



TS150-E2

Pedestal Server



E1852

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

About this guide

Audience

This user guide is intended for system integrators and experienced users with at least basic knowledge of configuring a server.

How this guide is organized

This guide contains the following parts:

1. Chapter 1: Product Introduction

This chapter describes the general features of the server, including sections on front panel and rear panel specifications.

2. Chapter 2: Hardware setup

This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

3. Chapter 3: Installation options

This chapter describes how to install optional components into the barebone server.

4. Chapter 4: Motherboard information

This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.

5. Chapter 5: BIOS information

This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.

6. Chapter 6: RAID configuration and driver installation

This chapter provides information on RAID configurations, RAID driver installation, and LAN driver installation for this motherboard.

7. Appendix: Reference information

This appendix gives information on the standard or redundant power supply that came with the barebone server. This section also provides a troubleshooting guide for solving common problems when using the barebone server.

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.
<i>Italics</i>	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 /iP5CR-VM.ROM

Chapter 1

This chapter describes the general features of the barebone server, including sections on the front panel and rear panel specifications.



ASUS TS150-E2

Product introduction

1.1 System package contents

Check your ASUS TS150-E2 package with the items on the following table. The package contents vary for the following configurations:

Item Description	
1.	ASUS TS150-E2 server with: <ul style="list-style-type: none">• ASUS P5CR-VM motherboard• 300 W power supply• Optical drive• Floppy disk drive• Chassis fan• CPU fan and heatsink assembly
2.	AC power cord
3.	System screws and labels
4.	Support CD including drivers and utilities
5.	User guide
6.	Optional items <ul style="list-style-type: none">• Second hard disk drive cage with retention base and screws• Expansion card holder



Contact your dealer immediately if any of the items is damaged or missing.

1.2 System specifications

The ASUS TS150-E2 is a server system featuring the ASUS P5CR-VM motherboard. The server supports the Intel® Pentium® 4 processor in the 775-land package, and includes the latest technologies through the chipsets embedded on the motherboard.

Chassis	Pedestal with front panel I/O ports
Motherboard	ASUS P5CR-VM (uATX form factor: 9.6 in. x 9.6 in.)
Chipset	Northbridge: Intel® E7221 Memory Controller Hub (MCH) Southbridge: Intel® ICH6R
Processor	LGA775 socket for Intel® Pentium® 4 processor with Extended Memory 64-bit Technology (EM64T) Supports Intel® Hyper-Threading Technology
Front Side Bus	800/533 MHz
Memory	Dual-channel memory architecture 4 x 240-pin DIMM sockets support ECC/non-ECC unbuffered 533/400 MHz DDR2 memory modules Supports 256 MB up to 4 GB of system memory
LAN	Dual Broadcom BCM5721 Gigabit LAN controller (PCI Express™ 1.0a specifications compliant)
Storage	Intel® ICH6R Southbridge supports: <ul style="list-style-type: none">- 2 x Ultra DMA 100/66/33 hard disk drives- 4 x Serial ATA hard disks with RAID 0, RAID 1 configuration
Expansion slots	2 x PCI 33 MHz/32-bit/5V (PCI 2.3) 1 x PCI Express™ x8 slot (PCI Express™ 1.0a) 1 x PCI Express™ x1 slot (PCI Express™ 1.0a) 1 x Mini-PCI socket for the ASUS Server Management Board
Drive bays	1 x 3.5-inch floppy disk drive bay 1 x 3.5-inch hard disk drive bay 4 x 5.25-inch optical drive bays
Rear panel	1 x PS/2 mouse port 1 x PS/2 keyboard port 2 x USB 2.0 ports 1 x Parallel port 1 x Serial (COM1) port 2 x LAN (RJ-45) ports 1 x VGA port
Chassis fan	9 cm chassis fan
Hardware monitors	Voltage, temperature, and fan speed monitoring
Power supply	SSI power supply with 24-pin ATX and 4-pin 12V plugs

1.3 Front panel features

The TS150-E2 chassis displays a black stylish front panel.

The power button, LED indicators, optical, and floppy drives are located on the front panel. Flip the front panel I/O ports cover to access the front panel USB ports.

Front panel I/O
ports cover



1.4 LED information

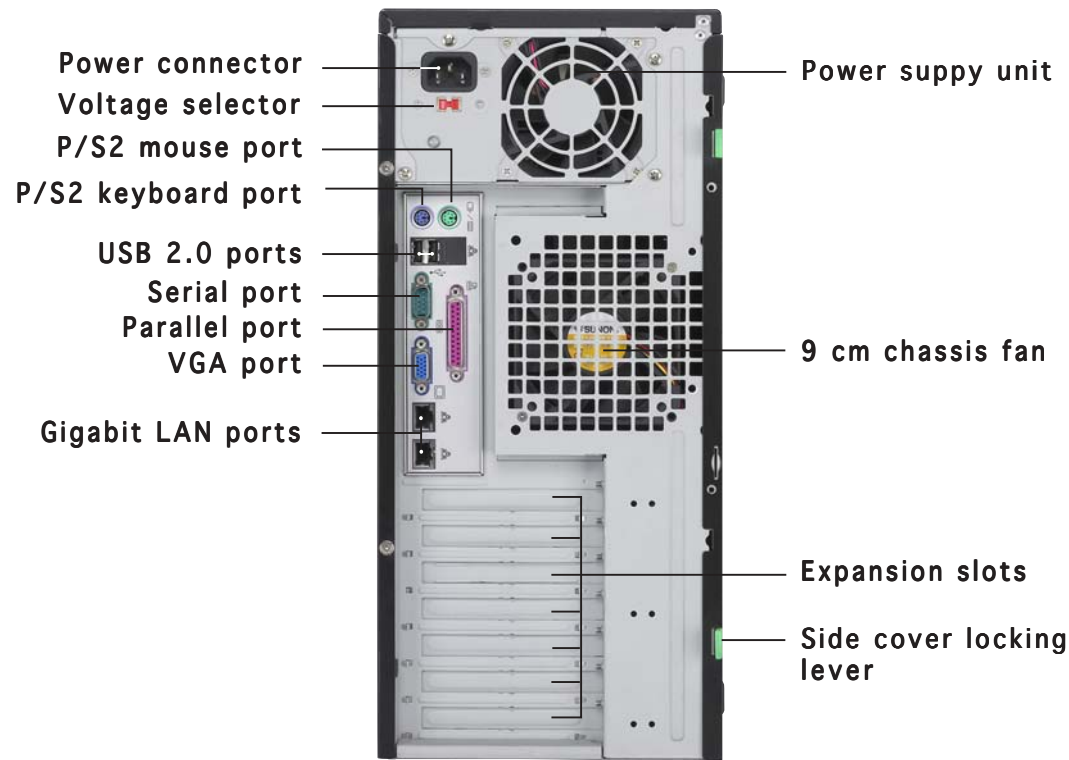
The TS150-E2 comes with two LED indicators. Refer to the picture for the LED location and the table below for LED description.



LED	Icon	Display	Description
Drive Activity LED		Blinking	Read/write data into the HDD
Power LED		ON Blinking	System power ON Suspend mode

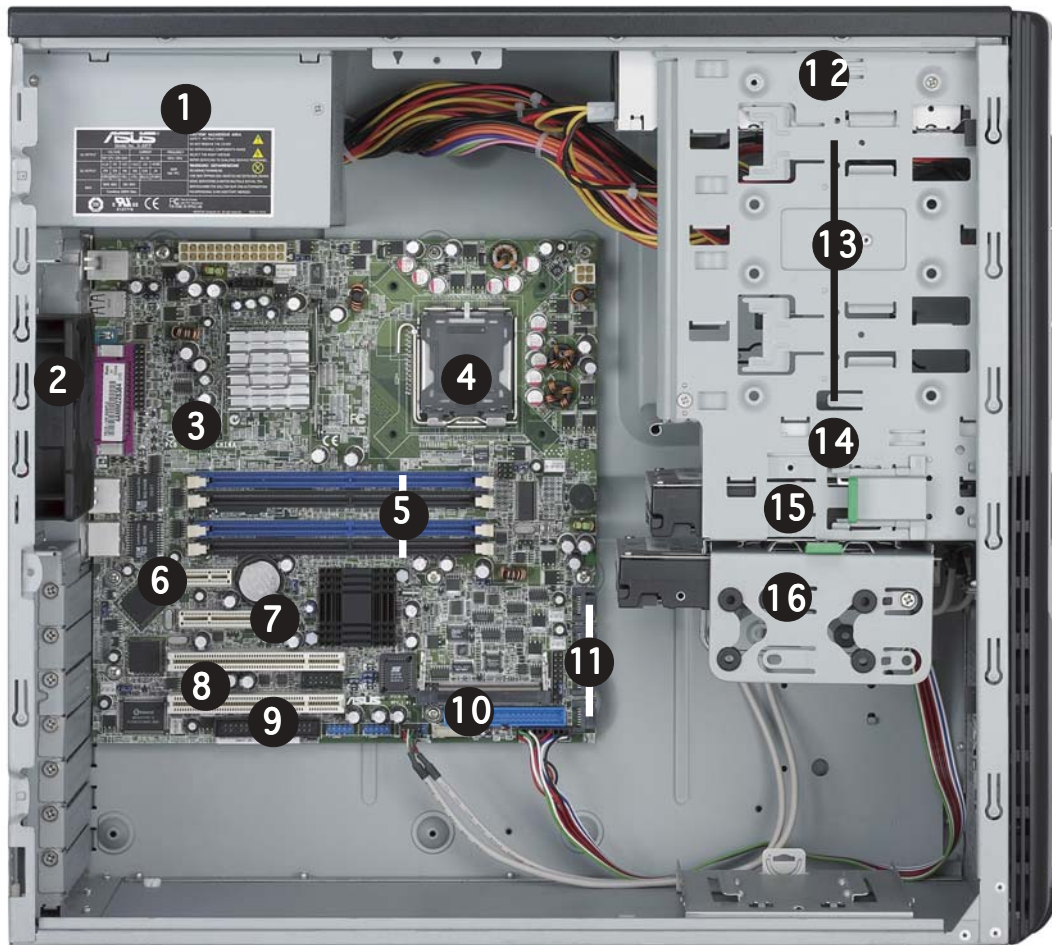
1.5 Rear panel features

The rear panel includes a slot for the motherboard rear I/O ports, seven full-length expansion slots, chassis cover locks, a vent for the system fan, and the power supply unit.



1.6 Internal features

The TS150-E2 chassis includes the basic components as shown.



- | | |
|-----------------------------|--------------------------------|
| 1. Power supply | 9. Floppy disk drive connector |
| 2. 9 cm chassis fan | 10. IDE connector |
| 3. ASUS P5CR-VM motherboard | 11. Serial ATA connectors |
| 4. CPU socket | 12. Optical drive |
| 5. DDR2 DIMM sockets | 13. Empty 5.25-inch drive bays |
| 6. PCI Express x1 slot | 14. Floppy disk drive |
| 7. PCI Express x8 slot | 15. HDD bay |
| 8. PCI slots | 16. Detachable HDD cage |



The hard disk drives are purchased separately.

Chapter 2

This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.



ASUS TS150-E2

Hardware setup

2.1 Preparation

Basic components to install

You need to install the following components to the barebone server.

1. Central processing unit (CPU)
2. Dual Inline Memory Module(s) (DIMMs)
3. Hard disk drive
4. 5.25-inch drive(s)
5. Expansion card(s)

Tool

You need a Phillips (cross) screw driver to install some system components.

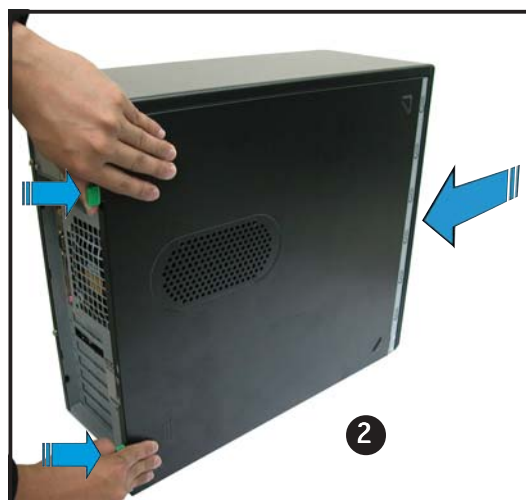
2.2 Removing the side cover

To remove the side cover:

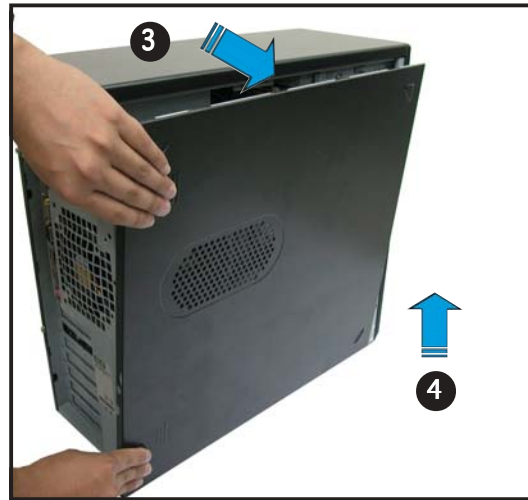
1. Locate the two side cover locks.



2. Press the side cover locks outward, then pull the side cover toward the rear panel for about one-half inch.



3. Move the side cover to the direction of the arrow.
4. Lift the side cover, then set aside.



- Make sure that you unplug the power cord before removing the side cover.
- Take extra care when removing the side cover. Keep your fingers from components inside the chassis that can cause injury, such as the CPU fan, rear fan, and other sharp-edged parts.

Viewing the internal structure

Without the side cover, the internal structure and installed components of the barebone server appear as shown in the following picture.

Perform the procedures in the succeeding sections to install the CPU, system memory, disk drives, and expansion cards.



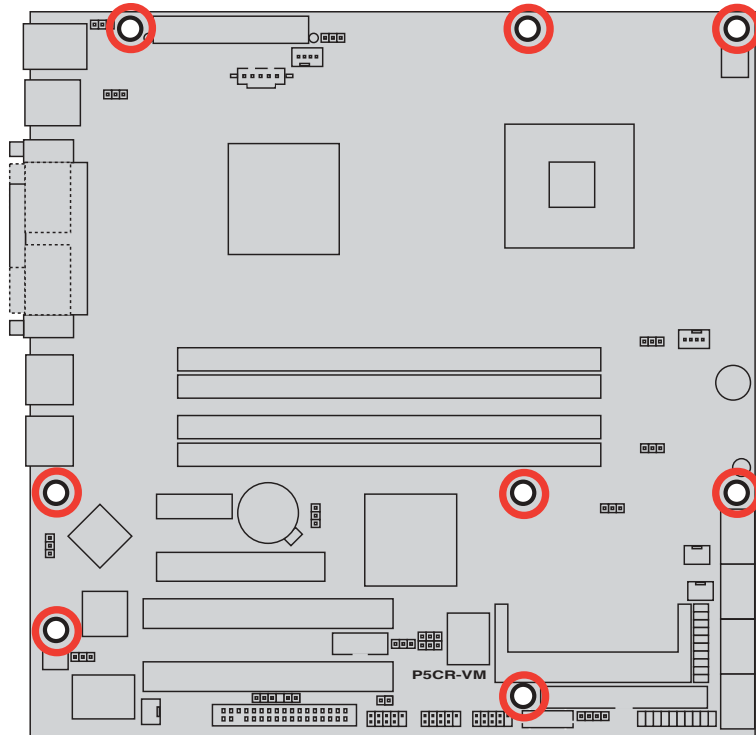
2.3 Motherboard information

The barebone server comes with the P5CR-VM motherboard already installed. The motherboard is secured to the chassis by eight (8) screws as indicated by the circles in the illustration below.



Refer to “Chapter 4 Motherboard information” for detailed information on the motherboard.

Place this side
towards the
rear of the
chassis



Make sure to unplug the power cord before installing or removing any motherboard component or connection. Failure to do so may cause you physical injury and may damage motherboard components.

2.4 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Pentium® 4 processor in the 775-land package.

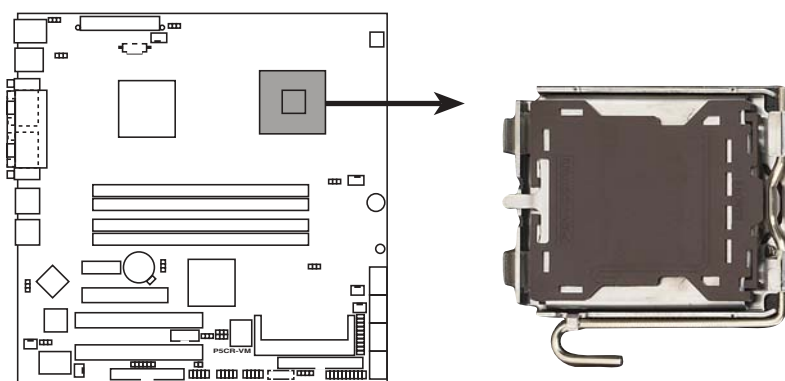


- Your boxed Intel® Pentium® 4 LGA775 processor package should come with installation instructions for the CPU, heatsink, and the retention mechanism. If the instructions in this section do not match the CPU documentation, follow the latter.
- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA775 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.4.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

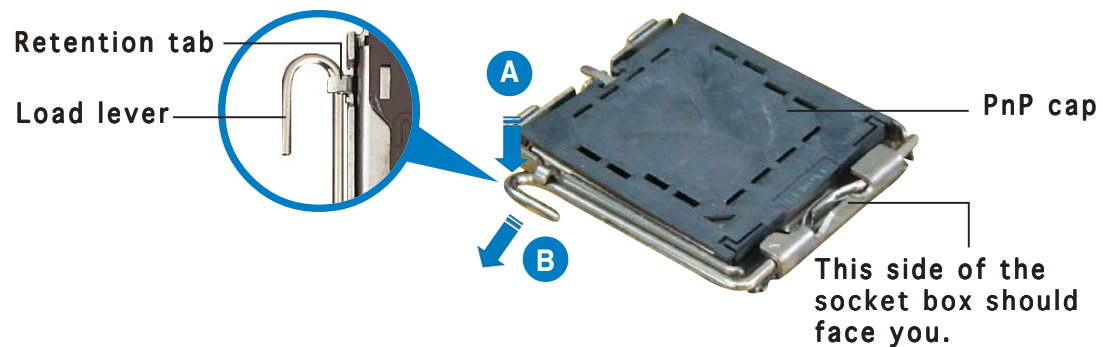


P5CR-VM CPU Socket 775



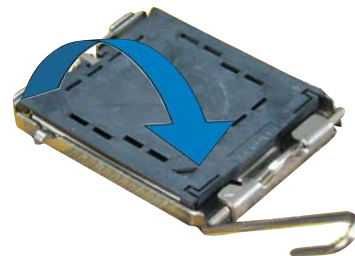
Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

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

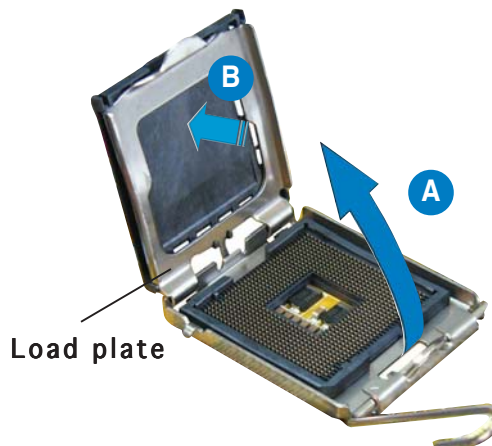


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

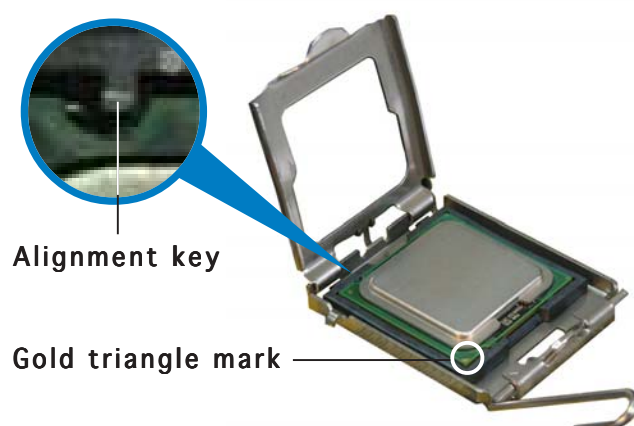
3. Lift the load lever in the direction of the arrow to a 135° angle.



