P5N-VM WS

Motherboard

E4201

First Edition
September 2008

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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.

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adpater 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.

This symbol of the crossed out wheeled bin indicates that the product (electrical, electronic equipment and mercury-containing button cell battery) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

About this guide

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

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**

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

- **Chapter 2: Hardware information**

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

- **Chapter 3: BIOS setup**

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

- **Chapter 4: Software support**

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

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 connected with a plus sign (+). Example: <Ctrl>+<Alt>+<D>
`Command`	Means that you must type the command exactly as shown. Example: At the DOS prompt, type the command line: `afudos /iP5NVMWS.ROM`

P5N-VM WS specifications

CPU	LGA775 socket for Intel® Core™ 2 Extreme / Core™ 2 Quad / Core™ 2 Duo / Pentium® dual-core / Celeron® dual-core / Celeron® processors Compatible with Intel® 05B/05A/06 processors Intel® 45nm multi-core CPU support * Refer to www.asus.com for Intel® CPU support list
Chipset	NVIDIA® Quadro FX470
System bus	1333 / 1066 / 800 MHz with EM64T
Memory	Dual-channel memory architecture - 4 x 240-pin DIMM sockets support non-ECC unbuffered DDR2 800 / 667 MHz memory modules - Supports up to 8 GB system memory
Expansion slots	1 x PCIe 2.0 x16 slot (x16 link) 1 x PCIe x4 slot (x1 link) for SAS, 1 x PCIe x1 slot (x1 link) 1 x PCI 32-bit / 33MHz slot
VGA	Integrated Quadro FX470 Quadro NVIEW support for Quad Display OpenGL 2.1 and DX10 support
Storage	**NVIDIA® Quadro FX470** - 6 x Serial ATA 3.0 Gb/s ports - NVIDIA® MediaShield™ RAID supports RAID 0, 1, 0+1, 5 and JBOD configuration across SATA drives **Optional SAS Controller add-on card** Optional 1: SASsaby 1064E PCIe 4-port SAS card - Supports LSI® Integrated RAID 0, 1, and 1E Optional 2: SASsaby M PCIe 4-port SAS card - Supports Hardware RAID 0, 1, 10 and 5
LAN	2 x Realtek® RTL8111C Gigabit LAN controllers - Supports teaming function
High Definition audio	ADI® 1988B 8-channel High-Definition Audio CODEC - Supports Jack-Sensing, Multi-Streaming, and Jack-Retasking Technology - Coaxial / Optical S/PDIF out ports at back I/O
USB	12 x USB 2.0 ports (6 ports at mid-board, 6 ports at back panel)

(continued on the next page)

P5N-VM WS specifications

ASUS Unique Features	**ASUS Workstation Features**: - ASUS SASsaby cards support **ASUS Quiet Thermal Solution:** - ASUS Fanless Design: Cool Thermal Solution **ASUS EZ DIY:** - ASUS CrashFree BIOS 3 - ASUS EZ Flash 2 - ASUS Q-Shield
Other Features	ASUS MyLogo 2 Multi-language BIOS
Internal connectors	3 x USB connectors support six additional USB ports 6 x Serial ATA connectors 1 x CPU fan connector with PWM control 4 x Chassis fan connectors 1 x TPM connector 1 x Chassis intrusion connector 1 x Front panel audio connector 1 x CD audio in connector 1 x 20-pin ATX power connector 1 x 4-pin ATX +12 V power connector 1 x 24-pin panel connector
Rear panel connectors	1 x PS/2 keyboard / mouse combo port 2 x LAN (RJ-45) ports 1 x S/PDIF Out port (Coaxial + Optical) 6 x USB 2.0/1.1 ports 8-channel audio ports 2 x DVI-I ports - Upper: Single Link with max. resolution up to 1920 x 1200 - Lower: Dual Link with max. resolution up to 2560 x 1600
BIOS features	8 Mb Flash ROM, AMI BIOS, PnP, DMI 2.0, WfM2.0, SMBIOS 2.3, ACPI 2.0a
Manageability	WOL by PME, WOR by PME, PXE, AI NET 2, Chassis Intrusion, BIOS flash utility under DOS
Support DVD contents	Drivers ASUS PC Probe II Anti-virus software Adobe Acrobat Reader 8 Microsoft Direct X ver 9.0C
Form factor	uATX form factor: 9.6 in x 9.6 in

***Specifications are subject to change without notice.**

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

1 Product introduction

Chapter summary

1

1.1 Welcome!

Thank you for buying an ASUS® P5N-VM WS 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 P5N-VM WS
Accessories	1 x ASUS Q-Shidle (I/O shield)
Application DVD	ASUS motherboard support DVD
Documentation	User guide

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

1.3 Special features

1.3.1 Product highlights

Green ASUS

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

Intel® Core™2 Extreme / Core™ 2 Quad / Core™2 Duo Processor Support

This motherboard supports the latest Intel® Core™ 2 Extreme / Core™ 2 Quad / Core™ 2 Duo processors in the LGA775 package. It is excellent for multi-tasking, multi-media and enthusiastic gamers with 1333 / 1066 / 800 MHz FSB. The Intel® Core™ 2 series processor is one of the most powerful CPUs in the world. This motherboard also supports Intel® CPUs in the new 45nm manufacturing process.

NVIDIA® Quadro FX470 chipset

It is the first integrated Quadro chipset used to build on Intel LGA775 motherboard. It supports Intel® CPU Front Side Bus interface with Hyper-Threading up to 1333MT/s (333 MHz bus clock), 128-bit dual-channel DDR2-800 (2 DIMMs per channel), and dual-DVI-I interface with integrated HDCP key. AHCI SATA controller is integrated with support up to six drives at 1.5Gbps or 3.0 Gbps speeds, which users can configure RAID0, 1, 0+1, 5 and JBOD in NVIDIA® MediaShield™ RAID.

PCIe 2.0

This motherboard supports the latest PCIe 2.0 device for twice the current speed and bandwidth. This enhances system performance while still providing backward compatibility to PCIe 1.0 devices. See page page 2-19 for details.

S/PDIF digital sound ready

This motherboard provides convenient connectivity to external home theater audio systems via coaxial and optical S/PDIF-out (SONY-PHILIPS Digital Interface) jacks. It allows to transfer digital audio without converting to analog format and keeps the best signal quality. See page 2-21 and 2-22 for details.

Dual Gigabit LAN solution

The integrated dual Gigabit LAN design allows a PC to serve as a network gateway for managing traffic between two separate networks. This capability ensures rapid transfer of data from WAN to LAN without any added arbitration or latency. See page 2-21 for details.

High Definition Audio

Enjoy high-end sound quality on your PC! The onboard 8-channel HD audio (High Definition Audio, previously codenamed Azalia) CODEC enables high-quality 192KHz/24-bit audio output, jack-sensing feature, retasking functions and multi-streaming technology that simultaneously sends different audio streams to different destinations. You can now talk to your partners on the headphone while playing multi-channel network games. See page 2-22 for details.

1.3.2 ASUS special features

ASUS Workstation Features

ASUS Workstation features provide complete support to system maintenance and storage technology.

ASUS SASsaby cards support

This motherboard is fully compatible with ASUS SASsaby cards (optional). Faster, safer and more stable, SAS will provide users with a better choice for storage expansion and upgrade needs.

ASUS EZ DIY

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

ASUS CrashFree BIOS 3

The ASUS CrashFree BIOS 3 allows users to restore corrupted BIOS data from a USB flash disk containing the BIOS file. See page 3-8 for details.

ASUS EZ Flash 2

EZ Flash 2 is a user-friendly BIOS update utility. Simply press the predefined hotkey to launch the utility and update the BIOS without entering the OS. Update your BIOS easily without preparing a bootable diskette or using an OS-based flash utility. See page 3-4 for details.

ASUS Q-Shield

The specially designed ASUS Q-Shield provides conductivity to best protect your motherboard against static electricity damage and shields it against Electronic Magnetic Interference (EMI). Without the usual "fingers" present, this new design is convenient and safe to install.

ASUS MyLogo2™

This feature allows you to convert your favorite photo into a 256-color boot logo for a more colorful and vivid image on your screen. See page 4-8 for details.

ASUS Multi-language BIOS

The multi-language BIOS allows you to select the language of your choice from the available options. The localized BIOS setup menu helps you configure your system easier and faster. See page 3-12 for details.

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

2 Hardware information

Chapter summary

2

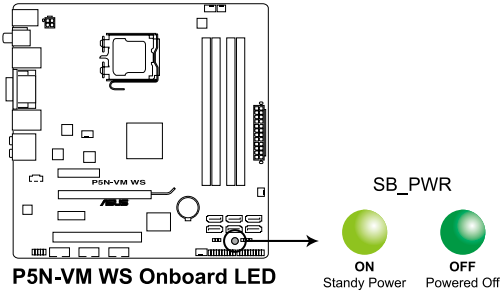
2.1 Before you proceed

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

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

Onboard LED

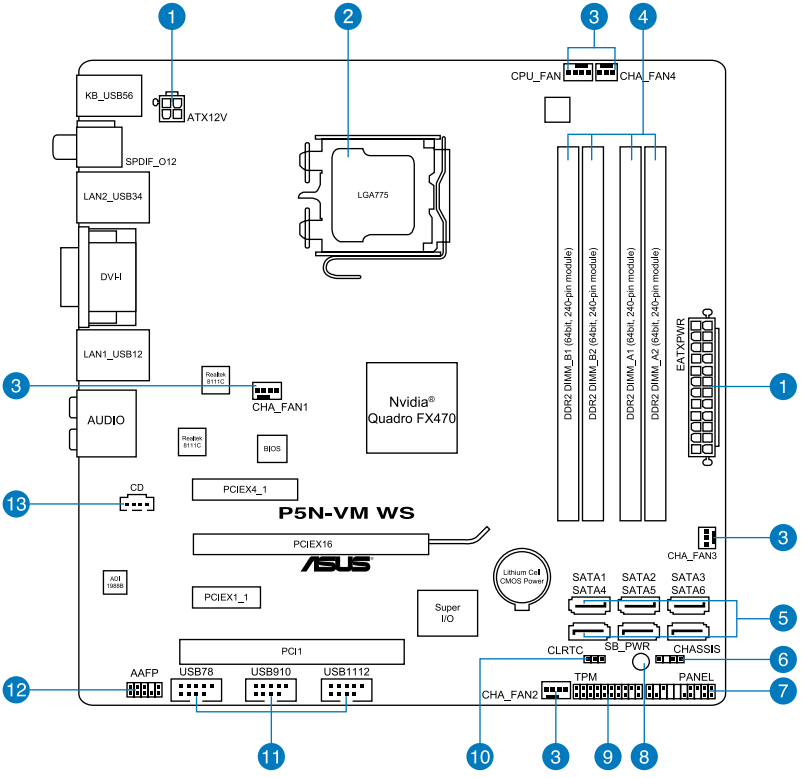
The motherboard comes with a standby power LED that lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows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



P5N-VM WS Onboard LED

2.2 Motherboard overview

2.2.1 Motherboard layout



Refer to **2.7 Connectors** for more information about rear panel connectors and internal connectors.

2.2.2 Layout contents

Internal connectors		Page
1.	ATX power connectors (24-pin EATXPWR, 4-pin ATX12V)	2-28
2.	LGA775 CPU Socket	2-6
3.	CPU and chassis fan connectors (4-pin CPU_FAN, 4-pin CHA_FAN1-2, 3-pin CHA_FAN3-4)	2-26
4.	DDR2 DIMM slots	2-11
5.	NVIDIA Quadro FX470 Serial ATA connectors (7-pin SATA1-4 [red]; 7-pin SATA5-6 [black])	2-23
6.	Chassis intrusion connector (4-1 pin CHASSIS)	2-27
7.	System panel connector (20-8 pin PANEL)	2-29
8.	Onboard LED (SB_PWR)	2-1
9.	TPM connector (20-1 pin TPM)	2-25
10.	Clear RTC RAM (3-pin CLRTC)	2-20
11.	USB connectors (10-1 pin USB78, USB910, USB1112)	2-24
12.	Front panel audio connector (10-1 pin AAFP)	2-27
13.	Optical drive audio connector (4-pin CD)	2-25

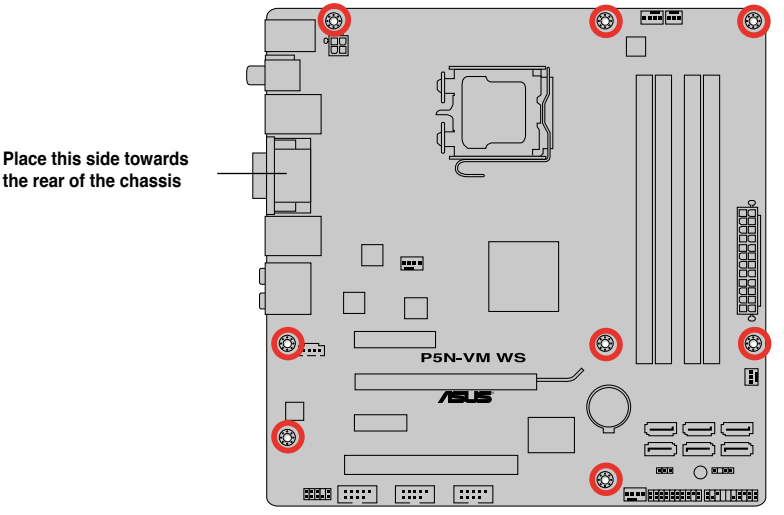
2.2.3 Placement direction

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

2.2.4 Screw holes

Place eight (8) 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.



2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Core™ 2 Extreme / Core™ 2 Quad / Core™ 2 Duo / Pentium® dual-core / Celeron® dual-core / Celeron processors.

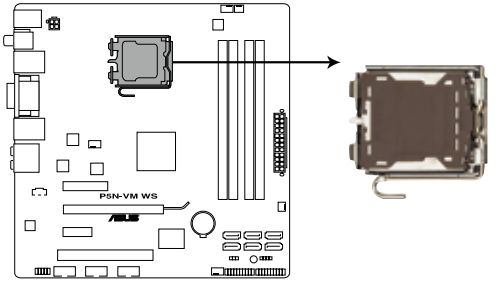
- Make sure that all power cables are unplugged before installing the CPU.
- If installing a dual-core CPU, connect the chassis fan cable to the CHA_FAN1 connector to ensure system stability.
- Due to the chipset limitation, we recommend you use FSB 800MHz CPU or above.

- Upon purchase of the motherboard, make sure 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.

2.3.1 Installing the CPU

To install a CPU:

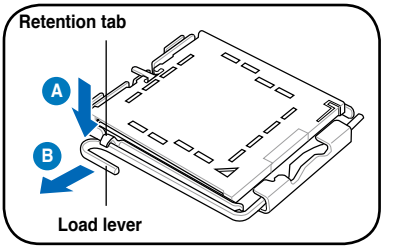
1. Locate the CPU socket on the motherboard.



P5N-VM WS CPU socket 775

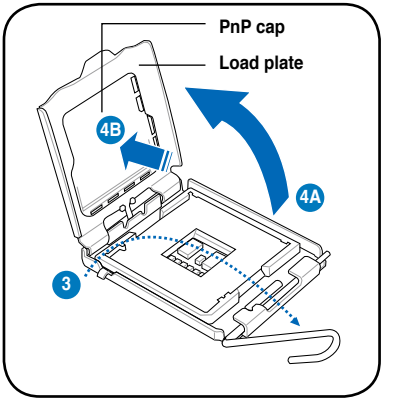
Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

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

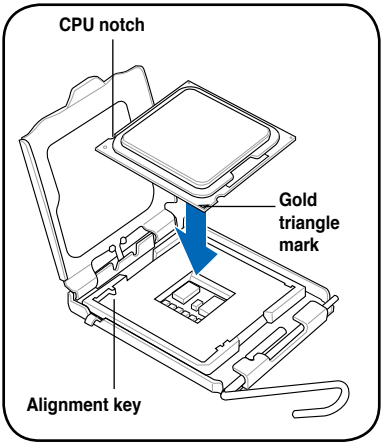


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

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

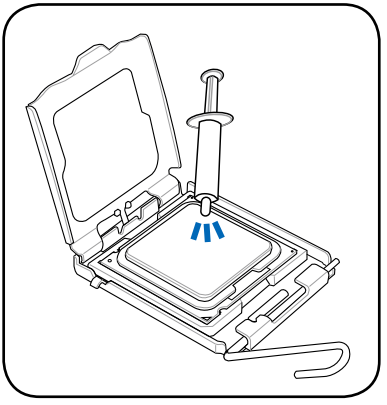


5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket then fit the socket alignment key into the CPU notch.



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

6. Apply several drops of thermal paste to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.

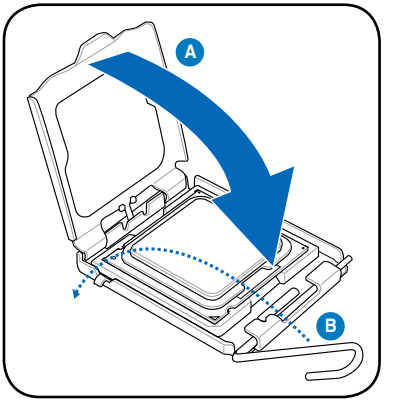


Some heatsinks come with pre-applied thermal paste. If so, skip this step.

