P5GC-VM

Motherboard

E3222

First Edition
July 2007

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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 adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

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

This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment, 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 manual contains the following parts:

- **Chapter 1: Product introduction**

    This chapter describes the features of the motherboard and the new technology it supports. This chapter also 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 2: 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 3: Software support**

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

- **Appendix: CPU features**

    This Appendix describes the CPU features that the motherboard supports.

Where to find more information

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

1. **ASUS websites**

    The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.

2. **Optional documentation**

    Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

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

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

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

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

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

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.
	Example: <Enter> means that you must press the Enter or Return key.
<Key1>+<Key2>+<Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).
	Example: <Ctrl>+<Alt>+<D>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.
	Example: At the DOS prompt, type the command line:
	`afudos /i[filename]`
	`afudos /iP5GCVM.ROM`

P5GC-VM specifications summary

CPU	LGA775 socket for Intel® Core™2 Duo / Pentium® D / Pentium® 4 / Celeron® D Processors Compatible with Intel® 06 / 05B / 05A processors Supports Intel® next generation 45nm CPU Supports Intel® Enhanced Intel SpeedStep® Technology (EIST), and Intel® Hyper-Threading Technology * Refer to www.asus.com for Intel CPU support list
Chipset	Northbridge: Intel® 945GC Southbridge: Intel® ICH7
Front Side Bus	1066 / 800 / 533 MHz
Memory	Dual-channel memory architecture 4 x 240-pin DIMM sockets support up to 4GB of unbufferred non-ECC 667/533 MHz DDR2 DIMMs
VGA	Integrated Intel® Graphics Media Accelerator 950
Expansion slots	1 x PCI Express x16 slot 3 x PCI slots
Storage	Intel® ICH7 SouthBridge supports: - 1 x Ultra DMA 100/66/33 - 4 x Serial ATA 3Gb/s ports
Audio	Realtek® ALC662 High-Definition audio CODEC, 6-channel audio port support S/PDIF out interface and Jack-detect
LAN	PCI Express Gigabit LAN
USB	Supports up to 8 USB 2.0 ports (four ports at mid-board, four ports at back panel)
Rear panel	1 x Parallel port 1 x COM port 1 x LAN (RJ-45) port 4 x USB 2.0 ports 1 x VGA port 1 x PS / 2 keyboard port 1 x PS / 2 mouse port 6-channel high-definition audio I/O port
BIOS features	4 Mb Flash ROM, AMI BIOS, PnP, WfM2.0, DMI2.0, SM BIOS 2.4

(continued on the next page)

P5GC-VM specifications summary

ASUS Special features	ASUS EZ Flash ASUS CrashFree BIOS 2 ASUS MyLogo™ ASUS Q-Fan
Manageability	WOL, PXE, RPL, WOR by Ring, PME Wake up
Internal connectors	2 x USB 2.0 connectors for 4 additional USB 2.0 ports 1 x Internal Speaker connector 1 x CPU fan connector 1 x Chassis fan connector 1 x Serial port conncetor (COM connector) 1 x TPM connector 1 x 24-pin EPS 12 V power connector 1 x 4-pin ATX 12 V power connector 1 x CD audio in connector 1 x Chassis intrusion connector 1 x Front panel high-definition audio connector 1 x S/PDIF out connector 1 x System Panel connector
Power Requirement	EPS power supply (with 24-pin 12 V plugs) ATX power supply (with 4-pin 12 V plugs)
Form Factor	MicroATX form factor: 9.6 in x 8.95 in (24.4 cm x 22.7 cm)
Support CD contents	Device drivers ASUS PC Probe II ASUS Live Update utility Anti-virus software (OEM version)

*Specifications are subject to change without notice.

This chapter describes the motherboard
features and the new technologies
it supports.

Product introduction

1.1 Welcome!

Thank you for buying an ASUS® P5GC-VM 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 P5GC-VM motherboard
Cables	1 x Serial ATA cable 1 x Serial ATA power cable 1 x Ultra DMA 100/66/33 cable 1 x Floppy disk drive cable
Accessories	I/O shield
Application CDs	ASUS motherboard support CD
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.

LGA775 Intel® Core™2 Processor Ready

This motherboard supports the latest Intel® Core™2 processor in the LGA775 package. With the new Intel® Core™ microarchitecture technology and 1066 / 800 / 533 MHz FSB, the Intel® Core™2 processor is designed to provide powerful and energy efficient performance.

Dual-Core CPU

Enjoy the extraordinary CPU power from the latest dual-core CPU. The advanced processing technology contains two physical CPU cores with individually dedicated L2 cache to satify the rising demand for more powerful prcessing capability.

Intel® 945GC chipset

The Intel® 945GC graphics memory controller hub (GMCH) and the ICH7 I/O controller hub provide the vital interfaces for the motherboard. The GMCH features the Intel® Graphics Media Accelerator 950, an integrated graphics engine for enhanced 3D, 2D, and video capabilities. The GMCH contains one 16-lane PCI Express port intended for an external PCI Express graphics card and provides the interface for a processor in the 775-land package with 1066/800/533 MHz front side bus (FSB), dual channel DDR2 at speeds of up to 667 MHz.

The Intel® ICH7 Southbridge represents the seventh generation I/O controller hub that provides the interface for PCI Express and high definition audio.

Intel Graphics Media Accelerator 950

The Intel Graphics engine has new capabilities that provide a significant increase in graphics performance. DirectX 9 hardware acceleration, 400MHz core clock, and up to 224M of video memory all together provide a full-value, high performance graphic solution to you. Through a dual-independent display technology, different content can be displayed on each monitor or stretched across both displays for more workspace.

DDR2 memory support

The motherboard supports DDR2 memory which features data transfer rates of 667 / 533 MHz to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The dual-channel DDR2 architecture doubles the bandwidth of your system memory to boost system performance, eliminating bottlenecks with peak bandwidths of up to 8.5 GB/s. See pages 1-16 to 1-20 for details.

PCI Express™ interface

The motherboard fully supports PCI Express, the latest I/O interconnect technology that speeds up the PCI bus. PCI Express features point-to-point serial interconnections between devices and allows higher clockspeeds by carrying data in packets. This high speed interface is software compatible with existing PCI specifications. See page 1-23 for details.

USB 2.0 technology

The motherboard implements the Universal Serial Bus (USB) 2.0 specification, dramatically increasing the connection speed from the 12 Mbps bandwidth on USB 1.1 to a fast 480 Mbps on USB 2.0. USB 2.0 is backward compatible with USB 1.1. See page 2-25 and 2-32 for details.

Serial ATA 3 Gb/s technology

The motherboard supports the Serial ATA technology through the Serial ATA interfaces and the Intel® ICH7 chipset. The SATA specification allows for thinner, more flexible cables with lower pin count, reduced voltage requirement, and up to 300 MB/s data transfer rate.

High Definition Audio

Enjoy high-end sound quality on your PC! The onboard HD audio (High Definition Audio, previously codenamed Azalia) CODEC enables high-quality 192KHz/24-bit audio output, 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.

TPM support

Support TPM which can provide secure working environment! This motherboard supports the Trusted Platform Module (TPM), which provides you with enhanced data protection, security via high-level encryption / decryption, and ensures platform integrity. The TPM meets the Windows Vista BitLocker™ Drive Encryption hardware requirement for a more secure working environment.

> The TPM module is purchased separately! This motherboard only supports Sinosun TPM.

1.3.2   Innovative ASUS features

ASUS CrashFree BIOS 2

This feature allows you to restore the original BIOS data from the support CD in case when the BIOS codes and data are corrupted. This protection eliminates the need to buy a replacement ROM chip. See page 2-6 for details.

ASUS EZ Flash

With the ASUS EZ Flash, you can easily update the system BIOS even before loading the operating system. No need to use a DOS-based utility or boot from a floppy disk. See page 2-3 for details.

ASUS Q-Fan technology

The ASUS Q-Fan technology smartly adjusts the fan speeds according to the system loading to ensure quiet, cool, and efficient operation.

ASUS MyLogo™

This feature present in the motherboard allows you to personalize and add style to your system with customizable boot logos. See details on page 2-32.

1.4 Before you proceed

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

- Unplug the power cord from the wall socket before touching any component.

- Use a grounded wrist strap or touch a safely grounded object or to 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.

SB_PWR

ON
Standby
Power

OFF
Powered
Off

P5GC-VM Onboard LED
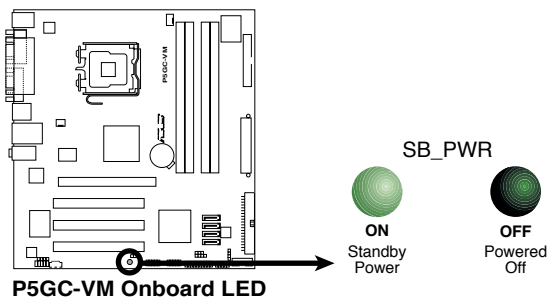
1.5   Motherboard overview

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

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

1.5.1   Placement direction

When installing the motherboard, 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.

1.5.2   Screw holes

Place six (6) screws into the holes indicated by circles to secure the motherboard to the chassis.

⚠ Do not overtighten the screws! Doing so can damage the motherboard.

Place this side towards the rear of the chassis

1.5.3   Motherboard layout

22.7cm (8.95in)

PS/2KBMS
T: Mouse
B: Keyboard

CPU_FAN

Super I/O

ATX12V

COM1

PARALLEL PORT

LGA775

P5GC-VM

DDR2 DIMM_A1 (64 bit,240-pin module)
DDR2 DIMM_A2 (64 bit,240-pin module)
DDR2 DIMM_B1 (64 bit,240-pin module)
DDR2 DIMM_B2 (64 bit,240-pin module)

FLOPPY

VGA

USB34

CHA_FAN

24.4cm (9.6in)

LAN1_USB12

Intel 82945GC

EATXPWR

AUDIO

ICS 9L PRS412

CR2032 3V
Lithium Cell
CMOS Power

Attansic
L1

PCIEX16

PCI1

PCI2

Intel ICH7

SATA4
SATA3
SATA2
SATA1

4Mb
BIOS

PRI_IDE

PCI3

ALC662

SPDIF_OUT

AAFP   CD

PS2_USBPW

SB_PWR

USB56   USB78   TPM

CLRTC

CHASSIS

F_PANEL

SPEAKER

COM2

1.6 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Core™2 Duo/Pentium® D/Pentium® 4 and Celeron® D processors.

> ⚠️ • Your boxed Intel® Core™2 Duo/Pentium® D/Pentium® 4 or Celeron® D LGA775 processor package should come with installation instructions for the CPU, fan and heatsink assembly. If the instructions in this section do not match the CPU documentation, follow the latter.
>
> • Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket pins are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket pins/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 pins resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

1.6.1 Installling the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.
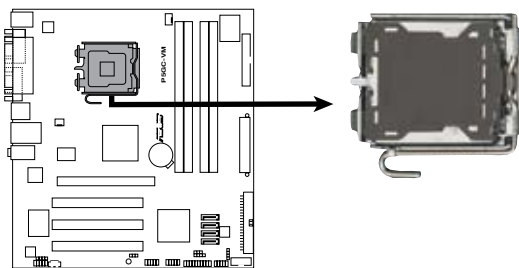
P5GC-VM CPU Socket 775

> ✎ 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) and move it to the left (B) until it is released from the retention tab.

Retention tab

Load lever

A

B

PnP Cap

This side of the cam box should face you.
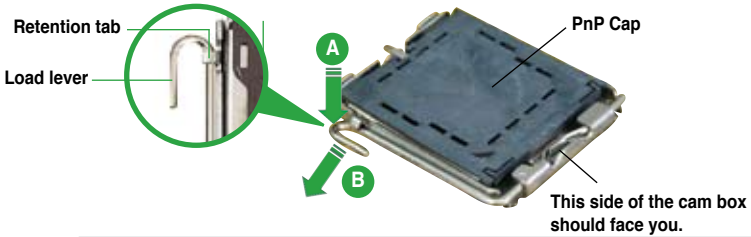
To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

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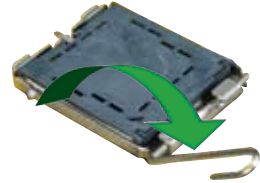
4. Lift the load plate with your thumb and forefinger to a 100º angle (A), then push the PnP cap from the load plate window to remove (B).