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



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.



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!

Notes on Intel® Hyper-Threading Technology



- This motherboard supports Intel® Pentium® 4 CPUs in the 775-land package with Hyper-Threading Technology.
- Hyper-Threading Technology is supported under Windows® 2000 Advanced Server, Windows® 2003 Server, 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 Technology item in the BIOS to ensure system stability and performance.
- 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.

To use the Hyper-Threading Technology on this motherboard:

1. Install an Intel® Pentium® 4 CPU that supports Hyper-Threading Technology.
2. Power up the system and enter the BIOS Setup (see Chapter 5: BIOS setup). Under the Advanced Menu, make sure that the item Hyper-Threading Technology is set to Enabled. The item appears only if you installed a CPU that supports Hyper-Threading Technology.
3. Reboot the computer.

2.4.2 Installing the CPU fan and heatsink assembly

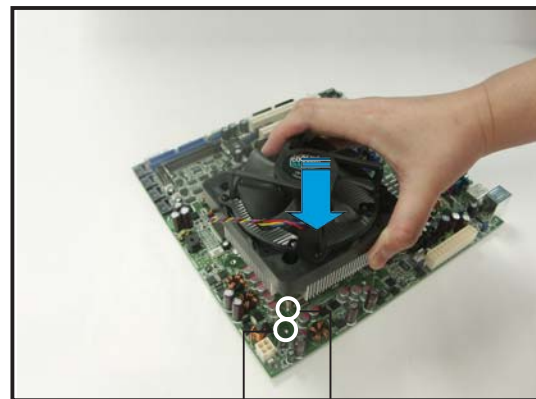
The Intel® Pentium® 4 LGA775 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.



- When you buy a boxed Intel® Pentium® 4 processor, the package includes the CPU fan and heatsink assembly.
- We recommend that you use the ASUS-certified multi-directional heatsink and fan bundled with the system.
- If you purchased a separate CPU heatsink and fan assembly, make sure that you have properly applied Thermal Interface Material to the CPU heatsink or CPU before you install the heatsink and fan assembly.
- **Before** installing the CPU fan and heatsink assembly, make sure to remove the screws that secure the X-Pad™ to the motherboard. (The screws help keep the X-Pad from falling off during transit.)

To install the CPU heatsink and fan:

1. Place the heatsink on top of the installed CPU, making sure that the CPU fan screws match the holes on the motherboard.

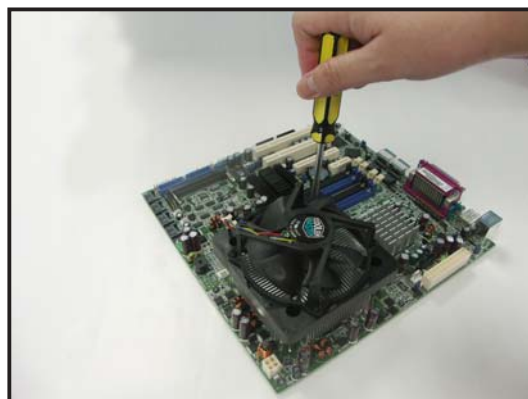
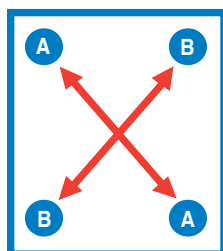


CPU fan screw hole CPU fan screw

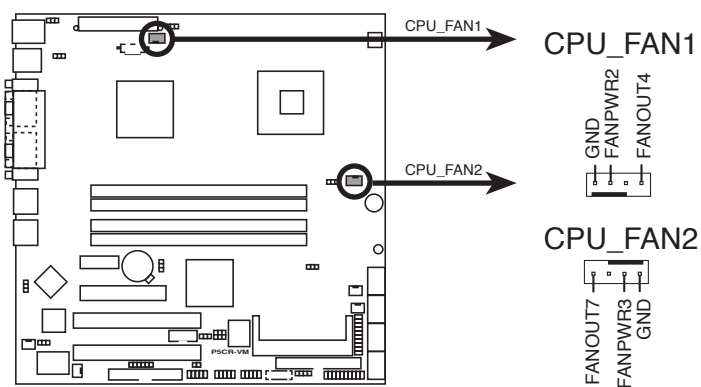


- Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU_FAN1 connector.
- An X-pad™ comes pre-installed under the motherboard.
- If you use the push-pin heatsink and fan assembly, make sure to remove the X-pad™ first.

2. Fasten the screws in a diagonal sequence to secure the heatsink and fan assembly in place.



3. Connect the CPU fan cable to the connectors on the motherboard labeled CPU_FAN1/CPU_FAN2.



P5CR-VM CPU fan connectors



- Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.
- If there is only one CPU fan cable, connect it to the connector labeled CPU_FAN1. Failure to do so may cause hardware monitoring errors.

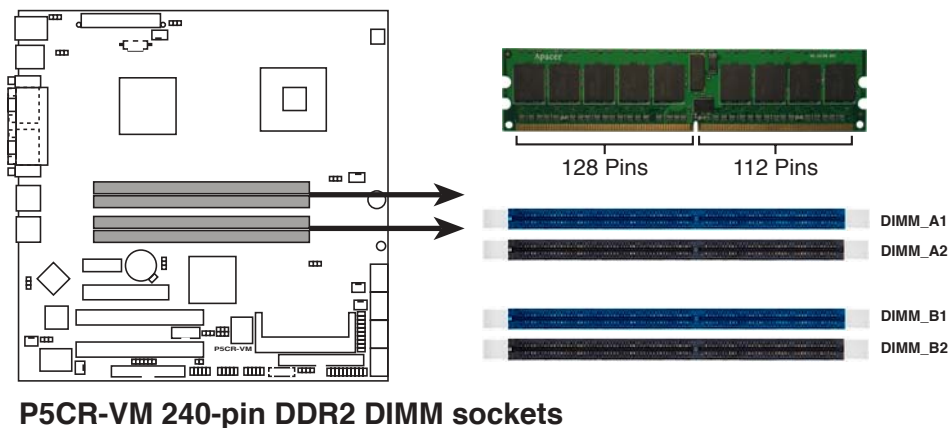
2.5 System memory

2.5.1 Overview

The motherboard comes with four 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 to match the break on the socket and ensure correct installation.

The figure illustrates the location of the DDR2 DIMM sockets:



2.5.2 Memory configurations

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



- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.
- Due to chipset limitation, the available memory space depends on the system configuration. Typically, the system allocates 3 ~ 4 GB memory space for onboard devices and add-on cards. However, actual resource allocation varies according to the type of add-on cards the user installs. Some PCI cards, for example, require larger memory space, thus decreasing the total available memory space to less than 3 GB.

Memory configuration table

ALLOCATION		DIMM_A1	DIMM_B1	DIMM_A2	DIMM_B2
Channel	# of DIMMS				
SINGLE	1	•			
	3	•	•	•	
DUAL	2	•	•		
	4	•	•	•	•



Install only identical memory modules. For optimum compatibility, do not mix single and double-sided memory modules on the same motherboard.

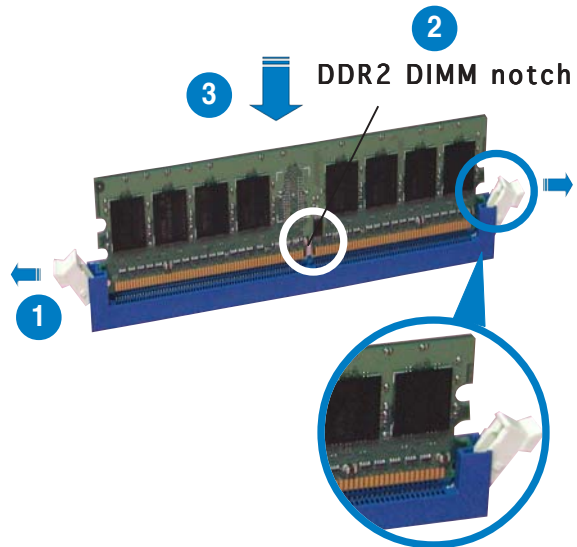
2.5.3 Installing a DIMM



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

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.



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.

2.5.4 Removing a DIMM

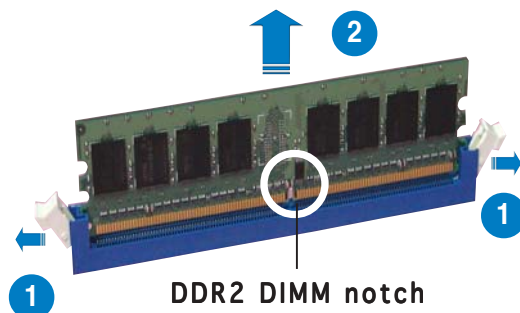
Follow these steps to remove a DIMM.

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



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

2. Remove the DIMM from the socket.



2.6 Installing a hard disk drive

The server system supports one Serial ATA hard disk drive through a detachable hard disk drive cage.



You may purchase a second hard disk drive cage to install an additional HDD. Refer to the next chapter for details.

Hard disk drive cage



Configure your hard disk drive as Master/Slave device before installing it to the chassis. Refer to the HDD documentation on how to set the drive as a Master/Slave device.

Hard disk drive installation

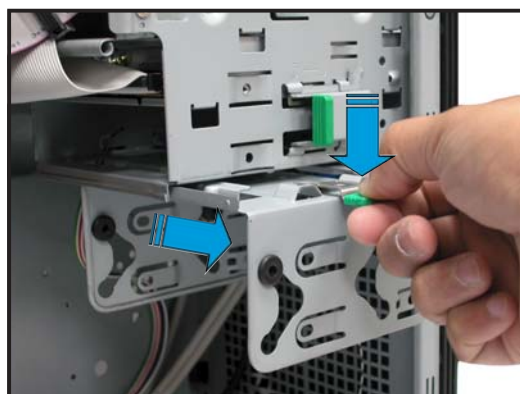
The detachable hard disk drive cage accommodates one Serial ATA hard disk drive.

To install a Serial ATA hard disk drive:



Configure your hard disk drive as Master/Slave device before installing it to the drive cage. Refer to the HDD documentation on how to set the drive as a Master/Slave device.

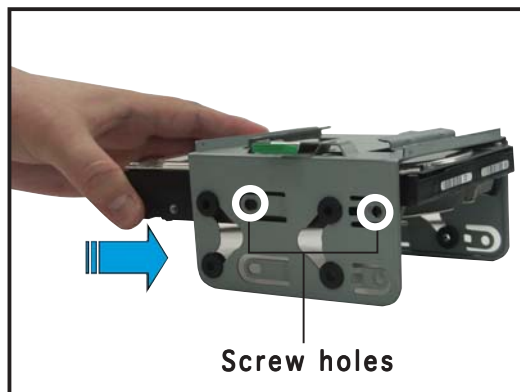
1. Press the HDD cage lock while pulling the cage out from the chassis. Place the HDD cage in a flat surface.



2. Insert an HDD to the upper bay of the cage. Make sure that the HDD screw holes are aligned with the HDD cage screw holes.



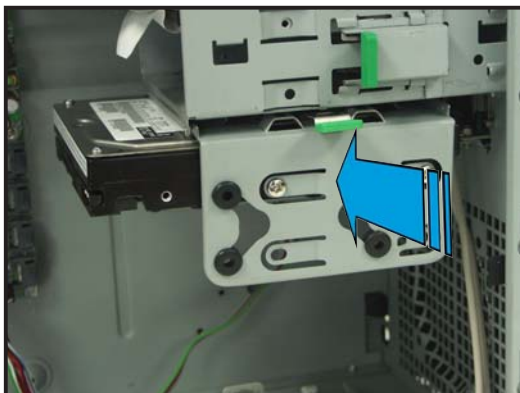
DO NOT install a hard disk drive to the lower bay of the cage.



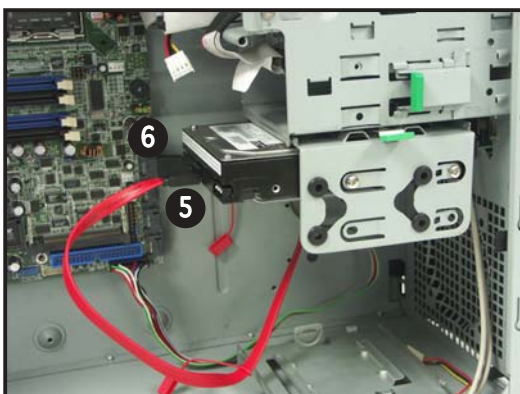
3. Secure the HDD to the cage with two screws on both sides of the cage.



4. Reinstall the HDD cage to the chassis. Align the HDD cage and bay assembly rails, then carefully push the HDD cage until it is flushed to the chassis.



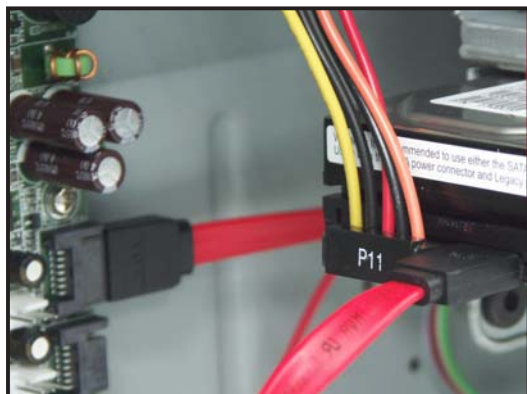
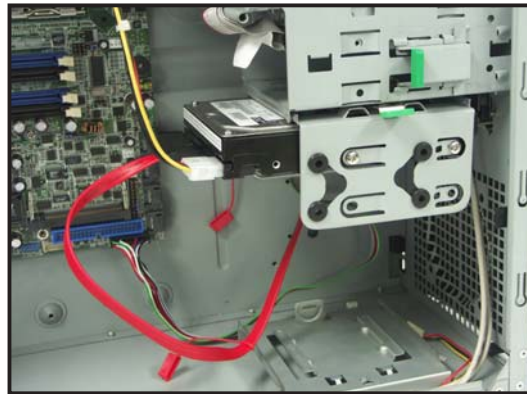
5. Connect one end of the supplied 7-pin SATA cable to the SATA connector at the back of the drive.
6. Connect the other end to a SATA connector on the motherboard. See page 3-6 for the location of the SATA connectors.



7. Connect a 4-pin power plug from the power supply unit to the power connector at the back of the drive.

OR

Connect the 15-pin Serial ATA power plug to the Serial ATA power connector at the back of the drive.



Use either the SATA power connector **OR** the legacy 4-pin power connector. **DO NOT** use both to prevent damage to components and to keep the system from becoming unstable.

2.7 Installing 5.25-inch drives



Make sure to unplug the power cable before installing or removing any system components. Failure to do so may cause severe damage to the motherboard and other system components!

The system comes with four 5.25-inch drive bays located on the upper front part of the chassis. An optical drive that comes standard with the system package occupies the uppermost bay (*labeled 1*). The lower bays (*labeled 2, 3, and 4*) are available for additional 5.25-inch optical, zip, or floppy disk drives.



You must remove the front panel cover before installing a 5.25-inch drive(s).

