user action.

Configuration options: [Prompt User] [1 second] [3 seconds] [5 seconds] [10 seconds] [15 seconds] [20 seconds] [30 seconds]

Reset User Data [No]

Allows you to clear Express Gate's user data.

[Reset] When setting this item to [Reset], ensure that you save the setting to the BIOS so that the user data will be cleared the next time you enter the Express Gate. User data includes the Express Gate's settings as well as any personal information stored by the web browser such as bookmarks, cookies, browsing history. This is useful in the rare case where corrupt settings prevent the Express Gate environment from launching properly.

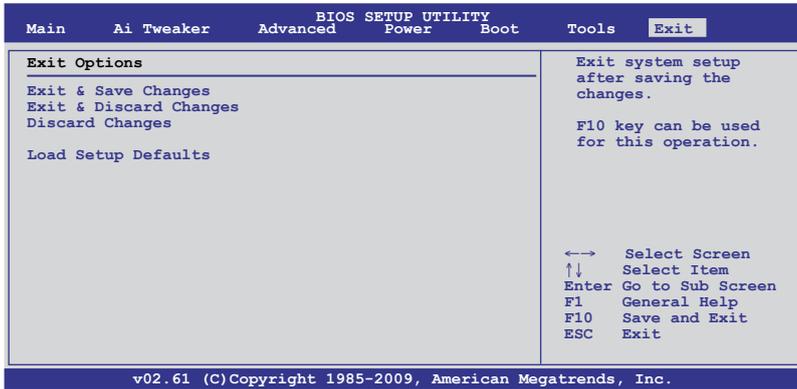
[No] Sets to [No] to disable the **Reset User Data** function when entering the Express Gate.



The first time wizard will run again when you enter the Express Gate environment after clearing its settings.

3.10 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.



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

Exit & Discard Changes

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

Discard Changes

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

Chapter 4

4.1 Installing an operating system

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



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

4.2 Support DVD information

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



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

4.2.1 Running the support DVD

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

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

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

Click the Contact tab to display the ASUS contact information.

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

Click the Highlights tab to display the software information

Click an icon to display DVD/ motherboard information

Click to obtain the corresponding software manuals

Click an item to install



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

4.2.2 Obtaining the software manuals

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

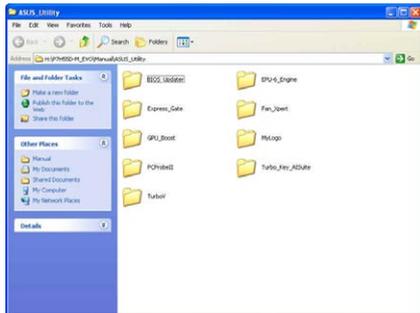


The software manual files are in Portable Document Format (PDF). Install the Adobe® Acrobat® Reader from the Utilities menu before opening the files.

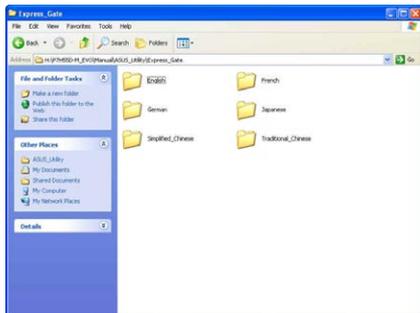
1. Click the **Manual** tab. Click **ASUS Motherboard Utility Guide** from the manual list on the left.



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



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



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

4.3 Software information

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

4.3.1 ASUS PC Probe II

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

Launching PC Probe II

1. Install PC Probe II from the motherboard support DVD.
2. Launch PC Probe II by clicking **Start > All Programs > ASUS > PC Probe II > PC Probe II v1.xx.xx**. The PC Probe II main window appears.
3. The PC Probe II icon appears in the Windows® notification area. Click this icon to close or restore the application.

PC Probe II main window



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



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

4.3.2 ASUS AI Suite

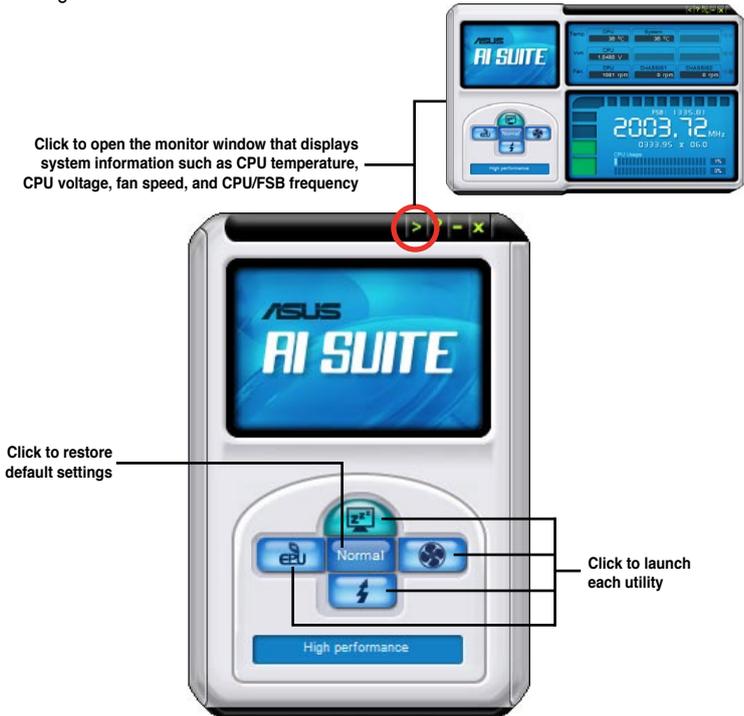
ASUS AI Suite allows you to launch several ASUS utilities easily.

