

P5QPL-VM EPU

ASUS[®]

Motherboard

E4538

First Edition V1

March 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 electric shock hazard, disconnect the power cable from the electric outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure 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, make sure 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 manual contains the following parts:

- **Chapter 1: Product introduction**
This chapter describes the features of the motherboard and the new technology it supports.
- **Chapter 2: BIOS information**
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

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



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



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



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



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

Typography

Bold text

Indicates a menu or an item to select.

Italics

Used to emphasize a word or a phrase.

<Key>

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

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

<Key1>+<Key2>+<Key3>

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

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

P5QPL-VM EPU specifications summary

CPU	<p>LGA775 socket for Intel® Core™2 Quad / Core™2 Extreme / Core™2 Duo / Celeron® E1000 Series and 400 Series processors</p> <p>Supports Intel® 45nm multi-core CPU</p> <p>Supports Intel® Hyper-Threading Technology and Enhanced Intel SpeedStep® Technology (EIST)</p> <p>* Refer to www.asus.com for the Intel CPU support list</p>
Chipset	<p>Northbridge: Intel® G41</p> <p>Southbridge: Intel® ICH7</p>
Front side bus	1333/1066/800MHz
Memory	<p>Dual channel memory architecture</p> <p>2 x 240-pin DIMM sockets support unbuffered non-ECC 1066(O.C)/800/667MHz DDR2 memory modules</p> <p>Supports up to 8GB system memory</p> <p>* When you install a total memory of 4GB or more, Windows® 32-bit operating system may only recognize less than 3GB. Hence, a total installed memory of less than 3GB is recommended if you are using a Windows® 32-bit operating system.</p> <p>** Refer to www.asus.com for the latest Memory QVL (Qualified Vendors Lists).</p>
Expansion slots	<p>1 x PCIe x16 slot</p> <p>1 x PCIe x1 slot</p> <p>2 x PCI slots</p>
Storage	<p>Intel® ICH7 southbridge supports:</p> <ul style="list-style-type: none"> - 1 x Ultra DMA 100/66 connector - 4 x Serial ATA 3Gb/s connectors
LAN	Atheros L1E PCIe Gigabit LAN
Audio	<p>Realtek ALC887 High Definition Audio 8-channel CODEC</p> <p>Supports Jack-detect and Multi-streaming technologies</p> <p>Supports S/PDIF_OUT interface</p>
USB	Supports up to 8 USB 2.0/1.1 ports (4 ports at mid-board, 4 ports at the back panel)
ASUS overclocking features	<p>SFS (Stepless Frequency Selection):</p> <ul style="list-style-type: none"> - FSB tuning from 200MHz up to 800MHz at 1MHz increment <p>Overclocking Protection:</p> <ul style="list-style-type: none"> - ASUS C.P.R. (CPU Parameter Recall)

continued on the next page

P5QPL-VM EPU specifications summary

ASUS special features	ASUS CrashFree BIOS3 ASUS Q-Fan ASUS EZ Flash2 ASUS MyLogo2 ASUS AI NET2 ASUS Express Gate ASUS EPU-4 Engine ASUS Turbo Key
Back panel ports	1 x PS/2 keyboard port 1 x PS/2 mouse port 1 x DVI port 1 x HDMI port 1 x Optical S/PDIF_OUT port 1 x VGA port 1 x RJ-45 port 4 x USB 2.0/1.1 ports 8-channel audio ports
Internal connectors	2 x USB 2.0/1.1 connectors support additional 4 USB 2.0/1.1 ports 1 x IDE connector 1 x COM connector 4 x SATA connectors 1 x CPU / 1 x Power / 1 x Chassis fan connectors 1 x S/PDIF_OUT connector 1 x LPT connector 1 x High definition front panel audio connector 1 x CD audio-in connector 1 x 24-pin EATX power connector 1 x 4-pin ATX 12V power connector 1 x System panel connector
BIOS	8Mb Flash ROM, AMI BIOS, PnP, DMI2.0, WfM2.0, SM BIOS2.5, ACPI2.0a
Manageability	WOL by PME, WOR by PME, WOR by Ring
Support DVD	Drivers ASUS PC Probe II ASUS LiveUpdate
Accessories	1 x Serial ATA cable 1 x Ultra DMA 100/66 cable 1 x I/O shield 1 x User Manual
Form factor	MicroATX form factor: 9.6 in x 8.2 in (24.4cm x 20.8cm)

**Specifications are subject to change without notice.*

Chapter 1

Product introduction

1.1 Welcome!

Thank you for buying an ASUS® P5QPL-VM EPU motherboard!

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

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

1.2 Package contents

Check your motherboard package for the following items.

Motherboard	ASUS P5QPL-VM EPU motherboard
Cables	1 x Serial ATA cable 1 x Ultra DMA 100/66 cable
Accessories	1 x I/O shield
Application DVD	ASUS motherboard Support DVD
Documentations	User Manual



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

1.3 Special features

1.3.1 Product highlights



Intel® Core™2 Extreme / Core™2 Quad / Core™2 Duo CPU support

This motherboard supports the latest Intel® Core™2 processors in the LGA775 package and Intel® 45nm multi-core processors. With the new Intel® Core™ microarchitecture technology and 1333/1066/800MHz FSB, the Intel® Core™2 processors are among the most powerful CPUs in the world.



Intel® G41 Chipset

The Intel® G41 Express Chipset is the latest chipset designed to support dual-channel DDR2 1066(O.C)/800/667 architecture, 1333/1066/800 Front Side Bus (FSB) and multi-core CPUs. It provides digital home entertainment of full 1080p high-definition video playback, including Blu-ray disc movies, with the next-generation Intel® Graphics Media Accelerator 4500. The Intel® G41 Express Chipset delivers optimized 3D graphics performance and supports Microsoft DirectX10, Shader Model 4.0 and OpenGL 2.1. It especially includes Intel® Fast Memory Access technology that significantly optimizes the use of available memory bandwidth and reduces the latency of the memory accesses.



Gigabit LAN solution

The onboard LAN controller is a highly integrated Gb LAN controller. It is enhanced with an ACPI management function to provide efficient power management for advanced operating systems.



HDMI support

HDMI (High-Definition Multimedia Interface) is the first and only industry-supported, uncompressed, all digital audio and video interface via a single cable and is HDCP compliant allowing playback of HD DVD, Blu-Ray Disc and other protected content.



HDMI/DVI/RGB support

This motherboard supports digital HDMI/DVI and analog D-Sub standards. DVI (Digital Visual Interface) provides high quality visuals for digital display devices like LCD monitors.



8-channel high definition audio

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



S/PDIF digital sound ready

This motherboard supports the SONY-PHILIPS Digital Interface (S/PDIF_OUT). It allows to transfer digital audio without converting it to analog format and keeps the best signal quality.

1.3.2

Innovative ASUS features



ASUS Express Gate

ASUS Express Gate is an instant-on environment that gives you quick access to the Internet. A few seconds after bootup, you can instantly surf the Internet without entering the Windows® OS.



- The actual boot time depends on the system configuration.
- ASUS Express Gate supports file uploading from SATA HDDs, ODDs and USB drives, and downloading to USB drives only.



ASUS MyLogo2™

Turn your favorite photos into 256-color boot logos to personalize your system.



ASUS CrashFree BIOS 3

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



ASUS EZ Flash 2

ASUS EZ Flash 2 allows you to update the BIOS from a USB flash disk before entering the OS.



ASUS Q-Fan

ASUS Q-Fan technology intelligently adjusts CPU fan speeds according to system loading to ensure a quiet, cool, and efficient operation.



ASUS EPU

ASUS EPU (Energy Processing Unit) is a unique power saving technology that detects the current system loadings and adjusts the power consumption in real time.



ASUS AI NET2

ASUS AI NET2 remotely detects the cable connection immediately after you turn on the system and any faulty cable connections are reported back up to 100 meters at 1 meter accuracy.



ASUS Turbo Key

ASUS Turbo Key allows you to turn the PC power button into an overclocking button. After the easy setup, Turbo Key boosts performances without interrupting ongoing work or games, simply through pressing the button.



C.P.R. (CPU Parameter Recall)

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



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.

1.4 Before you proceed

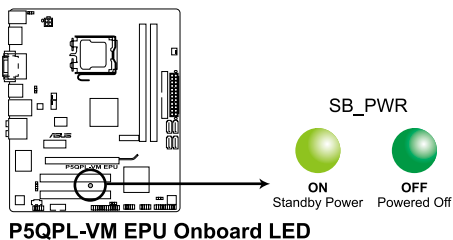
Take note of the following precautions before you install motherboard components or change any motherboard settings.



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

Onboard LED

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



1.5 Motherboard overview

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.



Ensure that you unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.

1.5.1 Placement direction

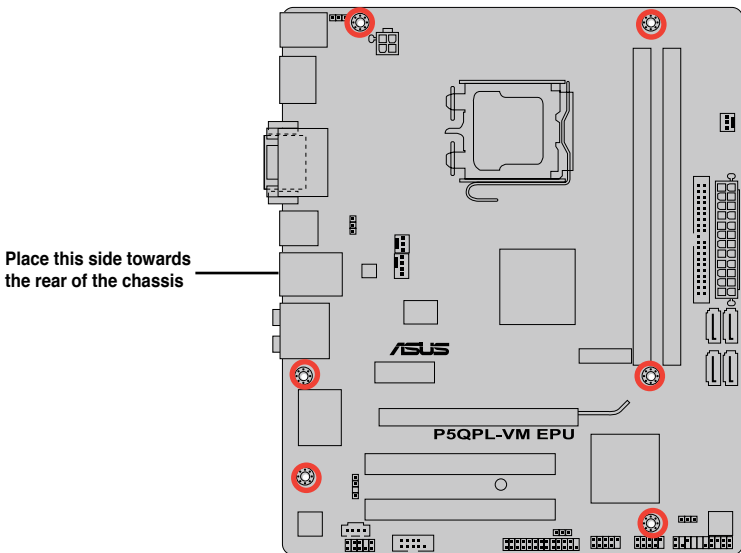
When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