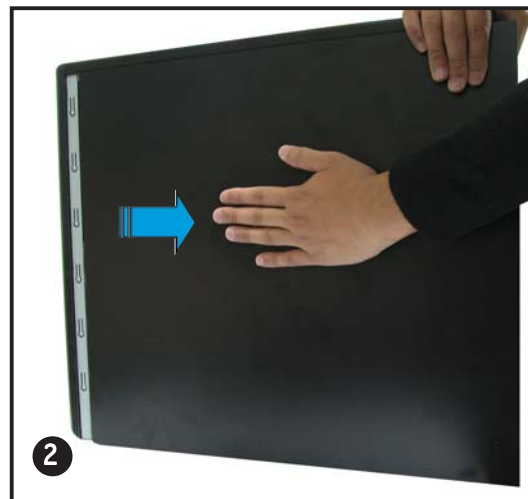


2.7.1 Removing the front panel cover

To remove the front panel cover:

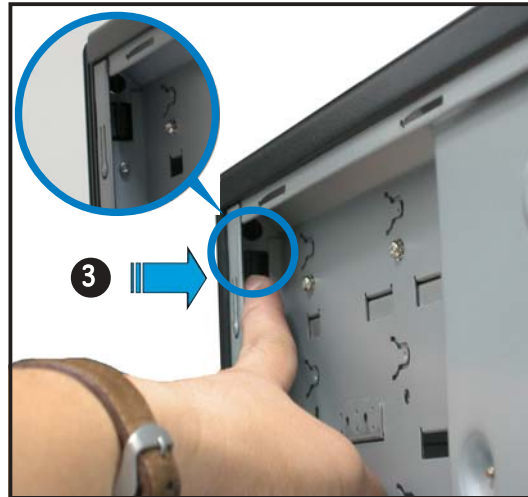


1. Locate and remove two screws that secure the left side cover to the chassis. Keep the screw for later use.

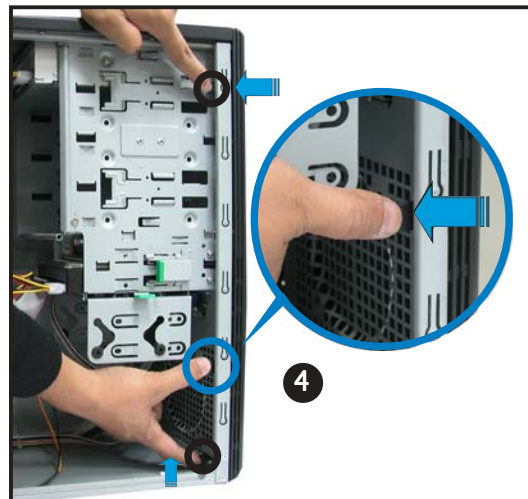


2. Slightly pull the cover toward the direction of the rear panel until it disengages from the chassis. Set the cover aside.

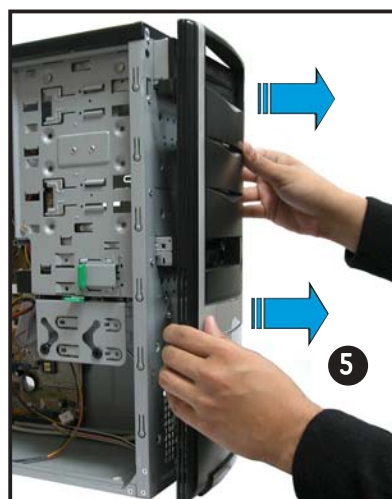
3. Press the front panel cover hook inward until it detaches from the chassis hole.



4. On the other side of the system, locate three front panel cover hooks. Press the hooks inward until the front panel cover detaches from the chassis.



5. Carefully remove the front panel cover, then set aside.

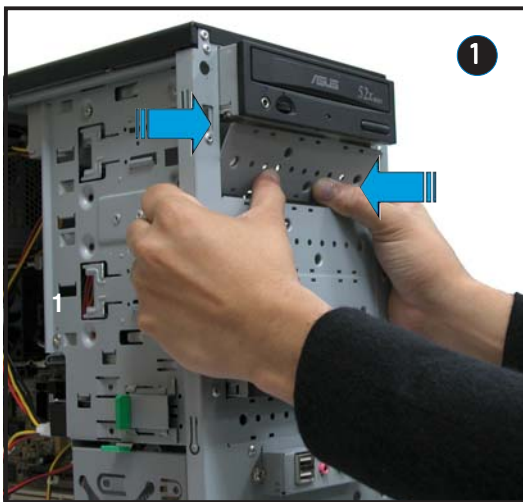


2.7.2 Installing additional optical drive(s)



Configure your optical drive as Master/Slave device before installing it to the drive bay. Refer to the optical drive documentation for details.

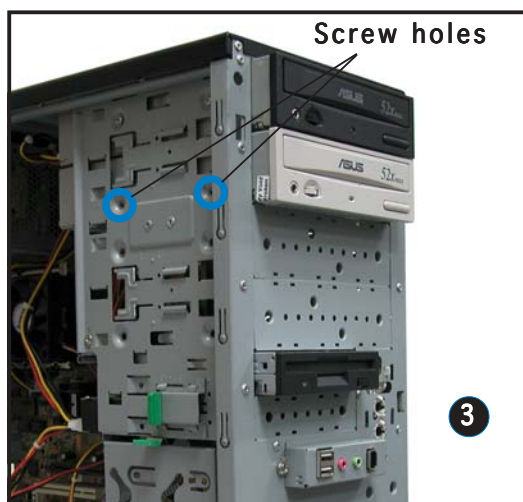
To install an additional optical drive(s):



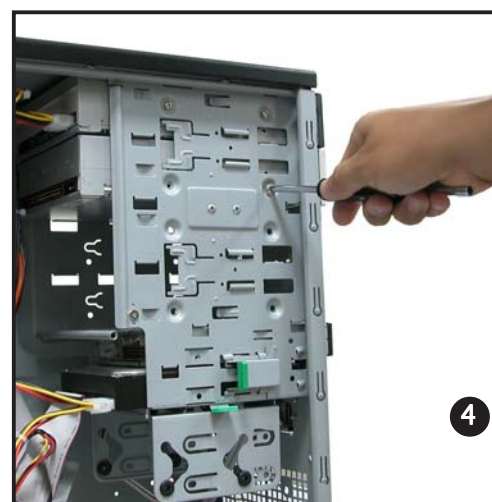
1. Select the drive bay you intend to use. Push the knock down metal cover in and out of the chassis until it is removed.



2. Carefully insert the drive to the bay, then push it inward until it is flushed to the chassis front panel.



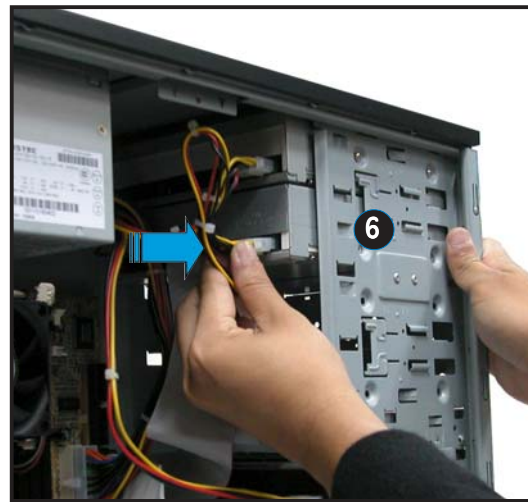
3. Align the optical drive and bay screw holes.



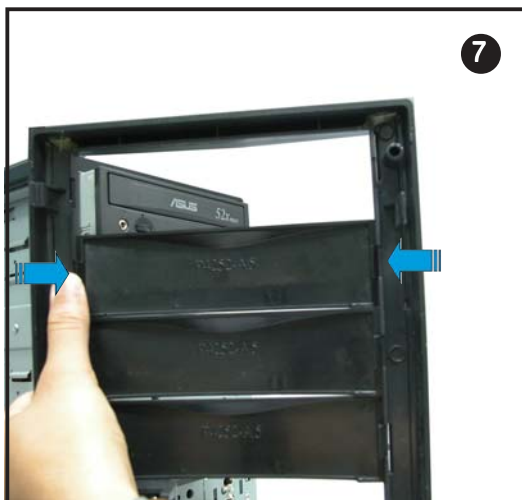
4. Secure the drive with two screws on both sides of the bay.



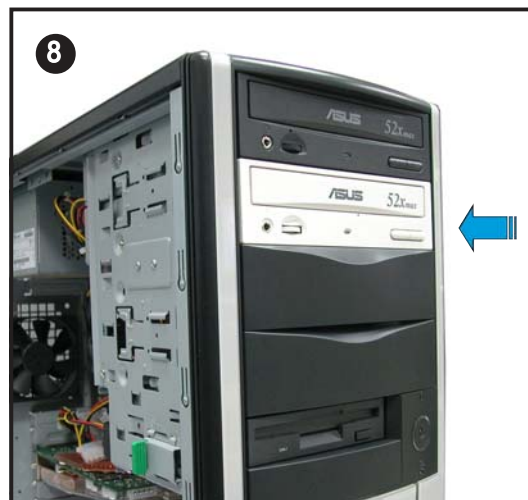
5. Connect a 40-pin IDE cable (from the first optical drive) to the IDE connector on the drive.



6. Connect a 4-pin power plug from the power supply unit to the drive power connector.



7. Remove the front panel bay cover opposite the drive bay you used by pressing the hooks inward.
Follow the same procedures when installing additional optical drives.



8. Reinstall the front panel and side covers when done.

2.8 Installing expansion cards

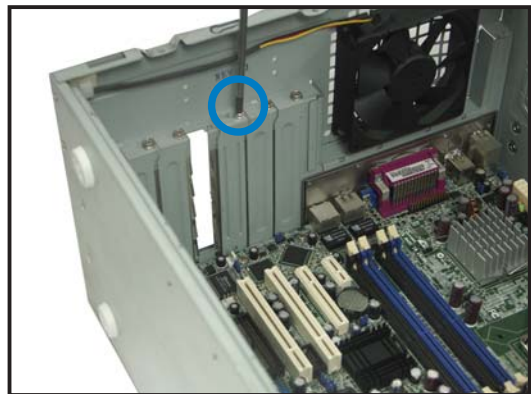
The system comes with two PCI slots, one PCI Express x8 slot, and one PCI Express x1 slot.



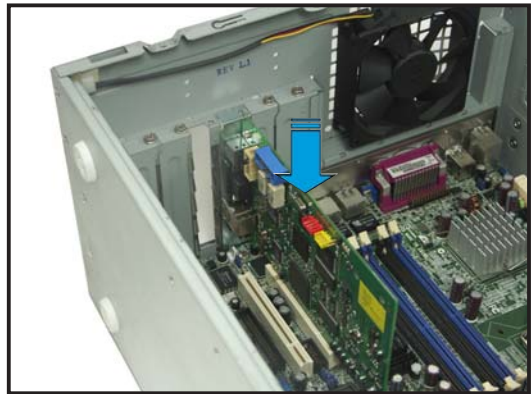
Make sure to unplug the power supply before installing or removing an expansion card(s). Failure to do so may cause severe damage to both the motherboard and the components.

To install an expansion card:

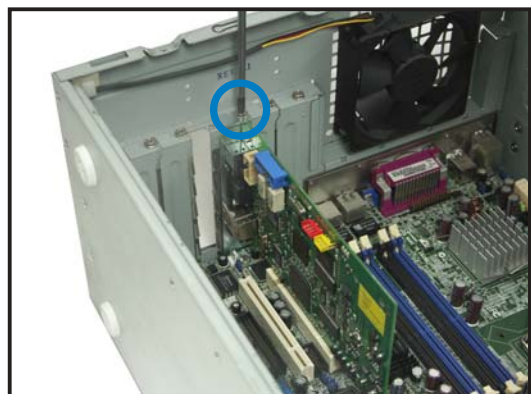
1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Lay the system on its side on a flat, stable surface.
3. Remove the metal bracket opposite the slot that you intend to use. Keep the metal bracket screw for later use.



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



5. Secure the card with the metal bracket screw you removed earlier.



2.9 Removing components

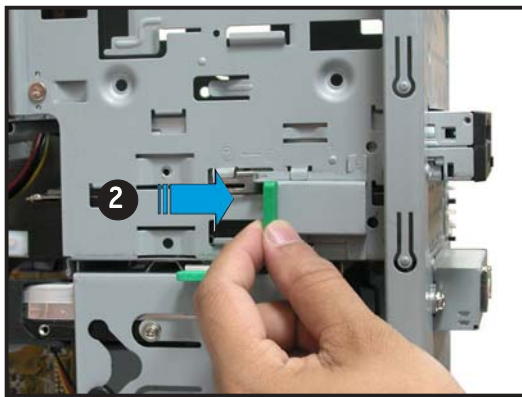
You may need to remove previously installed system components when installing or removing other system components, or when replacing a defective component. This section tells how to remove the following components:

1. Floppy disk drive (FDD)
2. System fan

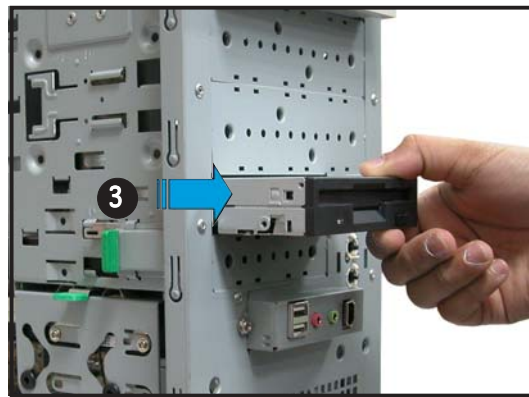
2.9.1 Removing the floppy disk drive

To remove the FDD:

1. Disconnect the FDD power plug and signal cable.



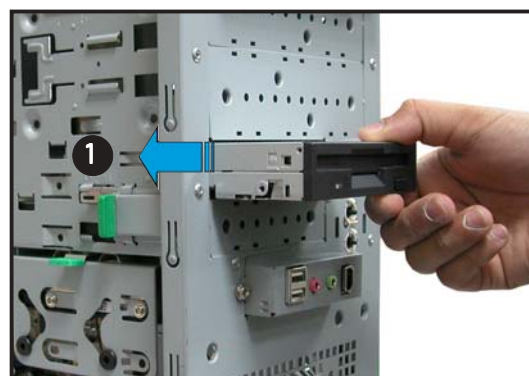
2. Unlock the FDD bay by moving the drive bay lock toward the direction of the front panel.



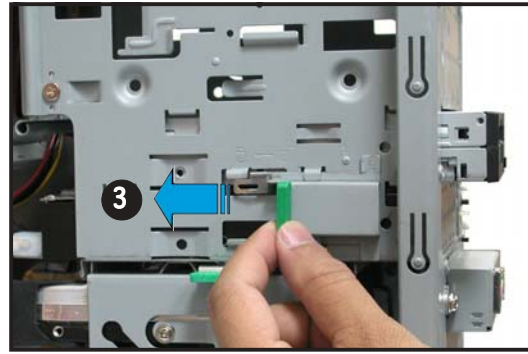
3. Carefully pull the FDD from the chassis. Set the FDD aside.

To install a floppy disk drive:

1. Insert the drive to the bay until it is flushed to the chassis front panel.
2. Align the FDD screw hole with the drive bay lock pin.



3. Move the drive bay lock toward the rear panel to secure the lock.
4. Attach the FDD power and signal cables to the connectors at the back of the drive.



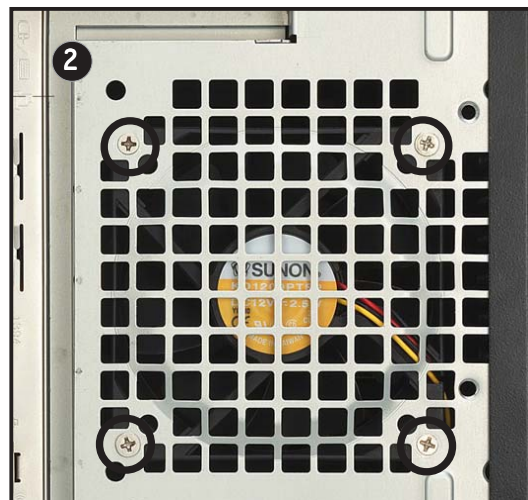
2.9.2 Removing the chassis fan

To remove the chassis fan:

1. Disconnect the chassis fan cable from the REAR_FAN1 connector on the motherboard.
2. Locate and remove four chassis fan screws at the rear panel. Keep the screws for later use.



Hold the chassis fan with one hand while removing the chassis fan screws.



3. Remove the chassis fan, then set aside.

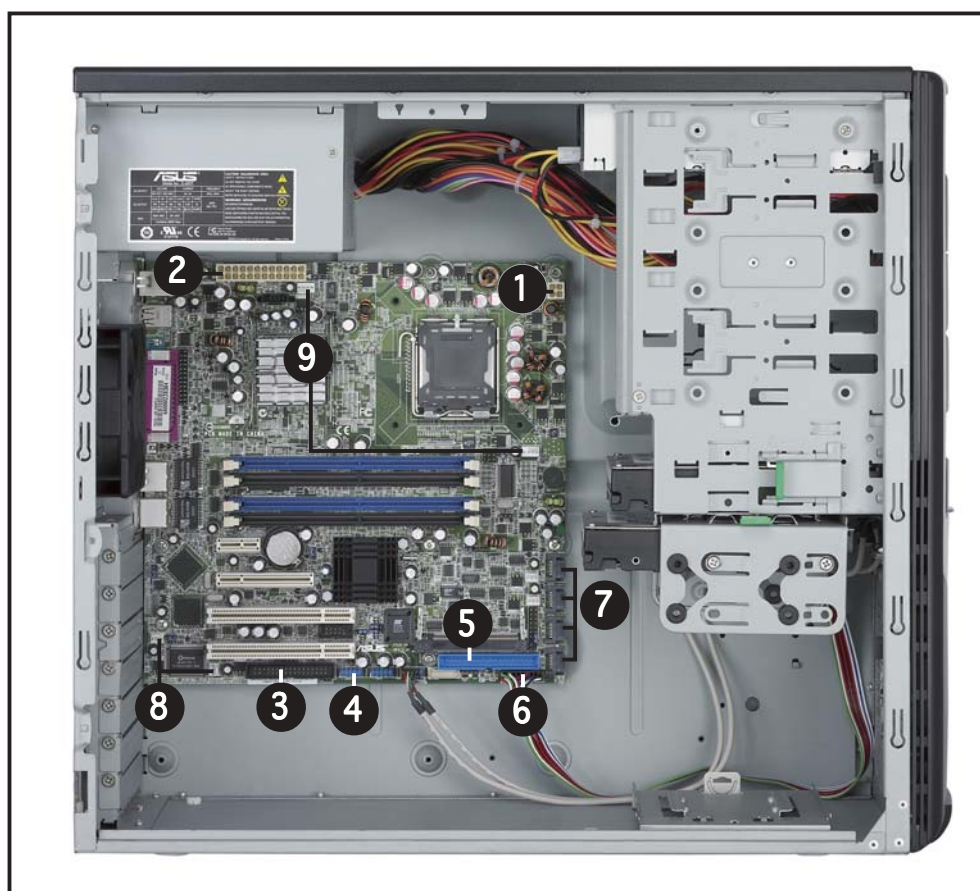


2.10 Connecting cables

The TS150-E2 chassis includes the power and signal cables that you need to connect to the motherboard, storage drives, and other devices that you intend to install.



Most of the cables for the chassis kit are already connected upon shipment. When installing system devices and connecting cables, make sure that all cables are routed properly for better system stability and performance. Refer to the picture below when arranging cables.