Launching AI Suite

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

Using AI Suite

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



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

4.3.3 ASUS Fan Xpert

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

Launching Fan Xpert

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

Using Fan Xpert



Fan profiles

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

4.3.4 ASUS TurboV

ASUS TurboV allows you to easily overclock without exiting or rebooting the OS, and set up the best O.C. settings for different scenarios.



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



- For system stability, all changes made in ASUS TurboV will not be saved to BIOS settings and will not be kept on the next system boot. Use the **Save Profile** function to save your customized overclocking settings and manually load the profile after Windows starts.
- EPU cannot run on the customized overclocking settings. Restart the computer to launch EPU.
- For system stability, set ASUS EPU to **High Performance** Mode while using ASUS TurboV.

Launching ASUS TurboV

1. Install the ASUS TurboV utility from the motherboard support DVD.
2. Click **Start > All Programs > ASUS > TurboV > TurboV**.

The screenshot shows the ASUS TurboV utility window. At the top, it says "Save the current settings as a new profile" with a "Save Profile" button. Below this, there are "Profiles:" and "Save Profile" buttons. The main area is divided into "Default settings" and "Advanced CPU and chipset voltage settings". The "Default settings" section includes: BCLK Frequency (133 MHz), CPU Voltage (1.22500 V), DRAM Bus Voltage (1.5 V), and IMC Voltage (1.10 V). Each has a slider and a numeric input field. The "Advanced CPU and chipset voltage settings" section includes: CPU Chip Voltage (with sub-sliders for CPU PLL and PCH), GPU Voltage (1.22501 V), and DRAM Reference Voltage (with sub-sliders for CHA DATA and CHB DATA). A "More Setting" button is located between the default and advanced sections. At the bottom, there are "Apply" and "Undo" buttons. Red boxes and lines highlight these elements, with labels: "Target settings" (pointing to the top bar), "Default settings" (pointing to the top section), "Click to show more settings" (pointing to the More Setting button), "Advanced CPU and chipset voltage settings" (pointing to the bottom section), "Voltage Adjustment bars" (pointing to the sliders in the default settings), "iGPU voltage and frequency settings" (pointing to the GPU Voltage slider), "Applies all changes immediately" (pointing to the Apply button), and "Undoes all changes without applying" (pointing to the Undo button).



- GPU Boost is available when you install the GPU Boost driver from the motherboard support DVD.
- For advanced overclock ability, adjust first the BIOS items, and then proceed more detailed adjustments using TurboV.
- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.3.5 ASUS GPU Boost

ASUS GPU Boost allows you to overclock the integrated GPU voltage and integrated GPU frequency in Windows® environment and takes effect in real-time without exiting and rebooting the OS.



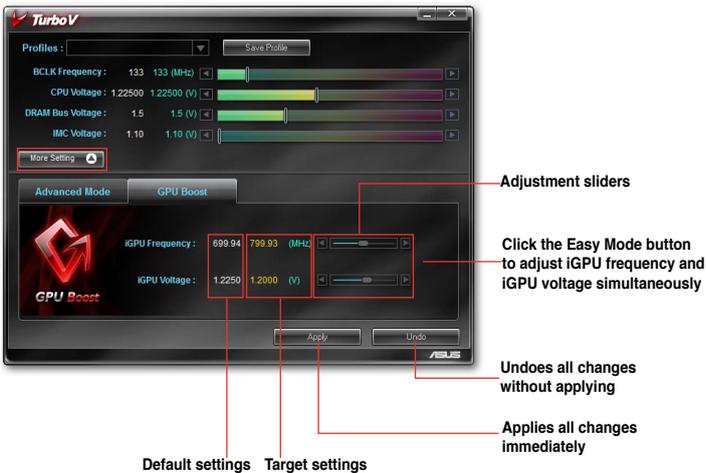
Refer to the CPU documentation before adjusting iGPU voltage settings. Setting a high voltage may damage the iGPU permanently, and setting a low voltage may make the system unstable.