B

A
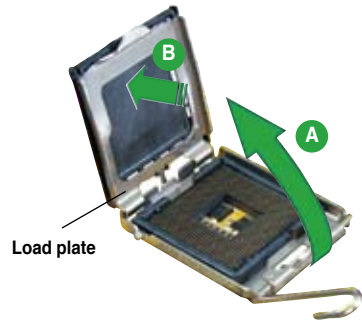
Load plate

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

Alignment key

Gold triangle mark
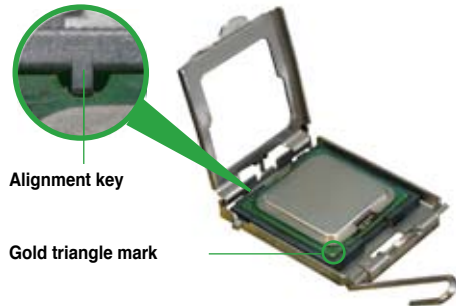
6. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab.
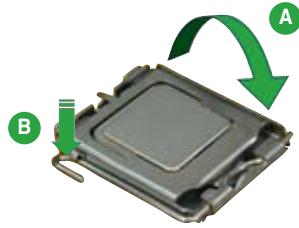
The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

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

1.6.2   Installling the CPU heatsink and fan

The Intel® Core™2 Duo/Pentium® D/Pentium® 4 and Celeron® D processors require a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

> •   Install the motherboard to the chassis before you install the CPU fan and heatsink assembly
>
> •   When you buy a boxed Intel® Core™2 Duo/Pentium® D/Pentium® 4 or Celeron® D LGA775 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 I Intel® Core™2 Duo/Pentium® D/Pentium® 4 or Celeron® D LGA775 heatsink and fan assembly comes in a push-pin design and requires no tool to install.

> If you purchased a separate CPU heatsink and fan assembly, make sure that a 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.

Fastener

Motherboard hole
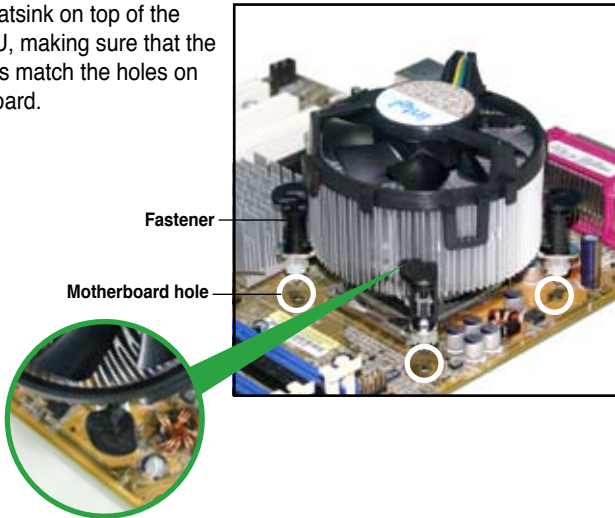
> Make sure each fastener is oriented as shown, with the narrow groove directed outward.

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.
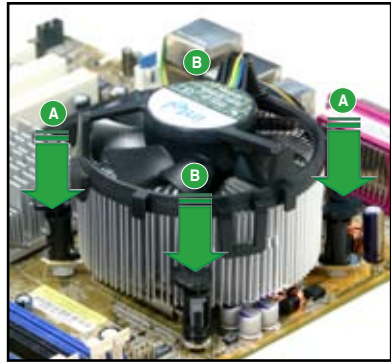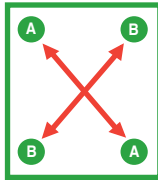
3. When the fan and heatsink assembly is in place, connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN.

CPU_FAN

CPU FAN PWM
CPU FAN IN
+12V
GND
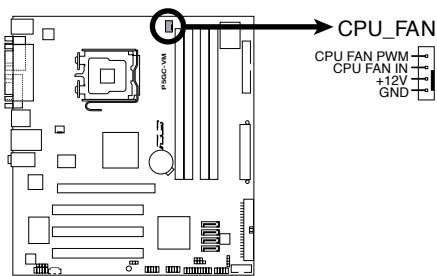
P5GC-VM CPU Fan Connector

• Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

• We recommend you to install the chassis fan for better thermal state.

1.6.3   Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

1.   Disconnect the CPU fan cable from the connector on the motherboard.

2.   Rotate each fastener counterclockwise.

3.   Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.
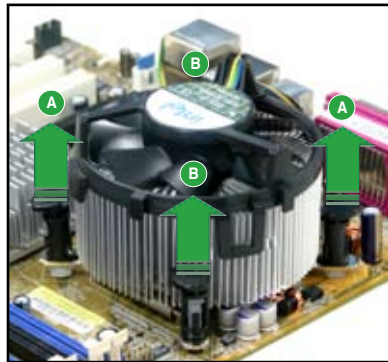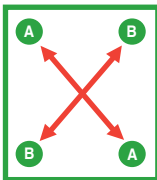
4.   Remove the heatsink and fan assembly from the motherboard.

5.   Rotate each fastener clockwise to reset the orientation.
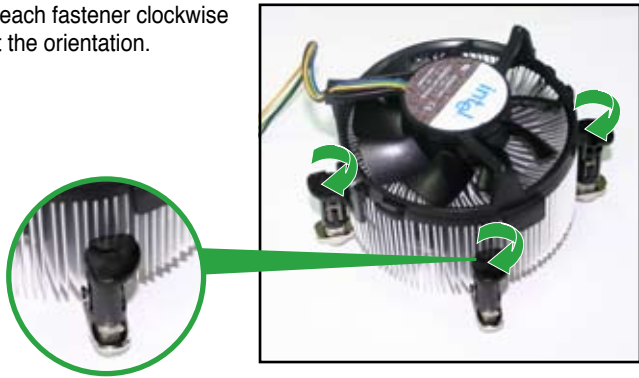
Narrow end of the groove

The narrow end of the groove should point outward after resetting. (The photo shows the groove shaded for emphasis.)

1.7   System memory

1.7.1   Overview

The motherboard comes with two Double Data Rate 2 (DDR2) Dual Inline Memory Modules (DIMM) sockets.

A DDR2 module has the same physical dimensions as a DDR DIMM but has a 240-pin footprint compared to the 184-pin DDR DIMM. DDR2 DIMMs are notched differently to prevent installation on a DDR DIMM socket.

The figure illustrates the location of the DDR2 DIMM sockets:
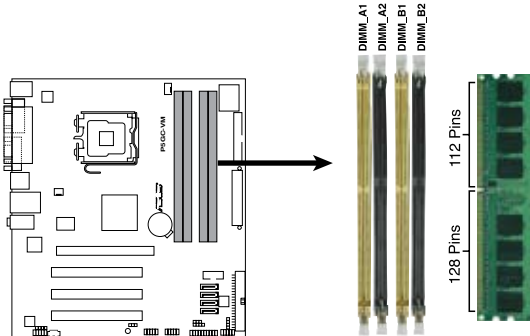
P5GC-VM 240-pin DDR2 DIMM Sockets

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

1.7.2   Memory configurations

You may install 256 MB, 512 MB, 1 GB and 2 GB unbuffered non-ECC DDR2 DIMMs into the DIMM sockets.

- • For dual-channel configuration, the total size of memory module(s) installed per channel must be the same (DIMM_A1 = DIMM_B1).

- • When installing two or three DDR2 DIMM modules for single-channel configuration, this motherboard only supports single-sided memory modules.

- • When installing four DDR2 DIMM modules, install the single-sided memory modules.

- • When installing four single-sided DDR2 DIMM modules, the transfer rate reduces to 533 MHz.

- • Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor. Refer to the DDR2 Qualified Vendors List on next page for details.

1.7.3 DDR2 Qualified Vendors List

The following table lists the memory modules that have been tested and qualified for use with this motherboard. Visit the ASUS website (www.asus.com) for the latest DDR2 DIMM modules for this motherboard.

DDR2 533 Qualified Vendors List

Size	Vendor	Model	Brand	Side(s)	Component	DIMM support A	B	C
256MB	Kingston	KVR533D2N4/256	Elpida	SS	E5116AB-5C-E	•	•	•
256MB	Kingston	KVR533D2N4/256	Elpida	SS	E5116AF-5C-E	•	•	•
512MB	Kingston	KVR533D2N4/512	Infineon	SS	HYB18T512800AF3733336550	•	•	•
1G	Kingston	KVR533D2N4/1G	Kingston	DS	D6408TE7BL-37	•	•	
1G	Kingston	KVR533D2N4/1G	Kingston	DS	D6408TLRAGL37U	•	•	
256MB	Samsung	M378T3253FG0-CD5	Samsung	SS	K4T56083QF-GCD5	•	•	•
512MB	Samsung	M378T6553BG0-CD5	Samsung	SS	K4T51083QB-GCD5	•	•	•
512MB	Qimonda	HYS64T64000GU-3.7-A	Qimonda	SS	HYB18T512800AC37SSS11511	•	•	
512MB	Qimonda	HYS64T64000HU-3.7-A	Qimonda	SS	HYB18T512800AF37FSS29334	•	•	
256MB	HY	HYMP532U64CP6-C4 AB	Hynix	SS	HY5PS121621CFP-C4	•	•	•
1G	HY	HYMP512U64CP8-C4 AB	Hynix	DS	HY5PS12821CFP-C4	•	•	
512MB	Micron	MT 16HTF6464AG-53EB2	Micron	DS	D9BOM	•	•	
512MB	Corsair	VS512MB533D2	Corsair	DS	MI110052532M8CEC	•	•	
1G	Corsair	VS1GB533D2	Corsair	DS	64M8CFEGQIB0900718	•	•	
512MB	Elpida	EBE51UD8ABFA-5C-E	Elpida	SS	E5108AB-5C-E	•	•	•
512MB	Kingmax	KLBC28F-A8KB4	Kingmax	SS	KKEA88B4IAK-37	•	•	•
256MB	Kingmax	KLBB68F-36EP4	Elpida	SS	E5116AB-5C-E	•	•	•
512MB	Kingmax	KLBC28F-A8EB4	Elpida	SS	E5108AE-5C-E	•	•	•
512MB	ADATA	M2OAD2G3H3166I1B52	ADATA	SS	AD29608A8A-37DG20719	•	•	
256MB	AENEON	AET560UD00-370A98Z	AENEON	SS	AET94F370AWVV34635G0520	•	•	
512MB	AENEON	AET660UD00-370A98Z	AENEON	SS	AET93F370A 3VV36328G 0522	•	•	
512MB	AENEON	AET660UD00-370B97X	AENEON	SS	AET93R370B 0640	•	•	•
1G	AENEON	AET760UD00-370A98S	AENEON	DS	AET92F370A 0606	•	•	
1G	AENEON	AET760UD00-370B97X	AENEON	DS	AET93R370B 0640	•	•	
1G	AENEON	AET760UD00-370B97S	AENEON	DS	AET92R370B 0644	•	•	
2G	AENEON	AET860UD00-370A08X	AENEON	DS	AET03F370AFVV26176G 0542	•	•	
512MB	REMAXEL	RML1040EG38D6F-533	Elpida	SS	E5108AG-5C-E	•	•	•
256MB	TAKEMS	TMS25B264B161-534KQ	takeMS	SS	MS18T51216-3.70711	•	•	•
512MB	TAKEMS	TMS51B264C081-534QI	takeMS	SS	MS18T51280-3.7	•	•	•
512MB	TAKEMS	TMS51B264C081-534AP	takeMS	SS	MS18T51280-3.7P0704D	•	•	•
512MB	TAKEMS	TMS51B264C081-534AE	takeMS	SS	MS18T51280-3.7EA07100	•	•	•
1G	TAKEMS	TMS1GB264C081-534AE	takeMS	DS	MS18T51280-3.7EA0651D	•	•	
1G	TAKEMS	TMS1GB264C081-534QI	takeMS	DS	MS18T51280-3.7	•	•	
1G	TAKEMS	TMS1GB264C081-534AP	takeMS	DS	MS18T51280-3.7P0645D	•	•	
512MB	VERITECH	GTP512HLTM46DG	VERITECH	SS	VTD264M8PC6G01A164129621	•	•	•
1G	VERITECH	GTP01GHLTM56DG	VERITECH	DS	VTD264M8PC6G01A164129621	•	•	