Standard cables connected to the motherboard

- | | |
|-----------------------------------|-----------------------------|
| 1. 4-pin ATX 12V power plug | 6. System panel cable |
| 2. 24-pin ATX power plug | 7. Serial ATA signal cables |
| 3. Floppy disk drive ribbon cable | 8. System fan cables |
| 4. Front panel USB 2.0 cable | 9. CPU fan cables |
| 5. IDE signal cable | |

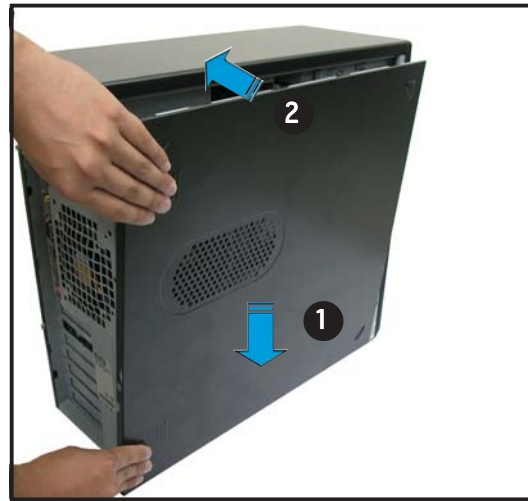


See “Chapter 4: Motherboard information” or detailed information on motherboard connectors.

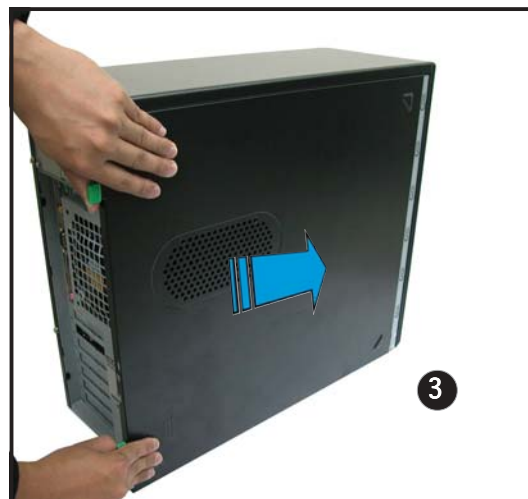
2.11 Replacing the side cover

After installing all components and re-connecting cables, replace the side cover by following these instructions.

1. Match the side cover hooks to the chassis rail on the side of the chassis.
2. Fit the side cover the cover toward the chassis until it fits.



3. Slide the cover toward the front until it snaps in place.



Chapter 3

This chapter describes how to install optional components into the barebone server.



ASUS TS150-E2

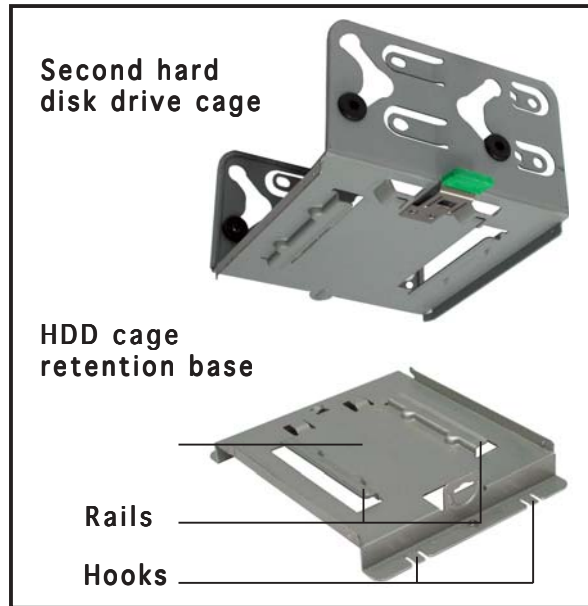
Installation options



The items required for the optional configurations described in this chapter are not included in the standard barebone system package. These items are purchased separately.

3.1 Second hard disk drive cage

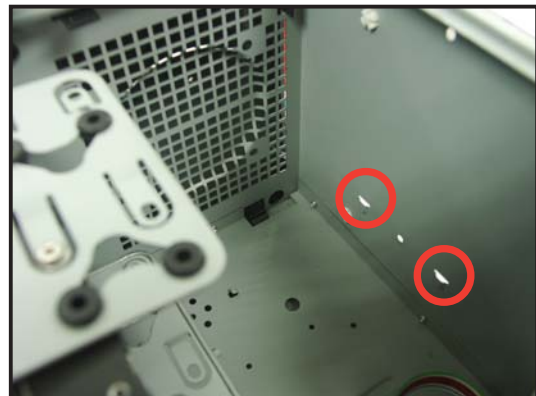
The second hard disk drive cage accommodates one IDE or Serial ATA hard disk drive.



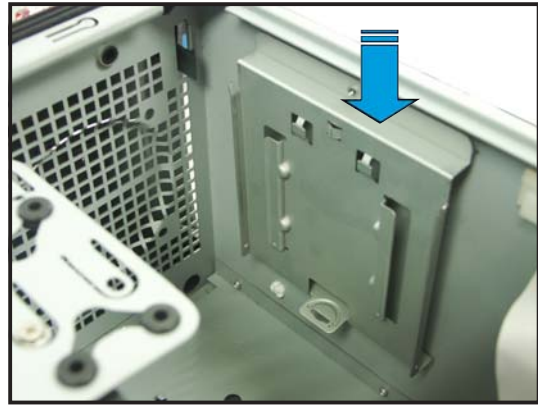
You need to install the retention base to the chassis before installing the second HDD cage.

To install the retention base:

1. Lay the system on its side on a flat, stable surface.
2. Locate two retention base holes on the chassis floor.



3. Insert the retention base hooks to the holes until they fit in place.



4. Secure the retention base with two screws.



5. Turn the system upright.

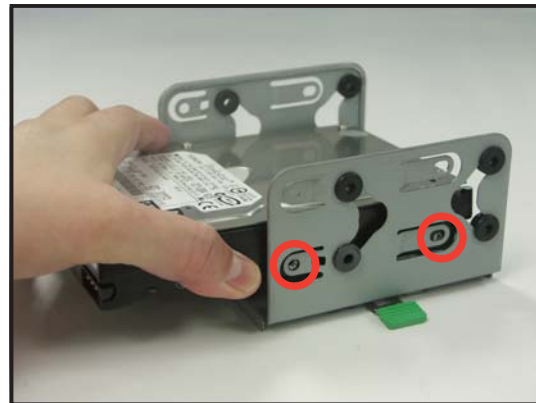


To install a Serial ATA hard disk drive:

1. Insert an HDD to the lower bay of the drive cage. Make sure that the HDD screw holes align with the drive cage screw holes.



DO NOT install a hard disk drive to the upper cage of the bay.



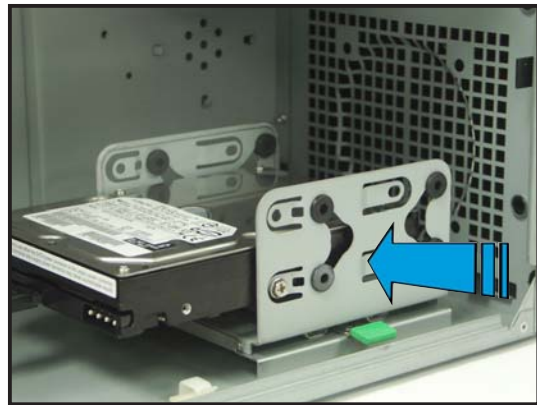
2. Secure the HDD to the cage with two screws (with metal washers) on each side of the bay.



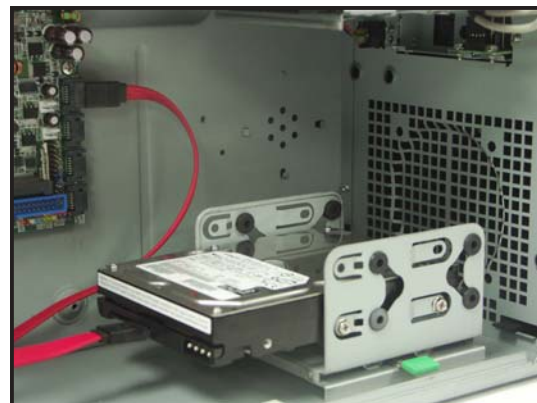
3. Connect one end of the 7-pin Serial ATA cable to the connector at the back of the drive.



4. Align the drive cage and retention base rails, then slightly push the cage until it clicks in place.



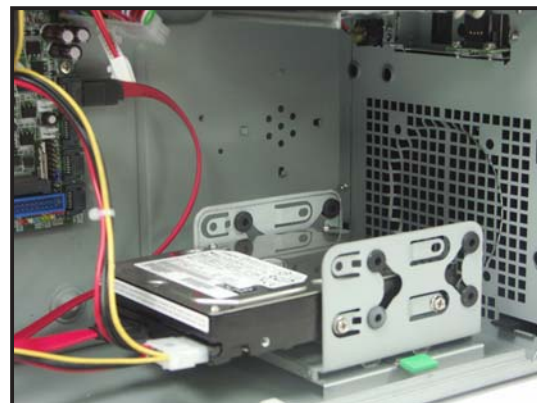
5. Connect the other end of the Serial ATA cable to the SATA connector on the motherboard.



6. Connect a 4-pin power plug from the power supply unit to the power connectors at the back of the drive.



Use a Serial ATA power cable and adapter for Serial ATA HDD(s) without a 4-pin power connector.

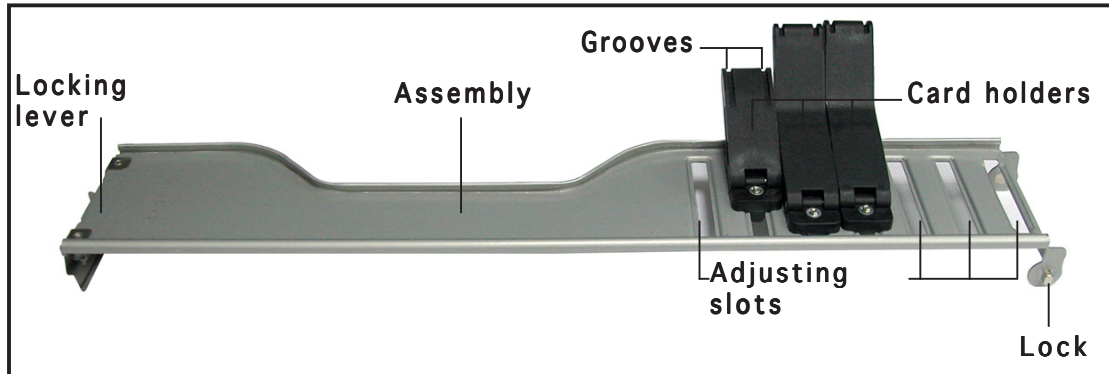


3.2 Expansion card holder

The expansion card holder provides support for long and heavy PCI cards.



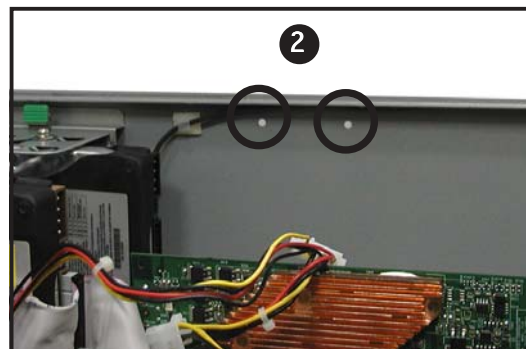
Install all necessary expansion cards before installing the expansion card holder.



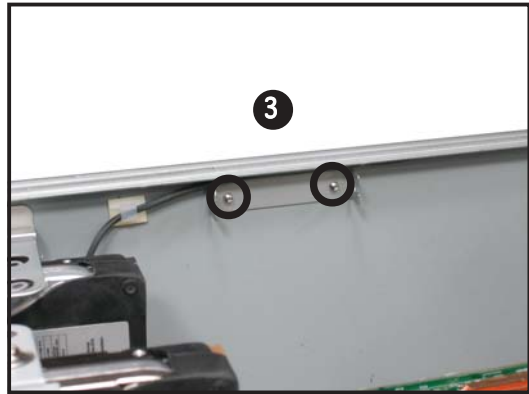
The expansion card holder comes with a retention bracket to keep the expansion card holder in place.

To install the retention bracket:

1. Lay the system on its side on a flat, stable surface.
2. Locate two retention bracket screw holes on the chassis floor.

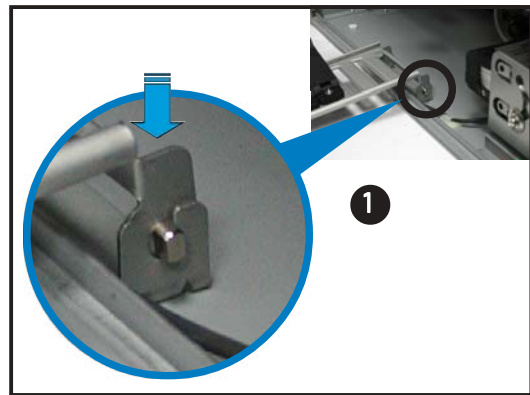


3. Place the retention bracket over the chassis floor screw holes, then secure the bracket with two screws.
4. Turn the chassis upright.

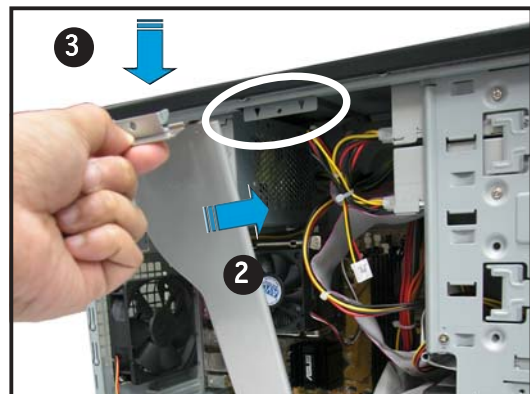


To install the expansion card holder:

1. Insert the expansion card holder lock to the retention bracket notch, as shown.



2. Turn the expansion card holder upright.
3. Press the locking lever, then insert the hooks to the chassis holes.



4. Secure the expansion card holder with one screw.



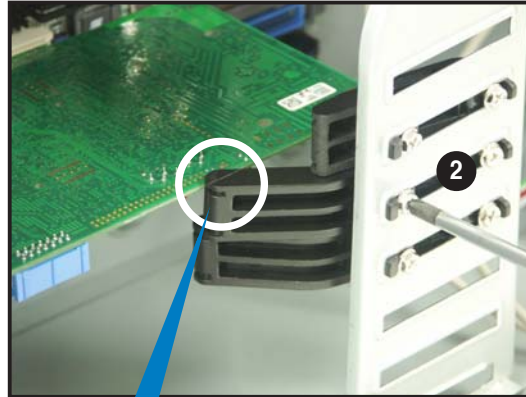
To hold long expansion cards:

1. Place the card holder at level with the expansion card.



Do not use the smaller card holder, which is for long AGP cards. The P5CR-VM motherboard does not have an AGP slot. The other card holders are for long PCI cards.

2. Loosen the screw(s) to adjust the card holder forward or sideward until its groove fits the edge of the expansion card.



3. Fasten the card holder screw(s).
4. Follow the same steps in holding other long expansion cards.



Chapter 4

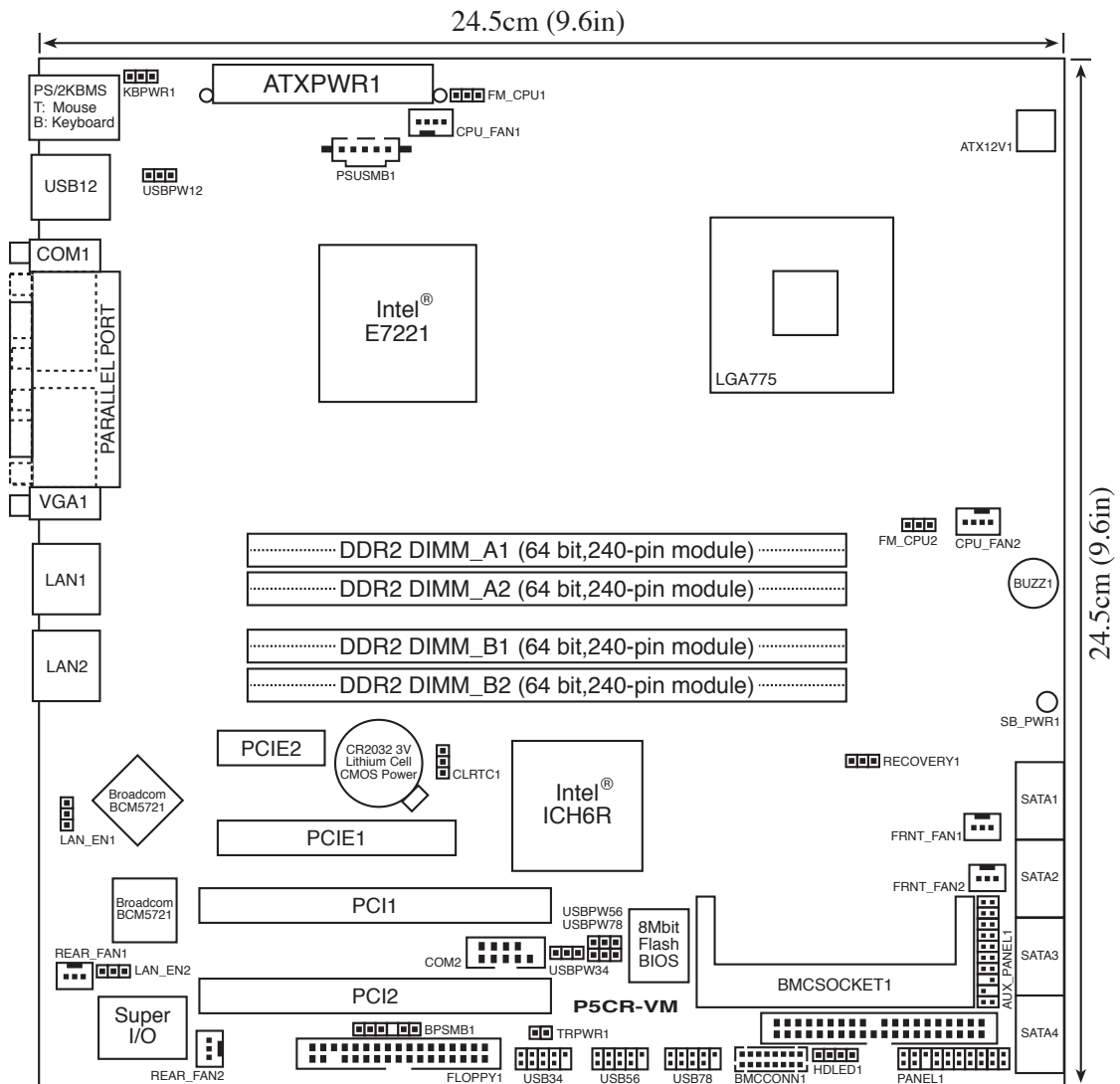
This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.