The Thermal Interface Material is toxic and inedible. If it gets into your eyes or touches your skin, ensure to 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.



2.3.2 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.

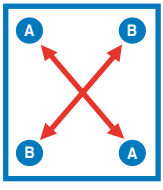
- When you buy a boxed Intel® processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel®-certified multi-directional heatsink and fan.
- Your Intel® LGA775 heatsink and fan assembly comes in a push-pin design and requires no tool to install.

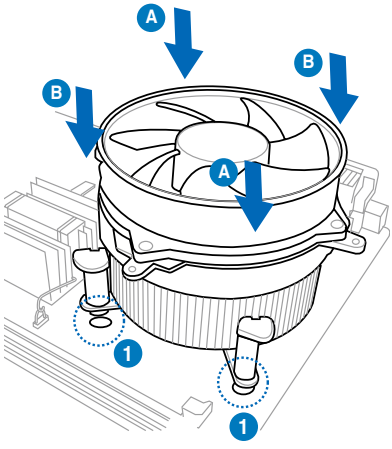
Make sure that you have installed the motherboard to the chassis before you install the CPU fan and heatsink assembly.

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

To install the CPU heatsink and fan

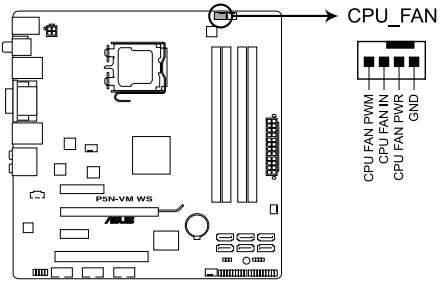
1. Place the heatsink on top of the installed CPU, making sure that the four fasteners match the holes on the motherboard.
2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.





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

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



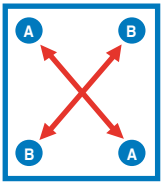
P5N-VM WS CPU fan connector

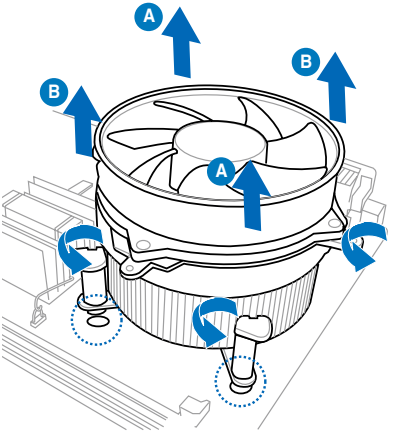
DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

2.3.3 Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan

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





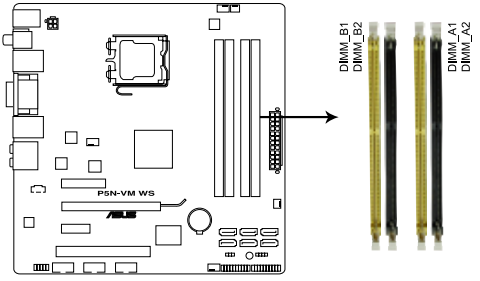
4. Carefully remove the heatsink and fan assembly from the motherboard.

2.4 System memory

2.4.1 Overview

The motherboard comes with four Double Data Rate II (DDR2) Dual Inline Memory Modules (DIMM) sockets to support 240-pin DDR2 modules.

The figure illustrates the location of the DDR2 DIMM sockets:



P5N-VM WS 240-pin DDR2 DIMM sockets

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

Recommend memory configuration

Mode	Sockets			
	DIMM_B1	DIMM_B2	DIMM_A1	DIMM_A2
Single-channel	-	-	populated	-
	populated	-	-	-
Dual-channel (1)	populated	-	populated	-
Dual-channel (2)	-	populated	-	populated
Full	populated	populated	populated	populated

2.4.2 Memory configurations

You may install 512 MB, 1 GB, and 2 GB non-ECC, unbuffered 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, it is recommended 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 install a 64-bit Windows OS when having 4GB or more memory installed on the motherboard.
- This motherboard does not support memory modules made up of 128 Mb chips.

The memory modules may require a better cooling system to work stably under full loading (4 DIMMs) setting.

P5N-VM WS Motherboard Qualified Vendors List (QVL)
DDR2-800MHz capability

Vendor	Part No.	Size	SS/ DS	Chip No.	CL	Chip Brand	DIMM socket support (Optional)		
							A*	B*	C*
A-DATA	M2OAD6H3J4171Q1E52	2GB	DS	AD20908A8A-25EG	N/A	A-DATA	•	•	•
Apacer	78.01GA0.9K5	1GB	SS	AM4B5808CQJS8E	N/A	APACER	•	•	•
Apacer	78.91G9I.9K5	512MB	SS	AM4B5708JQJS8E	N/A	APACER			•
Apacer	78.A1GA0.9K4	2GB	DS	AM4B5808CQJS8E	5	APACER	•	•	•
CORSAIR	Box P/N:TWIN2X4096-6400C5 (CM2X2048-6400C5)	4GB (Kit of 2)	DS	Heat-Sink Package	N/A	N/A	•	•	
CORSAIR	BoxP/N:TWIN2X4096-6400C4DHX (CM2X2048-6400C4DHX)	4GB (Kit of 2)	DS	Heat-Sink Package	4-4-4-12	N/A	•	•	•
CORSAIR	BoxP/N:TWIN2X4096-6400C5DHX (CM2X2048-6400C5DHX)	4GB (Kit of 2)	DS	Heat-Sink Package	N/A	N/A	•	•	
CORSAIR	CM2X1024-6400C4	1GB	DS	Heat-Sink Package	4	N/A	•	•	
Crucial	BL12864AA804.16FD3	1GB	DS	Heat-Sink Package	4	N/A		•	•
Crucial	BL12864AL804.16FD3	1GB	DS	Heat-Sink Package	4	N/A	•	•	•
G.SKILL	F2-6400CL5D-1GBNQ	1GB (Kit of 2)	SS	Heat-Sink Package	5-5-5-15	N/A	•	•	•
G.SKILL	F2-6400CL4D-2GBHK	1GB	DS	Heat-Sink Package	N/A	N/A	•	•	•
G.SKILL	F2-6400CL4D-2GBPK	1GB	DS	Heat-Sink Package	N/A	N/A	•	•	•
G.SKILL	F2-6400CL4D-4GBPK	4GB (Kit of 2)	DS	Heat-Sink Package	4	N/A		•	
G.SKILL	F2-6400CL5D-2GBNQ	1GB	DS	Heat-Sink Package	N/A	N/A	•	•	
G.SKILL	F2-6400CL5D-4GBPQ	4GB (Kit of 2)	DS	Heat-Sink Package	5	N/A	•	•	•
G.SKILL	F2-6400CL6D-4GBMQ	4GB (Kit of 2)	DS	Heat-Sink Package	6	N/A		•	•
G.SKILL	F2-6400CL6D-8GBNQ	8GB (Kit of 2)	DS	Heat-Sink Package	6-6-6-18	N/A		•	•
G.SKILL	F2-6400PHU2-2GBNR	1GB	DS	Heat-Sink Package	N/A	N/A		•	•
GEIL	GB22GB6400C4DC	2GB (Kit of 2)	DS	GL2L64M088BA30EB	N/A	N/A	•	•	•
GEIL	GB22GB6400C5DC	2GB (Kit of 2)	DS	GL2L64M088BA30EB	5-5-5-15	GEIL	•	•	•
GEIL	GB24GB6400C4DC	4GB (Kit of 2)	DS	GL2L128M88BA25AB	4-4-4-12	GEIL	•	•	•
GEIL	GB24GB6400C4QC	4GB (Kit of 4)	DS	GL2L64M088BA30EB	N/A	N/A	•	•	•
GEIL	GB24GB6400C5DC	4GB (Kit of 2)	DS	GL2L128M88BA25AB	5-5-5-15	GEIL	•		
GEIL	GB24GB6400C5QC	4GB (Kit of 2)	DS	GL2L64M088BA30EB	N/A	N/A	•	•	•
GEIL	GB28GB6400C4QC	8GB (Kit of 4)	DS	GL2L128M88BA25AB	N/A	N/A	•	•	•
GEIL	GB28GB6400C5QC	8GB (Kit of 4)	DS	GL2L128M88BA25AB	N/A	N/A	•		
GEIL	GE22GB800C4DC	2GB (Kit of 2)	DS	Heat-Sink Package	4-4-4-12	N/A	•	•	
GEIL	GE22GB800C5DC	2GB (Kit of 2)	DS	Heat-Sink Package	5-5-5-15	N/A	•	•	•
GEIL	GE24GB800C4DC	2GB	DS	Heat-Sink Package	4-4-4-12	N/A		•	•
GEIL	GE24GB800C4QC	4GB (Kit of 4)	DS	Heat-Sink Package	N/A	N/A	•	•	
GEIL	GE24GB800C5DC	2GB	DS	Heat-Sink Package	5-5-5-15	N/A	•	•	•
GEIL	GE24GB800C5QC	4GB (Kit of 4)	DS	Heat-Sink Package	5-5-5-15	N/A	•	•	•
GEIL	GE28GB800C4QC	2GB	DS	Heat-Sink Package	4-4-4-12	N/A		•	•
GEIL	GE28GB800C5QC	2GB	DS	Heat-Sink Package	5-5-5-15	N/A	•	•	•
GEIL	GX22GB6400C4USC	2GB	DS	Heat-Sink Package	4-4-4-12	N/A	•	•	•
GEIL	GX22GB6400DC	2GB (Kit of 2)	DS	Heat-Sink Package	5-5-5-15	N/A	•	•	•
GEIL	GX22GB6400LX	2GB	DS	Heat-Sink Package	5-5-5-15	N/A	•	•	•
GEIL	GX22GB6400UDC	2GB (Kit of 2)	DS	Heat-Sink Package	4-4-4-12	N/A	•	•	•
GEIL	GX24GB6400DC	4GB (Kit of 2)	DS	Heat-Sink Package	5-5-5-15	N/A			•
Hynix	HYMP564U64CP8-S5	512MB	SS	HY5PS12821CFP-S5	5-5-5	Hynix	•		•
Hynix	HYMP 512U64CP8-S5	1GB	DS	HY5PS12821CFP-S5	5-5-5	Hynix		•	•

P5N-VM WS Motherboard Qualified Vendors List (QVL)
DDR2-800MHz capability (continued)

Vendor	Part No.	Size	SS/ DS	Chip No.	CL	Chip Brand	DIMM socket support (Optional)		
							A*	B*	C*
KINGMAX	KLDC28F-A8KI5	512MB	SS	KKA8FEIBF-HJK-25A	N/A	KINGMAX		•	•
KINGMAX	KLDD48F-ABKI5	1GB	DS	KKA8FEIBF-HJK-25A	N/A	KINGMAX	•		
KINGMAX	KLDE88F-B8KB5	2GB	DS	KKB8FFBXF-CFA-25A	N/A	KINGMAX		•	•
KINGSTON	KHX6400D2/ 512	512MB	SS	Heat-Sink Package	N/A	N/A	•	•	•
KINGSTON	KVR800D2N5/ 512	512MB	SS	E5108AJBG-8E-E	N/A	ELPIDA		•	•
KINGSTON	KVR800D2N6/ 512	512MB	SS	E5108AJBG-8E-E	1.8	ELPIDA	•	•	•
KINGSTON	KHX6400D2/2G	2GB	DS	Heat-Sink Package	N/A	N/A	•	•	•
KINGSTON	KVR800D2N5/1G	1GB	DS	V59C1 512804QBF25	N/A	N/A	•	•	•
KINGSTON	KVR800D2N5/2G	2GB	DS	E1108ACBG-8E-E	N/A	ELPIDA		•	•
KINGSTON	KVR800D2N6/1G	1GB	DS	E5108AJBG-8E-E	1.8	ELPIDA		•	•
KINGSTON	KVR800D2N6/4G	4GB	DS	E2108ABSE-8G-E	N/A	ELPIDA	•	•	•
NANYA	NT 512T64U880BY-25C	512MB	SS	NT5TU64M8BE-25C	5	NANYA		•	•
NANYA	NT1GT64U8HB0BY-25C	1GB	DS	NT5TU64M8BE-25C	5	NANYA	•	•	•
NANYA	NT1GT64U8HCOBY-25D	1GB	DS	NT5TU64M8CE-25D	N/A	NANYA	•	•	•
NANYA	NT2GT64U8HC0BY-AC	2GB	DS	NT5TU128M8CE-AC	5	NANYA	•	•	•
OCZ	OCZ2G8001G	1GB	DS	Heat-Sink Package	5	N/A	•	•	•
OCZ	OCZ2P8004GK	4GB (Kit of 2)	DS	Heat-Sink Package	5-4-4	N/A	•	•	•
OCZ	OCZ2P800R22GK	2GB (Kit of 2)	DS	Heat-Sink Package	4	N/A		•	
OCZ	OCZ2T8002GK	1GB	DS	Heat-Sink Package	N/A	N/A		•	•
PSC	AL8E8F73C-8E1	2GB	DS	A3R1GE3CFF734MAA0E	5	PSC	•	•	•
Qimonda	HYS64T 512020EU-2.5-A	4GB	DS	HYB18T2G800AF-2.5	6	QIMONDA		•	
Qimonda	HYS64T 512020EU-25F-A	4GB	DS	HYB18T2G800AF-25F	5	QIMONDA	•	•	•
Qimonda	HYS64T256020EU-2.5-C2	2GB	DS	HYB18T1G800C2F-2.5	6	QIMONDA		•	•
Qimonda	HYS64T256020EU-25F-C2	2GB	DS	HYB18T1G800C2F-25F	5	QIMONDA	•	•	•
SAMSUNG	M378T2863QZS-CF7	1GB	SS	K4T1G084QQ	6	SAMSUNG	•	•	•
SAMSUNG	M378T6553GZS-CF7	512MB	SS	K4T51083QG	6	SAMSUNG		•	•
SAMSUNG	M391T2863QZ3-CF7	1GB	SS	K4T1G084QQ(ECC)	6	SAMSUNG		•	•
SAMSUNG	M378T2953GZ3-CF7	1GB	DS	K4T51083QG	6	SAMSUNG	•	•	•
SAMSUNG	M378T5263AZ3-CF7	4GB	DS	K4T2G084QA-HCF7	6	SAMSUNG	•	•	•
Transcend	JM800QLJ-1G	1GB	DS	TQ123PJF8	5	Transcen			•
Transcend	JM800QLU-2G	2GB	DS	TQ243PCF8	5	Transcen	•	•	•
Aeneon	AET760UD00-25DC08X	1GB	SS	AET03R25DC	5	Aeneon		•	•
Aeneon	AET760UD00-25DB97X	1GB	DS	AET93R25DB	N/A	Aeneon		•	•
Aeneon	AET860UD00-25DC08X	2GB	DS	AET03R25DC	5	Aeneon	•	•	•
Asint	SLY2128M8-JGE	1GB	SS	DDRII1208-GE	N/A	Asint		•	•
Asint	SLZ2128M8-JGE	2GB	DS	DDRII1208-GE	N/A	Asint	•	•	•
CENTURY	28V2H8	512MB	SS	HY5PS12821BFP-S5	N/A	Hynix	•	•	
CENTURY	28VOH8	1GB	DS	HY5PS12821BFP-S5	N/A	Hynix	•		•
Elixir	M2Y1G64TU88D4B-AC	1GB	SS	N2TU1G80DE-AC	5	Elixir	•	•	•
Elixir	M2Y1G64TU8HB0B-25C	1GB	DS	N2TU 51280BE-25C	5	Elixir		•	•
Elixir	M2Y2G64TU8HD4B-AC	2GB	DS	N2TU1G80DE-AC	5	Elixir	•	•	•
Kingbox	N/A	2GB	DS	D9HNL	N/A	N/A	•	•	•
Kingbox	N/A	2GB	DS	EPD2128082200E-3	N/A	Kingbox		•	•
Oci	04701G16CZ5D2A	1GB	DS	64M8PC6400	5	Infinity		•	•
Patriot	PSD2 51280081	512MB	SS	PM64M8D2BU-25EC	N/A	N/A		•	•
Patriot	PSD22GB002	2GB	DS	PM128M8D2BU-25KC	5	Patriot	•	•	•
Team	TEDD1024M800HC5	1GB	DS	Heat-Sink Package	5-5-5-15	N/A		•	•
Team	TEDD2048M800HC5	2GB	DS	Heat-Sink Package	5-5-5-15	N/A		•	•
UMAX	U2S12D30TP-8E	1GB	DS	D48001GP3-63BJU	N/A	UMAX	•	•	•