DDR2 667 Qualified Vendors List

Size	Vendor	Model	Brand	Side(s)	Component	A	B	C
256MB	Kingston	KVR667D2N5/256	Infineon	SS	HYB18T256800AF3SW65 33154	•	•	•
512MB	Kingston	KVR667D2N5/512	Kingston	SS	D6408TE8WL-27	•	•	•
1G	Kingston	KVR667D2N5/1G	Kingston	DS	D6408TEBGGL3U	•	•	
1G	Kingston	KVR667D2N5/1G	Elpida	DS	E5108AGBG-6E-E	•	•	
512MB	Samsung	KR M378T6553CZ0-CE6	Samsung	SS	K4T51083QC	•	•	
512MB	Samsung	KR M378T6453FZ0-CE6	Samsung	DS	K4T56083QF-ZCE6	•	•	
512MB	Samsung	M378T6553CZ3-CE6	Samsung	SS	K4T51083QC-ZCE6	•	•	•
1G	Samsung	M378T2953CZ3-CE6	Samsung	DS	K4T51083QC-ZCE6	•	•	
1G	Samsung	KR M378T2953CZ0-CE6	Samsung	DS	K4T51083QC-ZCE6	•	•	
256MB	Qimonda	HYS64T32000HU-3S-A	Qimonda	SS	HYB18T512160AF-3SSSS17310	•	•	•
512MB	Qimonda	HYS64T32000HU-3S-A	Qimonda	SS	HYB18T5128000AF-3SSSS27416	•	•	•
512MB	Qimonda	HYS64T64000HU-3S-A	Qimonda	SS	HYB18T512800AF3SFSS05346	•	•	•
1G	Qimonda	HYS64T128020HU-3S-A	Qimonda	DS	HYB18T512800AF3SSSS28104	•	•	•
512MB	Corsair	VS512MB667D2	Corsair	SS	64M8CFEGPS0900647	•	•	•
1G	Corsair	VS1GB667D2	Corsair	DS	MID095D62864M8CEC	•	•	
1G	Corsair	XMS2-5400	Corsair	DS	Heat-Sink Package	•	•	
256MB	HY	HYMP532U64CP6-Y5 AB	Hynix	SS	HY5PS121621CFP-Y5	•	•	
512MB	HY	HYMP564U64AP8-Y4 AA	Hynix	SS	HY5PS12821AFP-Y4	•	•	
512MB	HY	HYMP564U64AP8-Y5 AA	Hynix	SS	HY5PS12821AFP-Y5	•	•	
1G	HY	HYMP512U64AP8-Y5 AB	Hynix	DS	HY5PS12821AFP-Y5	•	•	
1G	HY	HYMP512U64CP8-Y5 AB	Hynix	DS	HY5PS12521CFP-Y5	•	•	•
512MB	Kingmax	KLCC28F-A8KB5	Kingmax	SS	KKEA88B4LAUG-29DX	•	•	•
1G	Kingmax	KLCD48F-A8KB5	Kingmax	DS	KKEA88B4LAUG-29DX	•	•	•
1G	Apacer	AU01GE667C5KBGC	Apacer	DS	AM4B5708GQJS7E0636B	•	•	
1G	Apacer	78.01092.420	Elpida	DS	E5108AE-6E-E	•	•	
1G	Apacer	AU01GE667C5KBGC	Apacer	DS	AM4B5708MIJS7E0627B	•	•	
512MB	ADATA	M20EL5G3H3160B1C0Z	Elpida	SS	E5108AE-6E-E	•	•	
512MB	ADATA	M20AD5G3H3166I1C52	ADATA	SS	AD29608A8A-3EG20648	•	•	
512MB	ADATA	M20AD5G3H3166I1C52	ADATA	SS	AD29608A8A-3EG20718	•	•	
2G	ADATA	M2OAD5H3J4170I1C53	ADATA	DS	AD20908A8A-3EG 30724	•	•	
512MB	VDATA	M2GVD5G3H31A4I1C52	VDATA	SS	VD29608A8A-3EC20615	•	•	
512MB	VDATA	M2GVD5G3H166I1C52	VDATA	SS	VD29608A8A-3EG20637	•	•	
1G	VDATA	M2GVD5G3I41P6I1C52	VDATA	DS	VD29608A8A-3EG20627	•	•	
1G	VDATA	M2GVD5G3I41C4I1C52	VDATA	DS	VD29608A8A-3EC20620	•	•	
1G	VDATA	M2GVD5G3I4176I1C52	VDATA	DS	VD29608A8A-3EG20641	•	•	
512MB	PSC	AL6E8E63B-6E1K	PSC	SS	A3R12E3GEF637BLC5N	•	•	•
512MB	PSC	AL6E8E63J-6E1	PSC	SS	A3R12E3JFF717B9A00	•	•	•
1G	PSC	AL7E8E63B-6E1K	PSC	DS	A3R12E3GEF637BLC5N	•	•	
1G	PSC	AL7E8E63J-6E1	PSC	DS	A3R12E3JFF717B9A01	•	•	
256MB	Nanya	NT256T64UH4A1FY-3C	Nanya	SS	NT5TU32M16AG-3C	•	•	
512MB	Nanya	NT512T64U88A1BY-3C	Nanya	SS	NT5TU64M8AE-3C	•	•	
512MB	MDT	MDT 512MB	MDT	SS	18D51280D-30648	•	•	
1G	MDT	MDT 1024MB	MDT	DS	18D51200D-30646	•	•	
1G	MDT	MDT 1024MB	MDT	DS	18D51280D-30646E	•	•	
512MB	Twinmos	8D-A3JK5MPETP	PSC	SS	A3R12E3GEF633ACAOY	•	•	•
1G	Twinmos	8D-B3KK5MPFTP	PSC	DS	A3R12E3GEF633ACAOY	•	•	

The table has a header group "DIMM support" spanning columns A, B, C.

DDR2 667 Qualified Vendors List

Size	Vendor	Model	Brand	Side(s)	Component	A	B	C
512MB	AENEON	AET660UD00-30DA98Z	AENEON	SS	AET93F30DA 0552	•	•	•
512MB	AENEON	AET660UD00-30DB97X	AENEON	SS	AET93R300B 0634	•	•	•
1G	AENEON	AET760UD00-30DA98Z	AENEON	DS	AET93F30DA8EE47414G 0540	•	•	
512MB	AENEON	AET660UD00-30DA98Z	AENEON	SS	AET93F300A 0606	•	•	•
1G	AENEON	AET760UD00-30DA98Z	AENEON	DS	AET93F30DA 0604	•	•	
1G	AENEON	AET760UD00-30DB97X	AENEON	DS	AET93R300B 0639	•	•	
512MB	TAKEMS	TMS51B264C081-665QI	takeMS	SS	MS18T51280-3	•	•	•
512MB	TAKEMS	TMS51B264C081-665AP	takeMS	SS	MS18T51280-3S0627D	•	•	•
1G	TAKEMS	TMS1GB264C081-665QI	takeMS	DS	MS18T51280-3	•	•	
1G	TAKEMS	TMS1GB264C081-665AE	takeMS	DS	MS18T51280-3SEA07100	•	•	
1G	TAKEMS	TMS1GB264C081-665AP	takeMS	DS	MS18T51280-3SP0717A	•	•	
512MB	VERITECH	GTP512HLTM45EG	VERITECH	SS	VTD264M8PC6G01A164129621	•	•	•
1G	VERITECH	GTP01GHLTM55EG	VERITECH	DS	VTD264M8PC6G01A164129621	•	•	
512MB	GEIL	GX21GB5300DC	GEIL	SS	Heat-Sink Package	•	•	•
512MB	Century	CENTURY 512MB	Nanya	SS	NT5TU64M8AE-3C	•	•	•
512MB	Century	CENTURY 512MB	Hynix	SS	HY5PS12821AFP-Y5	•	•	•
1G	Century	CENTURY 1G	Hynix	DS	HY5PS12821AFP-Y5	•	•	
1G	Century	CENTURY 1G	Nanya	DS	NT5TU64M8AE-3C	•	•	
512MB	KINGBOX	512MB 667MHz	KINGBOX	SS	EPD264082200-4	•	•	•
1G	KINGBOX	DDRII 1G 667MHz	KINGBOX	DS	EPD264082200-4	•	•	•
1G	KINGBOX	DDRII 1G 667MHz	KINGBOX	DS	EPD264082200E-4	•	•	

Side(s): SS - Single Sided   **DS** - Double Sided

DIMM Support:

A - Supports one module inserted into either slot, in a 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 (www.asus.com) for the latest memory Qualified Vendor List (QVL).

1.7.4   Installing a DIMM

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

To install a DIMM:

1. Unlock a 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.

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

DDR2 DIMM notch

2
3
1
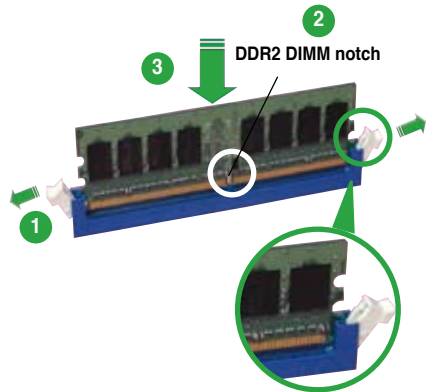
Unlocked retaining clip

✎ • 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.

• The DDR2 DIMM sockets do not support DDR DIMMs. DO not install DDR DIMMs to the DDR2 DIMM sockets.

1.7.5   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
1
1
1
DDR2 DIMM notch
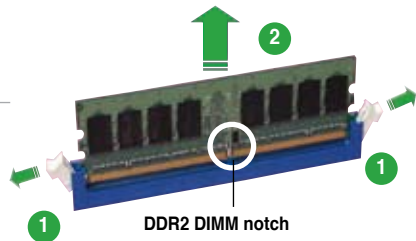
2. Remove the DIMM from the socket.

1.8   Expansion slots

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

⚠ 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.

1.8.1   Installing an expansion card

To install an expansion card:

1.   Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.

2.   Remove the system unit cover (if your motherboard is already installed in a chassis).

3.   Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.

4.   Align the card connector with the slot and press firmly until the card is completely seated on the slot.

5.   Secure the card to the chassis with the screw you removed earlier.

6.   Replace the system cover.

1.8.2   Configuring an expansion card

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

1.   Turn on the system and change the necessary BIOS settings, if any. See Chapter 2 for information on BIOS setup.

2.   Assign an IRQ to the card. Refer to the tables on the next page.

3.   Install the software drivers for the expansion card.

1.8.3   Interrupt assignments

Standard interrupt assignments

IRQ	Standard Function
0	System Timer
1	Keyboard Controller
2	Re-direct to IRQ#9
4	Communications Port (COM1)*
5	IRQ holder for PCI steering*
6	Floppy Disk Controller
7	Printer Port (LPT1)*
8	System CMOS/Real Time Clock
9	IRQ holder for PCI steering*
10	IRQ holder for PCI steering*
11	IRQ holder for PCI steering*
12	PS/2 Compatible Mouse Port*
13	Numeric Data Processor
14	Primary IDE Channel

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

IRQ assignments for this motherboard

	A	B	C	D	E	F	G	H
PCI slot 1	shared	—	—	—	—	—	—	—
PCI slot 2	—	—	—	—	shared	—	—	—
PCI slot 3	—	—	—	—	—	shared	—	—
PCI Express x16 slot	shared	—	—	—	—	—	—	—
Onboard USB controller 1	—	—	—	—	shared	—	—	—
Onboard USB controller 2	—	shared	—	—	—	—	—	—
Onboard USB controller 3	—	—	shared	—	—	—	—	—
Onboard USB controller 4	—	—	—	shared	—	—	—	—
Onboard USB 2.0 controller	—	—	—	—	shared	—	—	—
Onboard HD audio	—	—	—	shared	—	—	—	—
Onboard LAN	—	shared	—	—	—	—	—	—
Onboard VGA	shared	—	—	—	—	—	—	—

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

1.8.4   PCI slots

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

If you install a PCI graphics
card, we recommend that
you remove the onboard
graphics card driver.
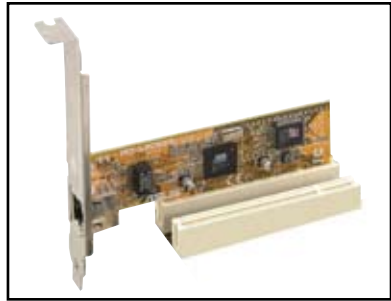
1.8.5   PCI Express x16 Slot

This motherboard supports one PCI
Express x16 graphics card. The figure
shows a graphics card installed on the
PCI Express x16 slot.