1.5.2 Screw holes

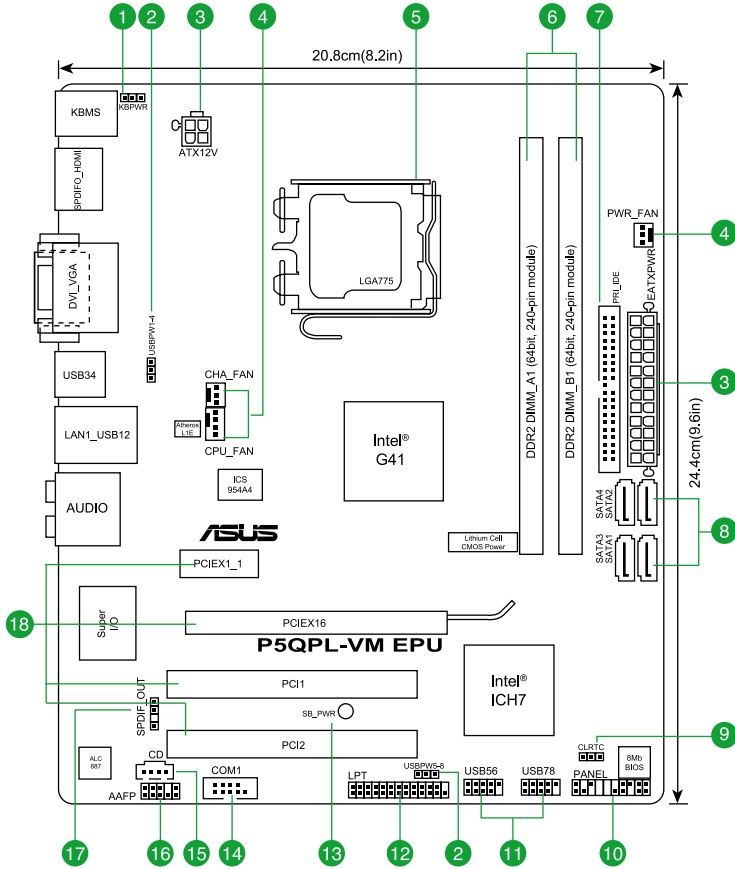
Place six screws into the holes indicated by circles to secure the motherboard to the chassis.



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



1.5.3 Motherboard layout



1.5.4 Layout contents

Connectors/Jumpers/Slots/LED	Page	Connectors/Jumpers/Slots/LED	Page
1. Keyboard power (3-pin KBPWR)	1-21	10. System panel connector (20-8 pin PANEL)	1-30
2. USB device wake-up (3-pin USBPW1-4, USBPW5-8)	1-21	11. USB connectors (10-1 pin USB56, USB78)	1-26
3. ATX power connectors (24-pin EATXPWR, 4-pin ATX12V)	1-29	12. LPT connector (26-1 pin LPT)	1-24
4. CPU, power, and chassis fan connectors (4-pin CPU_FAN, 3-pin PWR_FAN, and 3-pin CHA_FAN)	1-27	13. Onboard LED (SB_PWR)	1-4
5. LGA775 CPU socket	1-7	14. Serial port connector (10-1 pin COM1)	1-24
6. DDR2 DIMM slots	1-11	15. Optical drive audio connector (4-pin CD)	1-27
7. IDE connector (40-1 pin PRI_IDE)	1-25	16. Front panel audio connector (10-1 pin AAFP)	1-28
8. SATA connectors (7-pin SATA1, SATA2, SATA3, SATA4)	1-26	17. Digital audio connector (4-1 pin SPDIF_OUT)	1-28
9. Clear RTC RAM (3-pin CLRTC)	1-20	18. PCIe x16 / PCIe x1 / PCI slots	1-19

1.6 Central Processing Unit (CPU)

This motherboard comes with a surface mount LGA775 socket designed for the Intel® Core™2 Quad / Core™2 Extreme / Core™2 Duo / Celeron® E1000 Series and 400 Series processors.



- Unplug all power cables before installing the CPU.
- Connect the chassis fan cable to the CHA_FAN connector to ensure system stability.



- 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 LGA775 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.

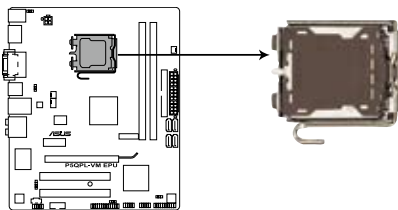


This motherboard supports Intel® LGA775 processors with the Intel® Hyper-Threading Technology and Enhanced Intel SpeedStep® Technology (EIST).

1.6.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.



P5QPL-VM EPU CPU socket 775

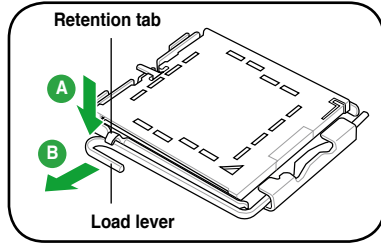


Before installing the CPU, ensure that the socket box is facing towards you and the load lever is on your left.

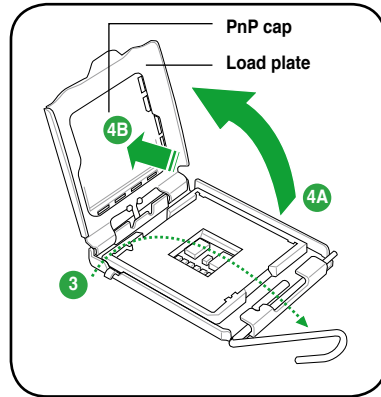
2. Press the load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.



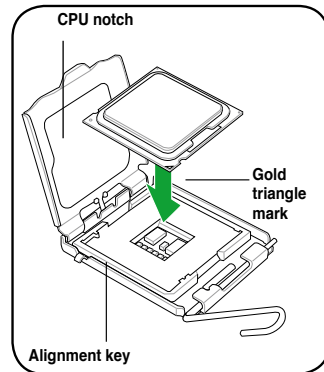
To prevent damage to the socket pins, DO NOT remove the PnP cap unless you are installing a CPU.



3. Lift the load lever in the direction of the arrow to a 135° angle.
4. Lift the load plate with your thumb and forefinger to a 100° angle (4A), then push the PnP cap from the load plate window to remove (4B).



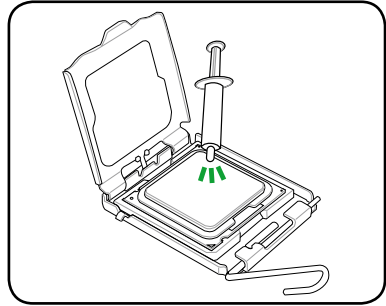
5. Position the CPU over the socket, ensuring that the gold triangle is on the bottom-left corner of the socket then fit the socket alignment key into the CPU notch.



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.

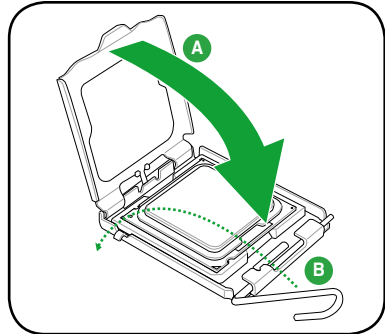


DO NOT eat the Thermal Interface Material. If it gets into your eyes or touches your skin, ensure that you wash it off immediately, and seek professional medical help.



To prevent contaminating the paste, DO NOT spread the paste with your finger directly.

7. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab.



1.6.2 Installing the CPU heatsink and fan

The Intel® LGA775 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® LGA775 heatsink and fan assembly comes in a push-pin design and requires no tool to install.
- If you purchased a separate CPU heatsink and fan assembly, ensure that you have properly applied Thermal Interface Material 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.

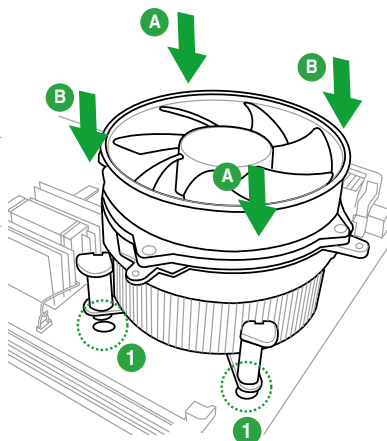
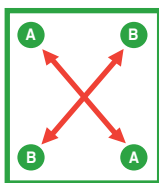
To install the CPU heatsink and fan:

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



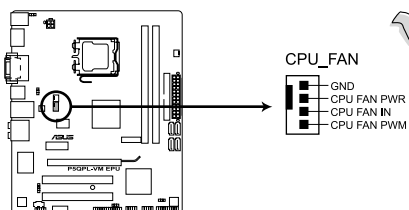
Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.



The type of CPU heatsink and fan assembly may differ, but the installation steps and functions should remain the same. The illustration above is for reference only.

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



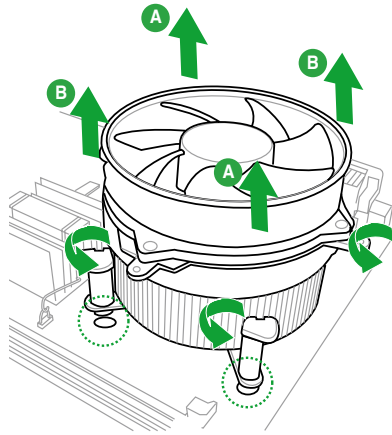
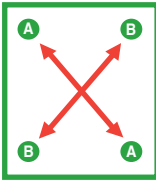
P5QPL-VM EPU CPU fan connector

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

1.6.3 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.

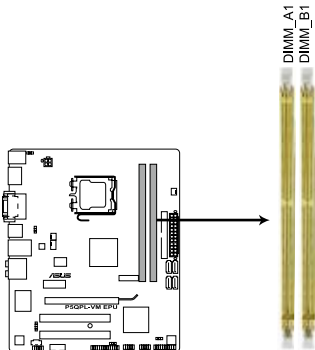


4. Carefully remove the heatsink and fan assembly from the motherboard.
5. Rotate each fastener clockwise to ensure correct orientation when reinstalling.

1.7 System memory

1.7.1 Overview

This motherboard comes with two Double Data Rate 2 (DDR2) Dual Inline Memory Modules (DIMM) sockets. The figure illustrates the location of the DDR2 DIMM sockets:



P5QPL-VM EPU 240-pin DDR2 DIMM sockets

Channel	Sockets
Channel A	DIMM_A1
Channel B	DIMM_B1

1.7.2 Memory configurations

You may install 512MB, 1GB, 2GB, and 4GB unbuffered non-ECC DDR2 DIMMs into the DIMM sockets.



- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.
- Due to the memory address limitation on 32-bit Windows® OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you do any of the following:
 - Install a maximum of 3GB system memory if you are using a 32-bit Windows® OS.
 - Use a 64-bit Windows® OS if you want to install 4GB or more memory on the motherboard.
- This motherboard does not support DIMMs made up of 256 megabits (Mb) chips or less.



- This motherboard supports up to 8GB memory modules on Windows® XP Professional x64 and Vista x64 editions. You may install a maximum of 4GB DIMMs on each slot.
- The default DIMM frequency depends 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, see section **2.4 Advanced menu** for manual memory frequency adjustment.
- For system stability, use a more efficient cooling system to support a full memory load (2 DIMMs) or overclocking conditions.
- Some old-version DDR2-800 DIMMs may not match Intel®'s On-Die-Termination (ODT) requirement and will automatically downgrade to run at DDR2-667. If this happens, contact your memory vendor to check the ODT value.
- Due to chipset limitation, DDR2-800 with CL=4 will be downgraded to run at DDR2-667 by default setting. If you want to operate with lower latency, adjust the memory timing manually.

P5QPL-VM EPU Motherboard Qualified Vendors Lists (QVL)

DDR2-1066MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	CL	DIMM support	
							A*	B*
A-Data	AD21066E002GU	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
Apacer	78.0AG9S.9K4	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
Apacer	78.AAGAL.9KZ	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
Corsair	CM2X1024-8500C5	1024MB	DS	Corsair	Heat-Sink Package		*	*
Corsair	CM2X2048-8500C5D	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
G.SKILL	F2-8500CL5S-1GBPK	1024MB	DS	N/A	Heat-Sink PackageSN:815130037562	5-5-5-15	*	*
G.SKILL	F2-8500CL5D-2GBPK	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
G.SKILL	F2-8500CL5D-4GBPI	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
G.SKILL	F2-8500CL5D-4GBPK	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
GEIL	GB22GB8500C5DC	1024MB	SS	GEIL	GL2L128M88BA25AB	5	*	*
GEIL	GB24GB8500C5QC	1024MB	SS	GEIL	GL2L128M88BA25AB	5	*	*
GEIL	GE22GB1066C5DC	1024MB	SS	GEIL	Heat-Sink Package	5	*	*
GEIL	GE24GB1066C5QC	1024MB	SS	GEIL	Heat-Sink Package	5	*	*
GEIL	GB24GB8500C5DC	2048MB	DS	GEIL	GL2L128M88BA25AB	5	*	*
GEIL	GE24GB1066C5DC	2048MB	DS	GEIL	Heat-Sink Package	5	*	*
GEIL	GX24GB8500C5UDC	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	5	*	*
Kingston	KHX8500D2K2/1G	1024MB(2 x 512MB)	SS	N/A	Heat-Sink Package	5-5-5-15	*	*
Kingston	KHX8500D2K2/1GN(EPP)	1024MB(2 x 512MB)	SS	Kingston	Heat-Sink Package	5-5-5-18	*	*
Kingston	KHX8500D2K2/2GN(EPP)	1024MB	DS	Kingston	Heat-Sink Package	5-5-5-18	*	*
Kingston	KVR1066D2N7/1G	1024MB	DS	Elpida	E5108AJBG-J-E	7	*	*
Kingston	KHX8500D2K2/2G	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
Kingston	KHX8500D2K2/4G	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
OCZ	OCZ2N10662GK	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
OCZ	OCZ2N1066SR2DK(Epp)	2048MB(2 x 1024MB)	DS	OCZ	Heat-Sink Package 004820806001601-2	5-5-5-15	*	*
OCZ	OCZ2N1066SR2GK(EPP)	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5	*	*
OCZ	OCZ2RPR10664GK	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
PSC	AL8E8G73F-AE1	2048MB	DS	PSC	A3R1GE3FGF907MAT0FTAIWAN-G8E	5-5-5-12	*	*
Qimonda	HYS64T128000EU-1.9-C2	1024MB	DS	Qimonda	HYB18T1G800C2F-1.9FSS25253		*	*
Transcend	TX1066QLU-2GK	2048MB(2 x 1024MB)	SS	N/A	Heat-Sink Package	5	*	*
Transcend	TX1066QLJ-2GK	2048MB(2 x 1024MB)	DS	Transcend	Heat-Sink Package	5	*	*
Transcend	TX1066QLU-4GK	4096MB(2 x 2048MB)	DS	Transcend	Heat-Sink Package	5	*	*
AENEON	AXT860UD20-19E	4096MB(2 x 2048MB)	DS	AENEON	Heat-Sink Package	6	*	*
Elixir	M2Y1G64TU88D5B-BD	1024MB	SS	Elixir	M2TU1G800E-BD	5	*	*
Mushkin	996612	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
Mushkin	996619	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*

DDR2-800MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	CL	DIMM support	
							A*	B*
A-Data	M2GVD6G3H3160Q1E52	512MB	SS	VDATA	VD29608A8A-25EG20813		*	*
A-Data	AD2800E001GOU	2048MB(2 x 1024MB)	SS	N/A	Heat-Sink Package	4-4-4-12	*	*
A-Data	M2GVD6G31417001E58	1024MB	DS	VDATA	VD29608A8A-25EG80813		*	*
A-Data	AD2800E002GOU	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	4-4-4-12	*	*
Apacer	78.91G91.9K5	512MB	SS	Apacer	AM4B5708JQS8E0751C	5	*	*
Apacer	78.01GA0.9K5	1024MB	SS	Apacer	AM4B5808CQJS8E0749D	5	*	*
Apacer	78.A1GA0.9K4	2048MB	DS	Apacer	AM4B5808CQJS8E0740E	5	*	*
Apacer	78.A1GA0.9K4	2048MB	DS	Apacer	AM4B5808CQJS8E0747D	5	*	*
Corsair	CM2X1024-6400	1024MB	DS	Corsair	Heat-Sink Package		*	*
Corsair	XMS2-6400	1024MB	DS	Corsair	Heat-Sink Package	4	*	*
Corsair	XMS2-6400	1024MB	DS	Corsair	Heat-Sink Package	5	*	*
Corsair	CM2X2048-6400C5DHX	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	5	*	*
Corsair	CM2X2048-6400C5	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	5	*	*
Crucial	BL12864AL80A.8FE5(EPP)	2048MB(2 x 1024MB)	SS	N/A	Heat-Sink Package	4-4-4-12	*	*
Crucial	BL25664AL80A.16FE5(EPP)	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	4-4-4-12	*	*
Crucial	BL25664AR80A.16FE5(EPP)	4096MB(2 x 2048MB)	DS	N/A	Heat-Sink Package	4-4-4-12	*	*
G.SKILL	F2-6400CL5D-1GBNQ	512MB	SS	G.SKILL	Heat-Sink Package SN:8151030036642	5-5-5-15	*	*
G.SKILL	F2-6400CL4D-2GBPK	1024MB	DS	G.SKILL	Heat-Sink Package	4	*	*
G.SKILL	F2-6400CL5D-2GBNQ	1024MB	DS	G.SKILL	Heat-Sink Package	5	*	*
G.SKILL	F2-6400CL4D-4GBPK	2048MB	DS	G.SKILL	Heat-Sink Package	4	*	*
G.SKILL	F2-6400CL5D-4GBPQ	2048MB	DS	G.SKILL	Heat-Sink Package	5	*	*
G.SKILL	F2-6400CL6C-16GMQ	4096MB	DS	N/A	Heat-Sink Package	5	*	*
GEIL	GB22GB6400C4DC	1024MB	DS	GEIL	GL2L64M088BA30EB	5	*	*
GEIL	GB22GB6400C5DC	1024MB	DS	GEIL	GL2L64M088BA30EB	5	*	*
GEIL	GB24GB6400C4QC	1024MB	DS	GEIL	GL2L64M088BA30EB	4	*	*
GEIL	GB24GB6400C5QC	1024MB	DS	GEIL	GL2L64M088BA30EB	5	*	*
GEIL	GE22GB800C4DC	1024MB	DS	GEIL	Heat-Sink Package	4	*	*
GEIL	GE22GB800C5DC	1024MB	DS	GEIL	Heat-Sink Package	5	*	*
GEIL	GE24GB800C4QC	1024MB	DS	GEIL	Heat-Sink Package	4	*	*
GEIL	GE24GB800C5QC	1024MB	DS	GEIL	Heat-Sink Package	5	*	*
GEIL	GX22GB6400UDC	1024MB	DS	GEIL	Heat-Sink Package	5	*	*
GEIL	GB24GB6400C4DC	2048MB	DS	GEIL	GL2L128M88BA25AB	4	*	*
GEIL	GB24GB6400C5DC	2048MB	DS	GEIL	GL2L128M88BA25AB	5	*	*
GEIL	GB28GB6400C4QC	2048MB	DS	GEIL	GL2L128M88BA25AB	4	*	*
GEIL	GB28GB6400C5QC	2048MB	DS	GEIL	GL2L128M88BA25AB	5	*	*
GEIL	GE24GB800C4DC	2048MB	DS	GEIL	Heat-Sink Package	4	*	*
GEIL	GE24GB800C5DC	2048MB	DS	GEIL	Heat-Sink Package	5	*	*
GEIL	GE28GB800C4QC	2048MB	DS	GEIL	Heat-Sink Package	4	*	*
GEIL	GE28GB800C5QC	2048MB	DS	GEIL	Heat-Sink Package	5	*	*
GEIL	GX22GB6400CJSC	2048MB	DS	GEIL	Heat-Sink Package	4	*	*
GEIL	GX22GB6400LX	2048MB	DS	GEIL	Heat-Sink Package	5	*	*
GEIL	GX24GB6400DC	2048MB	DS	GEIL	Heat-Sink Package	5	*	*
Kingmax	KLDC28F-A8K15	512MB	SS	Kingmax	KK48FF1XF-JFS-25A		*	*
Kingmax	KKB8FFBFX-CFA-25U	1024MB	SS	Kingmax	KLDD48F-B8KB5		*	*
kingmax	KLDE88F-B8KB5	2048MB	DS	kingmax	KKB8FFBFX-CFA-25U		*	*
Kingston	KVR800D2N6/ 512	512MB	SS	Elpida	E5108AJBG-8E-E	6	*	*
Kingston	KHX6400D2LL2/1GN	1024MB(2 x 512MB)	SS	Kingston	Heat-Sink Package	4-4-4-12	*	*
Kingston	KVR800D2N5/1G(Low Profile)	1024MB	SS	Kingston	D1288TEFCGL25U	5	*	*
Kingston	KHX6400D2LL1/1G	1024MB	DS	Kingston	Heat-Sink Package	4-4-4-12	*	*
Kingston	KVR800D2N5/1G	1024MB	DS	Kingston	D6408TR4CGL25USL362406PECX	5	*	*
Kingston	KVR800D2N6/1G(Low Profile)	1024MB	DS	Elpida	E5108AJBG-8E-E	6	*	*
Kingston	KVR800D2N6/1G	1024MB	DS	Elpida	E5108AJBG-8E-E	6	*	*