ASUS TS15-E2

Motherboard info

4.1 Motherboard layout



Layout contents

Jumpers	Page
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4. Keyboard and mouse power (3-pin KBPWR1)	4-6
5. Gigabit LAN controller setting (3-pin LAN_EN1)	4-6
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7. BIOS recovery (3-pin RECOVERY1)	4-8

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Internal connectors	Page
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4. CPU fan connectors (4-pin CPU_FAN1/CPU_FAN2))	4-12
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6. Hard disk activity LED connector (4-pin HDLED1)	4-13
7. USB connectors (10-1 pin USB34, USB56, USB78)	4-13
8. SSI power connectors (24-pin ATXPWR1, 4-pin ATX12V1)	4-14
9. Serial port connector (10-1 pin COM2)	4-15
10. Backplane SMBus connector (6-1 pin BPSMB1)	4-15
11. Power supply SMBus connector (5-pin PSUSMB1)	4-16
12. BMC connector (16-pin BMCCONN1)	4-16
13. TRPWR connector (2-pin TRPWR1)	4-17
14. Auxiliary panel connector (20-pin AUX_PANEL1) <ul style="list-style-type: none"> • Chassis Intrusion connector (3-pin CASEOPEN) • LAN1 link activity LED (2-pin LAN1_LINKACTLED) • LAN2 link activity LED (2-pin LAN2_LINKACTLED) • Locator LED 1 (2-pin LOCATORLED1) • Locator LED 2 (2-pin LOCATORLED2) • Locator Button/Switch (2-pin LOCATORBTN) • Front Panel SMBus (6-1 pin) 	4-18
15. System panel connector (20-pin PANEL1) <ul style="list-style-type: none"> • System power LED (Green 3-pin PLED) • Hard disk drive activity LED (Red 2-pin HDLED) • System warning speaker (Orange 4-pin SPEAKER) • ATX power button/soft-off button (Yellow 2-pin POWERBTN) • Reset button (Blue 2-pin RESETCON) 	4-19

4.2 Jumpers

1. Clear RTC RAM (CLRTC1)

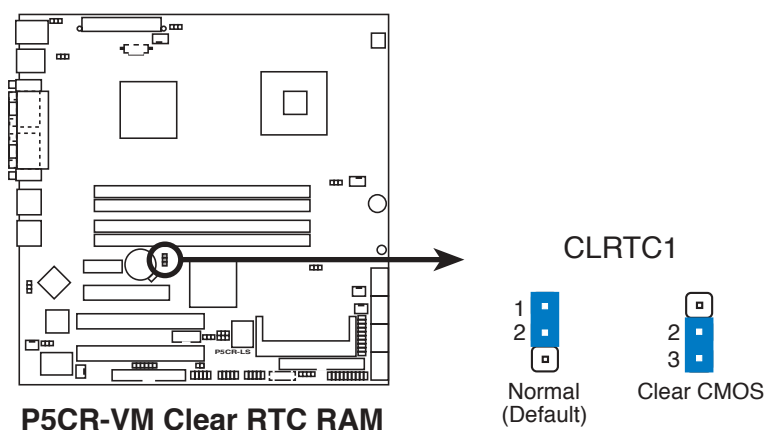
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

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. Reinstall the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the key during the boot process and enter BIOS setup to re-enter data.

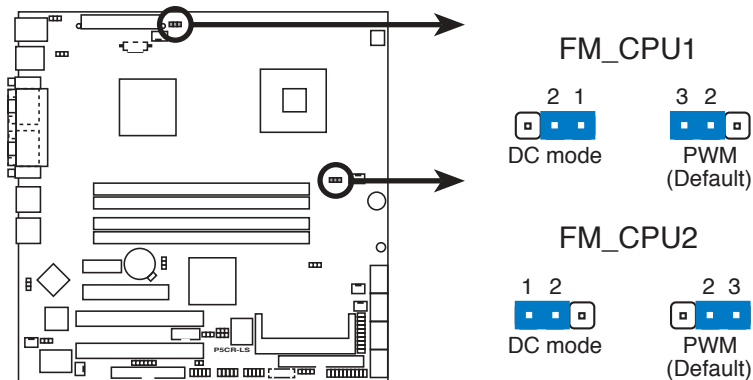


Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



2. CPU fan mode selection (3-pin FM_CPU1, FM_CPU2)

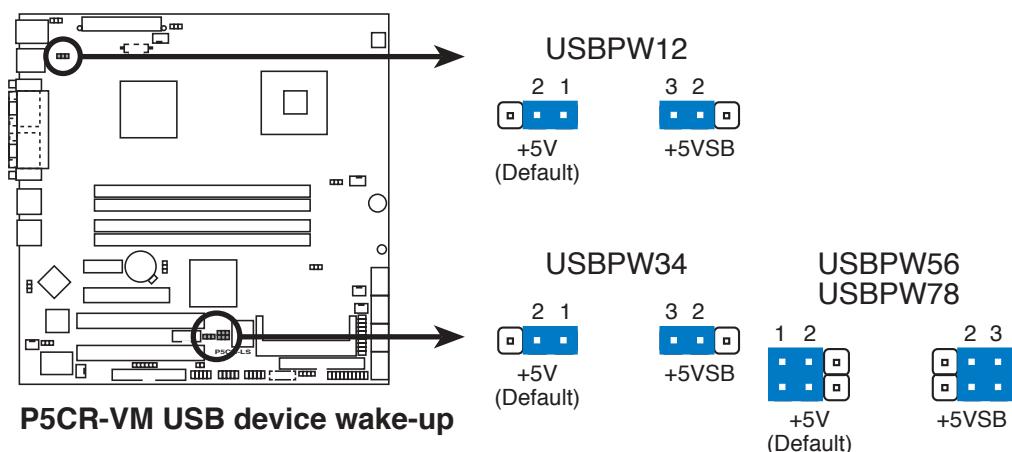
These jumpers allow you to connect either a 3-pin or a 4-pin fan cable plug to the CPU fan connectors (CPU_FAN1, CPU_FAN2). Set these jumpers to pins 1-2 if you are using a 3-pin fan cable plug, or to pins 2-3 if you are using a 4-pin plug.



P5CR-VM FM_CPU Setting

3. USB device wake-up (3-pin USBPW12, USBPW34, USBPW56, USBPW78)

Set these jumpers to +5V to wake up the computer from S1 sleep mode using the connected USB devices. Set to +5VSB to wake up from S4 sleep mode (no power to CPU, DRAM power supply in reduced power mode).



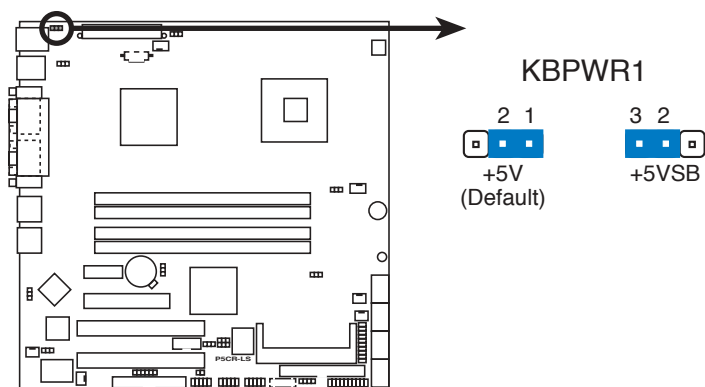
P5CR-VM USB device wake-up



- 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.

4. Keyboard and mouse power (3-pin KBPWR1)

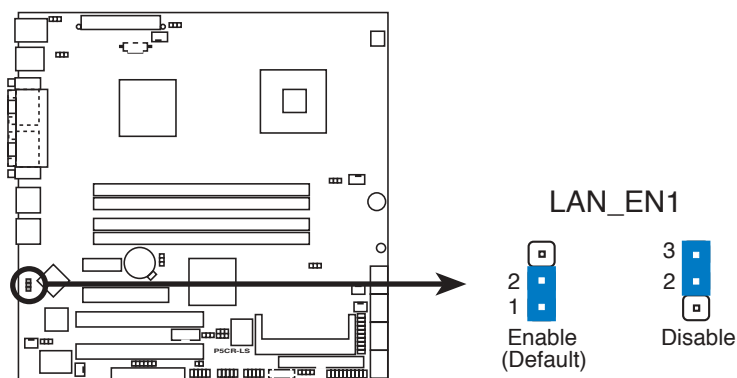
This jumper allows you to enable or disable the keyboard and mouse wake-up feature. Set this jumper to pins 2-3 (+5VSB) to wake up the computer when you press a key on the keyboard (the default is the Space Bar) or click the mouse. This feature requires an ATX power supply that can supply at least 1A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



P5CR-VM Keyboard and mouse power setting

5. Gigabit LAN controller setting (3-pin LAN_EN1)

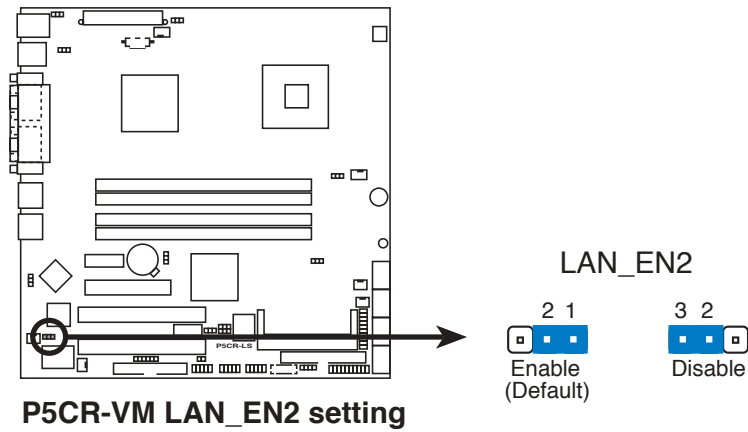
These jumpers allow you to enable or disable the onboard Broadcom BCM5721 Gigabit LAN controller. Set to pins 1-2 to activate the Gigabit LAN feature.



P5CR-VM LAN_EN1 setting

6. Gigabit LAN controller setting (3-pin LAN_EN2)

These jumpers allow you to enable or disable the onboard Broadcom BCM5705E Gigabit LAN controller. Set to pins 1-2 to activate the Gigabit LAN feature.

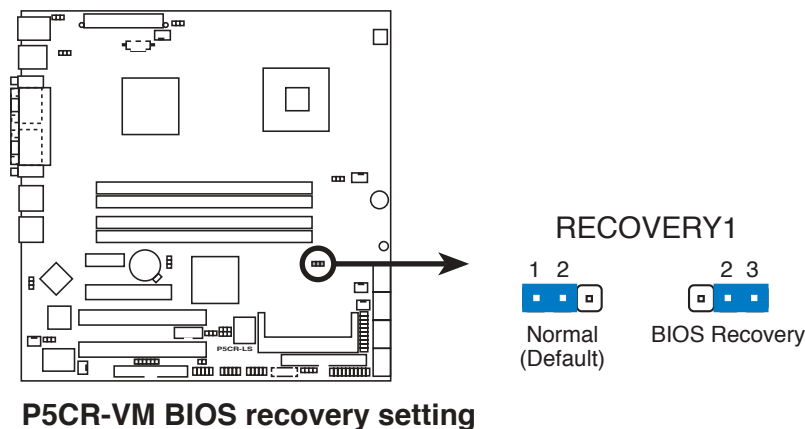


7. BIOS recovery (3-pin RECOVERY1)

This jumper allows you to recover your original BIOS from a floppy disk in case the BIOS codes and data are corrupted.

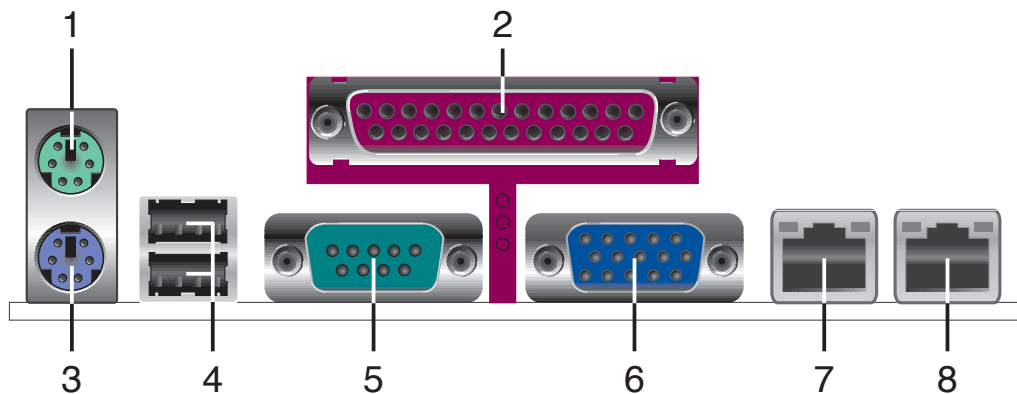
To recover the BIOS:

1. Turn OFF your computer and unplug the power cord.
2. Move the jumper cap from pins 1-2 (default) to pins 2-3.
3. Insert a floppy disk with the original or updated BIOS file.
4. Plug the power cord and turn ON the computer.
5. The system searches for the BIOS file in the floppy then reflashes the BIOS.
6. When finished, shut down your computer.
7. Replace the jumper cap from pins 2-3 to pins 1-2.
8. Reboot your computer.
9. Hold down the key during the boot process and enter BIOS setup to re-enter data.



4.3 Connectors

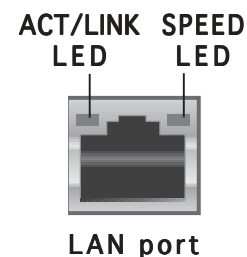
4.3.1 Rear panel connectors



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. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.
4. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
5. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.
6. **Video Graphics Adapter (VGA) port.** This port is for a VGA monitor or other VGA-compatible devices.
7. **LAN 1 (RJ-45) port.** 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.
8. **LAN 2 (RJ-45) port.** 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	Description0
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



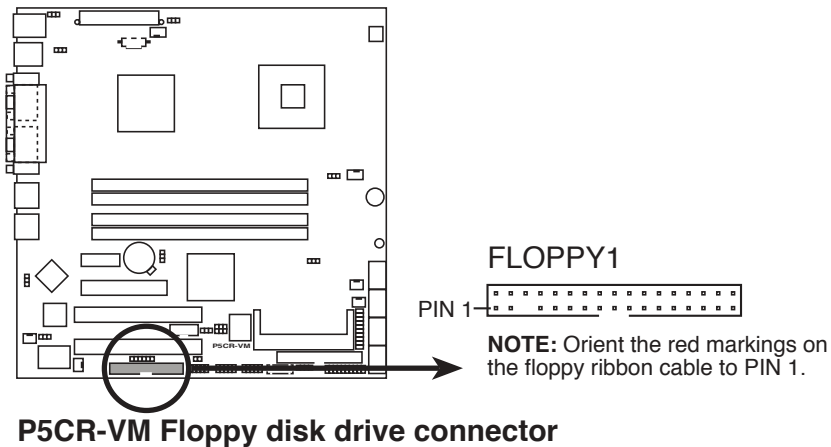
4.3.2 Internal connectors

1. Floppy disk drive connector (34-1 pin FLOPPY1)

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 a FDD cable with a covered Pin 5.

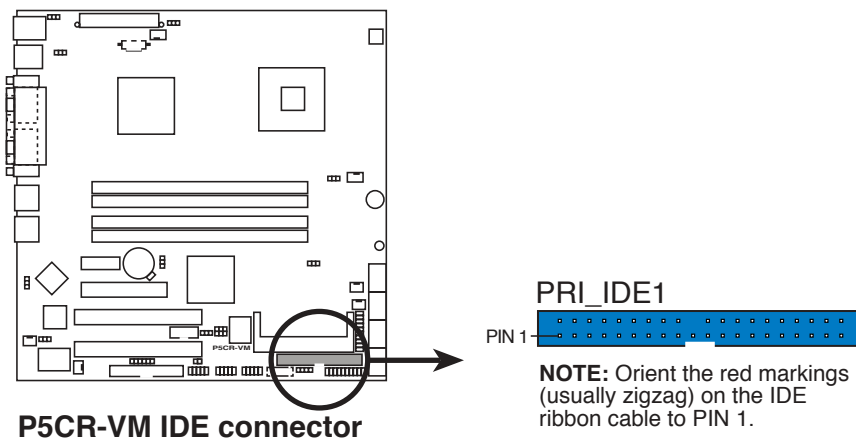


2. IDE connector (40-1 pin PRI_IDE1)

This connector is for an Ultra DMA 100/66 signal cable. The Ultra DMA 100/66 signal cable has three connectors: a blue connector for the primary IDE connector on the motherboard, a black connector for an Ultra DMA 100/66 IDE slave device (optical drive/hard disk drive), and a gray connector for an Ultra DMA 100/66 IDE master device (hard disk drive). If you install two hard disk drives, you must configure the second drive as a slave device by setting its jumper accordingly. Refer to the hard disk documentation for the jumper settings.



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



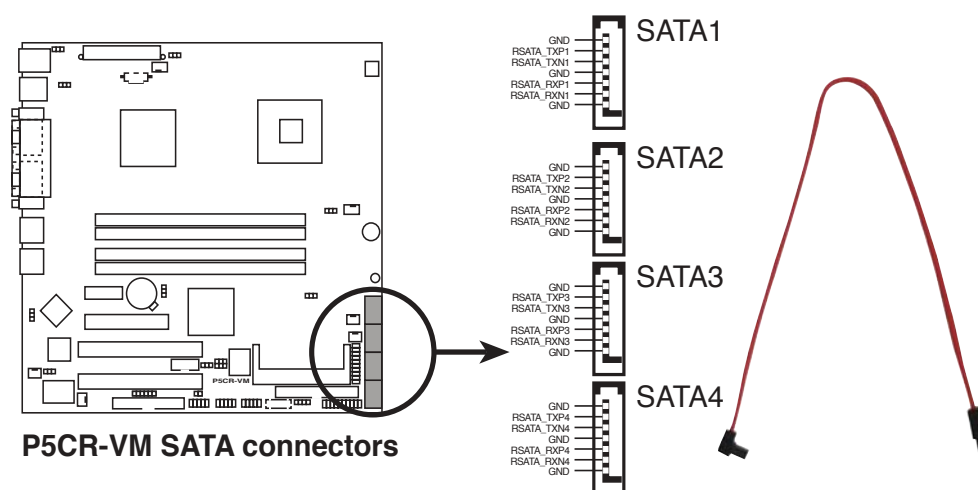
3. Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4)

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

If you installed Serial ATA hard disk drives, you can create a RAID 0 or RAID 1 configuration with the onboard Intel® ICH6R RAID controller.