1.9   Jumpers

1.   Clear RTC RAM (CLRTC)

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

To erase the RTC RAM:

1.   Turn OFF the computer and unplug the power cord.

2.   Remove the onboard battery.

3.   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.

4.   Re-install the battery.

5.   Plug the power cord and turn ON the computer.

6.   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!

P5GC-VM Clear RTC RAM

CLRTC

1 2   2 3

Normal   Clear RTC
(Default)
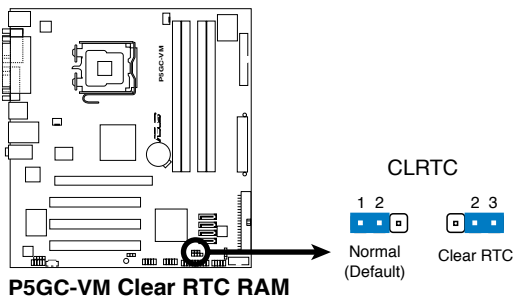
2. USB device wake-up (3-pin PS2_USBPW)

Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set to +5VSB to wake up from S3 and S4 sleep modes (no power to CPU, DRAM in slow refresh, power supply in reduced power mode).
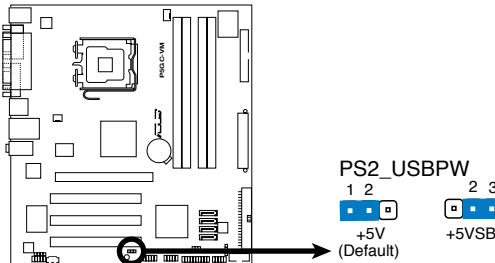
P5GC-VM USB Device Wake Up

- The USB device wake-up feature requires a power supply that can provide 500mA on the +5VSB lead for each USB port; otherwise, the system would not power up.

- The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

1.10 Connectors

1.10.1 Rear panel connectors
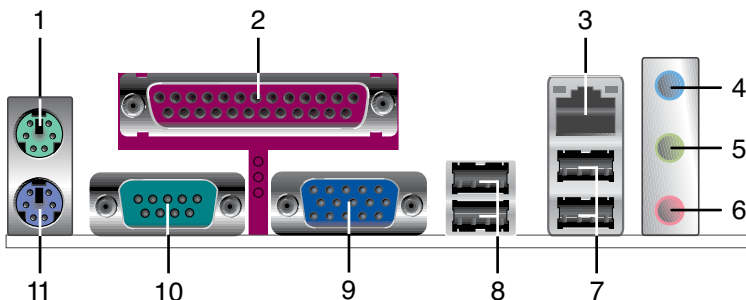
1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.

2. **Parallel port.** This 25-pin port connects a parallel printer, a scanner, or other devices.

3. **LAN (RJ-45) port.** Supported by Marvell Gigabit LAN controller, this port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

LAN port LED indications

ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
ORANGE	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

ACT/LINK   SPEED
  LED   LED

LAN port
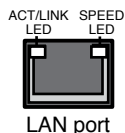
4. **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.

5. **Line Out port (lime green).** This port connects a headphone or a speaker. In 4-channel, and 6-channel configuration, the function of this port becomes Front Speaker Out.

6. **Microphone port (pink).** This port connects a microphone.

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

Audio 2, 4, or 6-channel configuration

Port	Headset 2-channel	4-channel	6-channel
Light Blue	Line In	Rear Speaker Out	Rear Speaker Out
Lime Green	Line Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Bass/Center

7. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

8. **USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

9. **VGA port.** This port is for a VGA monitor or other VGA-compatible devices.

10. **Serial port.** This 9-pin COM1 port is for pointing devices or other serial devices.

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

1.10.2   Internal connectors

1. **Floppy disk drive connector (34-1 pin FLOPPY)**

    This connector is for the provided floppy disk drive (FDD) signal cable. Insert one end of the cable to this connector, then connect the other end to the signal connector at the back of the floppy disk drive.

    Pin 5 on the connector is removed to prevent incorrect cable connection when using an FDD cable with a covered Pin 5.

FLOPPY

PIN 1

NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.

P5GC-VM Floppy Disk Drive Connector
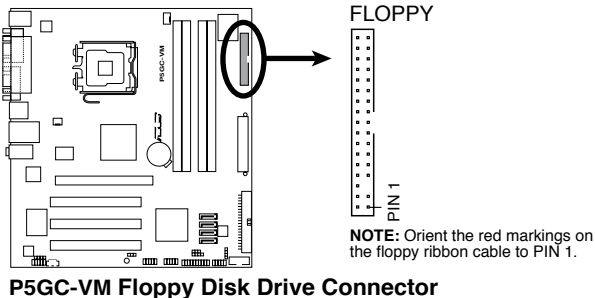
2. IDE connector (40-1 pin PRI_IDE)

The onboard IDE connector is for Ultra DMA 100/66/33 signal cable. There are three connectors on each Ultra DMA 100/66/33 signal cable: blue, black, and gray. Connect the blue connector to the motherboard's IDE connector, then select one of the following modes to configure your device(s).

P5GC-VM IDE Connector

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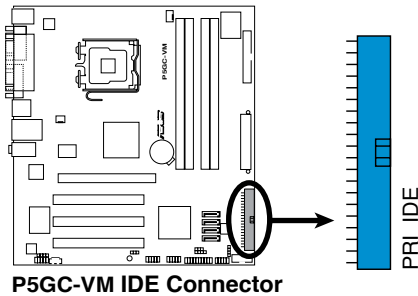
	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
	Slave	Slave	

• Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.

• Use the 80-conductor IDE cable for Ultra DMA 100/66/33 IDE devices.

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

3. **Serial ATA connectors (7-pin SATA1 [red], SATA2 [red], SATA3 [black], SATA4 [black])**

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives.
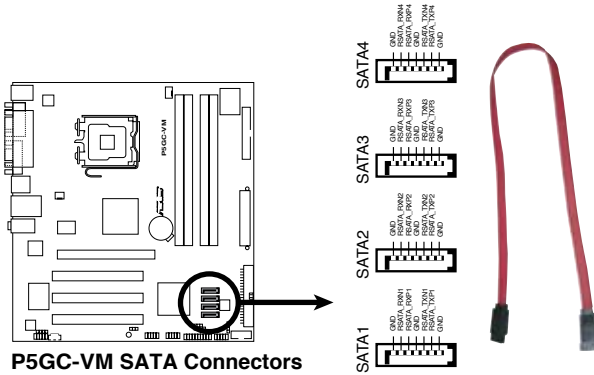
P5GC-VM SATA Connectors

When using the connectors in Standard IDE mode, connect the primary (boot) hard disk drive to the SATA1/2 connector. Refer to the table below for the recommended SATA hard disk drive connections.

Serial ATA hard disk drive connection

Connector	Color	Setting	Use
SATA1/2	Red	Master	Boot disk
SATA3/4	Black	Slave	Data Disk

4. **Speaker connector (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.

SPEAKER

- Speaker Out
- GND
- GND
- +5V
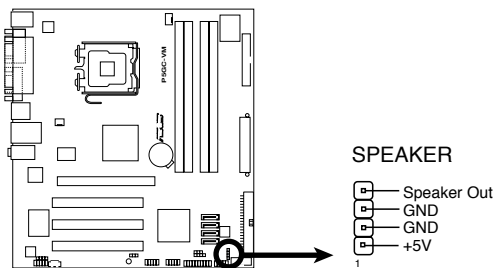
P5GC-VM Speaker Out Connector

5. CPU and Chassis fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN)

The fan connectors support cooling fans of a total of 1A~2.2A (26.4W 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.

CPU_FAN

CPU FAN PWM
CPU FAN IN
CPU FAN PWR
GND

CHA_FAN

GND
+12V
Rotation
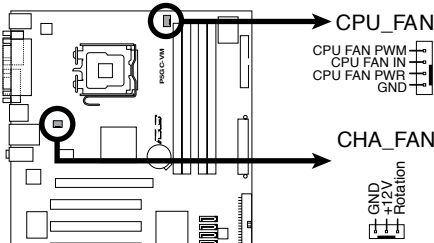
P5GC-VM Fan Connectors

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

This connector is for the S/PDIF audio module to allow digital sound output. Connect one end of the S/PDIF audio cable to this connector and the other end to the S/PDIF module.

+5V
SPDIFOUT
GND
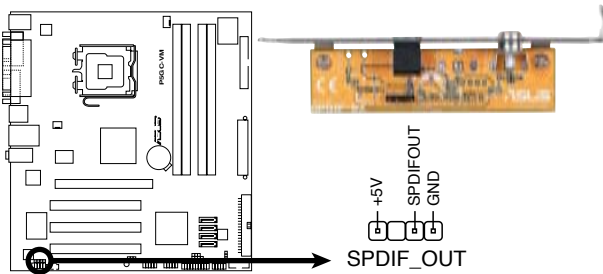
SPDIF_OUT

P5GC-VM Digital Audio Connector

> The S/PDIF out module is purchased separately.

7.   ATX power connectors (24-pin EATXPWR and 4-pin ATX12V)

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

- Do not forget to connect the 4-pin ATX +12 V 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.

- Make sure that your power supply unit (PSU) can provide at least the minimum power required by your system.

- If you intent to use a PSU with 20-pin and 4-pin power plugs, make sure that the 20-pin power plug can provide at least 15A on +12V and that the PSU has a minimum power rating of 350 W. The system may become unstable or may not boot up if the power is inadequate.

- The ATX 12 V Specification 2.0-compliant PSU passed the motherboard power requirement test with the following configuration:

CPU	:	Intel® Pentium® 4 3.6 GHz
Memory	:	512 MB DDR (x 4)
Graphics card	:	PCI Express x16 Nvidia EN5900
Parallel ATA devices	:	IDE hard disk drive (x 2)
Serial ATA device	:	SATA hard disk drive
Optical drive	:	CD-ROM (x2)
SCSI devices	:	SCSI card and SCSI hard disk drive

- You must install a PSU with a higher power rating if you intend to install additional devices.

ATX12V   EATXPWR

+12V DC — +12V DC
GND — GND

+3 Volts	Ground
+12 Volts	+5 Volts
+12 Volts	+5 Volts
+5V Standby	+5 Volts
Power OK	NC
Ground	Ground
+5 Volts	Ground
Ground	Ground
+5 Volts	PSON#
Ground	Ground
+3 Volts	-12 Volts
+3 Volts	+3 Volts

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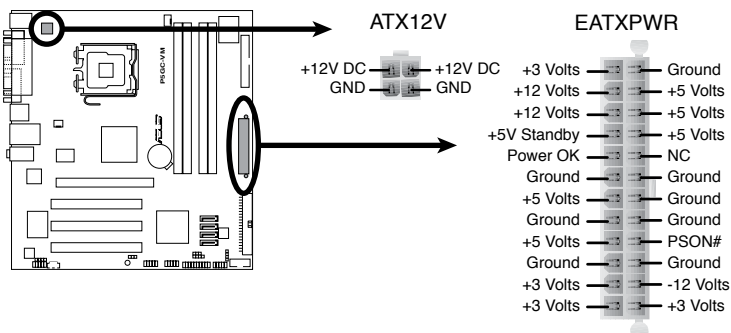
8. Optical drive audio connector (4-pin CD)

This connector allows you to receive stereo audio input from sound sources such as a CD-ROM, TV tuner, or MPEG card.

Right Audio Channel
Ground
Ground
Left Audio Channel

(black)
CD

P5GC-VM Internal Audio Connector
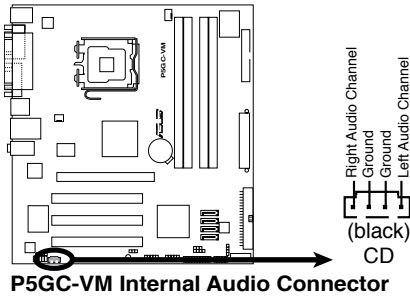
Enable the CD-IN function in the audio utility when using this connector.