(continued on the next page)

DDR2-800MHz capability

Vendor	Part No.	Size	S/S/DS	Chip Brand	Chip NO.	CL	DIMM support	
							A'	B'
Kingston	KHX6400D2K2/2G	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
Kingston	KHX6400D2/2G	2048MB	DS	Kingston	Heat-Sink Package	5	*	*
Kingston	KVR800D2N5/2G(Low Profile)	2048MB	DS	Kingston	D1288TPFCGL25U	5	*	*
Kingston	KVR800D2N5/2G	2048MB	DS	Elpida	E1108ACBG-8E-E	5	*	*
Kingston	KVR800D2N6/2G(Low Profile)	2048MB	DS	Elpida	E8105ACBG-8E-E	6	*	*
Kingston	KVR800D2N6/2G	2048MB	DS	Qimonda	HYB18T1G800C2F-2.5	6	*	*
Kingston	KVR800D2N6/4G	4096MB	DS	Elpida	E2108ABSE-8G-E	6	*	*
OCZ	OCZ2G800R22GK	1024MB	DS	OCZ	Heat-Sink Package	4-5-5-15	*	*
OCZ	OCZ2P800R22GK	1024MB	DS	OCZ	Heat-Sink Package	4-4-4-15	*	*
OCZ	OCZ2RPR8002GK	1024MB	DS	OCZ	Heat-Sink Package	4-4-4-15	*	*
OCZ	OCZ2VU8004GK	1024MB	DS	OCZ	Heat-Sink Package	5-6-6-18	*	*
OCZ	OCZ2SE8002GK	2048MB(2 x 1024MB)	DS	N/A	Heat-Sink Package	5-5-5-15	*	*
OCZ	OCZ2F8004GK(EPP)	2048MB	DS	N/A	Heat-Sink Package	5-4-4-18	*	*
PSC	AL7E8F73C-8E1	1024MB	SS	PSC	A3R1GE3CFF734MAAOE	5	*	*
PSC	AL8E8F73C-8E1	2048MB	DS	PSC	A3R1GE3CFF734MAAOE	5	*	*
PSC	PL8E8F73C-8E1	2048MB	DS	PSC	SHG772-AA3G	5	*	*
PSC	PL8E8G73E-8E1	2048MB	DS	PSC	XCP271A3G-A	5	*	*
Qimonda	HYS64T256020EU-2.5-C2	2048MB	DS	Qimonda	HY818T1G800C2F-2.5	5	*	*
Samsung	K4T51083QG-HCF7	512MB	SS	Qimonda	M378T6553QZS-CF7	6	*	*
Samsung	K4T1G084QQ-HCF7	1024MB	SS	Qimonda	M378T2863QZS-CF7	6	*	*
Samsung	K4T51083QG-HCF7	1024MB	DS	Samsung	M378T2953QZ3-CF7	6	*	*
Samsung	K4T1G084QQ-HCF7	2048MB	DS	Samsung	M378T5663QZ3-CF7	6	*	*
Samsung	M378T5263AZ3-CF7	4096MB	DS	Samsung	K4T2G084QA-HCF7	6	*	*
Super Talent	T800UB1G4	1024MB	DS	Super Talent	Heat-Sink Package	4	*	*
Transcend	TS64MLQ64V8J	512MB	SS	Micron	7HD22 D9GMH	5	*	*
Transcend	JM800QLU-1G	1024MB	SS	Transcend	TQ1243PCF8	5	*	*
Transcend	TS128MLQ64V8U	1024MB	SS	ELPIDA	E1108ACBG-8E-E	5	*	*
Transcend	JM800QLJ-1G	1024MB	DS	Transcend	TQ123PJF8F0801	5	*	*
Transcend	JM800QLJ-1G	1024MB	DS	Transcend	TQ123YBF8 T0747	5	*	*
Transcend	TS128MLQ64V8J	1024MB	DS	Mircon	7HD22D9GMH	5	*	*
Transcend	JM800QLU-2G	2048MB	DS	Transcend	TQ243PCF8	5	*	*
Transcend	TS256MLQ64V8U	2048MB	DS	Elpida	E1108ACBG-8E-E	5	*	*
AENEON	AET760UD00-25DC08X	1024MB	SS	AENEON	AET03R250C 0732	5	*	*
AENEON	AET860UD00-25DC08X	2048MB	DS	AENEON	AET03R250C 0732	5	*	*
ASINT	SLY2128M8-JGE	1024MB	SS	ASINT	DDR1I1208-GE 8115		*	*
ASINT	SLZ2128M8-JGE	2048MB	DS	ASINT	DDR1I1208-GE 8115		*	*
Elixir	M2Y1G64TU88D5B-AC 0828.GS	1024MB	SS	Elixir	N2TU16800E-AC		*	*
ELIXIR	M2Y1G64TU88B0B-25C	1024MB	DS	ELIXIR	N2TU 51280BE-25C802006Z1DV	5	*	*
Elixir	M2Y2G64TU88D5B-AC 0826.SG	2048MB	DS	Elixir	N2TU880DE-AC		*	*
MDT	MDT 512MB	512MB	SS	MDT	18D 51280D-2.50726F	5	*	*
MDT	MDT 1024MB	1024MB	DS	MDT	18D 51280D-2.50726E	5	*	*
TAKEMS	TMS51B264C081-805EP	512MB	SS	takeMS	MS18T 51280-2.5P0710	5	*	*
TAKEMS	TMS1GB264C081-805EP	1024MB	DS	takeMS	MS18T 51280-2.5P0716	5	*	*
UMAX	D48001GP3-63BJU	1024MB	DS	UMAX	U2S12D30TP-8E		*	*
UMAX	D48002GP0-73BCU	2048MB	DS	UMAX	U2S24D30TP-8E	5	*	*

DDR2-667MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	CL	DIMM support	
							A*	B*
A-Data	M20AD5H3J4170H1C53	2048MB	DS	ADATA	AD20908A8A-3EG 30724		•	•
Apacer	78.91G92.9K5	512MB	SS	Apacer	AM4B5708JQS7E0751C	5	•	•
Apacer	AU 512E667C5KBGC	512MB	SS	Apacer	AM4B5708GQJS7E06332F	5	•	•
Apacer	AU 512E667C5KBGC	512MB	SS	Apacer	AM4B5708MJS7E0627B	5	•	•
Apacer	78.01G90.9K5	1024MB	SS	Apacer	AM4B5808CQJS7E0751C	5	•	•
Apacer	AU01GE667C5KBGC	1024MB	DS	Apacer	AM4B5708GQJS7E0636B		•	•
Apacer	AU01GE667C5KBGC	1024MB	DS	Apacer	AM4B5708MJS7E0627B	5	•	•
Apacer	AM4B5808CQJS7E0749B	2048MB	DS	Apacer	78.A1G90.9K4	5	•	•
Corsair	VS 512MB667D2	512MB	DS	Corsair	MII0052532M8CEC		•	•
Corsair	VS1GB667D2	1024MB	DS	Corsair	MID095D62864M8CEC		•	•
Corsair	XMS2-5400	1024MB	DS	Corsair	Heat-Sink Package	4	•	•
G.SKILL	F2-5400PHU2-2GBNT	2048MB(2 x 1024MB)	DS	G.SKILL	D2 64M8CCF 0815 C17173S		5-5-5-15	•
G.SKILL	F2-5300CL5D-4GBMQ	4096MB(2 x 2048MB)	DS	G.SKILL	Heat-Sink Package SN:8151030036559		5-5-5-15	•
GEIL	GX21GB5300SX	1024MB	DS	GEIL	Heat-Sink Package	3	•	•
GEIL	GX22GB5300LX	2048MB	DS	GEIL	Heat-Sink Package	5	•	•
GEIL	GX24GE5300LDC	2048MB	DS	GEIL	Heat-Sink Package	5	•	•
Kingmax	KLCC28F-A8KB5	512MB	SS	Kingmax	KKEA88B4LAUG-29DX		•	•
Kingmax	KLCD48F-A8KB5	1024MB	DS	Kingmax	KKEA88B4LAUG-29DX		•	•
Kingston	KVR667D2N5/ 512(Low Profile)	512MB	SS	Kingston	D6408TR7CGL25U	5	•	•
Kingston	KVR667D2N5/ 512	512MB	SS	Kingston	S01237650821 SBP D6408TR4CGL25 USL074905PECNB	5	•	•
Kingston	KVR667D2N5/1G(Low Profile)	1024MB	DS	PSC	E5108AJBG-8E-E	5	•	•
Kingston	KVR667D2N5/2G(Low Profile)	2048MB	DS	Elpida	E1108ACBG-8E-E	5	•	•
Kingston	KVR667D2N5/2G	2048MB	DS	Micron	7RE22 D9HNL		5-5-5-15	•
Micron	MT8HTF12864AY-667E1	1024MB	SS	Micron	D9HNL 7ZE17	5	•	•
PSC	AL6E8E63J-6E1	512MB	SS	PSC	A3R12E3JFF717B9A00	5	•	•
PSC	AL7E8F73C-6E1	1024MB	SS	PSC	A3R1GE3CF734MAA0J	5	•	•
PSC	AL6E8E63J-6E1	1024MB	DS	PSC	A3R12E3JFF717B9A01	5	•	•
PSC	AL8E8F73C-6E1	2048MB	DS	PSC	A3R1GE3CF733MAA00	5	•	•
Samsung	M378T5263AZ3-CE6	4096MB	DS	Samsung	K4T2G084QA-HCE6		•	•
Super Talent	T667UB1GV	1024MB	DS	Super Talent	PG 64M8-800 0750	5	•	•
Transcend	JM667QLU-1G	1024MB	SS	Transced	TQ243PCF8T0838	5	•	•
Transcend	JM667QLJ-1G	1024MB	DS	Elpida	E5108AJBG-6E-E	5	•	•
Transcend	JM667QLU-2G	2048MB	DS	Transced	TQ243PCF8T0834	5	•	•
Twinmos	8D-A3JK5MPETP	512MB	SS	PSC	A3R12E3GEF633ACA0Y	5	•	•
AENEON	AET860UD00-30DB08X	2048MB	DS	AENEON	AET03F30DB 0730	5	•	•
Asint	SLX264M8-J6E	512MB	SS	Asint	DDRII6408-6E		•	•
ASINT	SLY2128M8-J6E	1024MB	SS	ASINT	DDRIII1208-6E 8115		•	•
Century	CENTURY 512MB	512MB	SS	Hynix	HY5PS12821AFP-Y5		•	•
Century	CENTURY 512MB	512MB	SS	Nanya	NT5TU64M8AE-3C		•	•
Century	CENTURY 1G	1024MB	DS	Nanya	NT5TU64M8AE-3C		•	•
ELIXIR	M2Y1G64TU8HA2B-3C	1024MB	DS	elixir	M2TU 51280AE-3C717095R28F	5	•	•
Elixir	M2Y1G64TU8HBOB-3C	1024MB	DS	Elixir	N2TU 51280BE-3C63909W1CF	5	•	•
KINGBOX	512MB 667MHz	512MB	SS	KINGBOX	EPD264082200-4		•	•
KINGBOX	DDRII 1G 667MHz	1024MB	DS	KINGBOX	EPD264082200-4		•	•