These connectors are set to **Standard IDE** mode by default. In **Standard IDE** mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the **Configure SATA As** item in the BIOS to [RAID]. See section “5.3.5 IDE Configuration” for details.



Important notes on Serial ATA

- You must install Windows® 2000 Service Pack 4, Windows® 2000 Advanced Server, or Windows® Server 2003 before using Serial ATA hard disk drives. The Serial ATA RAID feature (RAID 0 and RAID 1) is available only if you are using Windows® 2000/2003 Server.
- Use only two Serial ATA RAID connectors for each RAID 0 and RAID 1 set.
- When using the connectors in **Standard IDE** mode, connect the primary (boot) hard disk drive to the SATA1 or SATA2 connector. Refer to the table below for the recommended SATA hard disk drive connections.

Serial ATA hard disk drive connection

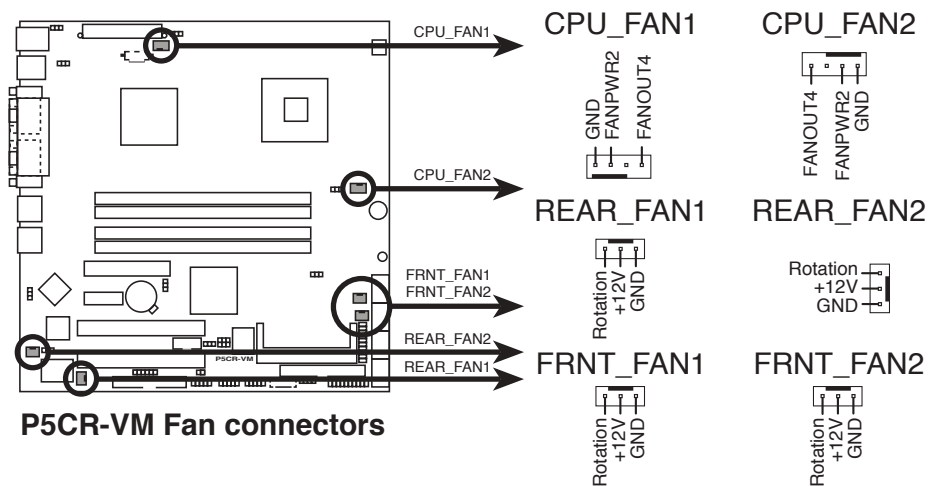
Connector	Setting	Use
SATA1, SATA2	Master	Boot disk
SATA3, SATA4	Slave	Data disk

4. CPU and system fan connectors (4-pin CPU_FAN1/2, REAR_FAN1/2, FRNT_FAN1/2)

The fan connectors support cooling fans of 350 mA ~ 740 mA (8.88 W max.) or a total of 2.1 A ~ 4.44 A (53.28 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.

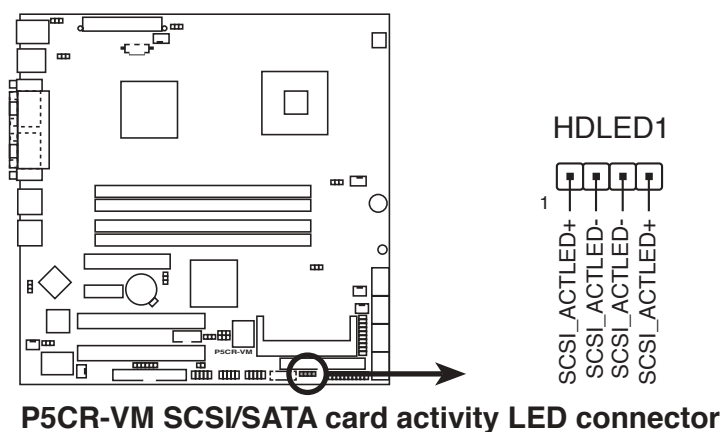


Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



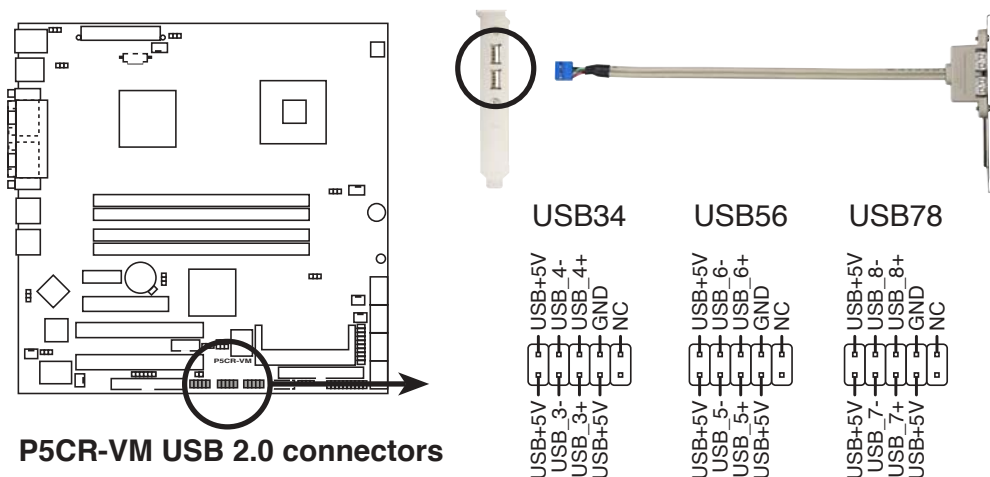
5. Hard disk activity LED connector (4-pin HDLED1)

This connector supplies power to the hard disk activity LED. The read or write activities of any device connected to the primary/secondary SCSI connectors or the SATA connectors cause this LED to light up.



6. USB connectors (10-1 pin USB34, USB56, USB78)

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



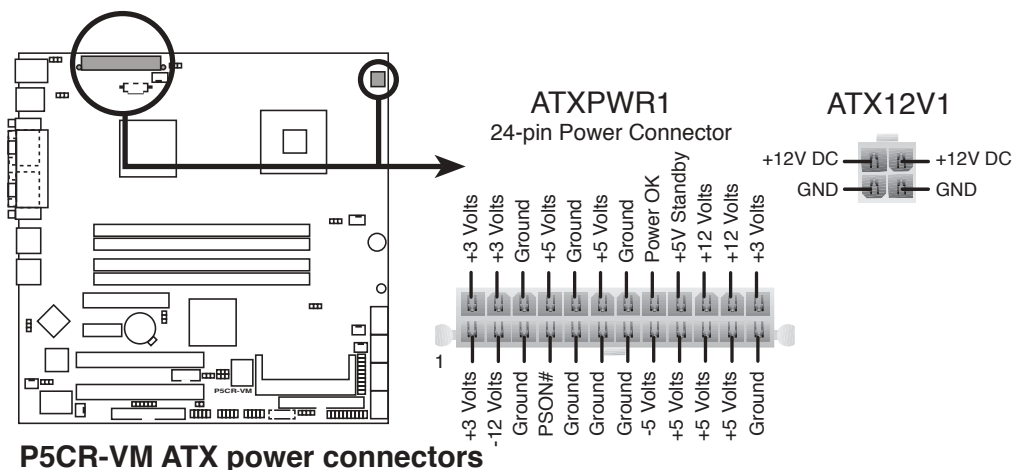
Never connect a **1394 cable** to the USB connectors. Doing so will damage the motherboard!

7. SSI power connectors (24-pin ATXPWR1, 4-pin ATX12V1)

These connectors are for SSI 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.

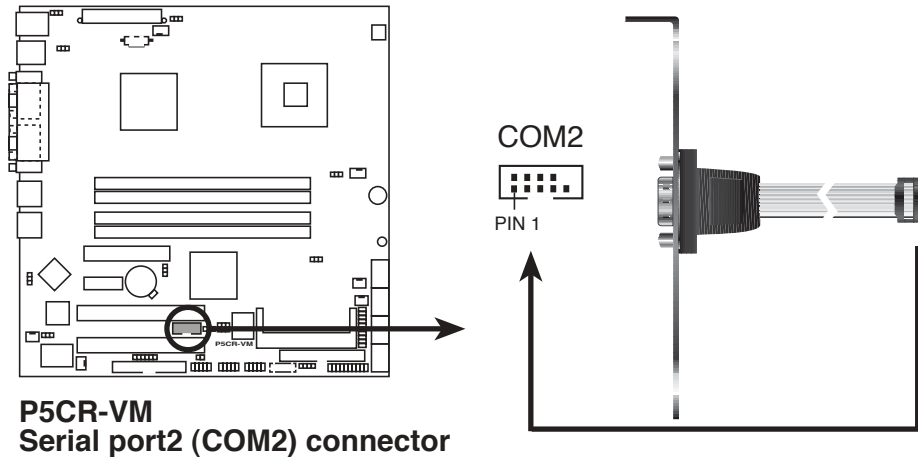


- Use of an SSI 12 V Specification 2.0-compliant power supply unit (PSU) that provides a minimum power of 450 W is recommended for a fully-configured system.
- Do not forget to connect the 4-pin ATX +12 V power plug; otherwise, the system will not boot up.
- Use of a PSU with a higher power output is 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.
- You must install a PSU with a higher power rating if you intend to install additional devices.



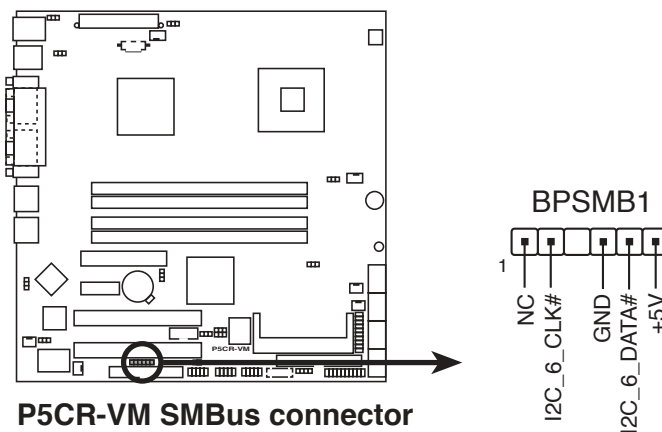
8. Serial port connector (10-1 pin COM2)

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.



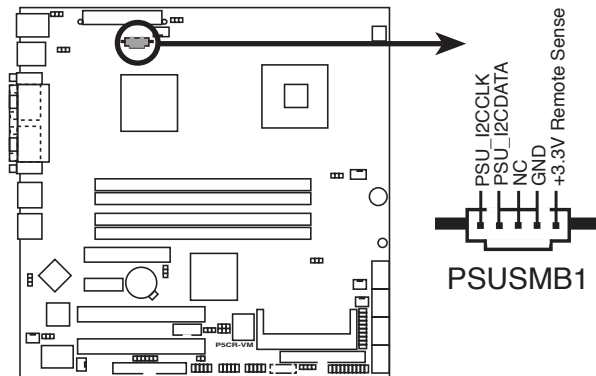
9. Backplane SMBus connector (6-1 pin BPSMB1)

This connector allows you to connect SMBus (System Management Bus) devices. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.



10. Power supply SMBus connector (5-pin PSUSMB1)

This connector allows you to connect SMBus (System Management Bus) devices. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.

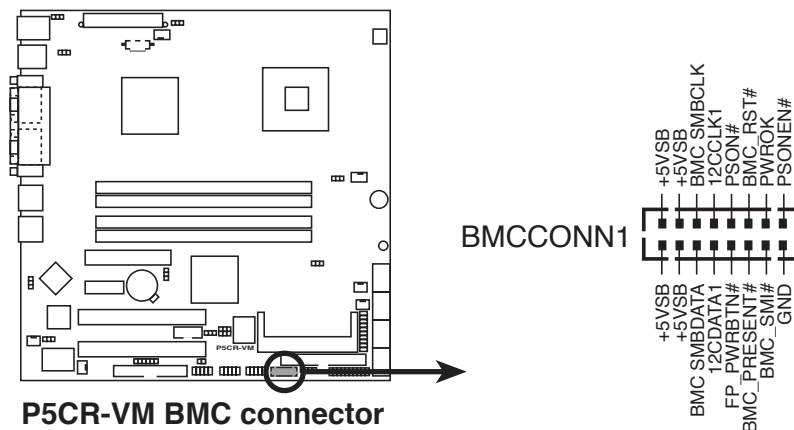


PSUSMB1

P5CR-VM Power supply SMBus connector

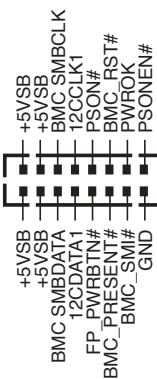
11. BMC connector (16-pin BMCCONN1)

This connector is for an ASUS server management card.



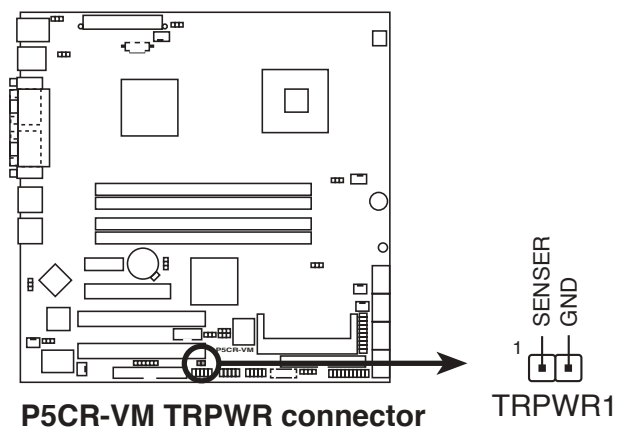
BMCCONN1

P5CR-VM BMC connector



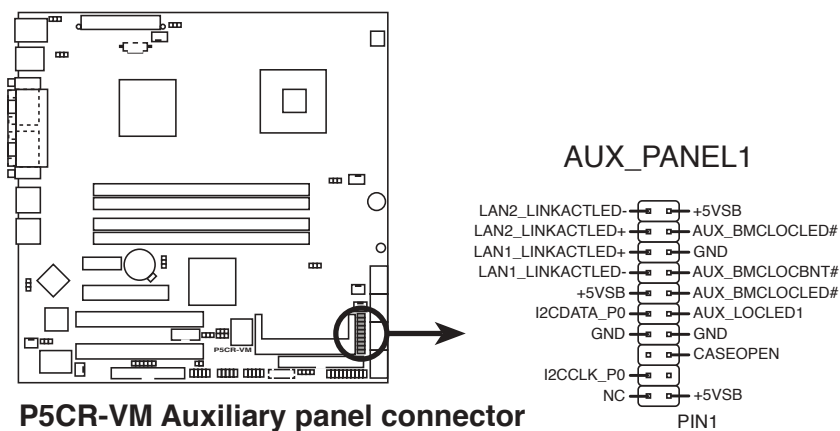
12. TRPWR connector (2-pin TRPWR1)

This connector is for an internal temperature sensor/probe.



13. Auxiliary panel connector (20-pin AUX_PANEL1)

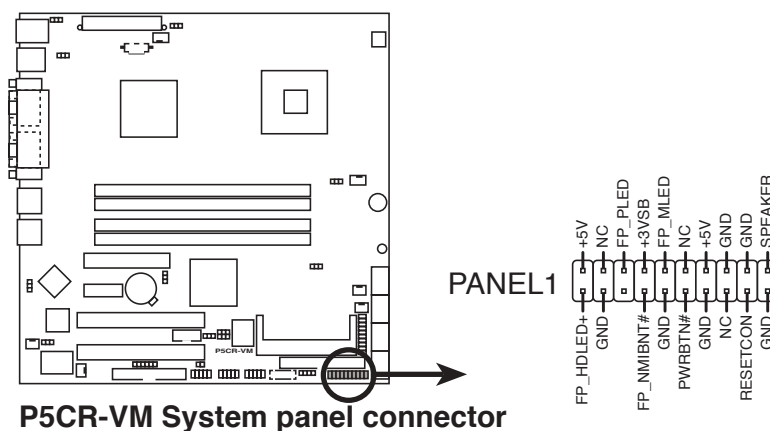
This connector supports several server system functions.



- **Chassis Intrusion connector (3-pin CASEOPEN)**
This lead is for a chassis with an intrusion detection feature. This requires an external detection mechanism such as a chassis intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to this lead to record a chassis intrusion event.
- **LAN1 link activity LED (2-pin LAN1_LINKACTLED)**
This 2-pin connector is for the LAN1 Activity LED. Connect the LAN1 Activity LED cable to this connector. This LED blinks during a network activity and is always lit when linked.
- **LAN2 link activity LED (2-pin LAN2_LINKACTLED)**
This 2-pin connector is for the LAN2 Activity LED. Connect the LAN2 Activity LED cable to this connector. This LED blinks during a network activity and lights up when linked.
- **Locator LED 1 (2-pin LOCATORLED1)**
This 2-pin connector is for the Locator LED 1. Connect the Locator LED 1 cable to this connector. This LED lights up when the Locator button is pressed and if there is no LAN1 connection (e.g. the LAN1 controller is broken).
- **Locator LED 2 (2-pin LOCATORLED2)**
This 2-pin connector is for the Locator LED 2. Connect the Locator LED 2 cable to this connector. This LED is synchronized with the LAN2 LED.
- **Locator Button/Switch (2-pin LOCATORBTN)**
This connector is for the locator button. This button queries the state of the system locator.
- **Front Panel SMBus (6-1 pin)**
This connector allows you to connect SMBus (System Management Bus) devices. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.

14. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.



The system panel connector is color-coded for easy connection.

- **System power LED (Green 3-pin PLED)**
This 3-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 (Red 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.
- **System warning speaker (Orange 4-pin SPEAKER)**
This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.
- **ATX power button/soft-off button (Yellow 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 (Blue 2-pin RESETCON)**
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

Chapter 5

This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.