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

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

USB56

USB+5V
USB_P6-
USB_P6+
GND
NC

USB_-5V
USB_P5-
USB_P5+
GND

USB78

USB+5V
USB_P8-
USB_P8+
GND
NC

USB+5V
USB_P7-
USB_P7+
GND

P5GC-VM USB 2.0 Connectors
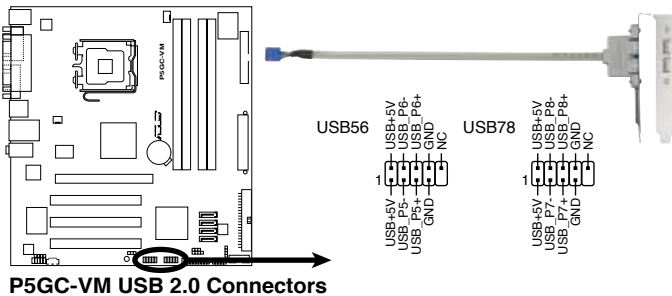
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

The USB module is purchased separately.

10. **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.

Azalia-compliant pin definition

AAFP

AGND
PRESENSE#
MIC2_JD
HP_HD

MIC2_L
MIC2_R
HP_R
Jack_Sense
HP_L

Legacy AC'97-compliant pin definition

AGND
NC
NC
NC

MIC2_L
MIC2_R
Line out_R
NC
Line out_L

P5GC-VM Front Panel Audio Connector
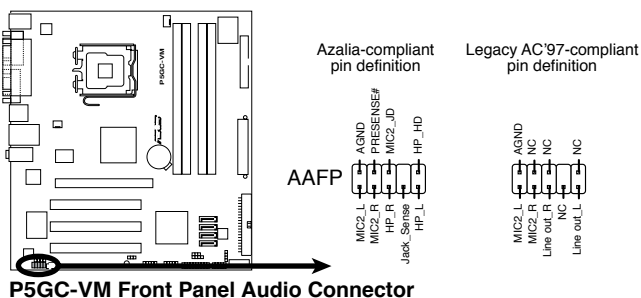
• We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

• By default, this connector is set to AC97 Audio. If you want to connect a High Definition front panel audio module to this connector, set the **Front Panel Support Type** item in the BIOS to [HD Audio]. See section "2.4.4 Onboard Devices Configuration" for details.

11. **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 pins 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.

CHASSIS

+5VSB_MB
Chassis Signal
GND

(Default)

P5GC-VM Intrusion Connector
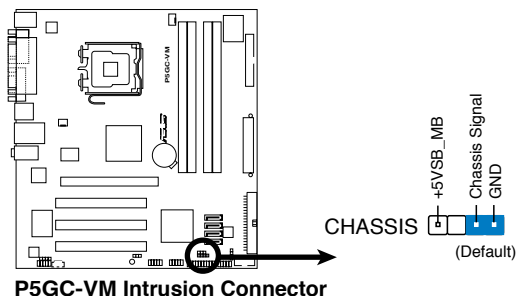
12. Serial port connector (10-1 pin COM2)

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

P5GC-VM COM Port Connector
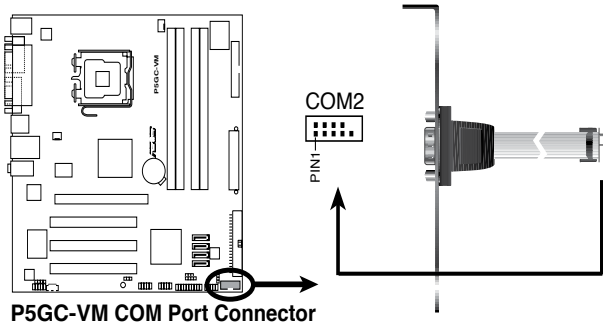
13. TPM connector (20-1 pin TPM) [Optional]

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.

P5GC-VM TPM Connector
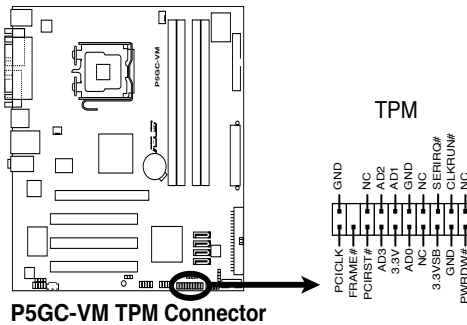
- This motherboard only supports Sinosun TPM.

- The COM model and the TPM model are purchased separately!

14. System panel connector (20-8 pin F_PANEL)

This connector supports several chassis-mounted functions.

P5GC-VM System Panel Connector
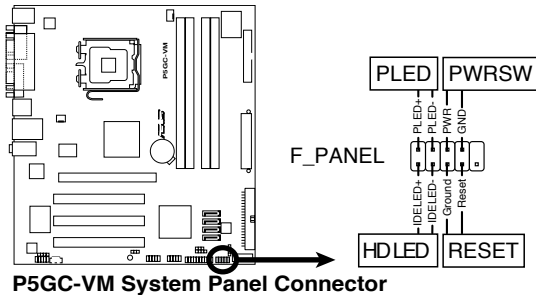
- **System power LED (2-pin PWRLED)**

  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 HDLED)**

  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.

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

  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.

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

BIOS setup

2

2.1 Managing and updating your BIOS

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

1. **ASUS EZ Flash** (Updates the BIOS in DOS using a floppy disk or the motherboard support CD.)

2. **ASUS AFUDOS** (Updates the BIOS in DOS mode using a bootable floppy disk.)

3. **ASUS CrashFree BIOS 2** (Updates the BIOS using a bootable floppy, or the motherboard support CD when the BIOS file fails or gets corrupted.)

4. **ASUS Update** (Updates the BIOS in Windows® environment.)

Refer to the corresponding sections for details on these utilities.

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

2.1.1 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® 2000 environment

    To create a set of boot disks for Windows® 2000:

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

    b. Insert the Windows® 2000 CD to the optical drive.

    c. Click **Start,** then select **Run.**

    d. From the Open field, type

        D:\bootdisk\makeboot a:

        assuming that D: is your optical drive.

    e. Press <Enter>, then follow screen instructions to continue.

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

b. Click ![Windows icon] 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.

2.1.2 ASUS EZ Flash utility

The ASUS EZ Flash 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 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:

1. Visit the ASUS website (www.asus.com) to download the latest BIOS file for the motherboard and rename the same to P5GCVM.ROM.

2. Save the BIOS file to a floppy disk, then restart the system.

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

```
EZFlash starting BIOS update
Checking for floppy...
```

4. Insert the floppy disk that contains the BIOS file to the floppy disk drive. When the correct BIOS file is found, EZ Flash performs the BIOS update process and automatically reboots the system when done.

```
EZFlash starting BIOS update
Checking for floppy...
Floppy found!
Reading file "P5GCVM.rom". Completed.
Start erasing.......|
Start programming...|
Flashed successfully. Rebooting.
```

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

• A "Floppy not found!" error message appears if there is no floppy disk in the drive. A "P5GCVM.ROM not found!" error message appears if the correct BIOS file is not found in the floppy disk. Make sure that you rename the BIOS file to P5GCVM.ROM.

2.1.3　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.

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 CD 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.

   ```
   A:\>afudos /oOLDBIOS1.rom
   ```
   Main filename   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 CD 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 /iP5GCVM.ROM
    ```

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

    ```
    A:\>afudos /iP5GCVM.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
    ```

    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 /iP5GCVM.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:\>
    ```

2.1.4 ASUS CrashFree BIOS 2 utility

The ASUS CrashFree BIOS 2 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 CD, or the floppy disk that contains the updated BIOS file.

- Prepare the motherboard support CD, or the floppy disk containing the updated motherboard BIOS before using this utility.

- Make sure that you rename the original or updated BIOS file in the floppy disk to **P5GCVM.ROM**.

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

1. Turn on the system.
2. Insert the floppy disk with the original or updated BIOS file to the floppy disk drive.
3. The utility displays the following message and automatically checks the floppy disk for the original or updated BIOS file.

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

If your display monitor is connected to the onboard VGA connector, the display monitor will turn-off and the system will beep once while the CrashFree BIOS 2 starts updating your system. The system will beep once again while the process is finished, and the display will return after the system restarts.

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 "P5GCVM.ROM". Completed.
Start flashing...
```

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

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

Recovering the BIOS from the support CD

To recover the BIOS from the support CD:

1. Remove any floppy disk from the floppy disk drive, then turn on the system.
2. Insert the support CD to the optical drive.
3. The utility displays the following message and automatically checks the floppy disk for the original or updated BIOS file.

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

When no floppy disk is found, the utility automatically checks the optical drive for the original or updated BIOS file. The utility then updates the corrupted BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
Floppy not found!
Checking for CD-ROM...
CD-ROM found!
Reading file "P5GCVM.ROM". Completed.
Start flashing...
--
```

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

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

The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website (www.asus.com) to download the latest BIOS file.

2.1.5   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 CD 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 CD in the optical drive. The **Drivers** menu appears.
2.   Click the Utilities tab, then click **I**nstall ASUS Update.
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.
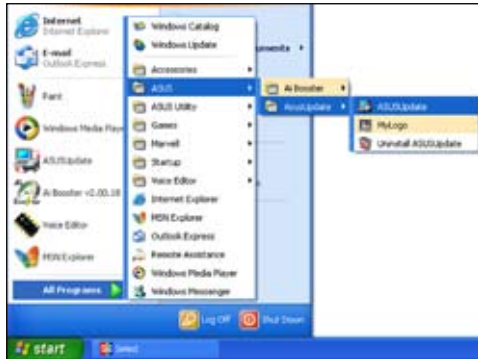
2.   Select Update BIOS from the Internet option from the drop-down menu, then click **Next**.

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.
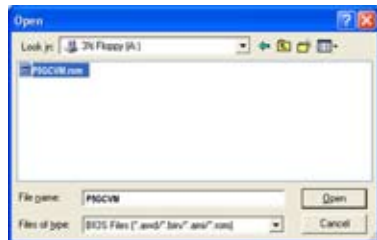
2.2   BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section "2.1 Managing and updating your BIOS."

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

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

The 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, reboot the system by doing any of the following procedures:

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

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

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

> - The default BIOS settings for this motherboard apply 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 Setup Defaults** item under the Exit Menu. See section "2.7 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.

2.2.1 BIOS menu screen

Menu items **Menu bar** **Configuration fields** **General help**

```
                          BIOS SETUP UTILITY
    Main   Advanced   Power   Boot   Exit

    System Time              [18:10:30]          Use [ENTER], [TAB]
    System Date              [Fri 01/11/2002]
    Legacy Diskette A        [1.44M, 3.5 in]     or [SHIFT-TAB] to

                                                 select a field.
    ▶  Primary IDE Master    :[Not Detected]
    ▶  Primary IDE Slave     :[Not Detected]
    ▶  Third IDE Master      :[ST380817AS]       Use [+] or [-] to
    ▶  Third IDE Slave       :[Not Detected]     configure system time.
    ▶  Fourth IDE Master     :[Not Detected]
    ▶  Fourth IDE Slave      :[Not Detected]
    ▶  IDE Configuration                         ←→    Select Screen
                                                 ↑↓    Select Item
                                                 +-    Change Option
    ▶  System Information                        F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit

              v00.00 (C)Copyright 1985-2002, American Megatrends, Inc.
```

Sub-menu items   **Navigation keys**

2.2.2 Menu bar

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

Main   For changing the basic system configuration

Advanced   For changing the advanced system settings

Power   For changing the advanced power management (APM) configuration

Boot   For changing the system boot configuration

Exit   For selecting the exit options and loading default settings

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

2.2.3 Navigation keys

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

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

2.2.4 Menu items

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

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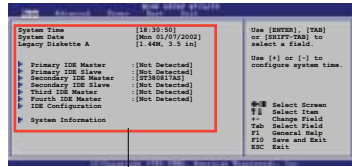
Main menu items

2.2.5 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>.