(continued on the next page)

DDR2-667MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	CL	DIMM support	
							A*	B*
Leadmax	LRMP 512U64A8-Y5	1024MB	DS	Hynix	HY5PS12821CFP-Y5 C 702AA	5	•	•
MDT	DDRII 512 PC667	512MB	DS	MDT	18D 51201D-30726E	4	•	•
MDT	MDT 1024MB	1024MB	DS	MDT	18D 51280D-30646E	4	•	•
TAKEMS	TMS51B264C081-665AP	512MB	SS	takeMS	MS18T 51280-3S0627D	5	•	•
TAKEMS	TMS51B264C081-665QI	512MB	SS	takeMS	MS18T 51280-3	5	•	•
TAKEMS	TMS1GB264C081-665AE	1024MB	DS	takeMS	MS18T 51280-3SEA07100	5	•	•
TAKEMS	TMS1GB264C081-665AP	1024MB	DS	takeMS	MS18T 51280-3SP0717A	5	•	
TAKEMS	TMS1GB264C081-665QI	1024MB	DS	takeMS	MS18T 51280-3	5	•	•
TEAM	TVDD1.02M667C4	1024MB	DS	TEAM	T2D648PT-6		•	•
UMAX	D46701GP3-63BJU	1024MB	DS	UMAX	U2S12D30YP-6E		•	•
UMAX	D46702GP0-73BCU	2048MB	DS	UMAX	U2S24D30TP-6E	5	•	•



SS: Single-sided / DS: Double-sided

DIMM support:

- **A***: Supports one module inserted into either slot as single-channel memory configuration.
- **B***: Supports one pair of modules inserted into both the slots as one pair of dual-channel memory configuration.



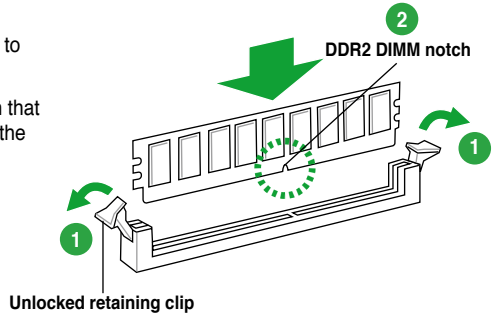
Visit the ASUS website at www.asus.com for the latest QVL.

1.7.3 Installing a DIMM



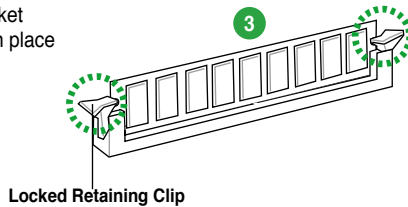
Unplug the power supply before adding or removing DIMMs or other system components. Failure to do so can cause severe damage to both the motherboard and the components.

1. Press the retaining clips outward to unlock a DDR2 DIMM socket.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.



A DDR2 DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

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



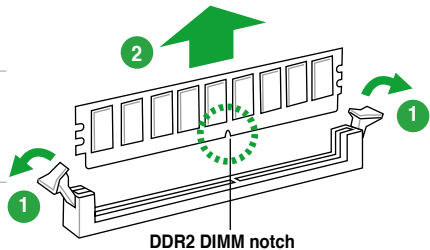
1.7.4 Removing a DIMM

To remove a DIMM:

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



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



2. Remove the DIMM from the socket.

1.8 Expansion slots

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



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

1.8.1 Installing an expansion card

To install an expansion card:

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

1.8.2 Configuring an expansion card

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

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



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

1.8.3 PCI slots

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

1.8.4 PCI Express x1 slot

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

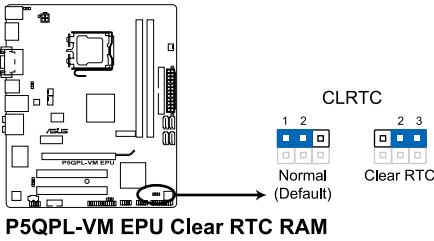
1.8.5 PCI Express x16 slot

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

1.9 Jumpers

1. Clear RTC RAM (3-pin CLRTC)

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



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 reenter data.



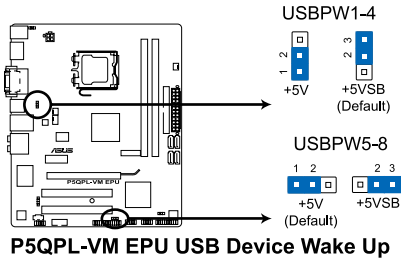
Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



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

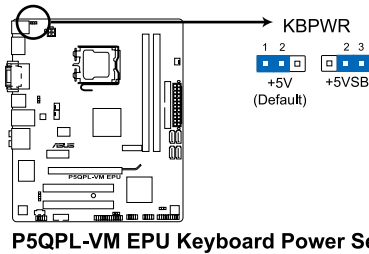
2. USB device wake-up (3-pin USBPW1-4, USBPW5-8)

Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set these jumpers to +5VSB to wake up the computer from S3 and S4 sleep modes (no power to CPU, DRAM in slow refresh, power supply in reduced power mode).



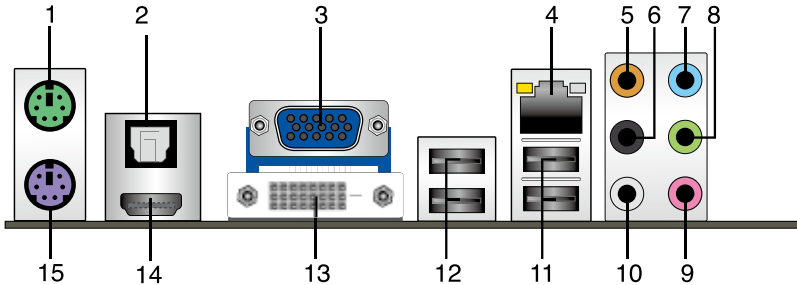
3. Keyboard power (3-pin KBPWR)

This jumper allows you to enable or disable the keyboard wake-up feature. When you set this jumper to pins 2-3 (+5VSB), you can wake up the computer by pressing a key on the keyboard (the default is the Space Bar). This feature requires an ATX power supply that can supply at least 1A on the +5VSB lead, and a corresponding setting in the BIOS.



1.10 Connectors

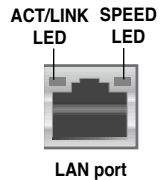
1.10.1 Rear panel connectors



1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **Optical S/PDIF_OUT port.** This port connects to an external audio output device via an optical S/PDIF cable.
3. **D-Sub port.** This 15-pin port is for a VGA monitor or other VGA-compatible devices.
4. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub.

LAN port LED indications

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



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



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

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

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



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

- USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are for USB 2.0 devices.
- USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are for USB 2.0 devices.
- DVI port.** This port is for any DVI-D compatible device and is HDCP compliant allowing playback of HD DVD, Blu-Ray, and other protected content.
- HDMI port.** This port is for a High-Definition Multimedia Interface (HDMI) connector, and is HDCP compliant allowing playback of HD DVD, Blu-Ray, and other protected content.



Dual display output support

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

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

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

- PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

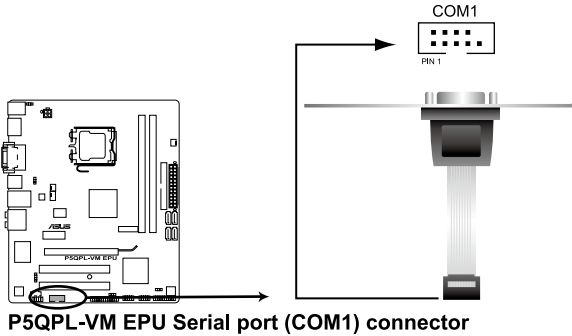
1.10.2 Internal connectors

1. Serial port connectors (10-1 pin COM1)

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



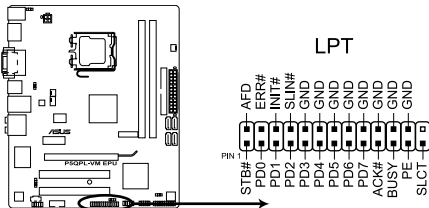
The serial port module (COM1) is purchased separately.



P5QPL-VM EPU Serial port (COM1) connector

2. LPT connector (26-1 pin LPT)

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



P5QPL-VM EPU Parallel Port Connector

3. IDE connector (40-1 pin PRI_IDE)

The onboard IDE connector is for the Ultra DMA 100/66 signal cable. There are three connectors on each Ultra DMA 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.