P5N-VM WS Motherboard Qualified Vendors List (QVL)
DDR2-667MHz capability

Vendor	Part No.	Size	SS/ DS	Chip No.	CL	Chip Brand	DIMM socket support (Optional)		
							A*	B*	C*
Apacer	78.01G9O.9K5	1GB	SS	AM4B5808CQJS7E	N/A	APACER	•	•	•
Apacer	78.91G92.9K5	512MB	SS	AM4B5708JQJS7E	N/A	APACER			•
Apacer	78.A1G9O.9K4	2GB	DS	AM4B5808CQJS7E	N/A	APACER	•	•	•
CORSAIR	VS 512MB667D2	512MB	SS	64M8CFEG	N/A	N/A	•	•	•
CORSAIR	VS1GB667D2	1GB	DS	64M8CFEG	N/A	N/A	•	•	•
crucial	BL6464AA663.8FD	512MB	SS	Heat-Sink Package	3	N/A	•		
crucial	BL12864AA663.16FD2	1GB	DS	Heat-Sink Package	3	N/A	•		
crucial	BL12864AA663.16FD	1GB	DS	Heat-Sink Package	3	N/A	•		
ELPIDA	EBE51UD8AEFA-6E-E	512MB	SS	E5108AE-6E-E	5	ELPIDA		•	•
G.SKILL	F2-5300CL5D-4GBMQ	4GB (Kit of 2)	DS	Heat-Sink Package	5-5-5-15	N/A	•	•	•
G.SKILL	F2-5400PHU2-2GBNT	2GB (Kit of 2)	DS	D264M8GCF	5-5-5-15	G.SKILL	•	•	•
GEIL	GX21GB5300SX	1GB	DS	Heat-Sink Package	3-4-4-8	N/A	•	•	•
GEIL	GX22GB5300LX	2GB	DS	Heat-Sink Package	5-5-5-15	N/A		•	•
GEIL	GX24GB5300LDC	4GB (Kit of 2)	DS	Heat-Sink Package	5-5-5-15	N/A			•
Hynix	HYMP112U64CP8-Y5	1GB	SS	HY5PS1G831CFP-Y5	5	Hynix	•	•	•
Hynix	HYMP 512U64CP8-Y5	1GB	DS	HY5PS12821CFP-Y5	5	Hynix	•	•	•
KINGSTON	KVR667D2N5/ 512	512MB	SS	D6408TEBGGL3U	5	KINGSTON	•	•	•
KINGSTON	KVR667D2E5/2G	2GB	DS	D9HNL(ECC)	N/A	MICRON		•	
KINGSTON	KVR667D2N5/1G	1GB	DS	E5108AJBG-8E-E	N/A	ELPIDA	•	•	•
KINGSTON	KVR667D2N5/1G	1GB	DS	HY5PS12821CFP-Y5	N/A	Hynix		•	•
KINGSTON	KVR667D2N5/2G	2GB	DS	E1108AB-6E-E	N/A	ELPIDA		•	•
KINGSTON	KVR667D2N5/2G	2GB	DS	HY5PS1G831CFP-Y5	N/A	Hynix		•	•
NANYA	NT 512T64U88B0BY-3C	512MB	SS	NT5TU64M8BE-3C	5	NANYA		•	•
NANYA	NT2GT64U8HB0JY-3C	2GB	DS	NT5TU128M8BJ-3C	5	NANYA			•
PSC	AL7E8E63J-6E1	1GB	DS	A3R12E3JFF719A9T02	5	PSC	•	•	•
SAMSUNG	M378T6553EZS-CE6	512MB	SS	K4T51083QE	5	SAMSUNG		•	•
SAMSUNG	M378T2953EZ3-CE6	1GB	DS	K4T51083QE	5	SAMSUNG	•	•	•
SAMSUNG	M378T5263AZ3-CE6	4GB	DS	K4T2G084QA-HCE6	5	SAMSUNG	•	•	
Super Talent	T6UA 512C5	512MB	SS	Heat-Sink Package	5	N/A		•	•
Super Talent	T6UB1GC5	1GB	DS	Heat-Sink Package	5	N/A	•	•	•
Transcend	JM667QLU-2G	2GB	DS	TQ243ECF8	5	Transcend		•	
TwinMOS	8D-23JK5M2ETP	512MB	SS	TMM6208G8M30C	5	TwinMOS	•		•

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

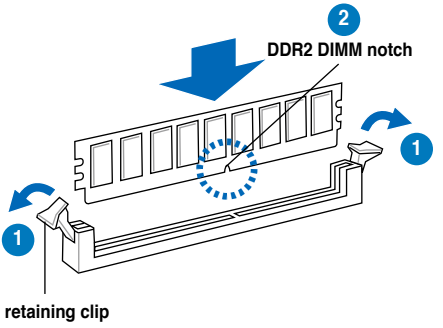
- **A*:** Supports one module inserted into either slot as Single-channel memory configuration.
- **B*:** Supports one pair of modules inserted into either the yellow slots or the black slots as one pair of Dual-channel memory configuration.
- **C*:** Supports four modules inserted into both the yellow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

Visit the ASUS website for the latest QVL.

2.4.3 Installing a DIMM

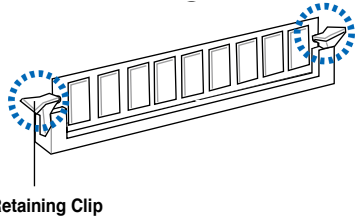
Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

1. Unlock a DDR2 DIMM socket by pressing the retaining clips outward.
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.

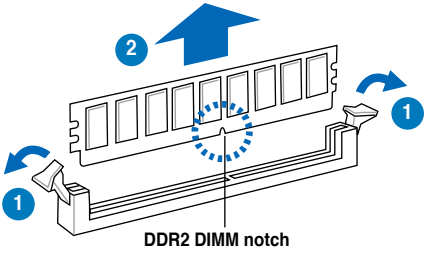
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



2.4.4 Removing a DIMM

Follow these steps 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.

2.5 Expansion slots

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

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

2.5.1 Installing an expansion card

To install an expansion card:

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

2.5.2 Configuring an expansion card

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

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

- When using PCI cards on shared slots, ensure that the drivers support “Share IRQ” or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable. Refer to the table on the next page for details.
- By default, if you install a discrete graphics card on the PCIe x16 slot, the onboard GPU will be automatically disabled. Connect the VGA cable to the discrete graphics card first when using a discrete graphics card. To use quad-display, enable both the onboard GPU and the discrete Quadro graphics card. See section **3.4.2 Chipset > Southbridge Configuration** for details.

2.5.3 Interrupt assignments

IRQ	Priority	Standard function
0	1	System timer
1	2	Keyboard controller
2	–	Re-direct to IRQ#9
3	11	IRQ holder for PCI steering*
5	13	IRQ holder for PCI steering*
7	15	IRQ holder for PCI steering*
8	3	System CMOS/Real Time Clock
9	4	IRQ holder for PCI steering*
10	5	IRQ holder for PCI steering*
11	6	IRQ holder for PCI steering*
12	7	PS/2 compatible mouse port*
13	8	Numeric data processor
14	9	IRQ holder for PCI steering*
15	10	IRQ holder for PCI steering*

*** These IRQs are usually available for PCI devices.**

IRQ assignments for this motherboard

	LNKC	LN0A	LN3A	LN4A	LN5A	LN6A	SGRU	LUB0	LUB2	UB11	UB12	LSA0	LAZA
PCI slot	Shared	–	–	–	–	–	–	–	–	–	–	–	–
PCIe x16 slot	–	Shared	–	–	–	–	–	–	–	–	–	–	–
RTL 8111C_1	–	–	Shared	–	–	–	–	–	–	–	–	–	–
RTL 8111C_2	–	–	–	Shared	–	–	–	–	–	–	–	–	–
PCIe x4 slot	–	–	–	–	Shared	–	–	–	–	–	–	–	–
PCIe x1 slot	–	–	–	–	–	Shared	–	–	–	–	–	–	–
USB 1.1 (OHCI)	–	–	–	–	–	–	–	Shared	–	–	–	–	–
USB 2.0 (EHCI)	–	–	–	–	–	–	–	–	Shared	–	–	–	–
USB1 1.1 (OHCI)	–	–	–	–	–	–	–	–	–	Shared	–	–	–
USB1 2.0 (EHCI)	–	–	–	–	–	–	–	–	–	–	Shared	–	–
HDA (Azalia)	–	–	–	–	–	–	–	–	–	–	–	–	Shared
SB Internal GPU	–	–	–	–	–	–	Shared	–	–	–	–	–	–
SATA Controller	–	–	–	–	–	–	–	–	–	–	–	Shared	–

2.5.4 PCI Express 2.0 x16 slot

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

2.5.5 PCI Express x4 slot

This motherboard supports PCI Express x4 network cards, SAS cards and other cards that comply with the PCI Express specifications. Refer to the figure below for the location of the slot.

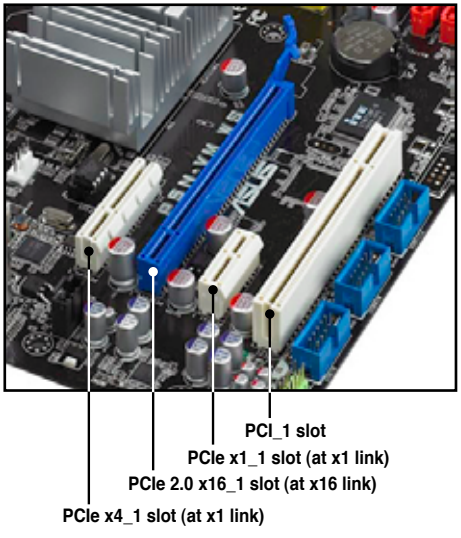
2.5.6 PCI Express x1 slot

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

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

2.5.7 PCI slots

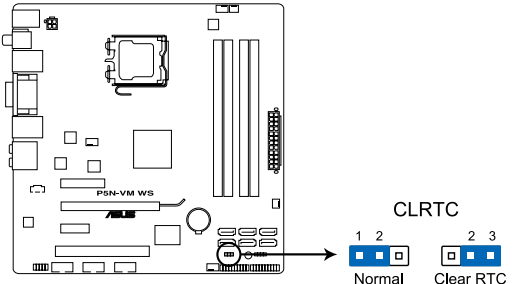
The PCI slots support cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications. Refer to the figure below for the location of the slots.



2.6 Jumper

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.



P5N-VM WS Clear RTC RAM

To erase the RTC RAM

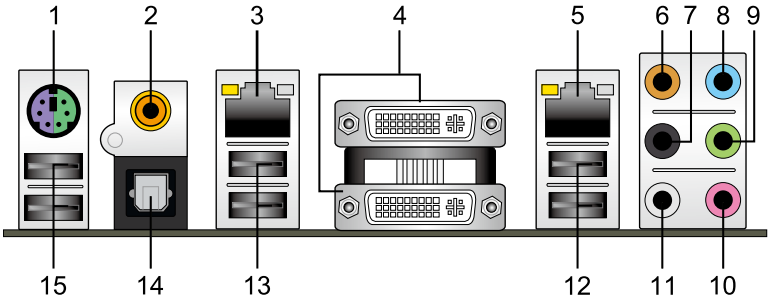
1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and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

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

If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.

2.7 Connectors

2.7.1 Rear panel connectors



1. **PS/2 keyboard / mouse combo port**. This port is for a PS/2 keyboard or mouse.
2. **Coaxial S/PDIF Out port**. This port connects an external audio output device via a coaxial S/PDIF cable.
3. **LAN2 (RJ-45) port**. Supported by Realtek® Gigabit LAN controller, this port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table on the next page for the LAN port LED indications.
4. **DVI-I out ports**. These ports are for any DVI-I compatible device and are HDCP compliant, allowing playback of HD DVDi, Blu-Ray and other protected content.

- This motherboard comes with dual-DVI output that features different displays on 2 monitors at the same time if you connect 2 monitors to both the DVI-I ports. The upper DVI-I port supports Single Link with max. resolution up to 1920x1200. The lower DVI-I port supports Dual Link with max resolution up to 2560x1600.

Playback of HD DVD and Blu-Ray Discs

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

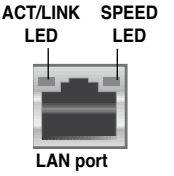
File format	Best resolution	
	Windows XP	Windows Vista
Non-protected clips	1920 x 1080p	1920 x 1080p
HD-DVD	1920 x 1080p	1280 x 1080p
Blu-Ray	1280 x 1080p	1280 x 1080p

- Supported DVD formats: VC-1, H.264, and MPEG-2.
- To play HD DVD or Blu-Ray Disc, ensure to use HDCP compliant devices and softwares.

5. **LAN1 (RJ-45) port**. Supported by Realtek® Gigabit LAN controller, this port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table on the next page for the LAN port LED indications.

LAN port LED indications

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



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

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

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

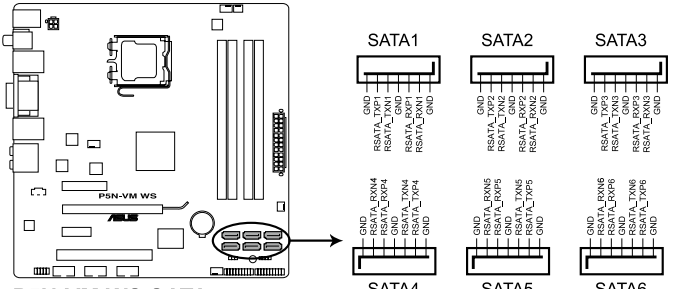
Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Line In
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	–	–	Center/Subwoofer	Center/Subwoofer
Black	–	Rear Speaker Out	Rear Speaker Ou	Rear Speaker Out
Gray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

12. **USB 2.0 ports 1 and 2**. These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
13. **USB 2.0 ports 3 and 4**. These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
14. **Optical S/PDIF Out port**. This port connects an external audio output device via an optical S/PDIF cable.
15. **USB 2.0 ports 5 and 6**. These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

2.7.2 Internal connectors

1. NVIDIA® Quadro FX470 Serial ATA connectors (7-pin SATA1-4 [red]; 7-pin SATA5-6 [black])

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

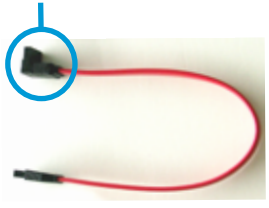


P5N-VM WS SATA connectors

- SATA1-4 connectors are set to [IDE] by default. If you intend to create a SATA RAID set using these connectors, set the **SATA Mode select** item in the BIOS to [RAID Mode].
- SATA 5-6 connectors support RAID mode and AHCI mode only. To use these connectors, set the **SATA Mode select** item in the BIOS to [RAID mode] or [AHCI Mode].
- SATA devices connected to SATA 5-6 connectors can be used only as data storage devices. Do not connect a boot device to the SATA 5-6 connectors.
- Due to chipset limitation, when set any of SATA ports to RAID or AHCI mode, all SATA ports run at RAID or AHCI mode together.
- If you intend to use SATA hard disk drives in RAID or AHCI mode, ensure to create a RAID / AHCI driver disk using the motherboard support DVD, and then load the RAID / AHCI driver during OS installation.
- You must install the Windows XP® Service Pack 1 before using SATA hard disk drives. The SATA RAID feature is available only if you are using Windows XP® or later version.

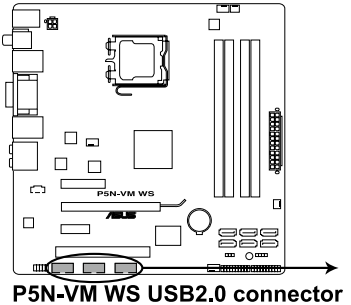
Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

Right angle side

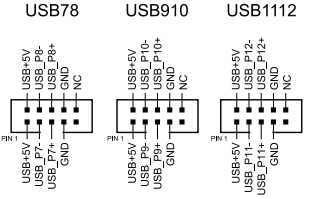


2. USB connectors (10-1 pin USB78, USB910, USB1112)

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



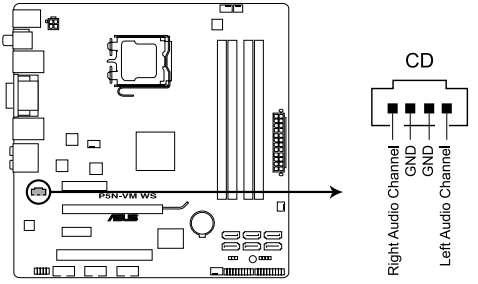
P5N-VM WS USB2.0 connector



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

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

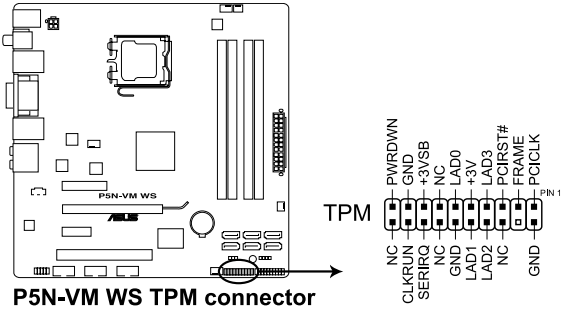
These connectors allow you to receive stereo audio input from sound sources such as a CD-ROM, TV tuner, or MPEG card.



P5N-VM WS Internal audio connector

4. TPM connector (20-1 pin TPM)

This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.