2.2.6 Configuration fields

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

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

2.2.7 Pop-up window

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

2.2.8 Scroll bar

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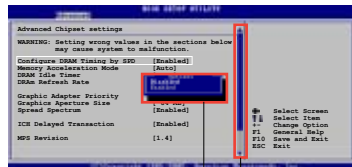
Pop-up window

Scroll bar

2.2.9 General help

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

2.3   Main menu

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

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

```
                          BIOS SETUP UTILITY
 Main    Advanced    Power    Boot    Exit

 System Time                    [18:45:17]        Use [ENTER], [TAB]
 System Date                    [Fri 01/11/2002]  or [SHIFT-TAB] to
 Legacy Diskette A              [1.44M, 3.5 in]   select a field.

 ▶  Primary IDE Master          :[Not Detected]
 ▶  Primary IDE Slave           :[Not Detected]   Use [+] or [-] to
 ▶  Third IDE Master            :[ST380817AS]     configure system time.
 ▶  Third IDE Slave             :[Not Detected]
 ▶  Fourth IDE Master           :[Not Detected]
 ▶  Fourth IDE Slave            :[Not Detected]   ←→   Select Screen
 ▶  IDE Configuration                             ↑↓   Select Item
                                                  +-   Change Option
                                                  F1   General Help
 ▶  System Information                            F10  Save and Exit
                                                  ESC  Exit

         v00.00 (C)Copyright 1985-2002, American Megatrends, Inc.
```

2.3.1   System Time [xx:xx:xx]

Allows you to set the system time.

2.3.2   System Date [Day xx/xx/xxxx]

Allows you to set the system date.

2.3.3   Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed. Configuration options: [Disabled] [360K, 5.25 in.] [1.2M , 5.25 in.] [720K , 3.5 in.] [1.44M, 3.5 in.] [2.88M, 3.5 in.]

2.3.4 Primary, Third and Fourth IDE Master/Slave

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.

```
                          BIOS SETUP UTILITY
  Main

   Primary IDE Master                              Secect the type
                                                   of device connected
   Device       : Hard Disk                        to the system.
   Vendor       : ST320413A
   Size         : 20.0GB
   LBA Mode     : Supported
   Block Mode   : 16 Sectors
   PIO Mode     : Supported
   Async DMA    : MultiWord DMA-2
   Ultra DMA    : Ultra DMA-5
   SMART Monitoring: Supported
   Type                         [Auto]
   LBA/Large Mode               [Auto]             ↔    Select Screen
   Block(Multi-Sector Transfer) M  [Auto]          ↑↓   Select Item
   PIO Mode                     [Auto]             +-   Change Option
   DMA Mode                     [Auto]             F1   General Help
   SMART Monitoring             [Auto]             F10  Save and Exit
   32Bit Data Transfer          [Disabled]         ESC  Exit

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```

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

Type [Auto]

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

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]

SMART Monitoring [Auto]

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

32Bit Data Transfer [Disabled]

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

2.3.5   IDE Configuration

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

```
                           BIOS SETUP UTILITY
   Main

    IDE Configuration                              Set [Compatible Mode]
                                                   when Legacy OS (i.e.
                                                   WIN ME, 98, NT4.0, MS
 Onboard IDE Operate Mode       [Enhanced Mode]    DO) is used.
    Enhanced Mode Support On    [S-ATA]
                                                   Set [Enhanced Mode]
 IDE Detect Time Out (Sec)      [35]               when Native OS (i.e.
                                                   WIN2000, WIN XP) is
                                                   used.
```
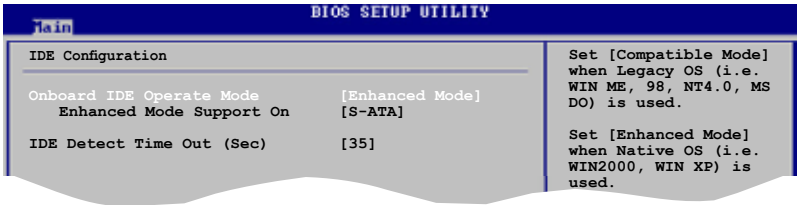
Onboard IDE Operate Mode [Enhanced Mode]

Disables or allows selection of the IDE operation mode depending on the operating
system (OS) that you installed. Set to Enhanced Mode if you are using native OS,
such as Windows® 2000/XP. Configuration options: [Disabled] [Compatible Mode]
[Enhanced Mode]

Enhanced Mode Support On [S-ATA]
The default setting S-ATA allows you to use native OS on Serial ATA and Parallel ATA ports. We recommend that you do not change the default setting for better OS compatibility. In this setting, you may use legacy OS on the Parallel ATA ports only if you did not install any Serial ATA device.

The P-ATA+S-ATA and P-ATA options are for advanced users only. If you set to any of these options and encounter problems, revert to the default setting S-ATA. Configuration options: [S-ATA+P-ATA] [S-ATA] [P-ATA]

IDE Detect Time Out [35]

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

2.3.6   System Information

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

```
                        BIOS SETUP UTILITY
  Main

  AMIBIOS
  Version    : 0107
  Build Date : 05/25/07

  Processor
  Type       : Genuine Intel(R) CPU 2.80GHz
  Speed      : 2800MHz
  Count      : 2

  System Memory                          ←→    Select Screen
  Total       : 512MB                     ↑↓    Select Item
  Appropriated : 8MB                      +-    Change Option
  Available   : 504MB                     F1    General Help
                                          F10   Save and Exit
                                          ESC   Exit
```

AMI BIOS

Displays the auto-detected BIOS information

Processor

Displays the auto-detected CPU specification

System Memory

Displays the auto-detected system memory

2.4   Advanced menu

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

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

2.4.1   USB Configuration

The items in this menu allows you to change the USB-related features. Select an item then press <Enter> to display the configuration options.
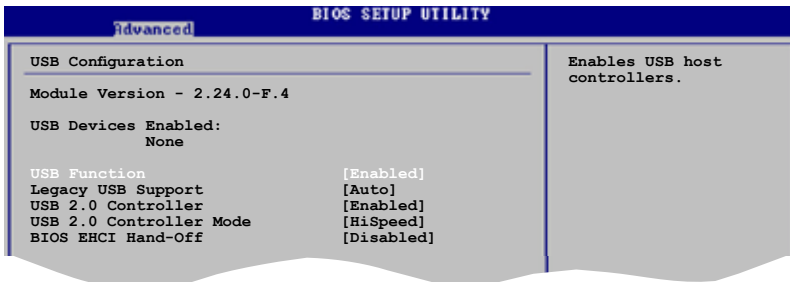
✎ The Module Version and USB Devices Enabled items show the auto-detected values. If no USB device is detected, the item shows None.

USB Function [Enabled]

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

Legacy USB Support [Auto]

Allows you to enable or disable support for USB devices on legacy operating systems (OS). 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 [Enabled]

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

USB 2.0 Controller Mode [HiSpeed]

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

BIOS EHCI Hand-Off [Disabled]

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

2.4.2   CPU Configuration

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


```
                           BIOS SETUP UTILITY
    Advanced

  Configure advanced CPU settings                        Sets the ratio between
                                                         CPU Core Clock and the
  Manufacturer: Intel                                    FSB Frequency.
  Brand String: Genuine Intel(R) CPU 2.80GHz             NOTE: If an invalid
  Frequency   : 2800MHz                                  ratio is set in CMOS
  FSB Speed   :  800MHz                                  then actual and
                                                         setpoint values may
  Cache L1    : 16 KB                                    differ.
  Cache L2    : 2048 KB
  Cache L3    : 0 KB

  Ratio Status: Unlocked (Max:14, Min:14)
  Ratio Actual Value : 14                          ←→    Select Screen
    Ratio CMOS Setting:          [ 14]             ↑↓    Select Item
    VID CMOS Setting:            [ 62]             +-    Change Option
  Microcode Updation             [Enabled]         F1    General Help
  Max CPUID Value Limit          [Disabled]        F10   Save and Exit
  Execute Disable Function       [Disabled]        ESC   Exit
  CPU Internal Thermal Control   [Auto]

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```

Ratio CMOS Setting [14]

Sets the ratio between the CPU Core Clock and the Front Side Bus frequency. The default value of this item is auto-detected by BIOS. Use the <+> or <-> keys to adjust the values.

VID CMOS Setting [62]

Allows you to set the VID CMOS setting at which the processor is to run. The BIOS auto-detects the default value of this item. Use the <+> or <-> keys to adjust the values.

Microcode Updation [Enabled]

Allows you to enable or disable the microcode updation.
Configuration options: [Disabled] [Enabled]

Max CPUID Value Limit [Disabled]

Enable this item to boot legacy operating systems that cannot support CPUs with extended CPUID functions. Configuration options: [Disabled] [Enabled]

Execute Disable Function [Disabled]

Enables or disables the Execute Disable function. This item appears only when you install a processor with the Execute Disable function.
Configuration options: [Disabled] [Enabled]

CPU Internal Thermal Control [Auto]

Disables or sets the CPU internal thermal control. Configuration options: [Auto] [Disabled]

2.4.3 Chipset

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

```
                          BIOS SETUP UTILITY
      Advanced

   Advanced Chipset Settings

   DRAM Frequency                  [Auto]
   Configure DRAM Timing by SPD    [Enabled]
   Hyper Path 3                    [Auto]
   DRAM Throttling Threshold       [Auto]

   Boot Graphic Adapter Priority   [PCI Express/Int-VG]
   Internal Graphics Mode Select   [Enabled, 8MB]

   Graphics memory type            [Auto]
    Boot Display Device            [Auto]        ←→   Select Screen
    TV Connector                   [Auto]        ↑↓   Select Item
    HDTV Output                    [Auto]        +-   Change Option
    TV Standard                    [VBIOS-Default] F1   General Help
                                                  F10  Save and Exit
   PEG Buffer Length               [Auto]        ESC  Exit
   Link Latency                    [Auto]

   PEG Root Control                [Auto]        +-   Change Option
   Slot Power                      [Auto]        F1   General Help
   High Priority Port Select       [Disabled]    F10  Save and Exit
                                                 ESC  Exit

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```

DRAM Frequency [Auto]

Allows you to set the DDR2 operating frequency. Configuration options: [Auto] [533 Mhz] [667 Mhz]

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

Configure DRAM Timing by SPD [Enabled]

When this item is enabled, the DRAM timing parameters are set according to the DRAM SPD (Serial Presence Detect). When disabled, you can manually set the DRAM timing parameters through the DRAM sub-items. The following sub-items appear when this item is Disabled. Configuration options: [Disabled] [Enabled]

DRAM CAS# Latency [5 Clocks]
Controls the latency between the SDRAM read command and the time the data actually becomes available. Configuration options: [6 Clocks] [5 Clocks] [4 Clocks] [3 Clocks]

DRAM RAS# Precharge [4 Clocks]
Controls the idle clocks after issuing a precharge command to the DDR SDRAM. Configuration options: [2 Clocks] [3 Clocks] [4 Clocks] [5 Clocks] [6 Clocks]

DRAM RAS# to CAS# Delay [4 Clocks]
Controls the latency between the DDR SDRAM active command and the read/write command. Configuration options: [2 Clocks] [3 Clocks] [4 Clocks] [5 Clocks] [6 Clocks]

DRAM RAS# Activate to Precharge [15 Clocks]
Sets the RAS Activate timing to Precharge timing.
Configuration options: [4 Clock] [5 Clocks] ~ [18 Clocks]

DRAM Write Recovery Time [4 Clocks]
Sets the DRAM Write Recover Time. Configuration options: [2 Clocks] [3 Clocks] [4 Clocks] [5 Clocks] [6 Clocks]

Hyper Path 3 [Auto]

Sets this item to enabled to reduce bottlenecks of memory bandwidth. Sets it to disabled for safe mode. Configuration options: [Disabled] [Enabled] [Auto]

DRAM Throttling Threshold [Auto]

Allows you to enable DRAM Thermal Throttling to make your system more stable. Configuration options: [Disabled] [Auto]

Boot Graphic Adapter Priority [PCI Express/Int-VGA]

Allows selection of the graphics controller to use as primary boot device. Configuration options: [Internal VGA] [PCI Express/Int-VGA] [PCI Express/PCI] [PCI/PCI Express] [PCI/Int-VGA]

Internal Graphics Mode Select [Enabled, 8MB]

Sets the internal graphics mode. Configuration options: [Disabled] [Enabled, 1MB] [Enabled, 8MB]

Graphics memory type [Auto]

Sets the graphics memory type. Configuration options: [Auto] [DVMT] [FIX] [DVMT+FIX]

TV Connector [Auto]
Sets the TV connector. Configuration options: [Auto] [Composite]
[Component] [Composite & Component] [SCART Composite] [SCART
Component] [SCART Compos & Compon] [SCART Compos & Compon RGB]
[HDTV Serial] [HDTV Component] [HDTV Component RGB] [HDTV PnP
HDMI]

HDTV Output [Auto]
Sets the HDTV output. Configuration options: [Auto] [480i60] [480p60]
[576i50] [576p50] [720p60] [1080i50] [1080i60] [1080p24] [1080p25]
[1080p30] [1080p50] [1080p60]

TV Standard [VBIOS-Default]
Sets the TV standard. Configuration options: [VBIOS-Default] [NTSC] [PAL]
[SECAM] [SMPTE240M] [SMPTE260M] [SMPTE274M] [SMPTE295M]
[SMPTE296M] [SMPTE293M] [SMPTE170M] [ITURBT601]

PEG Buffer Length [Auto]

Sets PCIEX graphics card buffer length. Configuration options: [Auto] [Long]
[Short]

Link Latency [Auto]

Sets link latency. Configuration options: [Auto] [Slow] [Normal]

PEG Root Control [Auto]

Enables, disables or set to Auto of the link latency.
Configuration options: [Auto] [Disabled] [Enabled]

Slot Power [Auto]

Sets the slot power. Configuration options: [Auto] [Light] [Normal] [Heavy] [Heavier]

High Priority Port Select [Disabled]

Selects the high priority port. Configuration options: [Disabled]
[PCI Express Port 1]

2.4.4   Onboard Devices Configuration