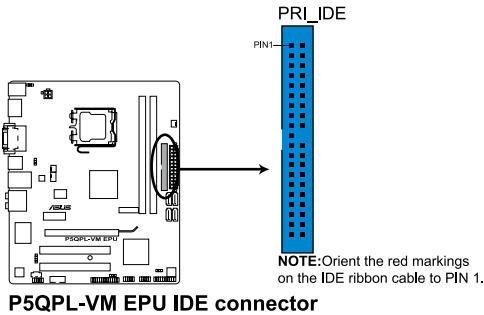
	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	—	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
		Slave	



- 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 100/66 IDE devices.

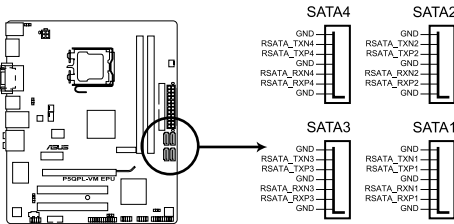


If any device jumper is set as "Cable-Select," ensure that all other device jumpers have the same setting.



4. Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4)

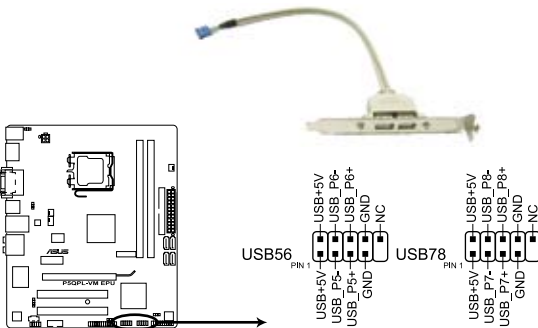
These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives.



P5QPL-VM EPU SATA connectors (ICH7®)

5. USB connectors (10-1 pin USB56, USB78)

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



P5QPL-VM EPU USB2.0 connectors



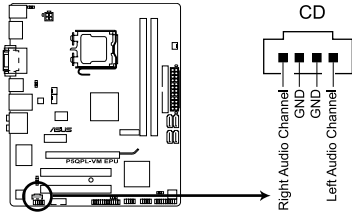
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



The USB module is purchased separately.

6. Optical drive audio connector (4-pin CD)

These connectors allow you to receive stereo audio input from sound sources such as a CD-ROM, TV tuner, or MPEG card.



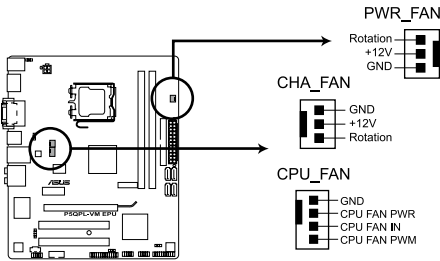
P5QPL-VM EPU Internal audio connector

7. CPU, chassis, and power fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN, 3-pin PWR_FAN)

The fan connectors support cooling fans of 350 mA ~ 2000 mA (24 W max.) or a total of 1 A ~ 7 A (84 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.



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



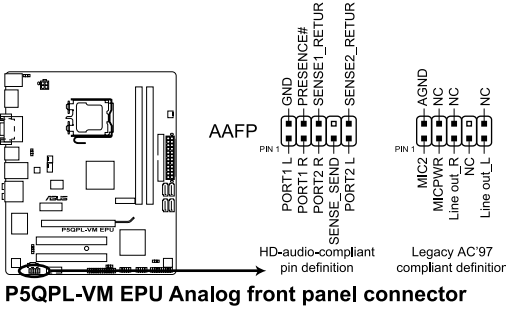
P5QPL-VM EPU fan connectors



Only the CPU fan supports the ASUS Q-Fan feature.

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.



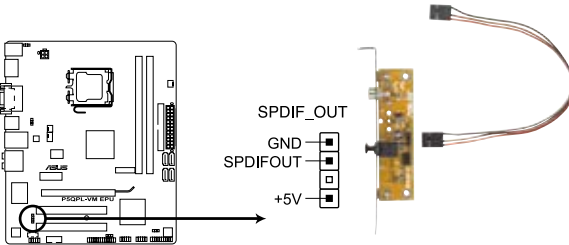
P5QPL-VM EPU Analog front panel connector



- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.
- If you want to connect a high definition front panel audio module to this connector, set the **Front Panel Type** item in the BIOS to **[HD Audio]**. See section 2.4.3 Chipset for details.

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

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



P5QPL-VM EPU Digital audio connector



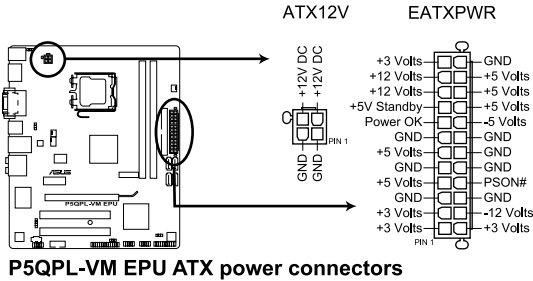
The S/PDIF module is purchased separately.



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

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

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.



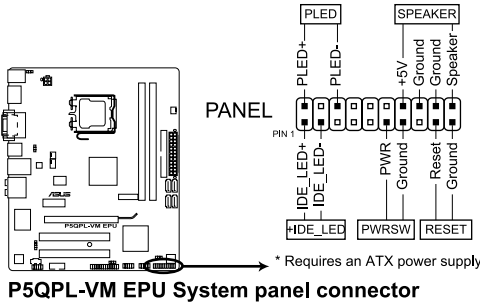
P5QPL-VM EPU ATX power connectors



- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12V Specification 2.0 (or later version) and provides a minimum power of 400W.
- DO NOT forget to connect the 4-pin ATX12V power plug. Otherwise, the system will not boot.
- We recommend that you use a PSU with a higher power output when configuring a system with more power-consuming devices or when you intend to install additional devices. The system may become unstable or may not boot up if the power is inadequate.

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

This connector supports several chassis-mounted functions.



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

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

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

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

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

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

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

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

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

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

1.11 Software support

1.11.1 Installing an operating system

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



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

1.11.2 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.

To run the Support DVD

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



Click an icon to display Support DVD/ motherboard information

Click an item to install



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

Chapter 2

BIOS information

2.1 Managing and updating your BIOS



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

2.1.1 ASUS Update utility

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



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

Installing ASUS Update

To install ASUS Update:

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



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

Updating the BIOS

To update the BIOS:

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

Updating from the Internet

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



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

Updating from a BIOS file

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

2.1.2 ASUS EZ Flash 2 utility

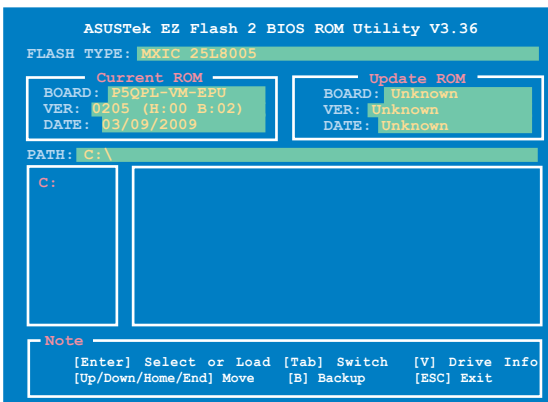
The ASUS EZ Flash 2 feature allows you to update the BIOS without using an OS-based utility.



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

To update the BIOS using EZ Flash 2:

1. Insert the USB flash disk that contains the latest BIOS file to the USB port, then launch EZ Flash 2 in either of these two ways:
 - Press **<Alt> + <F2>** during POST 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, then press **<Enter>**. EZ Flash 2 performs the BIOS updating process and automatically reboots the system when done.



- This function supports USB flash disks with **FAT 32/16** format and single partition only.
 - DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!
-

2.1.3 ASUS CrashFree BIOS 3 utility

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



-
- Prepare the motherboard support DVD or the USB flash disk containing the updated motherboard BIOS before using this utility.
 - Always connect the SATA cable to the SATA1/2/3/4 connector. Otherwise, the utility will not function.
-

Recovering the BIOS

To recover the BIOS:

1. Turn on the system.
2. Insert the support DVD or the USB flash disk containing the BIOS file to the optical drive or USB port.

The utility displays the following message and automatically checks the support DVD or USB flash disk for the BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for CD-ROM...
```

When the BIOS file is found, the utility reads it and starts erasing the corrupted BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for CD-ROM...
CD-ROM found!
Reading file "P5QLVME.ROM". Completed.
Start erasing...
Start programming...
```

3. Restart the system after the utility completes the updating process.



-
- Only the USB flash disk with FAT 32/16 format and single partition supports ASUS CrashFree BIOS 3. The device size should be smaller than 8GB.
 - DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!
-



The recovered BIOS may not be the latest BIOS version for this motherboard. Download the latest BIOS file from the ASUS website at www.asus.com.

2.2 BIOS setup program

This motherboard supports a programmable Serial Peripheral Interface (SPI) chip that you can update using the provided utility described in section 2.1 **Managing and updating your BIOS**.

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

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

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

If you want to enter Setup after POST, reboot the system by doing any of the following procedures:

- Restart using the OS standard shut-down procedure.
- Press **<Ctrl>+<Alt>+** simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on.



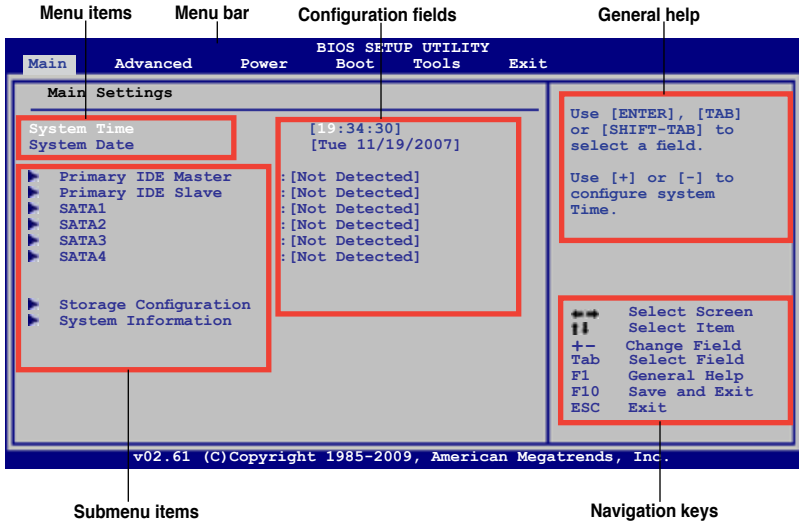
Using the **power button**, **reset button**, or the **<Ctrl>+<Alt>+** keys to force reset from a running operating system can cause damage to your data or system. We recommend that you always shut down the system properly from the operating system.