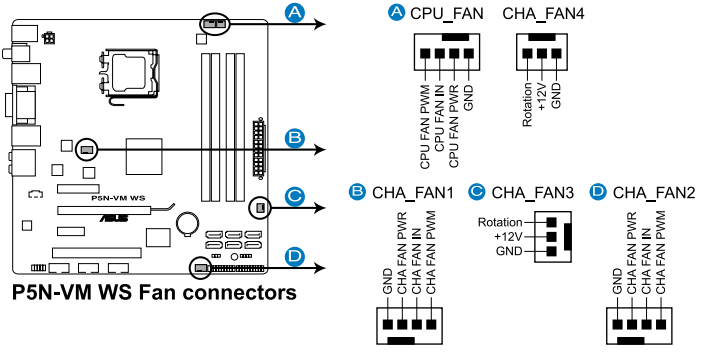
P5N-VM WS TPM connector

The TPM module is purchased separately.

5. CPU and chassis fan connectors (4-pin CPU_FAN, 4-pin CHA_FAN1-2, 3-pin CHA_FAN3-4)

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, making sure that the black wire of each cable matches the ground pin of the connector.

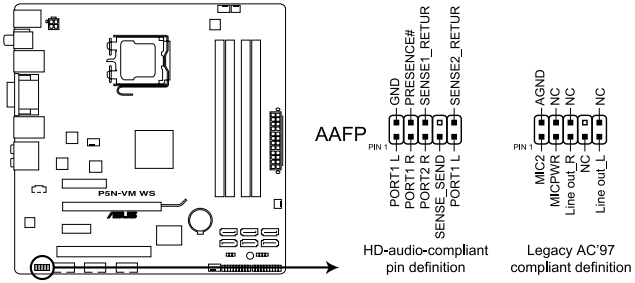
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



P5N-VM WS Fan connectors

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

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

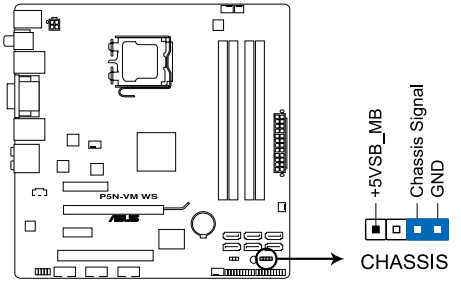


P5N-VM WS Analog front panel connector

7. Chassis intrusion connector (4-1 pin CHASSIS)

This connector is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.

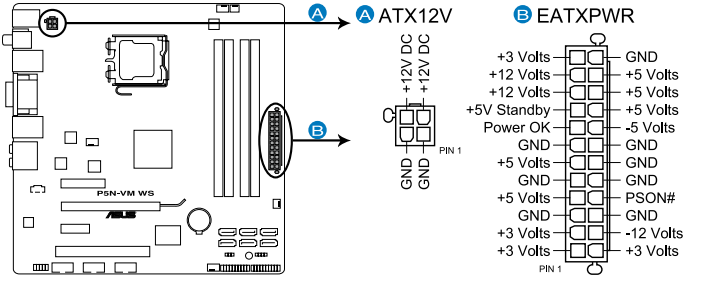
By default, the pin labeled “Chassis Signal” and “Ground” are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.



P5N-VM WS Chassis intrusion connector

8. ATX power connectors (24-pin EATXPWR, 4-pin EATX12V)

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



P5N-VM WS ATX power connectors

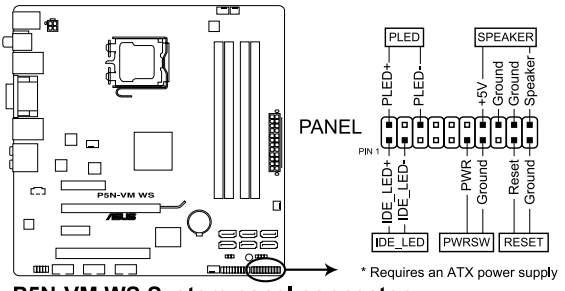
- Do not forget to connect the 4-pin EATX12V power plug; otherwise, the system will not boot.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- If you are uncertain about the minimum power supply requirement for your system, refer to the **Recommended Power Supply Wattage Calculator** at http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us for details.

PSU suggested list

PSU suggested list
ACBEL POLYTECH INC PC7057-Z6AG 390W W/PFC
ACBEL POLYTECH INC PC7009-000G 380W W/PFC

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

This connector supports several chassis-mounted functions.



P5N-VM WS System panel connector

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

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

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

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

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

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

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

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

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

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

2.8 Starting up for the first time

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

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

AMI BIOS beep codes

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

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

2.9 Turning off the computer

2.9.1 Using the OS shut down function

If you are using Windows® XP or later version:

1. Click the Start button then select Turn Off Computer.
2. Click the Turn Off button to shut down the computer.
3. The power supply should turn off after Windows® shuts down.

If you are using Windows® Vista:

1. Click the Start button then select ShutDown.
2. The power supply should turn off after Windows® shuts down.

2.9.2 Using the dual function power switch

While the system is ON, pressing the power switch for less than four seconds puts the system to sleep mode or to soft-off mode, depending on the BIOS setting. Pressing the power switch for more than four seconds lets the system enter the soft-off mode regardless of the BIOS setting. Refer to section **3.5 Power Menu** in Chapter 3 for details.

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

3 BIOS setup

Chapter summary

3

3.1 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup.

1. **ASUS Update** (Updates the BIOS in Windows® environment.)
2. **ASUS EZ Flash 2** (Updates the BIOS using a floppy disk or USB flash disk.)
3. **ASUS AFUDOS** (Updates the BIOS using a bootable floppy disk.)
4. **ASUS CrashFree BIOS 3** (Updates the BIOS using a bootable floppy disk, USB flash disk or the motherboard support DVD when the BIOS file fails or gets corrupted.)

Refer to the corresponding sections for details on these utilities.

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

3.1.1 ASUS Update utility

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

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

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

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

Installing ASUS Update

To install ASUS Update:

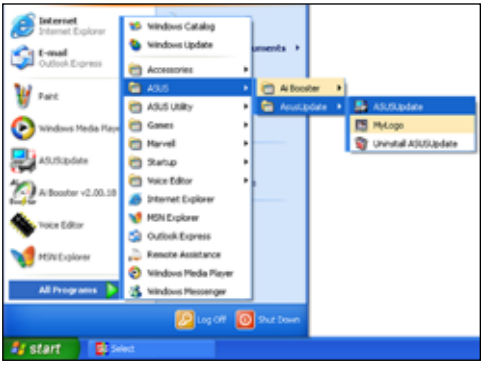
1. Place the support DVD in the optical drive. The Drivers menu appears.
2. Click the Utilities tab, then click Install ASUS Update VX.XX.XX.
3. The ASUS Update utility is copied to your system.

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

Updating the BIOS through the Internet

To update the BIOS through the Internet:

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



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

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

4. From the FTP site, select the BIOS version that you wish to download. Click **Next**.
5. Follow the screen instructions to complete the update process.

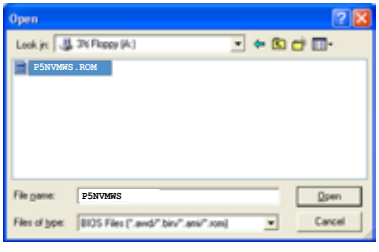
The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.

Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

1. Launch the ASUS Update utility from the Windows® desktop by clicking **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate**. The ASUS Update main window appears.
2. Select Update BIOS from a file option from the drop-down menu, then click **Next**.

3. Locate the BIOS file from the Open window, then click **Open**.
4. Follow the screen instructions to complete the update process.



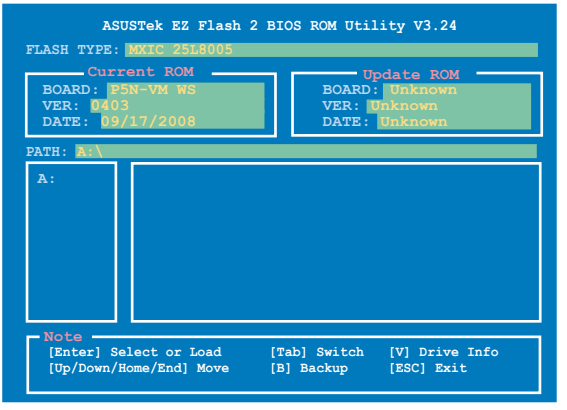
3.1.2 ASUS EZ Flash 2 utility

The ASUS EZ Flash 2 feature allows you to update the BIOS without having to go through the long process of booting from a floppy disk and using a DOS-based utility. The EZ Flash 2 utility is built in the BIOS chip so it is accessible by pressing <Alt> + <F2> during the Power-On Self Tests (POST).

To update the BIOS using EZ Flash 2:

1. Visit the ASUS website (www.asus.com) to download the latest BIOS file for the motherboard.
2. Save the BIOS file to a floppy disk or a USB flash disk, then restart the system.
3. You can launch the EZ Flash 2 by two methods.
   (1) Insert the floppy disk / USB flash disk that contains the BIOS file to the floppy disk drive or the USB port.

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



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

   You can switch between drives by pressing <Tab> before the correct file is found. Then press <Enter>.
4. When the correct BIOS file is found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.

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

3.1.3 Creating a bootable floppy disk

The motherboard does not provide a floppy drive connector. You have to use a USB floppy drive when creating a bootable floppy disk.

1. Do either one of the following to create a bootable floppy disk.

   DOS environment

   a. Insert a 1.44MB floppy disk into the drive.

   b. At the DOS prompt, type `format A:/S` then press <Enter>.

   Windows® XP environment

   a. Insert a 1.44 MB floppy disk to the floppy disk drive.

   b. Click **Start** from the Windows® desktop, then select **My Computer**.

   c. Select the 3 1/2 Floppy Drive icon.

   d. Click File from the menu, then select **Format**. A **Format 3 1/2 Floppy Disk** window appears.

   e. Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.

   Windows® Vista environment

   a. Insert a formatted, high density 1.44 MB floppy disk to the floppy disk drive.

   b. Click  from the Windows® desktop, then select **Computer**.

   c. Right-click **Floppy Disk Drive** then click **Format** to display the **Format 3 1/2 Floppy** dialog box .

   d. Select the **Create an MS-DOS startup disk** check box.

   e. Click **Start**.

2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

3.1.4 AFUDOS utility

The AFUDOS utility allows you to update the BIOS file in DOS environment using a bootable floppy disk with the updated BIOS file. This utility also allows you to copy the current BIOS file that you can use as backup when the BIOS fails or gets corrupted during the updating process.

The motherboard does not provide a floppy drive connector. You have to use a USB floppy drive to use the AFUDOS utility.

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:

- Make sure that the floppy disk is not write-protected and has at least 1024KB free space to save the file.
- The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be same as shown.

1. Copy the AFUDOS utility (afudos.exe) from the motherboard support DVD to the bootable floppy disk you created earlier.
2. Boot the system in DOS mode, then at the prompt type:

   afudos /o[filename]

   where the [filename] is any user-assigned filename not more than eight alphanumeric characters for the main filename and three alphanumeric characters for the extension name.

3. Press <Enter>. The utility copies the current BIOS file to the floppy disk.

```
A:\>afudos /oOLDBIOS1.rom
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.
    Reading flash ..... done
    Write to file...... ok
A:\>
```

The utility returns to the DOS prompt after copying the current BIOS file.

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

1. Visit the ASUS website (www.asus.com) and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable floppy disk.

Write the BIOS filename on a piece of paper. You need to type the exact BIOS filename at the DOS prompt.

2. Copy the AFUDOS utility (afudos.exe) from the motherboard support DVD to the bootable floppy disk you created earlier.
3. Boot the system in DOS mode, then at the prompt type:

   afudos /i[filename]

   where [filename] is the latest or the original BIOS file on the bootable floppy disk.

```
A:\>afudos /iP5NVMWS.ROM
```

4. The utility verifies the file and starts updating the BIOS.

```
A:\>afudos /iP5NVMWS.ROM
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

    WARNING!! Do not turn off power during flash BIOS
    Reading file ....... done
    Reading flash ...... done

    Advance Check ......
    Erasing flash ...... done
    Writing flash ...... 0x0008CC00 (9%)
```

Do not shut down or reset the system while updating the BIOS to prevent system boot failure!

5. The utility returns to the DOS prompt after the BIOS update process is completed. Reboot the system from the hard disk drive.

```
A:\>afudos /iP5NVMWS.ROM
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

    WARNING!! Do not turn off power during flash BIOS
    Reading file ....... done
    Reading flash ...... done

    Advance Check ......
    Erasing flash ...... done
    Writing flash ...... done
    Verifying flash .... done

    Please restart your computer

A:\>
```

3.1.5 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 the USB flash disk that contains the updated BIOS file.

Prepare the motherboard support DVD, the floppy disk or the USB flash disk containing the updated motherboard BIOS before using this utility.

Recovering the BIOS from the support DVD

To recover the BIOS from the support DVD:

1. Turn on the system.
2. Insert the motherboard support DVD to the optical drive.
3. The utility displays the following message and automatically checks the DVD for the BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
```

When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
Floppy found!
Reading file "P5NVMWS.ROM". Completed.
Start flashing...
```

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

Recovering the BIOS from the USB flash disk

To recover the BIOS from the USB flash disk:

1. Insert the USB flash disk that contains the BIOS file to the USB port.
2. Turn on the system.
3. The utility will automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.
4. Restart the system after the utility completes the updating process.

- Only the USB flash disk with FAT 32/16 format and single partition can support 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!

3.2 BIOS setup program

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

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

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

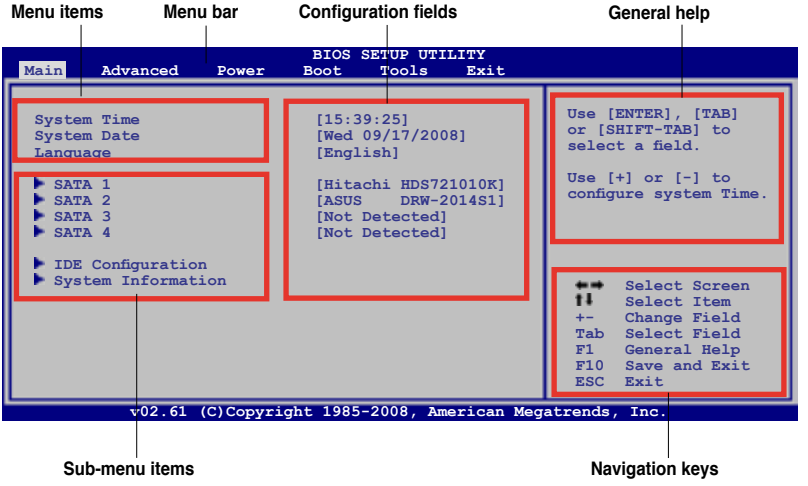
The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

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

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

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the Load Default Settings item under the Exit Menu. See section **3.8 Exit Menu**.
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

3.2.1 BIOS menu screen



3.2.2 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 special system 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.

3.2.3 Navigation keys

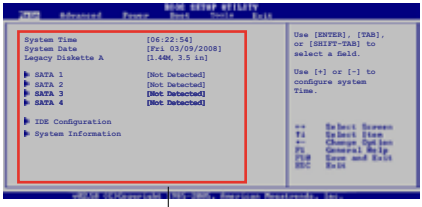
At the bottom right corner of a menu screen are the navigation keys for that particular menu. Use the navigation keys to select items in the menu and change the settings.

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

3.2.4 Menu items

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

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



Main menu items

3.2.5 Sub-menu items

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

3.2.6 Configuration fields

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

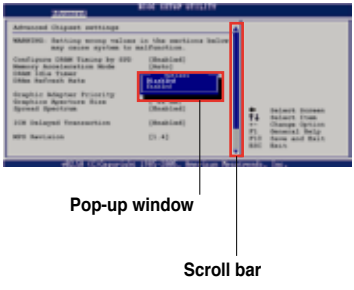
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to **3.2.7 Pop-up window**.

3.2.7 Pop-up window

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

3.2.8 Scroll bar

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



Pop-up window

Scroll bar

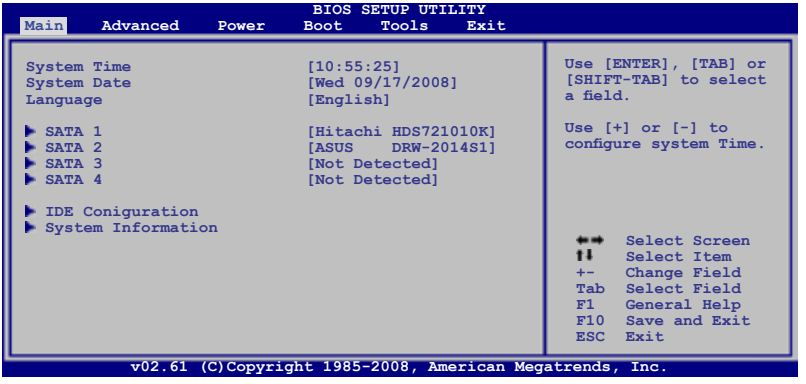
3.2.9 General help

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

3.3 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 **3.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.