ASUS AP1710-E1

BIOS information

5.1 Managing and updating your BIOS

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

1. **ASUS AFUDOS** (Updates the BIOS in DOS mode using a bootable floppy disk.)
2. **ASUS EZ Flash** (Updates the BIOS using a floppy disk during POST.)
3. **ASUS CrashFree BIOS 2** (Updates the BIOS using a bootable floppy disk 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.

5.1.1 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® Server 2003*
 - 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. In the **Open** field, type **D:\bootdisk\makeboot a:** assuming that D is your optical drive letter.
 - e. Press <Enter>, then follow screen instructions to continue.
2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

5.1.2 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 1024 KB 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 /iP5CR-VM.ROM
```

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

```
A:\>afudos /iP5CR-VM.ROM /pbnc
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

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

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



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

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

```
A:\>afudos /iP5CR-VM.ROM /pbnc
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:\>
```

5.1.3 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 **P5CR-VM.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 "P5CR-VM.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 "P5CR-VM.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 P5CR-VM.ROM.

5.1.4 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 **P5CR-VM.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...
```

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 "P5CR-VM.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 "P5CR-VM.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.

5.1.5 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 **Install ASUS Update. VX.XX.XX.**
3. The ASUS Update utility is copied to your system.

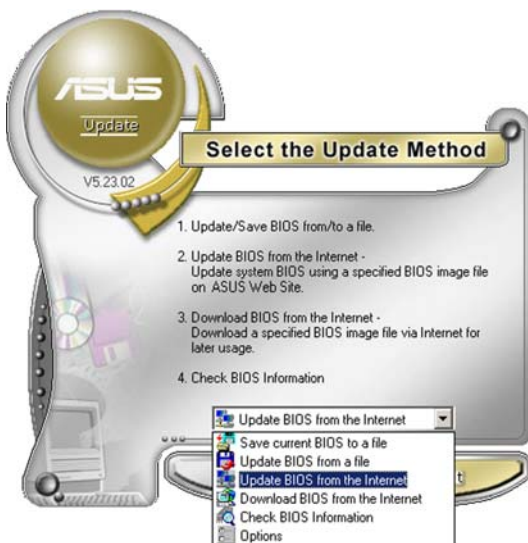
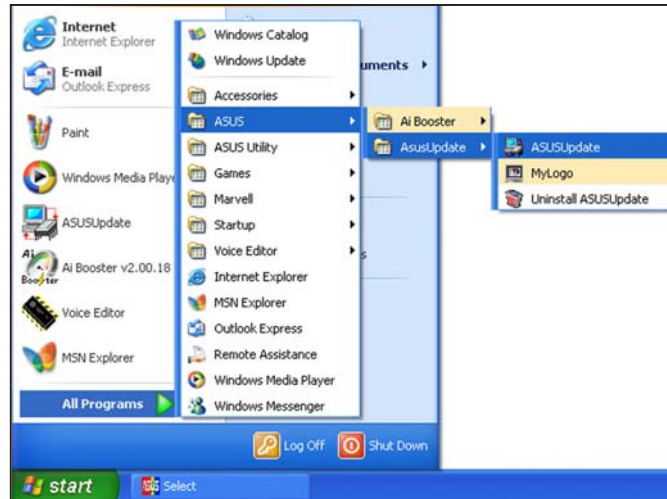


Quit all Windows® applications before you update the BIOS using this utility.

Updating the BIOS through the Internet

To update the BIOS through the Internet:

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



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



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

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



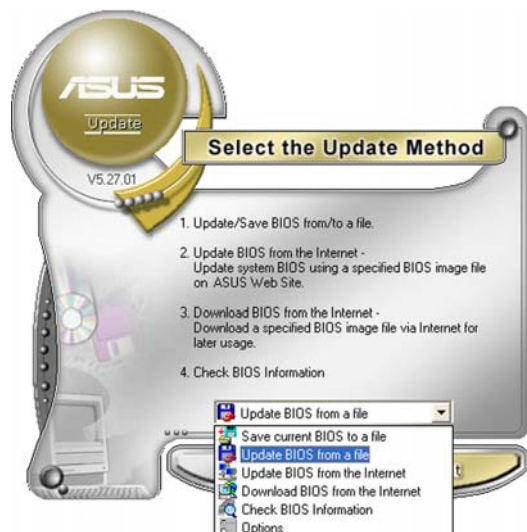
The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail of all its features.



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 **Save**.
4. Follow the screen instructions to complete the update process.

5.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section “5.1 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 firmware hub.

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

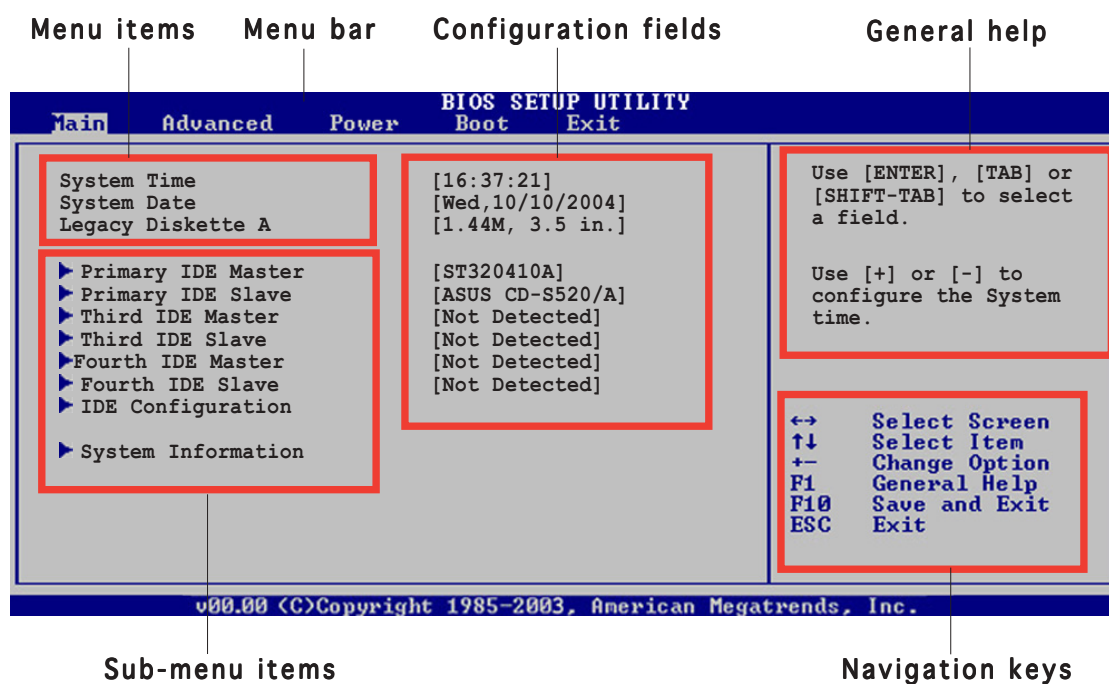
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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



-
- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section “5.7 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.
-

5.2.1 BIOS menu screen



5.2.2 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.

5.2.3 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.

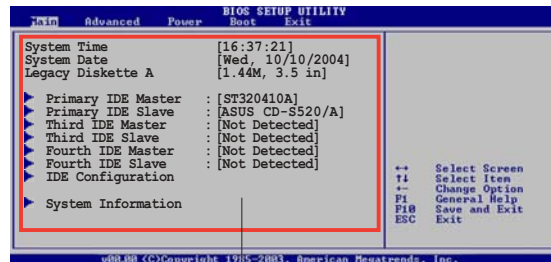


Some of the navigation keys differ from one screen to another.

5.2.4 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

5.2.5 Sub-menu items

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

5.2.6 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.

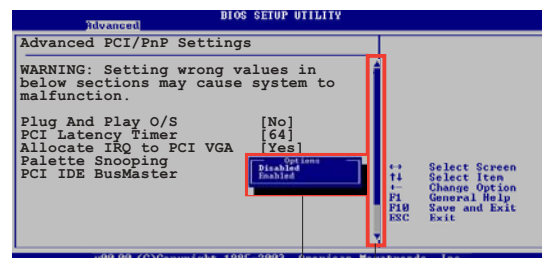
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to “5.2.7 Pop-up window.”

5.2.7 Pop-up window

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

5.2.8 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

5.2.9 General help

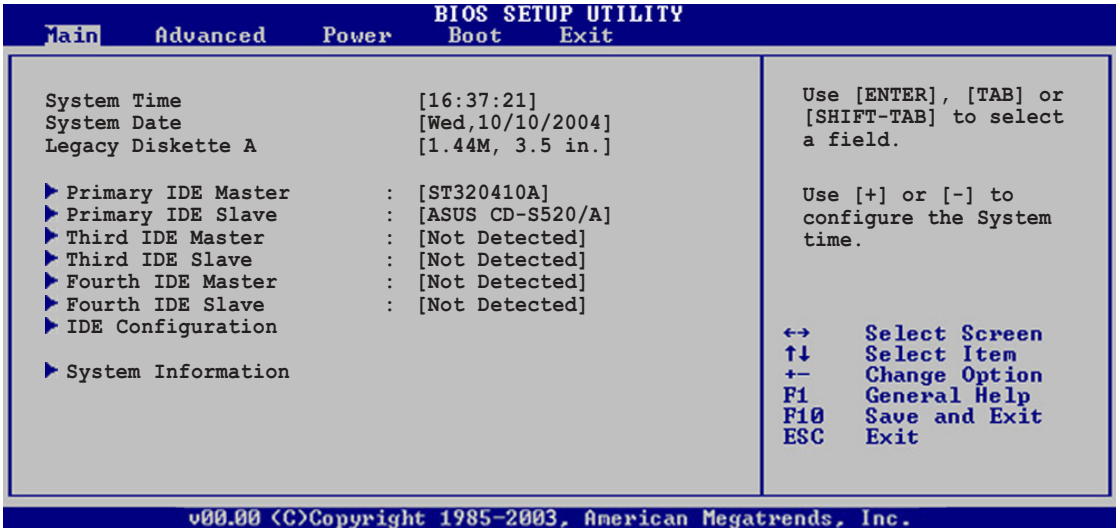
At the top right corner of the menu screen is a brief description of the selected item.

5.3 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 “5.2.1 BIOS menu screen” for information on the menu screen items and how to navigate through them.



5.3.1 System Time [xx:xx:xx]

Sets the system time.

5.3.2 System Date [Day xx/xx/xxxx]

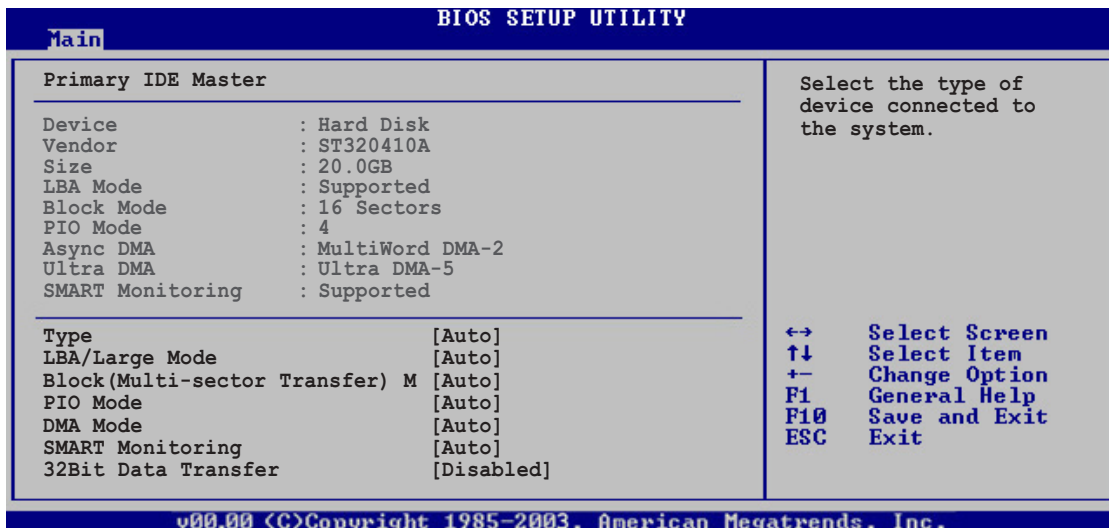
Sets the system date.

5.3.3 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.]

5.3.4 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.



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

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) [Auto]

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

PIO Mode [Auto]

Selects the PIO mode.

Configuration options: [Auto] [0] [1] [2] [3] [4]

DMA Mode [Auto]

Selects the DMA mode. Configuration options: [Auto] [SWDMA0]

[SWDMA1] [SWDMA2] [MWDMA0] [MWDMA1] [MWDMA2] [UDMA0]

[UDMA1] [UDMA2] [UDMA3] [UDMA4] [UDMA5]

SMART Monitoring [Auto]

Sets the Smart Monitoring, Analysis, and Reporting Technology.

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

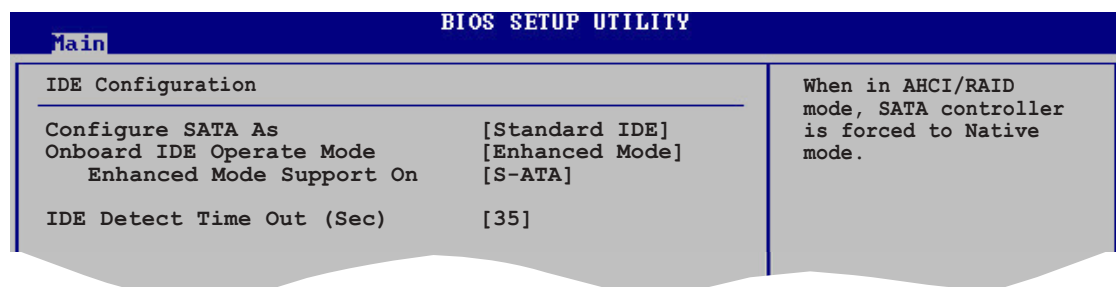
32Bit Data Transfer [Disabled]

Enables or disables 32-bit data transfer.

Configuration options: [Disabled] [Enabled]

5.3.5 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 want to configure the item.



Configure SATA As [Standard IDE]

Sets the Serial ATA configuration. When set in Advanced Host Controller Interface (AHCI) or RAID mode the SATA controller is set to Native mode.

Configuration options: [Standard IDE] [AHCI] [RAID]

Onboard IDE Operate Mode [Enhanced Mode]

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 SATA 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 S-ATA+P-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 **SATA**. Configuration options: [S-ATA+P-ATA] [S-ATA] [P-ATA]



The **Onboard IDE Operate Mode** and its submenu items appear only when the **Configure SATA As** item is set to Standard IDE.

Onboard Serial-ATA BOOTROM [Disabled]

Enables or disables the onboard Serial ATA boot ROM. Configuration options: [Disabled] [Enabled]



The **Onboard Serial-ATA BOOTROM** item appears only when the **Configure SATA As** item is set to RAID.

ALPE and ASP [Disabled]

Enables or disables the ALPE and ASP. Configuration options: [Disabled] [Enabled]

Stagger Spinup Support [Disabled]

Enables or disables the stagger spinup support. Configuration options: [Disabled] [Enabled]

AHCI Port 3 Interlock Switch [Disabled]

Enables or disables the Advanced Host Controller Interface (AHCI) Port 3 interlock switch. Configuration options: [Disabled] [Enabled]



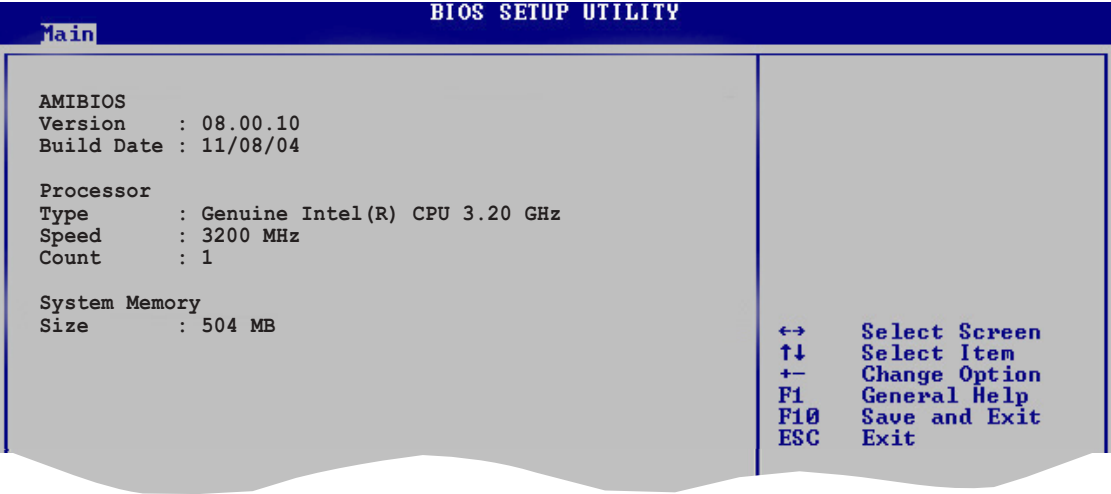
The **ALPE and ASP** item appears only when the **Configure SATA As** item is set to AHCI.

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]

5.3.6 System Information

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



AMI BIOS

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

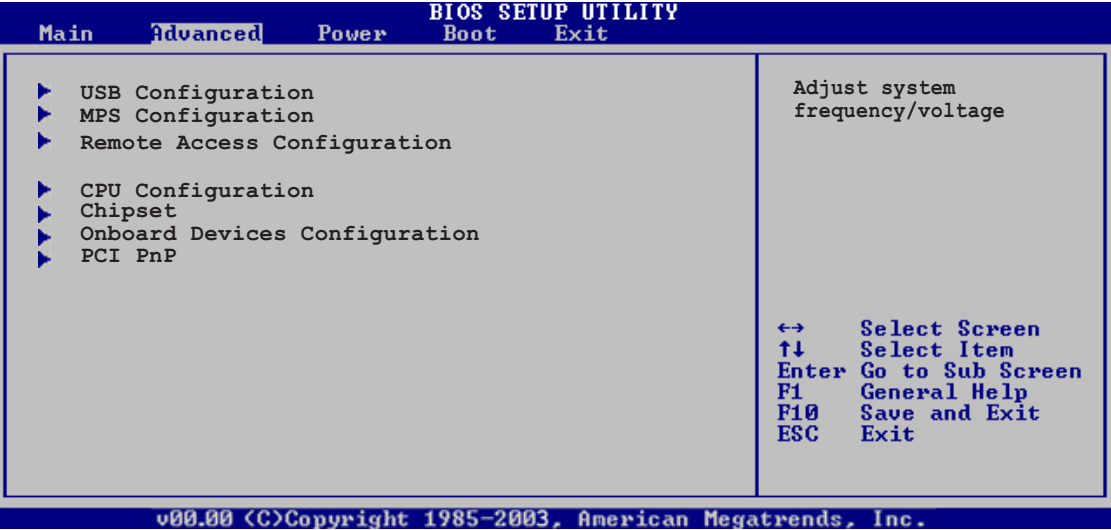
Displays the auto-detected system memory.

5.4 Advanced menu

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

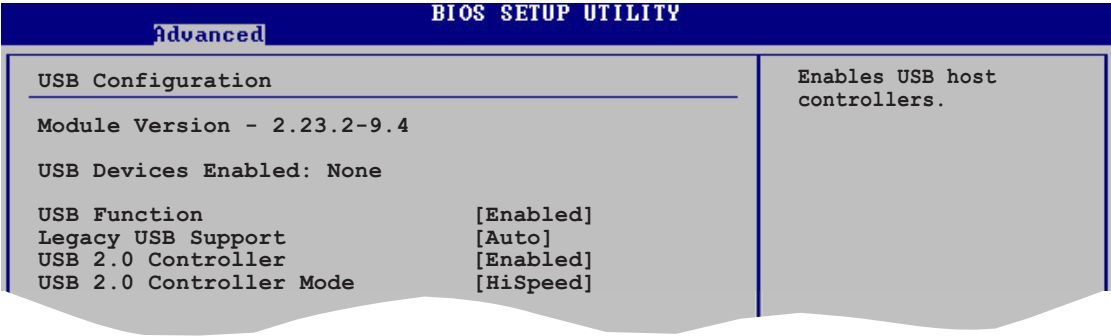


Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



5.4.1 USB Configuration

The items in this menu allow 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 legacy USB devices. Setting to Auto allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled. Configuration options: [Disabled] [Enabled] [Auto]