```
                        BIOS SETUP UTILITY
      Advanced

   Configure Win627DHG Super IO Chipset            Enable or Disable
                                                   High Definition Audio
   HD Audio Controller          [Enabled]          Controller
    Front Panel Support Type    [HD Audio]
   Onboard PCIEX 10/100/1000Mb LA[Enabled]
    LAN Option ROM              [Disabled]

   Serial Port1 Address         [3F8/IRQ4]
   Serial Port2 Address         [2F8/IRQ3]
   Parallel Port Address        [378]
   Parallel Port Mode           [ECP]
      ECP Mode DMA Channel      [DMA3]
    Parallel Port IRQ           [IRQ7]

                                                   ←→  Select Screen
                                                   ↑↓  Select Item
                                                   +-  Change Option
                                                   F1  General Help
                                                   F10 Save and Exit
                                                   ESC Exit

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```

HD Audio Controller [Enabled]

Enables or disables the Azalia/AC'97 CODEC.
Configuration options: [Enabled] [Disabled]

> *Front Panel Support Type [HD Audio]*
> Allows you to set the front panel audio connector (AAFP) mode to legacy
> AC'97 or high-definition audio depending on the audio standard that the front
> panel audio module supports. Configuration options: [AC97][HD Audio]

Onboard PCIEX 10/100/1000Mb LAN [Enabled]

Allows you to enable or disable the onboard PCIEX 10/100/1000Mb LAN controller.
Configuration options: [Enabled] [Disabled]

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

Serial Port1/2 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.
Configuration options: [Disabled] [3F8/IRQ4] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

Parallel Port Address [378]

Allows you to select the Parallel Port base addresses.
Configuration options: [Disabled] [378] [278] [3BC]

Parallel Port Mode [ECP]

Allows you to select the Parallel Port mode.
Configuration options: [Normal] [Bi-Directional] [EPP] [ECP]

ECP Mode DMA Channel [DMA3]

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

Parallel Port IRQ [IRQ7]
Configuration options: [IRQ5] [IRQ7]

2.4.5   PCI PnP

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

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

```
                         BIOS SETUP UTILITY
       Advanced

   Advanced PCI/PnP Settings                        NO: lets the BIOS
                                                    configure  all the
   WARNING: Setting wrong values in below sections  devices in the
            may cause system to malfunction.        system. YES: lets
                                                    the operating system
   Plug And Play O/S            [No]                 configure Plug and
   PCI Latency Timer            [64]                 Play (PnP) devices
   Allocate IRQ to PCI VGA      [Yes]                not required for
   Palette Snooping             [Disabled]           boot if your system
                                                    has a Plug and Play
   IRQ-3 assigned to            [PCI Device]         operating system.
   IRQ-4 assigned to            [PCI Device]
   IRQ-5 assigned to            [PCI Device]        ⬅➡  Select Screen
   IRQ-7 assigned to            [PCI Device]        ⬆⬇  Select Item
   IRQ-9 assigned to            [PCI Device]        +-   Change Option
   IRQ-10 assigned to           [PCI Device]        F1   General Help
   IRQ-11 assigned to           [PCI Device]        F10  Save and Exit
   IRQ-14 assigned to           [PCI Device]        ESC  Exit
   IRQ-15 assigned to           [PCI Device]

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```

Plug and Play O/S [No]

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

PCI Latency Timer [64]

Allows you to select the value in units of PCI clocks for the PCI device latency timer register. Configuration options: [32] [64] [96] [128] [160] [192] [224] [248]

Allocate IRQ to PCI VGA [Yes]

When set to [Yes], BIOS assigns an IRQ to PCI VGA card if the card requests for an IRQ. When set to [No], BIOS does not assign an IRQ to the PCI VGA card even if requested. Configuration options: [Yes] [No]

Palette Snooping [Disabled]

When set to [Enabled], the pallete snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

IRQ-xx assigned to [PCI Device]

When set to [PCI Device], the specific IRQ is free for use of PCI/PnP devices. When set to [Reserved], the IRQ is reserved for legacy ISA devices. Configuration options: [PCI Device] [Reserved]

2.4.6   TPM Configuration

The TPM Configuration menu allows you to configure settings related to Trusted Computing innovations.

The following items appear only when you installed a TPM device. This motherboard only supports Sinosun TPM.

```
                        BIOS SETUP UTILITY
       Advanced

   TPM Configuration                              Enable/Disable TPM
                                                  TCG (TPM 1.1/1.2)
   TCG/TPM SUPPORT            [Yes]               support in BIOS
   Execute TPM Command       [Last Setting]
     TPM Enable/Disable Status  [Enabled]
   Clearing the TPM          [Press Enter]
     TPM Owner Status        [UnOwned]
```
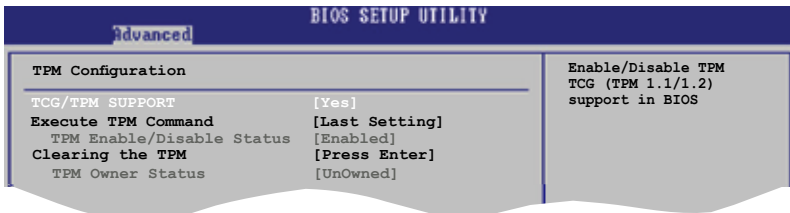
TCG/TPM SUPPORT [Yes]

Allows you to enable or disable the TPM/TCG (TPM 1.1/1.2) support in BIOS. Configuration options: [Yes] [No]

When TCG/TPM SUPPORT item is set to [Yes], the following items appear.

Execute TPM Command [Last Setting]

Allows you to enable or disable command to TPM. Configuration options: [Last Setting] [Disable] [Enable]

TPM Enable/Disable Status [Enabled]
Displays the TPM enable or disable status.

Clearing the TPM [Press Enter]

Allows you to return the TPM to factory defaults when press <enter>.

TPM Owner Status [UnOwned]
Displays the TPM owner status.

2.5   Power menu

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

2.5.1   Suspend Mode [Auto]

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

2.5.2   ACPI 2.0 Support [Disabled]

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

2.5.3   ACPI APIC Support [Enabled]

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

2.5.4 APM Configuration

```
                        BIOS SETUP UTILITY
                  Power

  APM Configuration                                  Go into On/Off,
                                                     or Suspend when
  Power Button Mode                  [On/Off]        Power button
                                                     is pressed.
  Restore on AC Power Loss     [Power Off]
  Power On By RTC Alarm        [Enabled]
    RTC Alarm Date             [15]
    RTC Alarm Hour             [12]
    RTC Alarm Minute           [30]
    RTC Alarm Second           [30]
  Power On By External Modems  [Disabled]
  Power On By PCI Devices      [Disabled]
  Power On By PCIE Devices     [Disabled]         ◄► Select Screen
  Power On By PS/2 Keyboard    [Disabled]         ↑↓ Select Item
  Power On By PS/2 Mouse       [Disabled]         +- Change Option
                                                  F1 General Help
```

Power Button Mode [On/Off]

Allows the system to go into On/Off mode or suspend mode 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 Off] [Power On] [Last State]

Power On By RTC Alarm [Enabled]

Allows you to enable or disable RTC to generate a wake event. When this item is set to Enabled, the items RTC Alarm Date, RTC Alarm Hour, RTC Alarm Minute, and RTC Alarm Second appear with set values. Configuration options: [Disabled] [Enabled]

Power On By External Modems [Disabled]

This allows either settings of [Enabled] or [Disabled] for powering up the computer when the external modem receives a call while the computer is in Soft-off mode. Configuration options: [Disabled] [Enabled]

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

Power On By PCI Devices [Disabled]

When set to [Enabled], this parameter allows you to turn on the system through a PCI LAN or modem card. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Enabled]

Power On By PCIE Devices [Disabled]

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

Power On By PS/2 Keyboard [Disabled]

Allows you to use specific keys on the keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Space Bar] [Ctrl-Esc] [Power Key]

Power On By PS/2 Mouse [Disabled]

When set to [Enabled], this parameter allows you to use the PS/2 mouse to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Enabled]

2.5.5   Hardware Monitor

```
                           BIOS SETUP UTILITY
                    Power

   Hardware Monitor                                   CPU Temperature

   CPU Temperature          [56.5°C/133.5°F]

   CPU Fan Speed            [4560RPM]
   CPU Q-Fan Control        [Disabled]
   Chassis Fan Speed (RPM)  [3152RPM]

   VCORE Voltage            [ 1.328V]
   3.3V Voltage             [ 3.264V]
   5V Voltage               [ 5.094V]
   12V Voltage              [11.932V]
                                                      ←→   Select Screen
                                                      ↑↓   Select Item
                                                      +-   Change Option
                                                      F1   General Help
                                                      F10  Save and Exit
                                                      ESC  Exit

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```

CPU Temperature [xxxC/xxxF]

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. Configuration options: [Ignored] [xxxC/xxxF]

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

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

CPU Q-Fan Control [Disabled]

Allows you to enable or disable the ASUS Q-Fan feature that smartly adjusts the fan speeds for more efficient system operation. Configuration options: [Disabled] [Enabled]

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

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

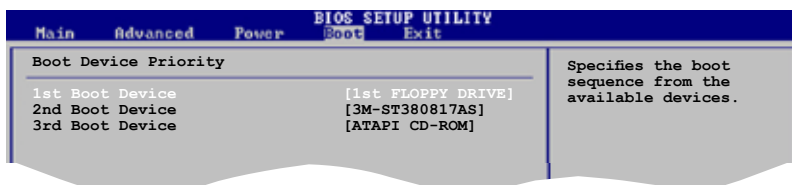### VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

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

2.6 Boot menu

The Boot menu items allow you to change the system boot options. Select an item then press <Enter> to display the sub-menu.
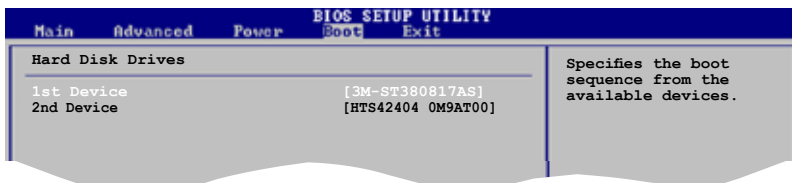
```
                          BIOS SETUP UTILITY
   Main    Advanced    Power    Boot    Exit

   Boot Settings                                  Specifies the Boot
  ─────────────────────────────────────          Device Priority
     Boot Device Priority                         sequence.
     Hark Disk Drives
                                                  A virtual floppy disk
     Boot Settings Configuration                  drive (Floppy Drive B:
     Security                                     )may appear when you
                                                  set the CD-ROM drive
                                                  as the first boot
                                                  device.


                                                  ←→    Select Screen
                                                  ↑↓    Select Item
                                                  Enter Go to Sub-screen
                                                  F1    General Help
                                                  F10   Save and Exit
                                                  ESC   Exit

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```

2.6.1 Boot Device Priority