3.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

3.3.2 System Date [Day xx/xx/xxxx]

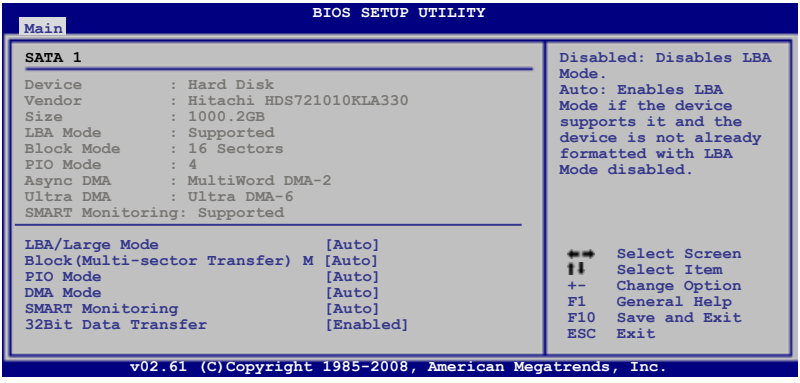
Allows you to set the system date.

3.3.3 Language [English]

Allows you to choose the BIOS language version from the options.
Configuration options: [Chinese (GB)] [Japanese] [English]

3.3.4 SATA 1–4

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



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

LBA/Large Mode [Auto]

Enables or disables the LBA mode. Setting 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 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 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] [SWDMA0] [SWDMA1] [SWDMA2] [MWDMA0] [MWDMA1] [MWDMA2] [UDMA0] [UDMA1] [UDMA2] [UDMA3] [UDMA4] [UDMA5] [UDMA6]

SMART Monitoring [Auto]

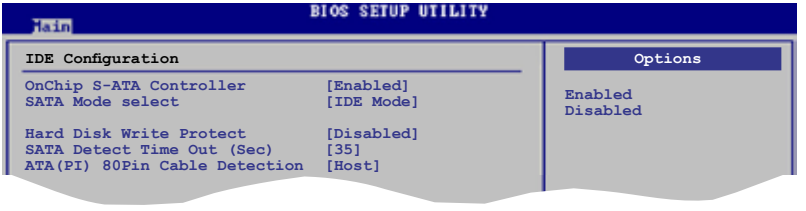
Sets the Smart Monitoring, Analysis, and Reporting Technology.
Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

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

3.3.5 IDE Configuration

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



OnChip S-ATA Controller [Enabled]

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

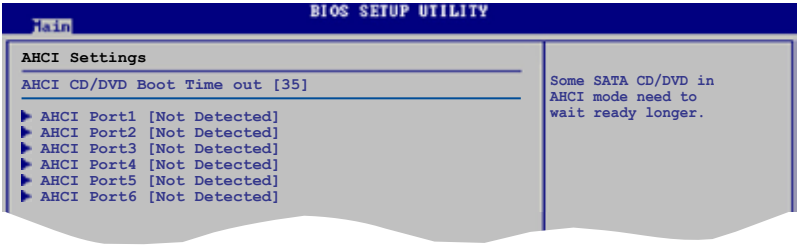
SATA Mode select [IDE Mode]

Sets the configuration for the Serial ATA connectors supported by the chipset.
Configuration options: [IDE Mode] [RAID Mode] [AHCI Mode]

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

AHCI Configuration

This menu is the section for AHCI configuration. It appears only when you set the **SATA Mode select** to [AHCI Mode].

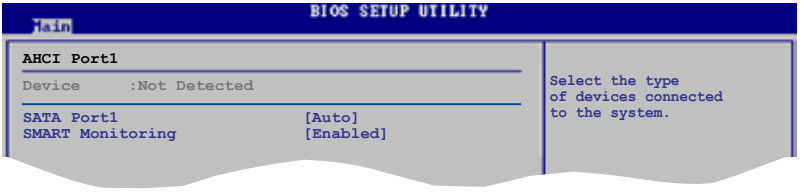


AHCI CD/DVD Boot Time out [35]

Selects the boot time out value for AHCI CD/DVD devices.
Congifuration options: [0] [5] [10] [15] [20] [25] [30] [35]

AHCI Port1~6 [XXXX]

Displays the status of auto-detection of SATA devices.



SATA Port1 [Auto]

Allows you to select the type of device connected to the system.
Configuration options: [Auto] [Not Installed]

SMART Monitoring [Enabled]

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

Hard Disk Write Protect [Disabled]

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

IDE Detect Time Out (Sec) [35]

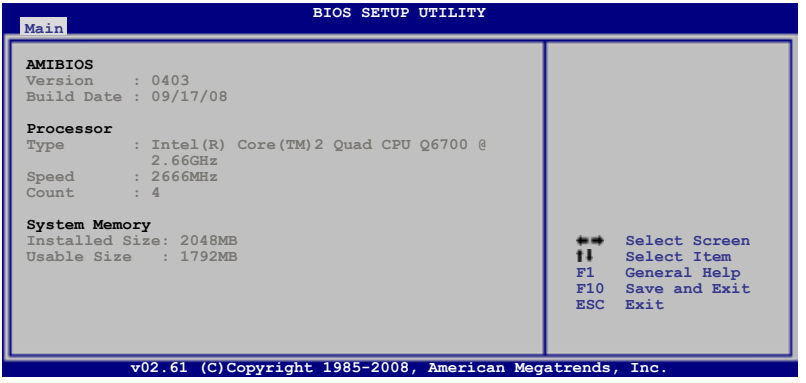
Selects the time out value for detecting ATA/ATAPI devices.
Configuration options: [0] [5] [10] [15] [20] [25] [30] [35]

ATA(PI) 80Pin Cable Detection [Host]

Select the mechanism for detecting 80Pin ATA(PI) Cable.
Configuration options: [Host & Device] [Host] [Device]

3.3.6 System Information

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



AMIBIOS

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

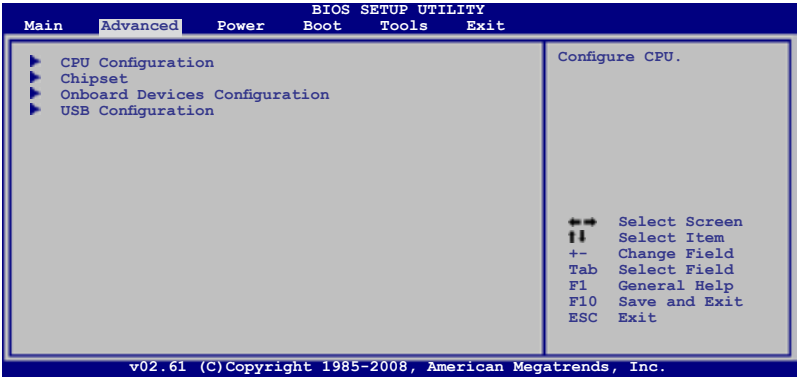
System Memory

Displays the auto-detected system memory.

3.4 Advanced menu

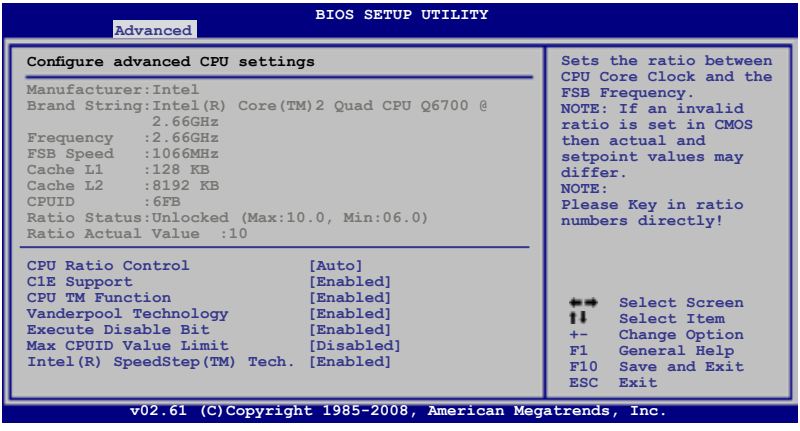
The Advanced menu items allow you to change the settings for the CPU and other system devices.

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



3.4.1 CPU Configuration

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



CPU Ratio Control [Auto]

This item allows you to set the ratio between CPU Core Clock and FSB Frequency. The value is adjusted by typing the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.
Configuration options: [Auto] [06.0]–[10.0]

C1E Support [Enabled]

Allows you to enable or disable Enhanced Halt State support.
Configuration options: [Disabled] [Enabled]

CPU TM Function [Enabled]

This function enables the overheated CPU to throttle the clock speed to cool down.
Configuration options: [Disabled] [Enabled]

Vanderpool Technology [Enabled]

The Vanderpool Technology allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.
Configuration options: [Disabled] [Enabled]

Execute Disable Bit [Enabled]

Allows you to enable or disable the No-Execution Page Protection Technology. Setting this item to [Disabled] forces the XD feature flag to always return to zero (0).
Configuration options: [Disabled] [Enabled]

Max CPUID Value Limit [Disabled]

Setting this item to [Enabled] allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.
Configuration options: [Disabled] [Enabled]

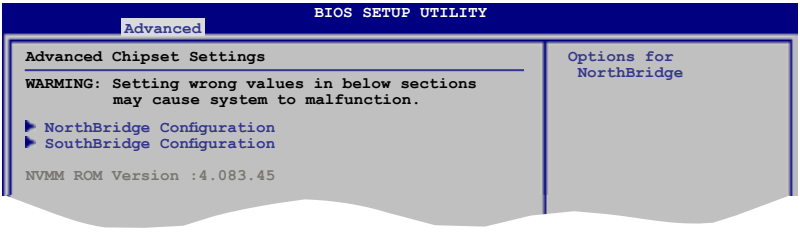
The following item appears only when you set the **CPU Ratio Control** to [Auto]

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

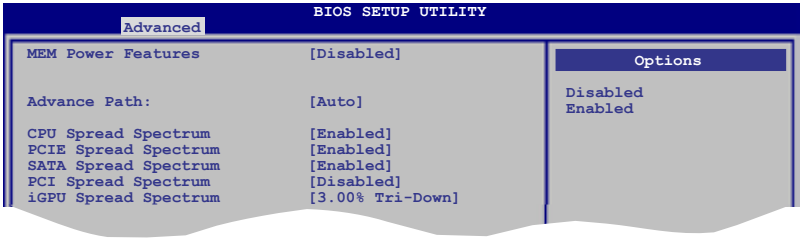
When set to [Disabled], the CPU runs at its default speed. When set to [Enabled], the CPU speed is controlled by the operating system.
Configuration options: [Enabled] [Disabled]

3.4.2 Chipset

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



NorthBridge Configuration



MEM Power Features [Disabled]
Configuration options: [Disabled] [Enabled]

Advance Path: [Auto]
Allows you to enable or disable Advance Path.
Configuration options: [Auto] [Enabled] [Disabled]

ADSTB: [2]
This item appears only when you set the **Advance Path** item to [Enabled] and allows you to set Address-Strobe Value.
Configuration options: [0] [1] [2] [3]

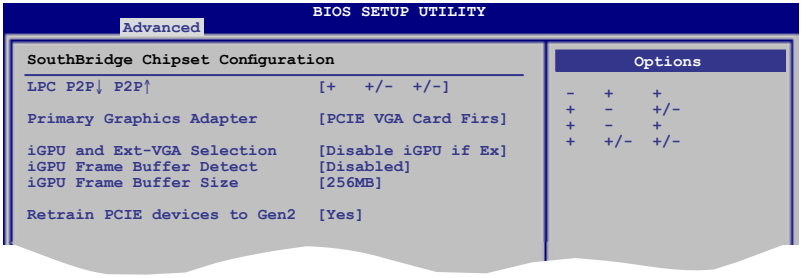
Budget: [3.00ns]
This item appears only when you set the **Advance Path** item to [Enabled].
Configuration options: [1.50ns] [1.75ns] [2.00ns] [2.25ns] [2.50ns] [2.75ns] [3.00ns] [3.25ns] [3.50ns] [3.75ns]

CPU/PCIE/SATA Spread Spectrum [Enabled]
Set these items to [Disabled] for better performance or [Enabled] for EMI control.
Configuration options: [Enabled] [Disabled]

PCI Spread Spectrum [Disabled]
Set this item to [Disabled] for better performance or [Enabled] for EMI control.
Configuration options: [Enabled] [Disabled]

iGPU Spread Spectrum [3.00% Tri-Down]
Set this item to [Disabled] for better performance.
Configuration options: [Disabled] [1.00% Tri-Down] [2.00% Tri-Down] [3.00% Tri-Down] [5.00% Tri-Down]

SouthBridge Configuration



LPC P2P↓ P2P↑ [+ +/- +/-]
Allows you to set the decoding mode for PLC and P2P.
Configuration options: [- + +] [+ - +/-] [+ - +] [+ +/- +/-]

Primary Graphics Adapter [PCIE VGA Card First]
Allows you to select which graphics controller to use as the primary boot device.
Configuration options: [PCI VGA Card First] [Internal VGA First] [PCIE VGA Card First]

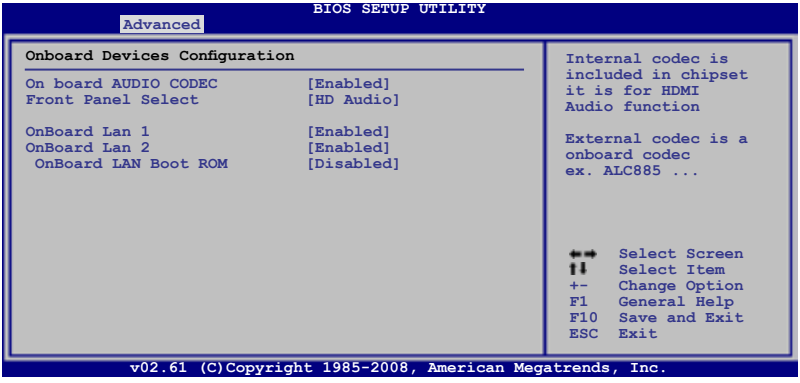
iGPU and Ext-VGA Selection [Disable iGPU if External VGA Card Exist]
Allows you to enable or disable the onboard GPU.
Configuration options: [Disable iGPU if External VGA Card Exist] [Both Exist and iGPU by Frame Buffer Detect]

iGPU Frame Buffer Detect [Disabled]
Allows you to set the onboard GPU frame buffer control mode.
Configuration options: [Disabled] [Enabled]

iGPU Frame Buffer Size [256MB]
This item becomes user-configurable when you set the **iGPU Frame Buffer Detect** item to [Disabled] and allows you to set frame buffer size for onboard GPU.
Configuration options: [32MB] [64MB] [128MB] [256MB] [512MB]

Retrain PCIE devices to Gen2 [Yes]
Set this item to [Yes] to allow the PCIe device installed on the PCIe x16 slot to work at PCIe 2.0 standard if supported.
Configuration options: [Yes] [No]

3.4.3 OnBoard Devices Configuration



On board AUDIO CODEC [Enabled]

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

Front Panel Select [HD Audio]

This item appears only when you enable the previous item and allows you to set the front panel audio connector (AAFP) mode to legacy AC'97 or high-definition audio depending on the audio standard that the front panel audio module supports.
Configuration options: [AC97] [HD Audio]

OnBoard LAN 1/2 [Enabled]

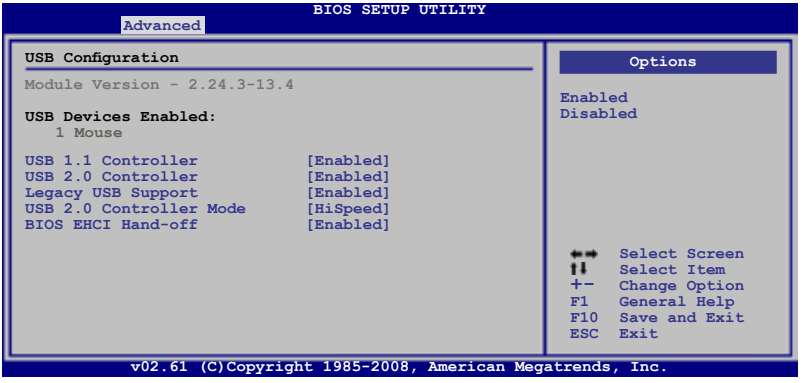
Allows you to enable or disable the onboard LAN ports.
Configuration options: [Enabled] [Disabled]

OnBoard LAN Boot ROM [Disabled]

This item appears only when you enable one of the previous items.
Configuration options: [Disabled] [Enabled]

3.4.4 USB Configuration

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



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

USB 1.1 Controller [Enabled]

Allows you to enable or disable the USB 1.1 controller. The following sub-items appear when this item is set to [Enabled].
Configuration options: [Disabled] [Enabled]

USB 2.0 Controller [Enabled]

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

Legacy USB Support [Enabled]

Allows you to enable or disable support for legacy USB devices. Setting 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]

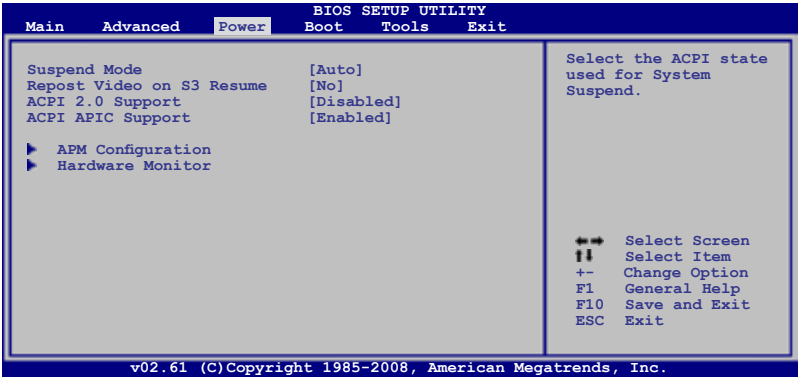
Allows you to set the USB 2.0 controller mode to HiSpeed (480 Mbps) or FullSpeed (12 Mbps). This item appears only when you enable the USB 2.0 Controller item.
Configuration options: [FullSpeed] [HiSpeed]

BIOS EHCI Hand-off [Enabled]

Allows you to enable support for operating systems without an EHCI hand-off feature.
Configuration options: [Disabled] [Enabled]

3.5 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.