- ASUS GPU Boost is available only when you install the GPU Boost driver from the motherboard support DVD.
- For system stability, all changes made in ASUS GPU Boost will not be saved to BIOS settings and will not be kept on the next system boot. Use the **Save Profile** function to save your customized overclocking settings and manually load the profile after Windows starts.
- EPU cannot run on the customized overclocking settings. Restart the computer to launch EPU.
- For system stability, set ASUS EPU to **High Performance Mode** while using ASUS GPU Boost.

Launching ASUS GPU Boost

1. Install the ASUS TurboV utility from the motherboard support DVD.
2. Install the ASUS GPU Boost driver from the motherboard support DVD.
3. Click **Start > All Programs > ASUS > TurboV > TurboV**.
4. Click **More Setting** from the TurboV main screen, and then click **GPU Boost**.



4.3.6 ASUS Turbo Key

ASUS Turbo Key allows the user to turn the PC power button into a physical overclocking button. After the easy setup, Turbo Key can boost performances without interrupting ongoing work or games—with just one touch!

Launching ASUS Turbo Key

1. Install ASUS Turbo Key from the motherboard support DVD.
2. Restart your computer. ASUS Turbo Key automatically starts after Windows® start-up.
3. Double-click the ASUS Turbo Key icon in the Windows® notification area to launch the Turbo Key user interface.



Configuring ASUS Turbo Key



1. Select your desired power button action. Select **Turbo Key Off** to keep the power button as a common switch. Select **Turbo Key On** to boost system performance after pressing the power button.
2. You can choose whether to show Turbo Key OSD and status by clicking the check boxes in the **Setting** section.
3. You can decide the performance boost level by selecting **Turbo Key Profile**. You can also load personal profiles saved in the ASUS TurboV utility. The default is "Rocket Mode". For detailed ASUS TurboV configurations, refer to the software manual in the support DVD or visit the ASUS website at www.asus.com.
4. Click **Apply** for all settings to take effect.

Using ASUS Turbo Key

Press the power button on your computer chassis to use the Turbo Key function defined in the Turbo Key user interface. Press the power button again to turn off the Turbo Key function.



Press and hold the power button for 4 seconds will turn off your computer.



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

4.3.7 ASUS EPU

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

ASUS EPU provides you with these modes to choose from:

-  **Turbo Mode**
-  **Medium Power Saving Mode**
-  **High Performance Mode**
-  **Max. Power Saving Mode**

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

Launching EPU

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



The first time you launch EPU, the following message will appear, asking you to run Calibration first. Running calibration allows the system to detect CPU properties to optimize power management.



Click **Run Calibration** and wait for a few seconds. Then, the EPU main menu appears.

EPU main menu



 **iGPU energy saving status**
GPU Boost is available only when you install the GPU Boost driver from the support DVD.

 **Displays the following message if no VGA power saving engine is detected.**



- EPU supports iGPU power saving solution when you use an Intel® Clarkdale CPU and install the GPU Boost driver from the support DVD.
- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.3.8 ASUS Express Gate

ASUS Express Gate is an instant-on environment that gives you quick access to the Internet, Skype, and viewing your pictures. Within a few seconds of powering on your computer, you will be at the Express Gate menu where you can start the web browser, Skype, or other Express Gate applications.

Notices about ASUS Express Gate



- Ensure to install ASUS Express Gate from the motherboard support DVD before use.
- ASUS Express Gate supports SATA devices in IDE mode only. See chapter 3 for BIOS setup details.
- ASUS Express Gate supports SATA devices connected to **motherboard chipset-controlled onboard SATA ports** only. All onboard extended SATA ports and external SATA ports are NOT supported. See chapter 2 for the exact location of onboard SATA ports.
- ASUS Express Gate supports file uploading from ODD and USB drives and downloading to USB drives only.
- ASUS Express Gate supports installation on SATA HDDs, USB HDDs and Flash drives with at least 1.2GB of available disk space. When installed on USB HDDs and Flash drives, connect the drives to the motherboard USB port before turning on the computer.
- Your monitor must support the screen resolution of **1024 x 768**, or ASUS Express Gate will be skipped during the booting process, and the existing OS will be launched directly.
- Installation of at least 1GB system memory is recommended for better performance.

The First Screen

Express Gate's first screen appears within a few seconds after you power on the computer.



Click any of the application icons to enter Express Gate environment and launch the selected application

Turn off the computer

Continue booting to existing OS when the timer above the Exit icon counts down to zero (0); click to immediately enter existing OS



- To enter the motherboard BIOS setup program, click **Exit** on the Express Gate First Screen, and then press the key during POST.
- See the software manual in the bundled motherboard support DVD or click  in the Express Gate environment for detailed software instructions.

4.3.9 Audio configurations

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

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

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



Realtek HD Audio Manager

A. Realtek HD Audio Manager for Windows® Vista™



B. Realtek HD Audio Manager for Windows XP