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



-
- The default BIOS settings for this motherboard apply to most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. See section 2.8 **Exit Menu**.
 - The BIOS setup screens in this chapter are for reference only. They may not exactly match what you see on your screen.
 - Visit the ASUS website at www.asus.com to download the latest BIOS file for this motherboard.
-

2.2.1 BIOS menu screen



2.2.2 Menu bar

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

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

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

2.2.3 Navigation keys

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



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

2.2.4 Menu items

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

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

2.2.5 Submenu items

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

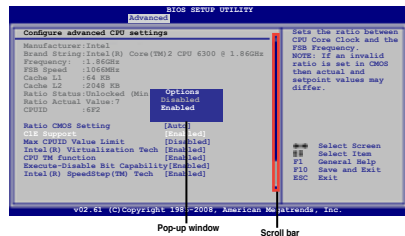
2.2.6 Configuration fields

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

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

2.2.7 Pop-up window

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



2.2.8 Scroll bar

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

2.2.9 General help

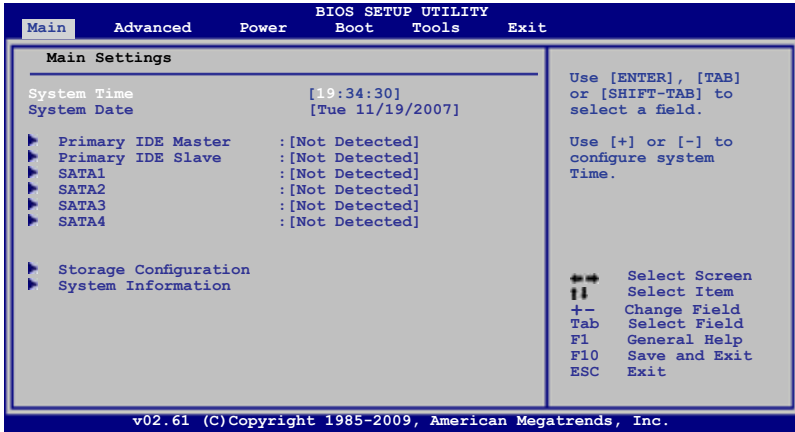
At the top right corner of the menu screen is a brief description of the selected item.

2.3 Main menu

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



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



2.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

2.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

2.3.3 Primary IDE Master/Slave, SATA1/2/3/4

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

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

Type [Auto]

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



This item only appears in the Primary IDE Master/Slave menus.

LBA/Large Mode [Auto]

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

Block (Multi-Sector Transfer) M [Auto]

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

PIO Mode [Auto]

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

DMA Mode [Auto]

Selects the DMA mode. Configuration options: [Auto]

SMART Monitoring [Auto]

Sets the Smart Monitoring, Analysis, and Reporting Technology.
Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

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

2.3.4 Storage Configuration

The items in this menu allow you to set or change the configurations for the storage devices installed in the system. Select an item then press **<Enter>** if you want to configure the item.

ATA/IDE Configuration [Enhanced]

Allows you to configure ATA/IDE. Configuration options: [Disabled] [Compatible] [Enhanced]

Enhanced Mode Support On [S-ATA]

Allows you to set Serial ATA, Parallel ATA or both as native mode. Configuration options: [S-ATA+P-ATA] [S-ATA] [P-ATA]

IDE Detect Time Out [35]

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

2.3.5 System Information

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

Bios information

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

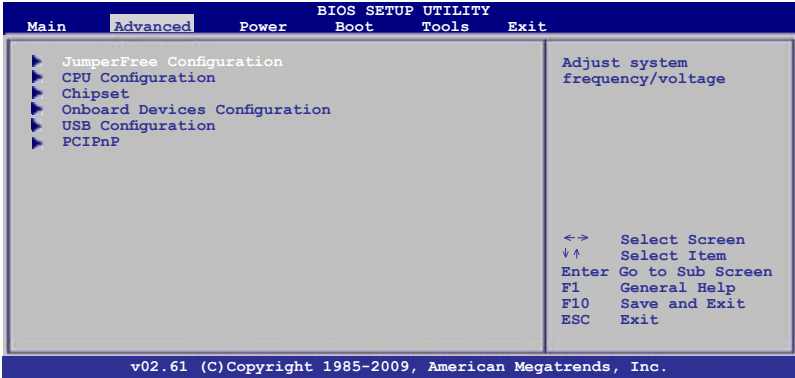
Displays the auto-detected system memory.

2.4 Advanced menu

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



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



2.4.1 JumperFree Configuration

AI Overclocking [Auto]

Allows selection of CPU overclocking options to achieve desired CPU internal frequency. Select either one of the preset overclocking. Configuration options: [MANUAL] [Auto] [Overclock Profile]



The following two items appear only when you set the **AI Overclocking** item to **[MANUAL]**.

CPU Frequency [XXX]

Displays the frequency sent by the clock generator to the system bus and PCI bus. The value of this item is auto-detected by the BIOS. Use the <-> and <-> keys to adjust the CPU frequency. You can also key in the desired CPU frequency using the numeric keypad. The values range from 200 to 800. Refer to the table below for the correct Front Side Bus and CPU External Frequency settings.

FSB / CPU External Frequency Synchronization

Front Side Bus	CPU External Frequency
FSB 1333	333MHz
FSB 1066	266MHz
FSB 800	200MHz

PCI Express Frequency [Auto]

Allows you to set the PCI Express frequency. Configuration options: [Auto] [90] ~ [150]



The following item appears only when you set the **AI Overclocking** item to **[Overclock Profile]**.

Overclock Options [Overclock 5%]

Allows you to select the overclock options. Configuration options: [Overclock 5%] [Overclock 10%] [Overclock 15%] [Overclock 20%] [Overclock 30%] [Test Mode]

DRAM Frequency [Auto]

Allows you to set the DDR2 operating frequency. Configuration options: [Auto] [667MHz] [800MHz] [1067MHz]



The DRAM Frequency options vary with different FSB values. Refer to the following table for the DRAM Frequency options when the FSB value is 1333, 1066, and 800.

FSB	DRAM Frequency							
	Auto	667MHz	800MHz	960MHz	1000MHz	1067MHz	1100MHz	1200MHz
1333	*	*	*		*		*	
1066	*	*	*			*		
800	*	*	*					



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

Memory Voltage [Auto]

Allows you to set the memory voltage. The values range from 1.50000V to 2.44500V with a 0.01500V increment. Use the <=> / <-> keys to adjust the value. Configuration options: [Auto] [Max. = 2.44500V] [Min. = 1.50000V]

NB Voltage [Auto]

Allows you to select the North Bridge voltage. Configuration options: [Auto] [1.125V] [1.175V] [1.225V] [1.275V]

SB 1.5V Voltage [1.5V]

Allows you to select the South Bridge voltage. Configuration options: [1.5V] [1.6V]

CPU VTT [1.2V]

Allows you to select FSB termination voltage. Configuration options: [1.2V] [1.3V]

CPU Over Voltage [Auto]

Allows you to select the CPU Over Voltage. Configuration options: [Auto] [+50mv] [+100mv] [+150mv]

Auto PSI [Enabled]

Enables or disables auto PSI. When you set this item to **[Disabled]**, power runs in the fixed 4 phase mode. When you set this item to **[Enabled]**, power runs in the auto mode. Configuration options: [Enabled] [Disabled]

2.4.2 CPU Configuration

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

Ratio CMOS Setting [Auto]

Allows you to set the ratio between CPU Core Clock and the FSB frequency.

Configuration options: [Auto]



-
- If an invalid ratio is set in CMOS then actual and set values may differ.
 - Key in ratio numbers directly.
-

C1E Support [Enabled]

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

Configuration options: [Disabled] [Enabled]

Max CPUID Value Limit [Disabled]

Allows you to determine whether to limit CPUID maximum value. Set this item to **[Disabled]** for Windows XP operating system; set this item to **[Enabled]** for legacy operating system such as Windows NT4.0. Configuration options: [Disabled] [Enabled]

Intel® Virtualization Tech [Enabled]

Enables or disables Intel® Virtualization Technology. Virtualization enhanced by Intel® Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions. With Virtualization, one computer system can function as multiple virtual systems. Configuration options: [Enabled] [Disabled]

CPU TM Function [Enabled]

Enables or disables Intel® CPU Thermal Monitor (TM) function, a CPU overheating protection function. When this item is enabled, the CPU core frequency and voltage are reduced when the CPU overheats. Configuration options: [Disabled] [Enabled]

Execute-Disable Bit Capability [Enabled]

Enables or disables Intel® Execute Disable Bit function. This function enhance protection of your computer, reducing exposure to viruses and malicious buffer overflow attacks when working with its supporting software and system. Configuration options: [Disabled] [Enabled]



The following item appears only when you installed an Intel® Pentium® 4 or later CPU that supports the Enhanced Intel SpeedStep® Technology (EIST).

Intel® SpeedStep® Tech [Enabled]

Allows you to use the Enhanced Intel® SpeedStep® Technology. When this item is set to **[Enabled]**, you can adjust the system power settings in the operating system to use the EIST feature. Set this item to **[Disabled]** if you do not want to use the EIST. Configuration options: [Enabled] [Disabled]

2.4.3 Chipset

The Chipset menu allows you to change the advanced chipset settings. Select an item then press <Enter> to display the submenu.