3.5.1 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]

3.5.2 Repost Video on S3 Resume [No]

Determines whether to invoke VGA BIOS POST on S3/STR resume.
Configuration options: [No] [Yes]

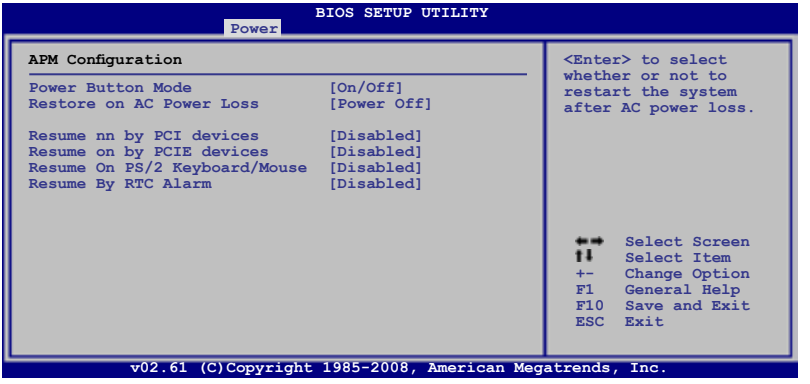
3.5.3 ACPI 2.0 Support [Disabled]

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

3.5.4 ACPI APIC Support [Enabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC). When set to Enabled, the ACPI APIC table pointer is included in the RSDT pointer list.
Configuration options: [Disabled] [Enabled]

3.5.5 APM Configuration



Power Button Mode [On/Off]

Decides whether the system turns On/Off or suspends when the power button is pressed.
Configuration options: [On/Off] [Suspend]

Restore on AC Power Loss [Power Off]

When set to Power Off, the system goes into off state after an AC power loss. When set to Power On, the system goes on after an AC power loss. When 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 On] [Power Off] [Last State]

Resume on by PCI devices [Disabled]

Allows you to enable or disable the PME to wake up from S5 by PCI devices.
Configuration options: [Disabled] [Enabled]

Resume on by PCIE devices [Disabled]

Allows you to enable or disable the PCIE devices to generate a wake event.
Configuration options: [Disabled] [Enabled]

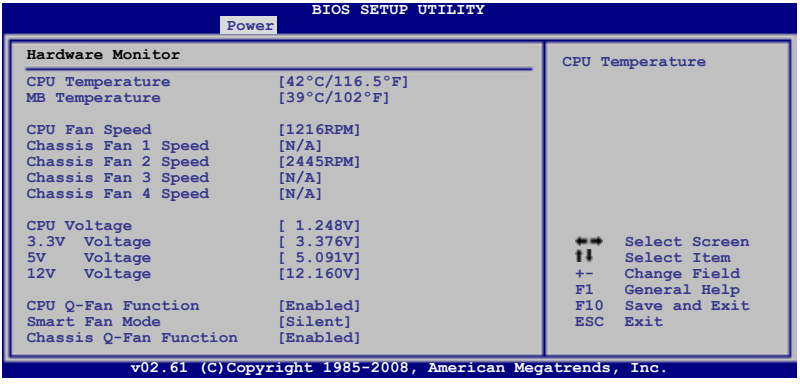
Resume On PS/2 Keyboard/Mouse [Disabled]

Allows you to enable or disable PS/2 keyboard/mouse to generate a wake event.
Configuration options: [Disabled] [Enabled]

Resume By RTC Alarm [Disabled]

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

3.5.6 Hardware Monitor



CPU/MB Temperature [xxx°C/xxx°F]

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 [xxxxRPM] or [Ignored] / [N/A]
Chassis Fan 1/2/3/4 Speed [xxxxRPM] or [Ignored] / [N/A]

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

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

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

CPU Q-Fan Function [Enabled]

Allows you to enable or disable the CPU Q-fan control feature.
Configuration options: [Disabled] [Enabled]

The following item appears only when you enable the CPU Q-Fan Control item.

Smart Fan Mode [Silent]

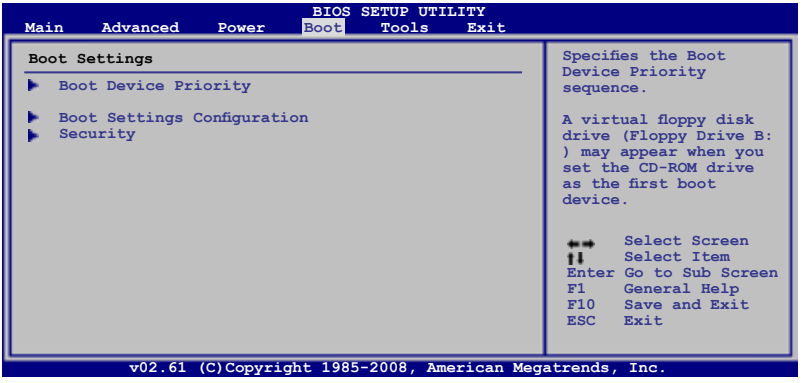
Allows you to set the appropriate performance level of the ASUS Q-Fan. When set to [Optimal], the CPU fan automatically adjusts depending on the CPU temperature. Set this item to [Silent] to minimize fan speed for quiet CPU fan operation, or [Performance] to achieve maximum CPU fan speed.
Configuration options: [Performance] [Optimal] [Silent]

Chassis Q-Fan Control [Enabled]

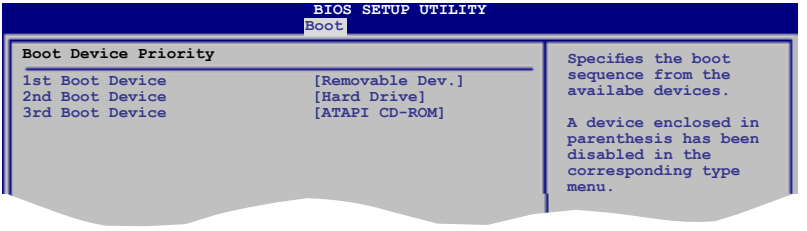
Allows you to enable or disable the Chassis Q-fan control feature.
Configuration options: [Disabled] [Enabled]

3.6 Boot menu

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



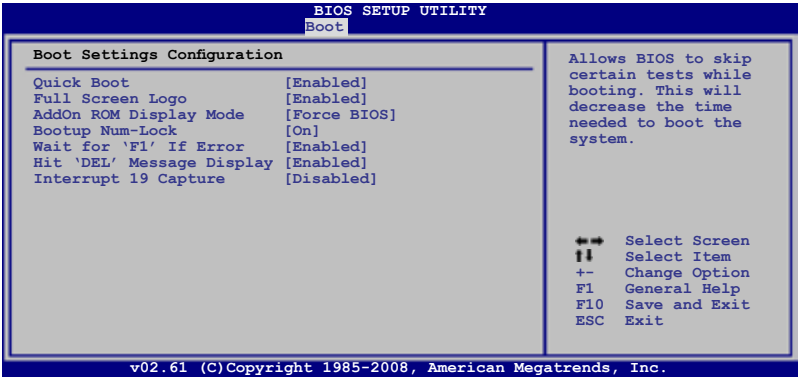
3.6.1 Boot Device Priority



1st ~ xxth Boot Device [xxx Drive]

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

3.6.2 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.

AddOn 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]

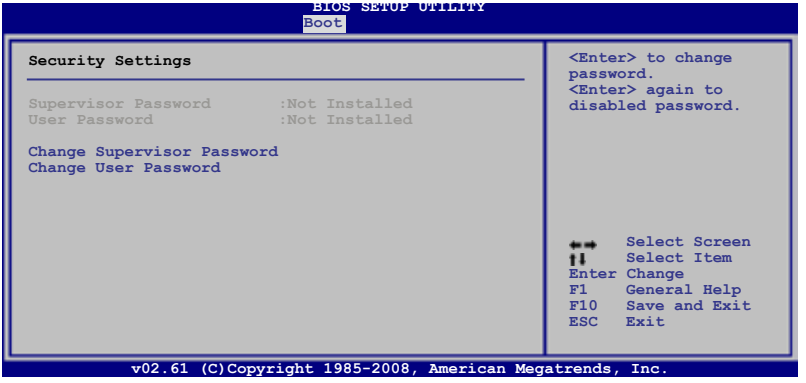
When set to Enabled, the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Disabled]

When set to [Enabled], this function allows the option ROMs to trap Interrupt 19.
Configuration options: [Disabled] [Enabled]

3.6.3 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 at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

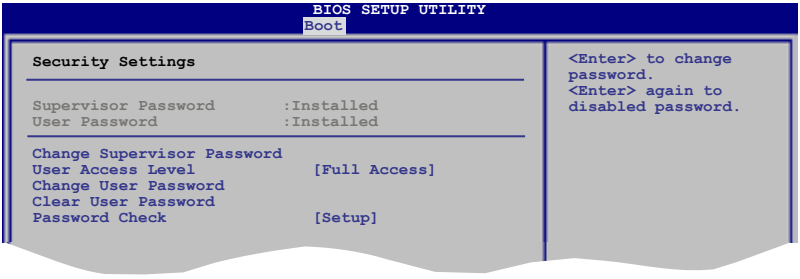
The message “Password Installed” appears after you successfully set your password.

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

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

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

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



User Access Level [Full Access]

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

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password

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

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

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

Clear User Password

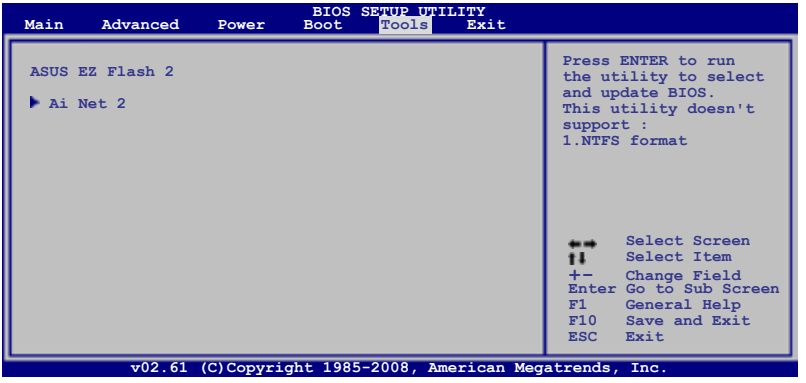
Select this item to clear the user password.

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]

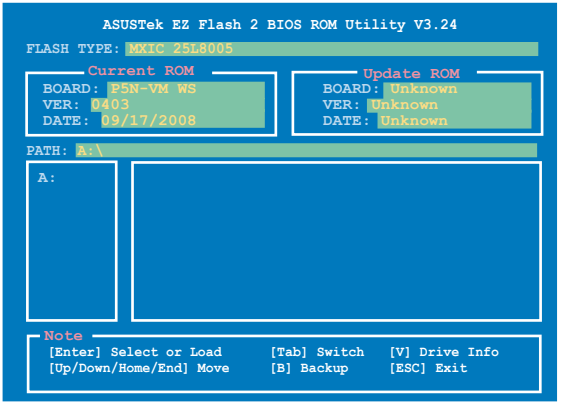
3.7 Tools menu

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



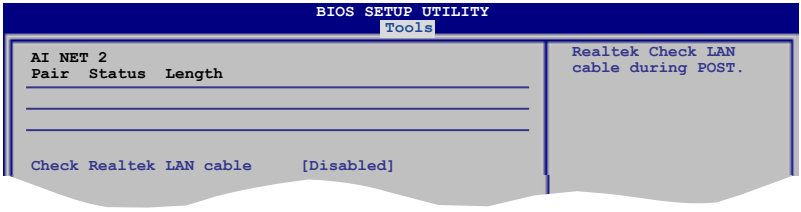
3.7.1 ASUS EZ Flash 2

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 [Ok] or [Cancel], then press <Enter> to confirm your choice. Please see section **3.1.2** for details.



3.7.2 Ai Net 2

This menu displays the status of the Local Area Network (LAN) cables connected to the LAN (RJ-45) ports.

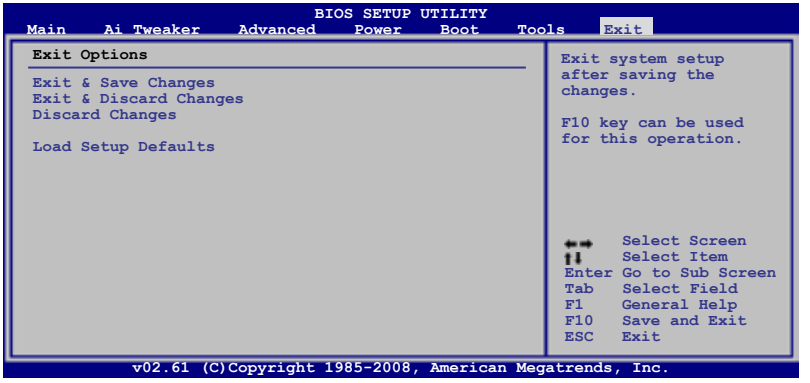


Check Realtek LAN cable [Disabled]

Allows you to enable or disable LAN cable check during POST. When enabled, the menu reports the cable faults or shorts, and displays the point (length) where the faults or shorts are detected.
Configuration options: [Disabled] [Enabled]

3.8 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 YES to save changes and exit.

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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

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

4 Software support

Chapter summary

4

4.1 Installing an operating system

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

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

4.2 Support DVD information

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

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

4.2.1 Running the support DVD

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

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

4.2.2 Drivers menu

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

ASUS InstAll - Installation Wizard for Anti-Virus and Drivers Utility

Installs all of the drivers and anti-virus utility through the installation wizard.

Norton Internet Security 2008

Installs Norton® Internet Security 2008 to protect your PC from the latest online threats.

NVIDIA Chipset Driver Program

Installs the NVIDIA® chipset drivers for the NVIDIA® Quadro FX470 chipset.

SoundMAX ADI Audio Driver

Installs the SoundMAX® ADI audio driver.

Realtek RTL8111C LAN Driver

Installs the Realtek® RTL8111C LAN driver.

4.2.3 Utilities menu

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

ASUS InstAll - Installation Wizard for Utilities

Installs all of the utilities through the Installation Wizard.

ASUS Update

Allows you to download the latest version of the BIOS from the ASUS website.

Before using the ASUS Update, make sure that you have an Internet connection so you can connect to the ASUS website.

ASUS PC Probe II

This smart utility monitors the fan speed, CPU temperature, and system voltages, and alerts you of any detected problems. This utility helps you keep your computer in healthy operating condition.

Adobe Acrobat Reader 8

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

Ulead Burn.Now

Installs the Ulead Burn.Now application for Audio DVD, CD and data disc creation.

Corel MediaOne Starter

Installs the Corel MediaOne Starter application to easily manage, edit share and protect your multimedia data.

Ulead PhotoImpact 12 SE

Installs the PhotoImpact image editing software.

CyberLink PowerBackup

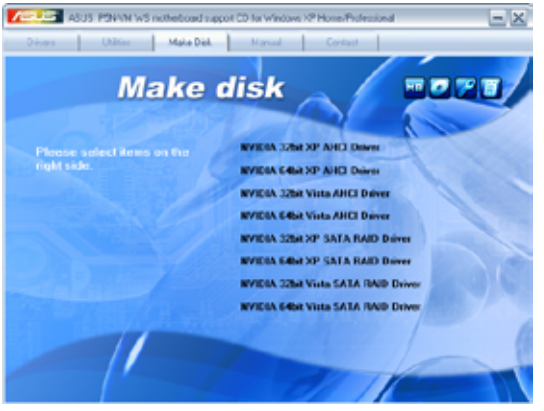
Installs CyberLink PowerBackup to back up and restore your data easily.

Winzip 11

Installs the Winzip utility for easy file-compression and protection.

4.2.4 Make Disk menu

The Make Disk menu contains items to create NVIDIA® Quadro FX470 RAID driver disk.