```
                          BIOS SETUP UTILITY
   Main    Advanced    Power    Boot    Exit

   Boot Device Priority                           Specifies the boot
  ─────────────────────────────────────          sequence from the
   1st Boot Device          [1st FLOPPY DRIVE]    available devices.
   2nd Boot Device          [3M-ST380817AS]
   3rd Boot Device          [ATAPI CD-ROM]
```

1st ~ xxth Boot Device [1st Floppy 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: [xxxxx Drive] [Disabled]
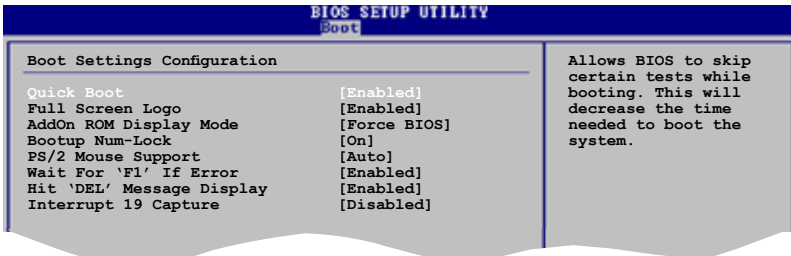
2.6.2 Hard Disk Drives

```
                          BIOS SETUP UTILITY
   Main    Advanced    Power    Boot    Exit

   Hard Disk Drives                               Specifies the boot
  ─────────────────────────────────────          sequence from the
   1st Device               [3M-ST380817AS]       available devices.
   2nd Device               [HTS42404 0M9AT00]
```

1st ~ xxth Device [3M-ST380817AS]

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: [3M-ST380817AS] [HTS42404 OM9AT00] [Disabled]

2.6.3 Boot Settings Configuration

```
                         BIOS SETUP UTILITY
                         Boot

 Boot Settings Configuration                           Allows BIOS to skip
                                                       certain tests while
 Quick Boot                     [Enabled]              booting. This will
 Full Screen Logo               [Enabled]              decrease the time
 AddOn ROM Display Mode         [Force BIOS]           needed to boot the
 Bootup Num-Lock                [On]                   system.
 PS/2 Mouse Support             [Auto]
 Wait For 'F1' If Error         [Enabled]
 Hit 'DEL' Message Display      [Enabled]
 Interrupt 19 Capture           [Disabled]
```

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 MyLogo™ feature.

Add On ROM Display Mode [Force BIOS]

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

Bootup Num-Lock [On]

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

PS/2 Mouse Support [Auto]

Allows you to enable or disable support for PS/2 mouse.
Configuration options: [Disabled] [Enabled] [Auto]

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]

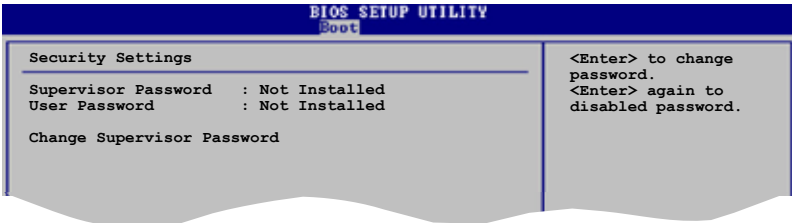### Hit 'DEL' Message Display [Enabled]

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]

2.6.4   Security

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

```
                        BIOS SETUP UTILITY
                            Boot

   Security Settings                              <Enter> to change
                                                  password.
   Supervisor Password    : Not Installed         <Enter> again to
   User Password          : Not Installed         disabled password.

   Change Supervisor Password

```

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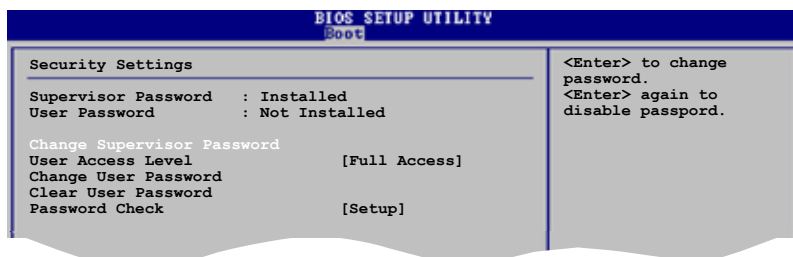
To change the supervisor password, follow the same steps as in setting a user password.

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 clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section "1.9 Jumpers" for information on how to erase the RTC RAM.

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

```
                          BIOS SETUP UTILITY
                               Boot

  Security Settings                                <Enter> to change
                                                   password.
  Supervisor Password   : Installed               <Enter> again to
  User Password         : Not Installed           disable passpord.

  Change Supervisor Password
  User Access Level              [Full Access]
  Change User Password
  Clear User Password
  Password Check                 [Setup]
```

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]

2.7   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.

```
              BIOS SETUP UTILITY
  Main   Advanced   Power   Boot   Exit

 Exit Options                                  Exit system setup
 ──────────────────────────────────           after saving the
 Exit & Save Changes                          changes.
 Exit & Discard Changes
 Discard Changes                              F10 key can be used
                                              for this operation.
 Load Setup Defaults


                                              ←→   Select Screen
                                              ↑↓   Select Item
                                              Enter Go to Sub-screen
                                              F1   General Help
                                              F10  Save and Exit
                                              ESC  Exit

        (C)Copyright 1985-2002, American Megatrends, Inc.
```

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

Exit & Save Changes

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

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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

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

Software
support
3

3.1 Installing an operating system

This motherboard supports Windows® 2000/XP/Vista operating systems (OS). Always install the latest OS version and corresponding updates to maximize the features of your hardware.

> • Motherboard settings and hardware options vary. 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® 2000 Service Pack 4 or the Windows® XP Service Pack 1 or later versions before installing the drivers for better compatibility and system stability.

3.2 Support CD information

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

3.2.1 Running the support CD

Place the support CD to the optical drive. The CD automatically displays the Drivers menu if Autorun is enabled in your computer.
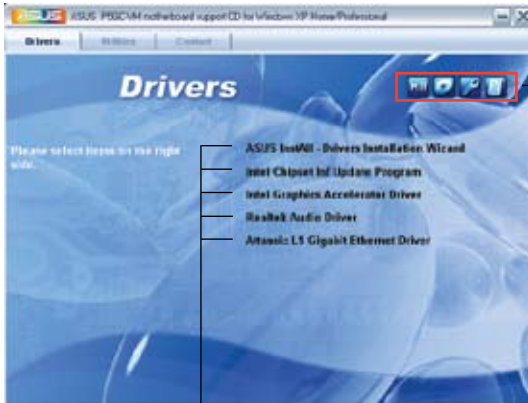
Click an icon to display support CD/motherboard information

Click an item to install

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

3.2.2   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-Drivers Installation Wizard

Installs the ASUS InstAll-Drivers Installation Wizard.

Intel Chipset Inf Update Program

This item installs the Intel® Chipset INF Update Program. This driver enables Plug-n-Play INF support for the Intel® chipset components on the motherboard. When installed to the target system, this driver provides the method for configuring the chipset components.

You can install this utility using three different modes: interactive, silent, or unattended preload. Installing the driver in interactive mode requires user input during installation. User input is not required when installing the driver in silent or unattended preload modes. Refer to the online help or readme file that came with the utility for details.

Intel Graphics Accelerator Driver

Installs the Intel Graphics Accelerator driver.

Realtek Audio Driver

Installs the Realtek Audio driver.

Attansic L1 Gigabit Ethernet Driver

Installs the Attansic L1 Fast Ethernet.

3.2.3   Utilities menu

The Utilities menu shows the applications and other software that the motherboard supports.
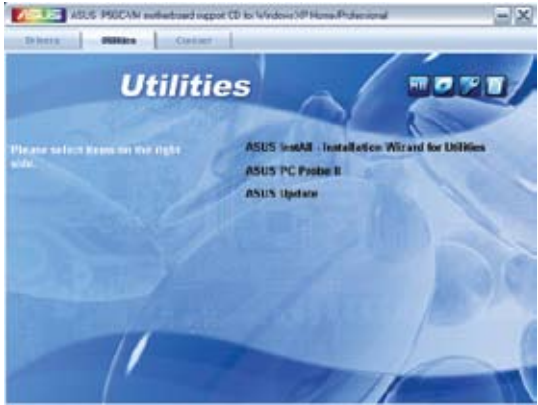
ASUS InstAll-Installation Wizard for Utilities

Installs all of the utilities through the Installation Wizard.

ASUS 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.

ASUS Update

The ASUS Update utility allows you to update the motherboard BIOS in a Windows® environment. This utility requires an Internet connection either through a network or an Internet Service Provider (ISP).

3.2.4 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.

The Appendix describes the CPU
features that the motherboard supports.

CPU features

A.1 Enhanced Intel SpeedStep® Technology (EIST)

• The motherboard comes with a BIOS file that supports EIST. You can download the latest BIOS file from the ASUS website (www.asus.com/support/download/) if you need to update the BIOS. See Chapter 2 for details.

• Visit www.intel.com for more information on the EIST feature.

A.1.1 System requirements

Before using EIST, check your system if it meets the following requirements:

• Intel® Pentium® 4 processor with EIST support
• BIOS file with EIST support
• Operating system with EIST support (Windows® XP SP2/Linux 2.6 kernel or later versions)

## A.1.2 Using the EIST

To use the EIST feature:

1. Turn on the computer, then enter the BIOS Setup.

2. Go to the Advanced Menu, highlight CPU Configuration, then press <Enter>.

3. Set the **Intel(R) SpeedStep Technology** item to [Automatic], then press <Enter>.

4. Press <F10> to save your changes and exit the BIOS setup.

5. After the computer restarts, right click on a blank space on the desktop, then select Properties from the pop-up menu.

6. When the Display Properties window appears, click the **Screen Saver** tab.

7. Click the Power button on the Monitor power section to open the Power Options Properties window.
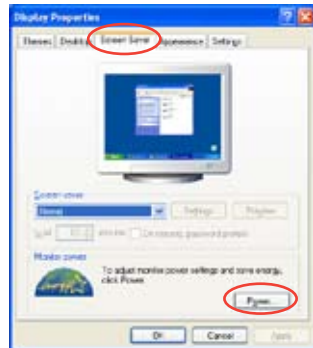
8. On the Power schemes section, click ⌄, then select any option except Home/Office Desktop or Always On.

9. Click Apply, then click **OK**.

10. Close the Display Properties window.

    After you adjust the power scheme, the CPU internal frequency slightly decreases when the CPU loading is low.
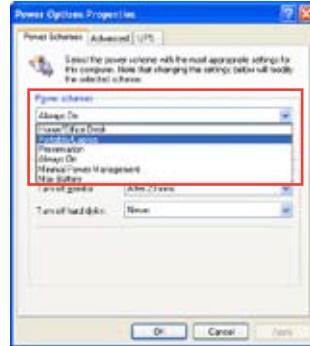
The screen displays and procedures may vary depending on the operating system.

A.2   Intel® Hyper-Threading Technology

- The motherboard supports Intel® Pentium® 4 LGA775 processors with Hyper-Threading Technology.

- Hyper-Threading Technology is supported under Windows® XP and Linux 2.4.x (kernel) and later versions only. Under Linux, use the Hyper-Threading compiler to compile the code. If you are using any other operating systems, disable the Hyper-Threading Techonology item in the BIOS to ensure system stability and performance.

- Installing Windows® XP Service Pack 1 or later version is recommended.

- Make sure to enable the Hyper-Threading Technology item in BIOS before installing a supported operating system.

- For more information on Hyper-Threading Technology, visit www.intel.com/info/hyperthreading.

Using the Hyper-Threading Technology

To use the Hyper-Threading Technology:

1.   Install an Intel® Pentium® 4 CPU that supports Hyper-Threading Technology.
2.   Power up the system and enter the BIOS Setup. Under the Advanced Menu, make sure that the item Hyper-Threading Technology is set to Enabled.

     The BIOS item appears only if you installed a CPU that supports Hyper-Threading Technology.
3.   Restart the computer.