North Bridge Configuration

Memory Remap Feature [Enabled]

Allows you to enable or disable the remapping of overlapped PCI memory above the total physical memory. Configuration options: [Enabled] [Disabled]

Configure DRAM Timing by SPD [Enabled]

Allows you to enable or disable configuring DRAM Timing by SPD. Configuration options: [Enabled] [Disabled]

Initiate Graphic Adapter [PEG/PCI]

Allows you to select the primary boot device. Configuration options: [IGD] [PCI/IGD] [PCI/PEG] [PEG/IGD] [PEG/PCI]

IGD Graphics Mode Select [Enabled, 32MB]

Allows you to select the amount of system memory used by the IGD graphics device. Configuration options: [Disabled] [Enabled, 32MB] [Enabled, 64MB] [Enabled, 128MB]

DVMT Memory [256MB]

Allows you to select the DVMT memory. Configuration options: [128MB] [256MB] [Maximum DVMT]



- The **[Maximum DVMT]** option only appears when you install 1GB system memory or more.
- The **[256MB]** option only appears when you install more than 512MB system memory.

Protect Audio Video Path Mode [Lite]

Allows you to use the High-Bandwidth Digital Content Protection (HDCP) function. This item is not user-configurable.

Feature	PAVP Lite
Compressed video buffer is encrypted	Yes
HW 128-bit AES decryption	Yes
Protected memory (96MB reserved during boot)	No

South Bridge Configuration

Audio Controller [Enabled]

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

Front Panel Type [HD Audio]

Allows you to select the front panel support type. If High Definition Audio Front Panel is used, set this item to **[HD Audio]**. Configuration options: [AC97] [HD Audio]



This item does not appear when the **Audio Controller** item is set to **[Disabled]**.

2.4.4 Onboard Devices Configuration

Onboard Gigabit LAN [Enabled]

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

Onboard LAN Boot ROM [Disabled]

Allows you to enable or disable the boot ROM in the onboard LAN controller. This item appears only when the Onboard LAN item is set to Enabled. Configuration options: [Disabled] [Enabled]

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]

Parallel Port Address [378]

Allows you to select the Parallel Port base addresses.

Configuration options: [Disabled] [378] [278] [3BC]

Parallel Port Mode [ECP]

Allows you to select the Parallel Port mode.

Configuration options: [Normal] [Bi-Directional] [EPP] [ECP]

ECP Mode DMA Channel [DMA3]

Appears only when the **Parallel Port Mode** item is set to **[ECP]**. This item allows you to set the Parallel Port ECP DMA. Configuration options: [DMA0] [DMA1] [DMA3]

Parallel Port IRQ [IRQ7]

Allows you to select parallel port IRQ. Configuration options: [IRQ5] [IRQ7]

2.4.5 USB Configuration

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



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

USB Functions [Enabled]

Allows you to enable or disable the USB functions. Configuration options: [Disabled] [Enabled]

USB 2.0 Controller [Enabled]

Allows you to enable or disable USB 2.0 controller. Configuration options: [Enabled] [Disabled]

Legacy USB Support [Auto]

Allows you to enable or disable support for USB devices on legacy operating systems (OS). Setting this item to **[Auto]** allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled. Configuration options: [Disabled] [Enabled] [Auto]

USB 2.0 Controller Mode [HiSpeed]

Allows you to configure the USB 2.0 controller in HiSpeed (480Mbps) or Full Speed (12Mbps). Configuration options: [FullSpeed] [HiSpeed]

2.4.6 PCI PnP

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



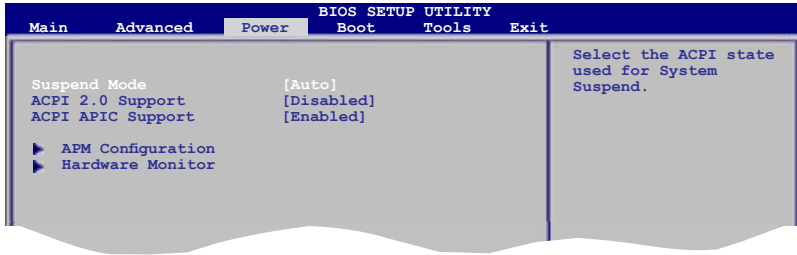
Take caution when changing the settings of the PCI PnP menu items. Incorrect field values can cause the system to malfunction.

Plug And Play O/S [No]

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

2.5 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.



2.5.1 Suspend Mode [Auto]

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

2.5.2 ACPI 2.0 Support [Disabled]

Allows you to add more tables for Advanced Configuration and Power Interface (ACPI) 2.0 specifications. Configuration options: [Disabled] [Enabled]

2.5.3 ACPI APIC Support [Enabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Application-Specific Integrated Circuit (ASIC). When this item is set to **[Enabled]**, the ACPI APIC table pointer is included in the RSDT pointer list. Configuration options: [Disabled] [Enabled]

2.5.4 APM Configuration

Restore on AC Power Loss [Power Off]

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

Power On By RTC Alarm [Disabled]

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

Power On By External Modem [Disabled]

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

Resume On PCI(E) Device [Disabled]

When set to **[Enabled]**, this parameter allows you to wake the system through a PCI/PCIe device. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Enabled]

Power On By PS/2 Keyboard [Disabled]

Allows you to enable or disable the PS/2 keyboard to generate a wake event. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Configuration options: [Disabled] [Enabled]

Power On By PS/2 Mouse [Disabled]

Allows you to enable or disable the PS/2 mouse to generate a wake event. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Configuration options: [Disabled] [Enabled]

2.5.5 Hardware Monitor

CPU Temperature [xxx°C/xxx°F] or [Ignored]

MB Temperature [xxx°C/xxx°F] or [Ignored]

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

CPU Fan Speed (RPM) [xxxxRPM] or [N/A] or [Ignored]

The onboard hardware monitor automatically detects and displays the CPU 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 want to display the detected speed.

CPU Q-Fan Control [Disabled]

Allows you to enable or disable the CPU Q-Fan control.

Configuration options: [Disabled] [Enabled]

Chassis/Power Fan Speed [xxxxRPM] or [N/A] or [Ignored]

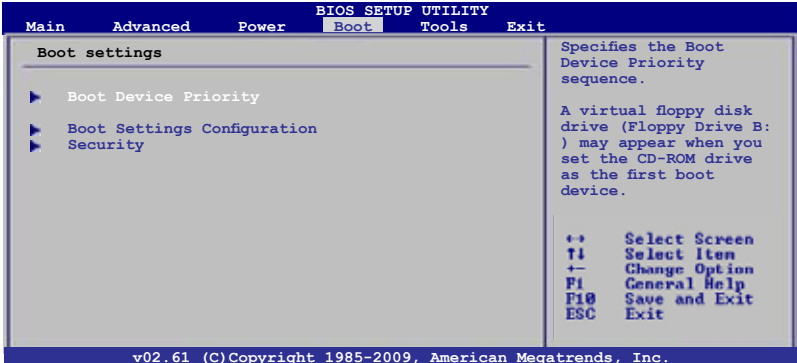
The onboard hardware monitor automatically detects and displays the chassis/power fan speed in rotations per minute (RPM). If the fan is not connected to the chassis/power, the specific field shows **N/A**. Select **[Ignored]** if you do not want to display the detected speed.

VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

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

2.6 Boot menu

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



2.6.1 Boot Device Priority

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]

2.6.2 Boot Settings Configuration

Quick Boot [Enabled]

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

Full Screen Logo [Enabled]

This allows you to enable or disable the full screen logo display feature. Configuration options: [Disabled] [Enabled]



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

Add On ROM Display Mode [Force BIOS]

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

Bootup Num-Lock [On]

Allows you to select the power-on state for the NumLock. Configuration options: [Off] [On]

Wait for 'F1' If Error [Enabled]

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

Hit 'DEL' Message Display [Enabled]

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

2.6.3 Security

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

Change Supervisor Password

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

To set a Supervisor Password:

1. Select the **Change Supervisor Password** item and press **<Enter>**.
2. From the password box, type a password composed of up to 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 supervisor password.

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



If you forget your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section **1.9 Jumpers** 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. Configuration options: [No Access] [View Only] [Limited] [Full Access]

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

1. Select the **Change User Password** item and press **<Enter>**.
2. On the password box that appears, type a password composed of up to 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

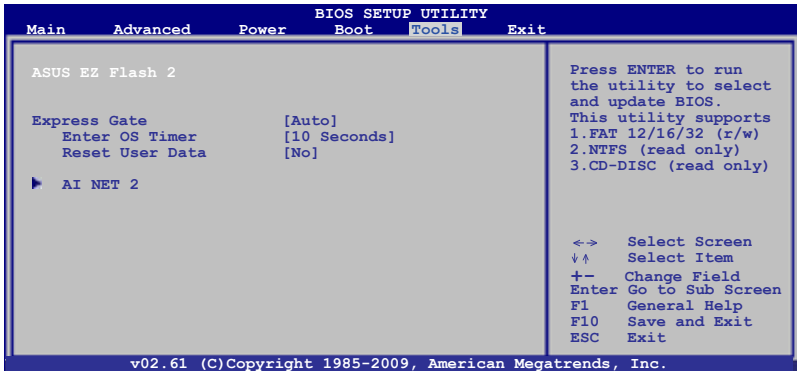
Select this item to clear the user password.

Password Check [Setup]

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

2.7 Tools menu

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



2.7.1 ASUS EZ Flash 2

Allows you to run ASUS EZ Flash 2. When you press **<Enter>**, a confirmation message appears. Use the left/right arrow key to select between **[Yes]** or **[No]**, then press **<Enter>** to confirm your choice. See section **2.1.2 ASUS EZ Flash 2 utility** for details.

2.7.2 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: [Disabled] [Enabled] [Auto]

Enter OS Timer [10 Seconds]

Allows you to set the 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]

When setting this item to **[Reset]**, ensure to 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 (bookmarks, cookies, browsing history, etc.). This is useful in the rare case where corrupt settings prevent the Express Gate environment from launching properly.



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

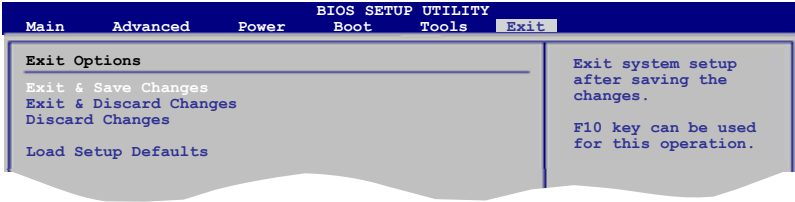
2.7.3 AI NET 2

Check Atheros LAN cable [Disabled]

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

2.8 Exit menu

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



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

Exit & Save Changes

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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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