NVIDIA 32/64bit XP / Vista AHCI / SATA RAID Driver

Allows you to create NVIDIA AHCI / SATA RAID driver disk for 32 / 64-bit Windows® XP / Vista.

The motherboard does not provide a floppy drive connector. You have to use a USB floppy drive when creating a driver disk.

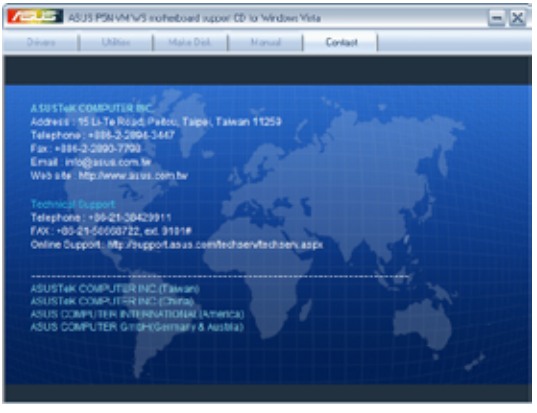
4.2.5 Manual menu

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

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

4.2.6 ASUS Contact information

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



4.2.7 Other information

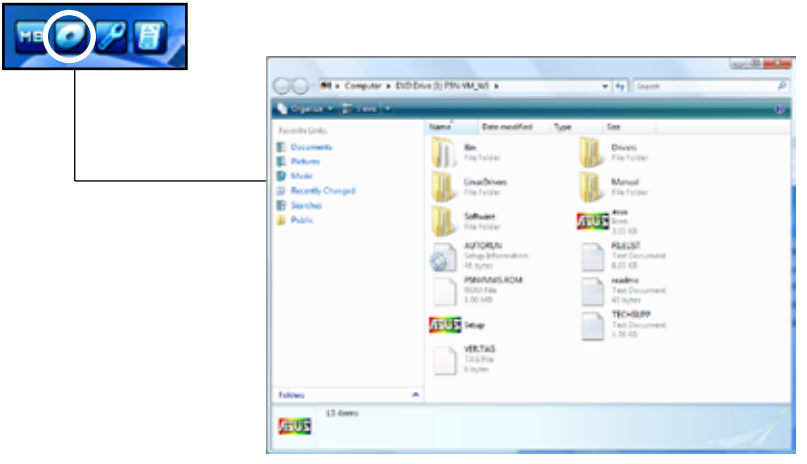
The icons on the top right corner of the screen give additional information on the motherboard and the contents of the support DVD. Click an icon to display the specified information.

Motherboard Info

Displays the general specifications of the motherboard.

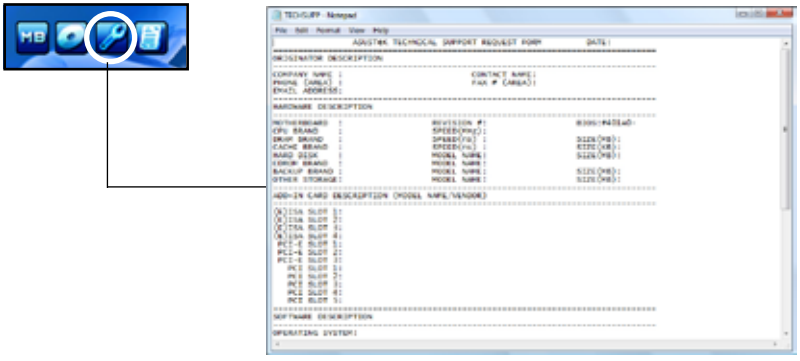
Browse this DVD

Displays the support DVD contents in graphical format.



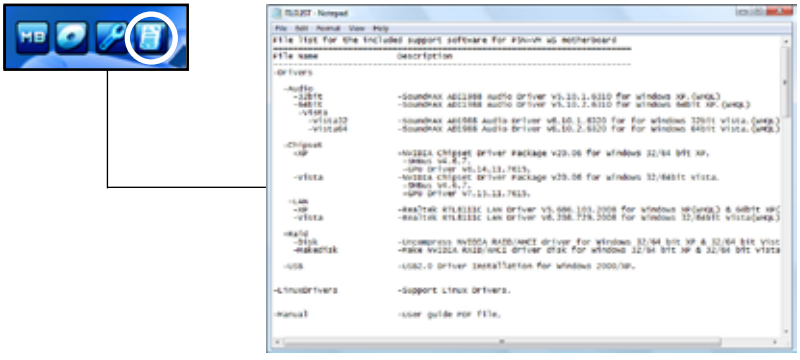
Technical support Form

Displays the ASUS Technical Support Request Form that you have to fill out when requesting technical support.



File list

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



4.3 Software information

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

4.3.1 ASUS MyLogo2™

The ASUS MyLogo2™ utility lets you customize the boot logo. The boot logo is the image that appears on screen during the Power-On Self-Tests (POST). The ASUS MyLogo2™ is automatically installed when you install the ASUS Update utility from the Support DVD. See section **4.2.3 Utilities menu** for details.

- Before using the ASUS MyLogo2™, use the AFUDOS utility to make a copy of your original BIOS file, or obtain the latest BIOS version from the ASUS website. See section **3.1.4 AFUDOS utility**.
- Make sure that the BIOS item Full Screen Logo is set to [Enabled] if you wish to use ASUS MyLogo2. See section **3.6.2 Boot Settings Configuration**.
- You can create your own boot logo image in GIF file format.
- The file size should be smaller than 150 K.

To launch the ASUS MyLogo2™:

1. Launch the ASUS Update utility. Refer to section **3.1.1 ASUS Update utility** for details.
2. Select **Options** from the drop down menu, then click **Next**.
3. Check the option **Launch MyLogo** to replace system boot logo before flashing BIOS, then click **Next**.
4. Select **Update BIOS** from a file from the drop down menu, then click **Next**.
5. When prompted, locate the new BIOS file, then click **Next**. The ASUS MyLogo window appears.
6. From the left window pane, select the folder that contains the image you intend to use as your boot logo.

7. When the logo images appear on the right window pane, select an image to enlarge by clicking on it.

8. Adjust the boot image to your desired size by selecting a value on the Ratio box.

9. When the screen returns to the ASUS Update utility, flash the original BIOS to load the new boot logo.
10. After flashing the BIOS, restart the computer to display the new boot logo during POST.

4.3.2 ASUS PC Probe II

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

Installing PC Probe II

To install PC Probe II on your computer:

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

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

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

Launching PC Probe II

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

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

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

Using PC Probe II

Main window

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

Click to close the Preference panel

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

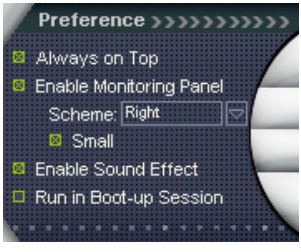
Sensor alert

When a system sensor detects a problem, the main window right handle turns red, as the illustrations below show.

When displayed, the monitor panel for that sensor also turns red. Refer to the Monitor panels section for details.

Preference

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



Hardware monitor panels

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

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

Large display

Small display

Changing the monitor panels position

To change the position of the monitor panels in the desktop, click the arrow down button of the Scheme options, then select another position from the list box. Click **OK** when finished.

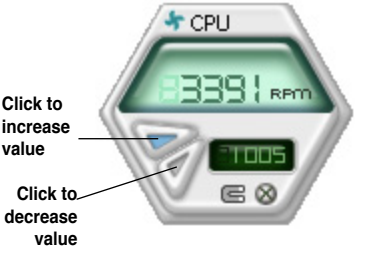
Moving the monitor panels

All monitor panels move together using a magnetic effect. If you want to detach a monitor panel from the group, click the horseshoe magnet icon. You can now move or reposition the panel independently.

Adjusting the sensor threshold value

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

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



Monitoring sensor alert

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

Large display

Small display

WMI browser

Click WMI to display the WMI (Windows Management Instrumentation) browser. This browser displays various Windows® management information. Click an item from the left panel to display on the right panel. Click the plus sign (+) before WMI Information to display the available information.

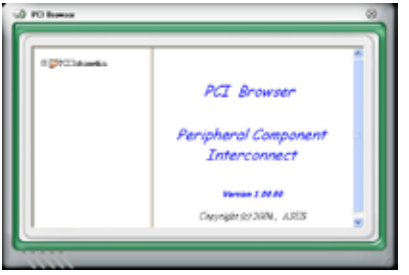
You can enlarge or reduce the browser size by dragging the bottom right corner of the browser.

DMI browser

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

PCI browser

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

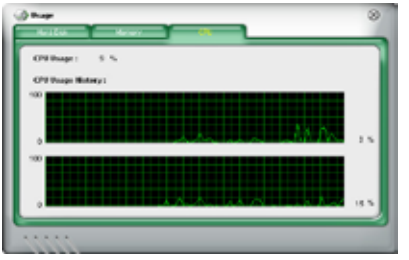


Usage

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

CPU usage

The CPU tab displays real-time CPU usage in line graph representation. If the CPU has an enabled Hyper-Threading, two separate line graphs display the operation of the two logical processors.



Hard disk drive space usage

The Hard Disk tab displays the used and available hard disk drive space. The left panel of the tab lists all logical drives. Click a hard disk drive to display the information on the right panel. The pie chart at the bottom of the window represents the used (blue) and the available HDD

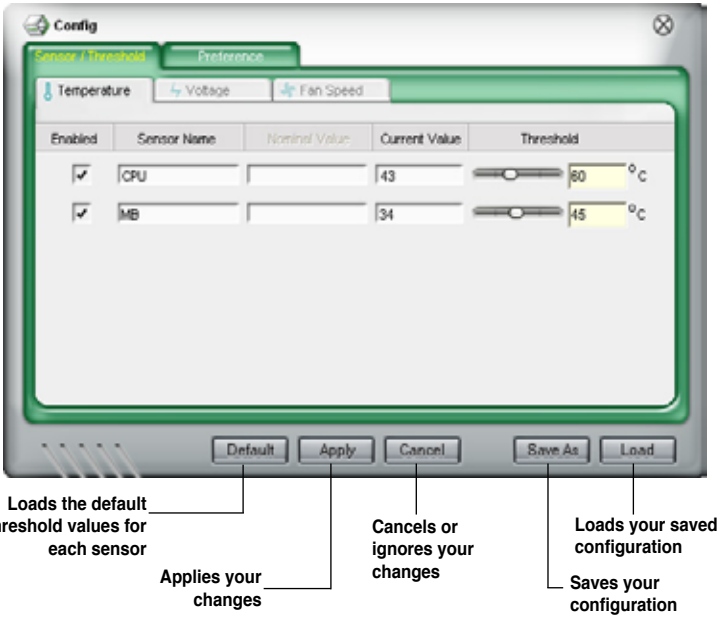
Memory usage

The Memory tab shows both used and available physical memory. The pie chart at the bottom of the window represents the used (blue) and the available physical memory.

Configuring PC Probe II

Click CONFIG to view and adjust the sensor threshold values.

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



4.3.3 SoundMAX® High Definition Audio utility

The ADI AD1988B High Definition Audio CODEC provides 8-channel audio capability through the SoundMAX® audio utility with AudioESP™ software to deliver the ultimate audio experience on your PC. The software implements high quality audio synthesis/rendering, 3D sound positioning, and advanced voice-input technologies.

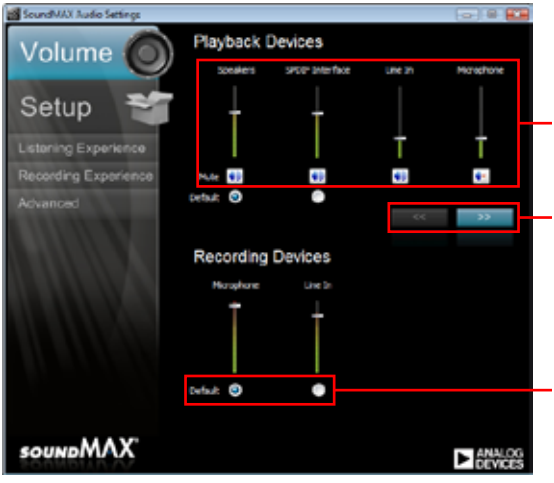
Follow the installation wizard to install the ADI AD1988B Audio Driver from the support DVD that comes with the motherboard package to activate the SoundMAX® audio utility.

If the SoundMAX® audio utility is correctly installed, you will find the SoundMAX® icon on the taskbar.

A. SoundMAX audio utility for Windows Vista™

Volume

The **Volume** tab allows you to adjust the individual volume of playback and recording devices. You can also set the default audio output and input device in this tab.



Setup

The **Setup** tab allows you to adjust multi-speaker settings.

Click each speaker to test volume.

Click to swap center/subwoofer output in 5.1 or 7.1 Surround

Click to show sliders beside all speakers for individual speaker volume adjustment

Click to choose a multi-speaker configuration

Listening Experience

The **Listening Experience** tab allows you to enable or disable the Sonic Focus sound effects and adjust further sound settings.

Click to enable Sonic Focus

Click to show license information of Sonic Focus

Recording Experience

The **Recording Experience** tab allows you to calibrate microphone settings for high quality recording effects.

Advanced

The **Advanced** tab allows you to configure detailed utility settings.

B. SoundMAX audio utility for Windows XP™

Audio Setup Wizard

By clicking the  icon from the SoundMAX® control panel, you can easily configure your audio settings. Simply follow the succeeding screen instructions and begin enjoying High Definition Audio.

Jack configuration

This screen helps you configure your computer's audio ports, depending on the audio devices you have installed.

Adjust speaker volume

This screen helps you adjust speaker volume. Click the **Test** button to hear the changes you have made.

Adjust microphone volume

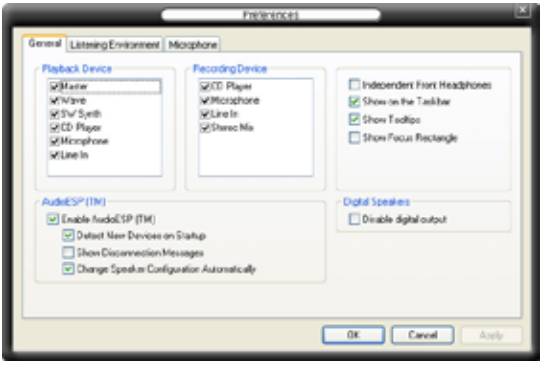
This screen helps you adjust microphone volume. You will be asked to read pre-written text to allow the AudioWizard to adjust the volume as you speak.

Audio preferences

Click the  icon to go to the Preferences page. This page allows you to change various audio settings.

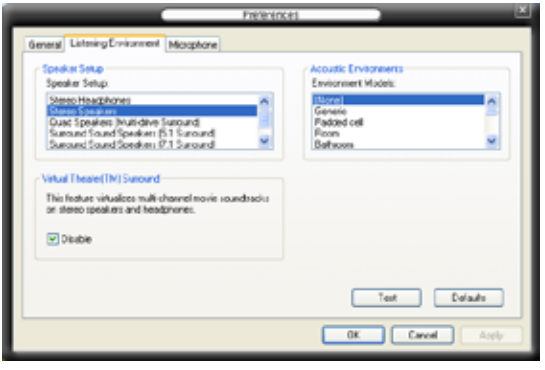
General options

Click the General tab to choose your playback and recording devices, enable/disable the AudioESP™ feature, and enable/disable digital output.



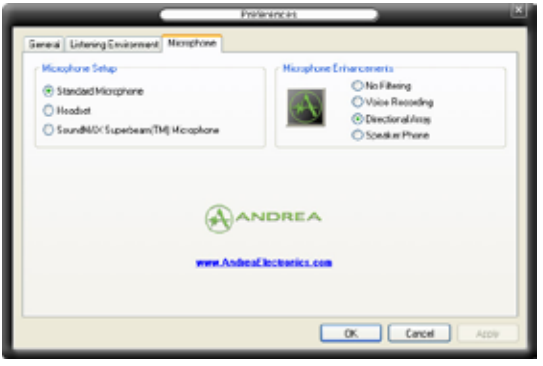
Listening Environment options

Click the Listening Environment tab to set up your speaker, acoustic environment, and enable/disable the Virtual Theater Surround function.



Microphone options

Click the Microphone tab allows you to optimize your microphone input settings.



Enhanced Microphone Features

Noise Filtering

Enables Noise Filter function. Detects repetitive and stationary noises like computer fans, air conditioners, and other background noises then eliminates it in the incoming sudio stream while recording. You can enable it for a better recording quality.

Directional Array

Receives only the sound coming from the reception cone and eliminates interferences including neighboring speakers and reverberations. You can enable it to transit clearer sound during on-line games, MSN, or Skype.

Speaker Phone

Advanced de-reverberation techniques can help to reduce echo and minimize its effect on the speech engine. You can enable it when you have conference call to reduce echoes in the other side.

- The directional Array and Speaker Phone are purchased separately and function only when working with the ASUS Array Mic.
- If you are using Windows Vista, you have to manually enable the directional Array and Speaker Phone function. Go to **Control panel > Sound**. Click the **Recording** tab on the top and select **Microphone**. Click the **Microphone Enhancement** tab and check **Directional beam**.

4.4 RAID configurations

The motherboard comes with NVIDIA® Quadro FX470 chipset that allows you to configure a RAID 0, 1, 0+1, 5, or JBOD set using Serial ATA hard disk drives.

4.4.1 RAID definitions

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 0+1 (RAID 10) is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10* configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

JBOD (Spanning) stands for Just a Bunch of Disks and refers to hard disk drives that are not yet configured as a RAID set. This configuration stores the same data redundantly on multiple disks that appear as a single disk on the operating system. Spanning does not deliver any advantage over using separate disks independently and does not provide fault tolerance or other RAID performance benefits.

If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support DVD to a floppy disk before you install an operating system to the selected hard disk drive. Refer to section **4.5 RAID driver installation** for details.

4.4.2 NVIDIA® RAID configurations

The motherboard includes a high performance SATA RAID controller integrated in the NVIDIA® Quadro FX470 chipset. It supports RAID 0, RAID 1, RAID 0+1, RAID 5, and JBOD for six independent Serial ATA channels.

Installing Serial ATA hard disks

The motherboard supports Serial ATA hard disk drives. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for a RAID configuration:

1. Install the SATA hard disks into the drive bays.
2. Connect the SATA signal cables.
3. Connect a SATA power cable to the power connector on each drive.

Setting the BIOS RAID items

After installing the hard disk drives, make sure to set the necessary RAID items in the BIOS before setting your RAID configuration.

To set the BIOS RAID items:

1. Boot the system and press <Del> during the Power-On Self-Test (POST) to enter the BIOS Setup Utility.
2. Set the **SATA Mode select** item to [RAID]. See section **3.3.5 IDE Configuration** for details.
3. Save your changes and Exit Setup.

- Due to chipset limitation, when set any of SATA ports to RAID mode, all SATA ports run at RAID mode together.
- Make sure to re-enter your NVRAID settings after the CMOS is cleared; otherwise, the system will not recognize your RAID setup.

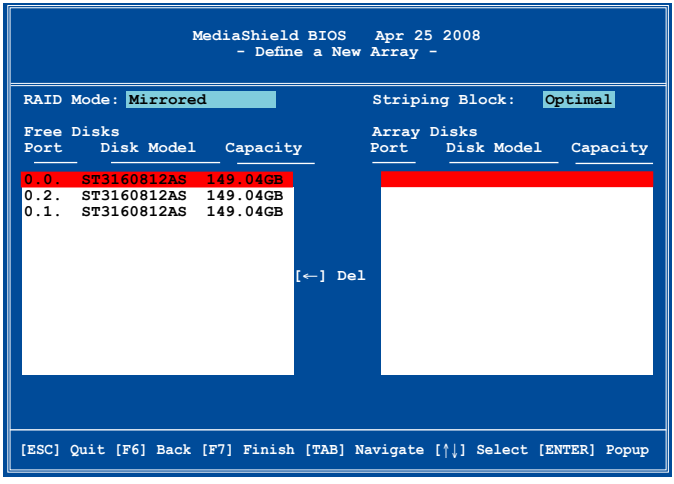
- For detailed descriptions on the NVIDIA® RAID configuration, refer to the "NVIDIA® RAID User Guide" found in your motherboard support DVD.
- When using Windows® XP operating system, make sure to install the Windows® XP Service Pack 2 or later versions.

Entering the NVIDIA® MediaShield BIOS RAID utility

To enter the NVIDIA® MediaShield BIOS RAID utility

1. Boot up your computer.
2. During POST, press <F10> to display the main menu of the utility.

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



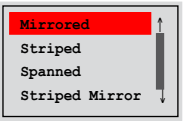
At the bottom of the screen are the navigation keys. These keys allow you to move through and select menu options.

Creating a RAID Volume

To create a RAID volume:

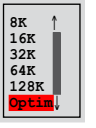
1. From the **Define a New Array** screen, use the <TAB> key to highlight the **RAID Mode** field, and then press <Enter>. The following sub-menu appears.

   Use the up or down arrow keys to select a RAID mode, and then press <Enter>.



2. Press <TAB> to highlight the **Stripe Block** field, and then press <Enter>. The following sub-menu appears:

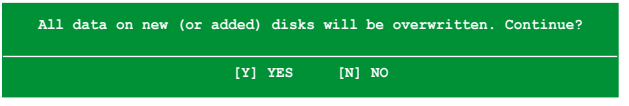
   Use the up or down arrow keys to select the stripe size for your RAID array, and then press <Enter>.The available values range from 8 KB to 128 KB. The default selection is Optimal. The strip value should be chosen based on the planned drive usage.



   - 8 /16 KB - low disk usage
   - 64 KB - typical disk usage
   - 128 KB - performance disk usage

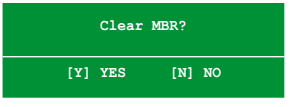
- For server systems, we recommend using a lower array block size. For multimedia computer systems used mainly for audio and video editing, we recommend a higher array block size for optimum performance.
- Stripe block size selection is not available for **Mirrored** or **Spanned** RAID arrays.

3. Press <TAB> to highlight the **Free Disks** field. Use the left or right arrow keys to assign the array disks.
4. Press <F7> to create RAID set. The following message box appears.



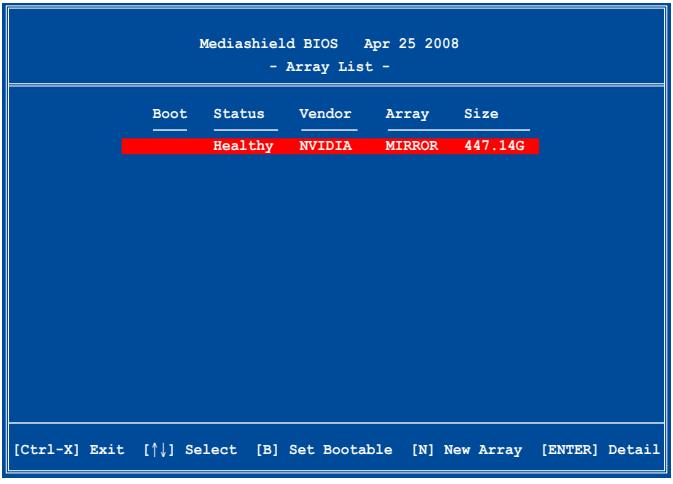
5. Press <Y> to clear the selected disks or <N> to proceed without clearing the disks. The following screen appears.

Take caution in using this option. All data on the RAID drives will be lost!



6. Press <Y> to clear the MBR.

The Array List screen appears, where you can review the RAID arrays that you have set up.



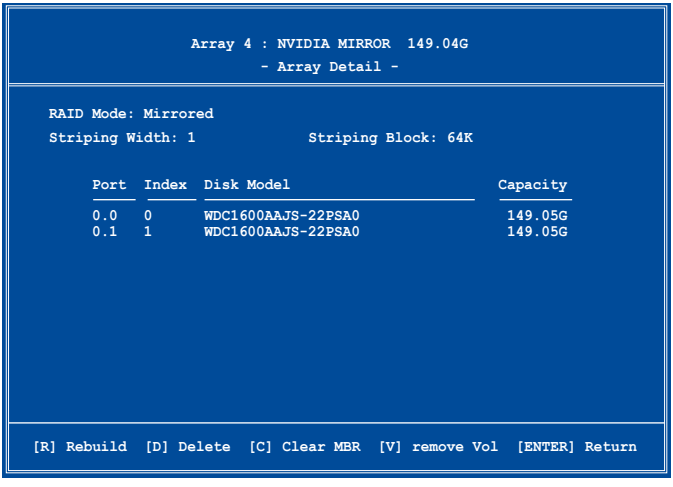
A new set of navigation keys is displayed on the bottom of the screen.

7. Press <Ctrl+X> to save settings and exit.

Rebuilding a RAID array

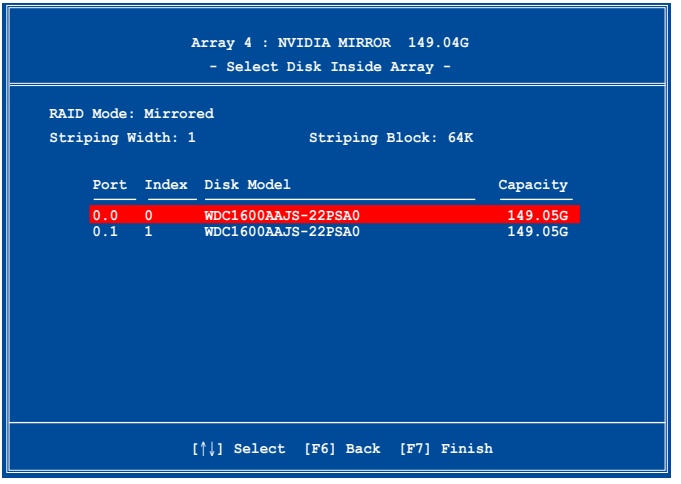
To rebuild a RAID array

1. From the **Array List** screen, use the up or down arrow keys to select a RAID array, and then press <Enter>. The RAID Array details appear.

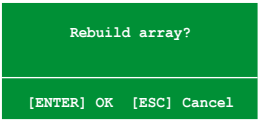


A new set of navigation keys is displayed on the bottom of the screen.

2. Press <R> to rebuild a RAID array. The following screen appears.



3. Use the up or down arrow keys to select a RAID array to rebuild, then press <F7>. The following confirmation message appears.



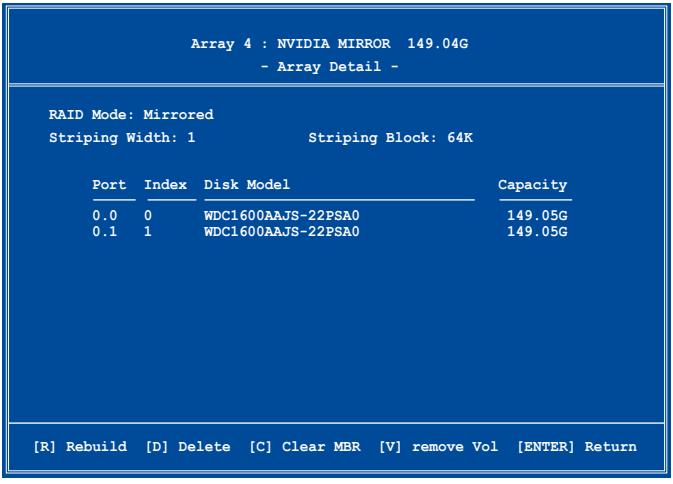
4. Press <Enter> to start rebuilding array or press <Esc> to cancel.
5. After the rebuild process, the Array list menu appears.

You will need to enter Window® XP/Vista and run the NVIDIA utility in order to complete the rebuilt process.

Deleting a RAID array

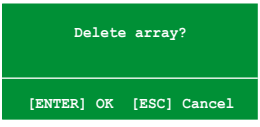
To delete a RAID array

1. From the **Array List** screen, use the up or down arrow keys to select a RAID array, and then press <Enter>. The RAID Array details appear.



   A new set of navigation keys is displayed on the bottom of the screen.

2. Press <D> to delete a RAID array. The following confirmation message appears.



3. Press <Y> to delete array or press <N> to cancel.

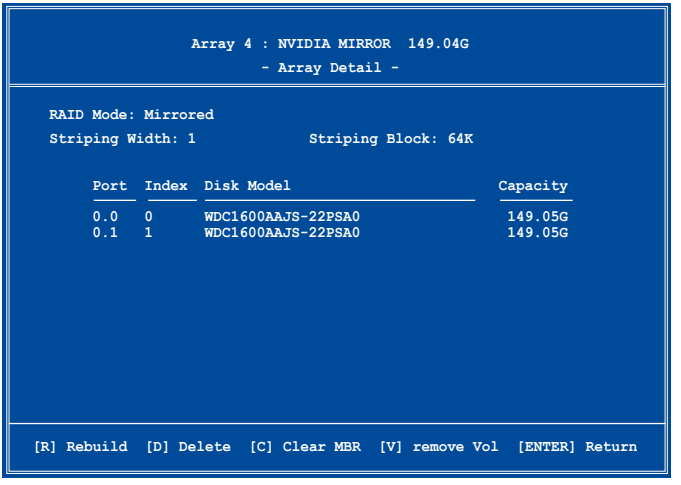
Take caution in using this option. All data on the RAID drives will be lost!

4. If you deleted all existing arrays, the **Define a New Array** screen appears again.

Clearing a disk MBR

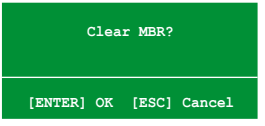
To clear disk MBR

1. From the **Array List** screen, use the up or down arrow keys to select a RAID array, and then press <Enter>. The RAID Array details appear.



   A new set of navigation keys is displayed on the bottom of the screen.

2. Press <C> to clear disk MBR. The following confirmation message appears.



3. Press <Y> to clear the disk MBR or press <N> to cancel.

Take caution in using this option. All data on the RAID drives will be lost!

4.5 RAID driver installation

A floppy disk with the RAID driver is required when installing Windows® XP operating system on a hard disk drive that is included in a RAID set. For Windows® Vista operating system, use either a floppy disk or a USB device with the RAID driver.

The motherboard does not provide a floppy drive connector. You have to use a USB floppy drive when creating a SATA RAID driver disk.

4.5.1 Creating a RAID driver disk without entering the OS

To create a RAID driver disk without entering the OS

1. Place the motherboard support DVD in the optical drive.
2. Restart the computer, and then enter BIOS Setup.
3. Select the optical drive as the first boot priority to boot from the support DVD. Save your changes, and then exit BIOS Setup.
4. Restart the computer.

   The Make Disk menu appears.

```
+-------------------------------------------------------+
+  Welcome to ASUS Motherboard Make Disk for DOS Menu   +
+                                              Rev.1.0  +
+-------------------------------------------------------+
     a)  NVIDIA Windows XP RAID/AHCI Driver Disk
     b)  NVIDIA Windows Vista RAID/AHCI Driver Disk
     c)  FreeDOS command prompt
Please choose a ~ c:
                  _
```

5. Place a blank, high-density floppy disk to the floppy disk drive, and then select the type of RAID driver disk you want to create by typing the letter before the option.
6. Follow screen instructions to create the driver disk.

4.5.2 Creating a RAID driver disk in Windows®

To create a RAID driver disk in Windows® environment

1. Start Windows®.
2. Place the motherboard support DVD into the optical drive.
3. Go to the **Make Disk** menu, and then click **NVIDIA 32/64bit XP/Vista SATA RAID Driver** to create a NVIDIA® 32/64 bit XP/Vista SATA RAID driver disk.
4. Insert a floppy disk into the floppy disk drive.
5. Follow succeeding screen instructions to complete the process.

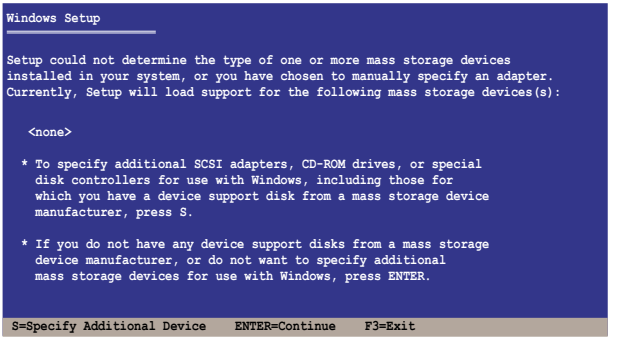
Write-protect the floppy disk to avoid computer virus infection.

4.5.3 Installing the RAID controller driver

Windows® XP OS

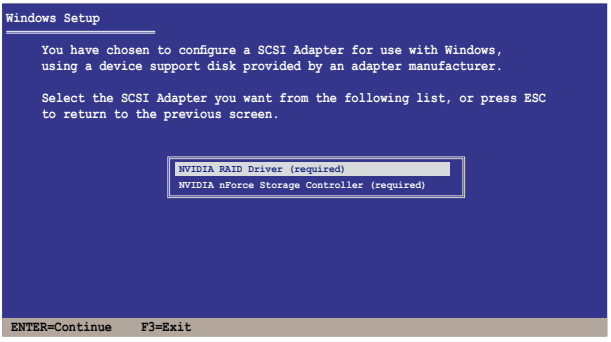
To install the RAID controller driver when installing Windows® XP OS

1. Boot the computer using the Windows® XP installation CD. The Windows® XP Setup starts.
2. Press <F6> when the message "**Press F6 if you need to install a third party SCSI or RAID driver...**" appears at the bottom of the screen.
3. When prompted, press **<S>** to specify an additional device.



4. Insert the RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.

5. Select the RAID controller driver from the list, then press <Enter>.



6. The Windows® Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

Windows® Vista OS

To install the RAID controller driver when installing Windows® Vista OS

1. Insert the floppy disk with RAID driver into the floppy disk drive.
2. During the OS installation, select **Load Driver**, click **Browse**, then select **Floppy Disk Drive (A:)**. Click **OK**.
3. Select **NVIDIA nForce RAID controller (A:\nvrd32.inf)** and click **Next**.
4. Follow the succeeding screen instructions to complete the installation.