USB 2.0 Controller [Enabled]

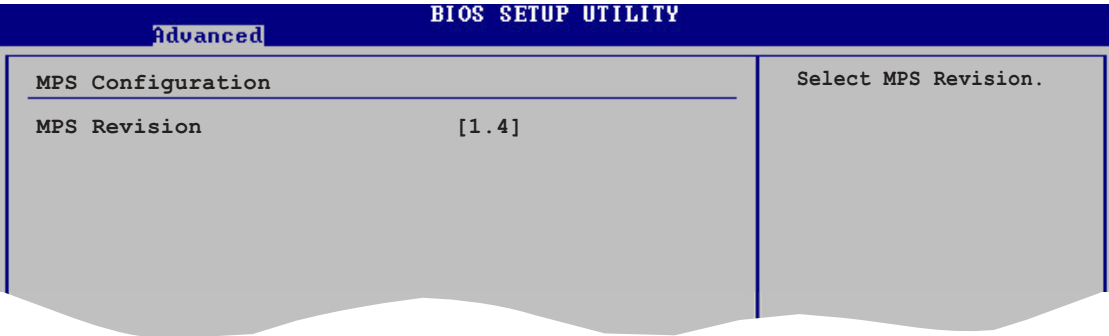
Allows you to enable or disable the USB 2.0 controller. Configuration options: [Enabled] [Disabled]

USB 2.0 Controller Mode [HiSpeed]

Allows you to set the USB 2.0 controller mode to HiSpeed (480 Mbps) or FullSpeed (12 Mbps). Configuration options: [FullSpeed] [HiSpeed]

5.4.2 MPS Configuration

This menu allows you to configure the Multi-Processor table. Select an item then press <Enter> to display the configuration options.

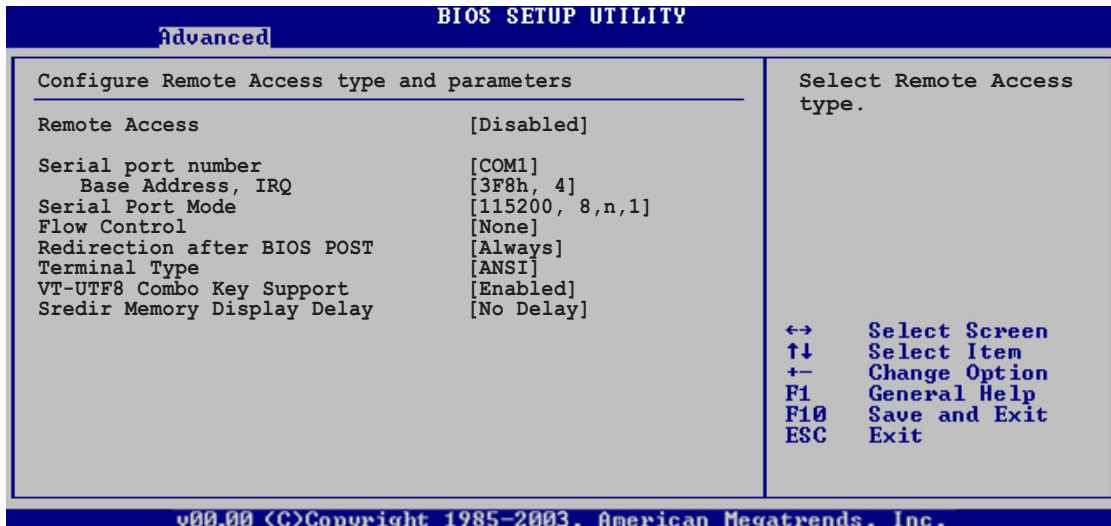


MPS Revision [1.4]

Allows you to choose the MPS revision. Configuration options: [1.1] [1.4]

5.4.3 Remote Access Configuration

The items in this menu allow you to configure the Remote Access features. Select an item then press <Enter> to display the configuration options.



Remote Access [Disabled]

Enables or disables the remote access feature.

Configuration options: [Disabled] [Enabled]



The succeeding items appear when the item **Remote Access** is set to [Enabled].

Serial port number [COM1]

Sets the serial port for console redirection. Make sure the selected port is enabled. Configuration options: [COM1] [COM2]

Base Address, IRQ [3F8h, 4]

Sets the base address and IRQ assignment of the selected serial port . This item is auto-detected and is not user-configurable.

Serial Port Mode [115200, 8,n,1]

Allows you to select the serial port mode settings.

Configuration options: [115200 8,n,1] [57600 8,n,1] [38400 8,n,1] [19200 8,n,1] [09600 8,n,1]

Flow Control [None]

Allows you to select the flow control for console redirection.

Configuration options: [None] [Hardware] [Software]

Redirection after BIOS POST [Always]

Sets the redirection mode after the BIOS Power-On-Self-Test (POST). Some operating systems may not work when this item is set to [Always].

Configuration options: [Disabled] [Boot Loader] [Always]

Terminal Type [ANSI]

Allows you to select the target terminal type.

Configuration options: [ANSI] [VT100] [VT-UTF8]

VT-UTF8 Combo Key Support [Enabled]

Enables or disables the VT-UTF8 combo key support for ANSI or VT100 terminals. Configuration options: [Disabled] [Enabled]

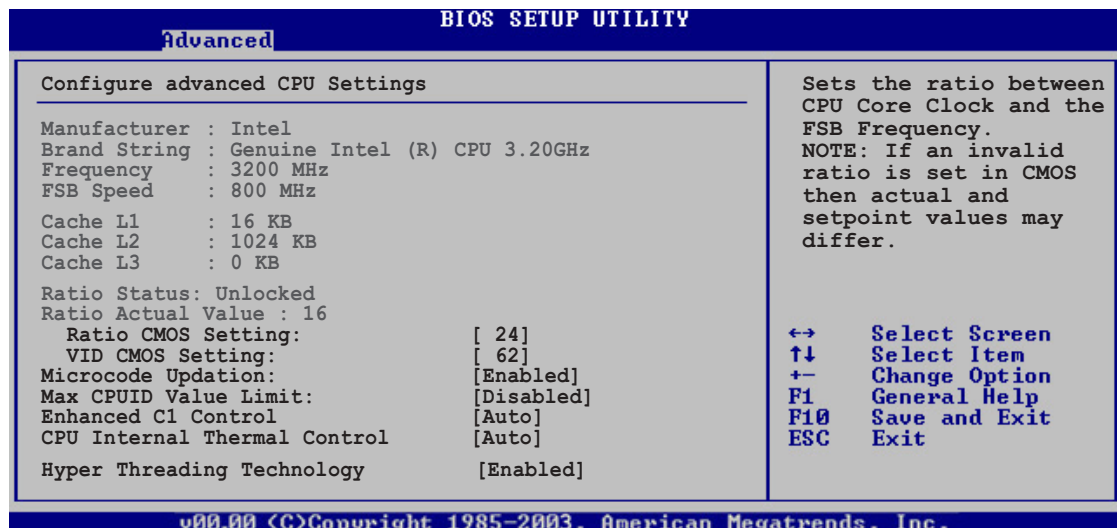
Sredir Memory Display Delay [No Delay]

Gives the delay period (in seconds) to display memory information.

Configuration options: [No Delay] [Delay 1 Sec] [Delay 2 Sec] [Delay 4 Sec]

5.4.4 CPU Configuration

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



Ratio CMOS Setting [24]

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 default value of this item is auto-detected by BIOS. Use the <+> or <-> keys to adjust the values.



You can only adjust the **Ratio CMOS** and the **VID CMOS** setting if you installed an unlocked CPU. Refer to the CPU documentation for details.

Microcode Updation [Enabled]

Enables or disables 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]

Enhanced C1 Control [Auto]

When set to [Auto], the BIOS will automatically check the CPU's capability to enable the C1E support. In C1E mode, the CPU power consumption is lower when idle. Configuration options: [Auto] [Disabled]

CPU Internal Thermal Control [Auto]

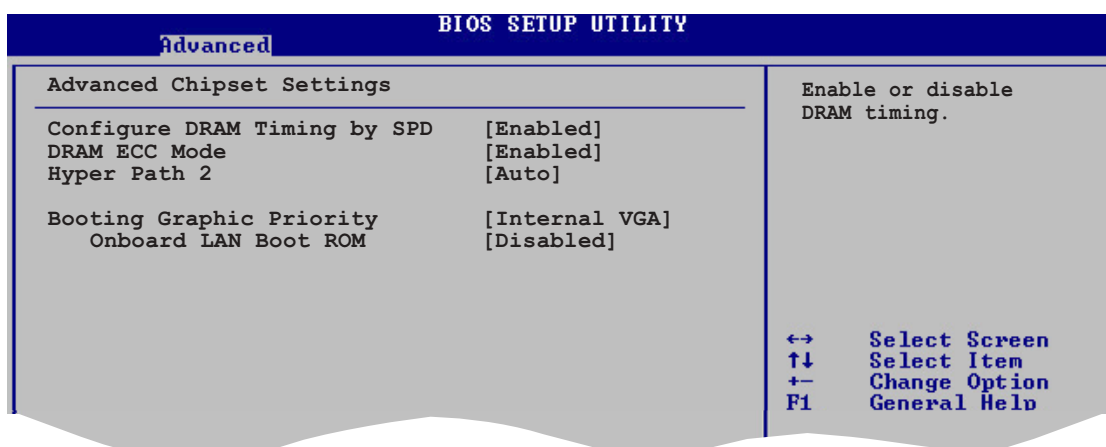
Disables or sets the CPU internal thermal control.
Configuration options: [Auto] [Disabled]

Hyper Threading Technology [Enabled]

Allows you to enable or disable the processor Hyper-Threading Technology. Configuration options: [Disabled] [Enabled]

5.4.5 Chipset

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



Advanced Chipset Settings

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. Configuration options: [Disabled] [Enabled]

The following sub-items appear when this item is Disabled.

DRAM CAS# Latency [5 Clocks]

Controls the latency between the SDRAM read command and the time the data actually becomes available.

Configuration options: [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]

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]

DRAM RAS# Activate to Precharge Delay [15 Clocks]

Configuration options: [1 Clock] ~ [15 Clocks]

DRAM Write Recovery Time [4 Clocks]

Sets the DRAM write recovery time.

Configuration options: [2 Clocks] [3 Clocks] [4 Clocks] [5 Clocks]

DRAM ECC Mode [Auto]

Allows you to enable or disable DRAM timing.

Configuration options: [Auto] [Disabled]

Hyper Path 2 [Auto]

Allows you to enable or disable the ASUS Hyper Path 2 feature.

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

Booting Graphic Priority [Internal VGA]

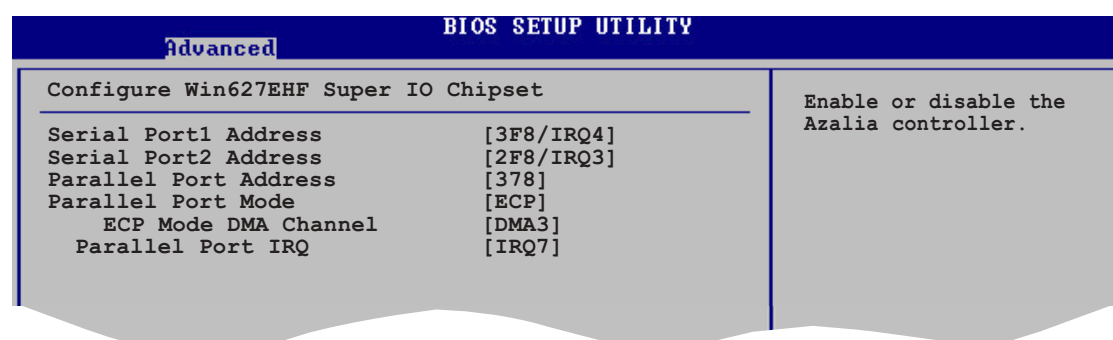
Allows selection of the graphics controller to use as primary boot device.

Configuration options: [Internal VGA] [PCI/Int-VGA]

Onboard LAN Boot ROM [Disabled]

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

5.4.6 Onboard Devices Configuration



Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.

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

Serial Port2 Address [2F8/IRQ3]

Allows you to select the Serial Port1 base address.

Configuration options: [Disabled] [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]

EPP Version [1.9]

Allows selection of the Parallel Port EPP version. This item appears only when the **Parallel Port Mode** is set to **EPP**.

Configuration options: [1.9] [1.7]

Parallel Port IRQ [IRQ7]

Allows selection of the Parallel Port IRQ.

Configuration options: [IRQ5] [IRQ7]

5.4.7 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	
WARNING: Setting wrong values in below sections may cause system to malfunction.	
Plug And Play O/S	[No]
PCI Latency Timer	[64]
Allocate IRQ to PCI VGA	[Yes]
Palette Snooping	[Disabled]
PCI IDE BusMaster	[Enabled]
IRQ-3 assigned to	[PCI Device]
IRQ-4 assigned to	[PCI Device]
IRQ-5 assigned to	[PCI Device]
IRQ-7 assigned to	[PCI Device]
IRQ-9 assigned to	[PCI Device]
IRQ-10 assigned to	[PCI Device]
IRQ-11 assigned to	[PCI Device]
IRQ-14 assigned to	[PCI Device]
IRQ-15 assigned to	[PCI Device]
No: Lets the BIOS configure all the devices in the system. Yes: Lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.	
←→ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit	
v00.00 (C)Copyright 1985-2003, American Megatrends, Inc.	

Reserved Memory Size	[Disabled]
DMA Channel 0	[PCI Device]
DMA Channel 1	[PCI Device]
DMA Channel 3	[PCI Device]
DMA Channel 5	[PCI Device]
DMA Channel 6	[PCI Device]
DMA Channel 7	[PCI Device]
Active State Power-Management	[Enabled]
←→ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit	
v00.00 (C)Copyright 1985-2003, American Megatrends, Inc.	

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 palette 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]

PCI IDE BusMaster [Enabled]

Allows BIOS to use PCI bus mastering when reading/writing to IDE devices. 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]

Reserved Memory Size [Disabled]

Allows you to choose the size of memory block to be reserved for legacy ISA devices. Configuration options: [Disabled] [16K] [32K] [64K]

DMA Channel X [PCI Device]

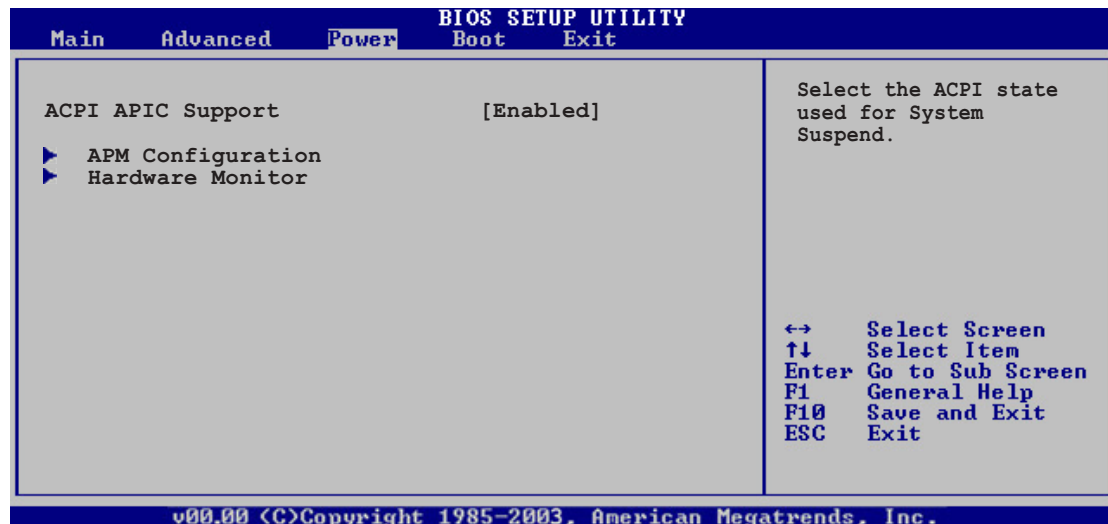
When set to [PCI Device], the specific DMA channel is free for use of PCI/PnP devices. When set to [Reserved], the DMA channel is reserved for legacy ISA devices. Configuration options: [PCI Device] [Reserved]

Active State Power-Management [Enabled]

Allows you to enable or disable the PCI Express L0s and L1 link power states. Configuration options: [Disabled] [Enabled]

5.5 Power menu

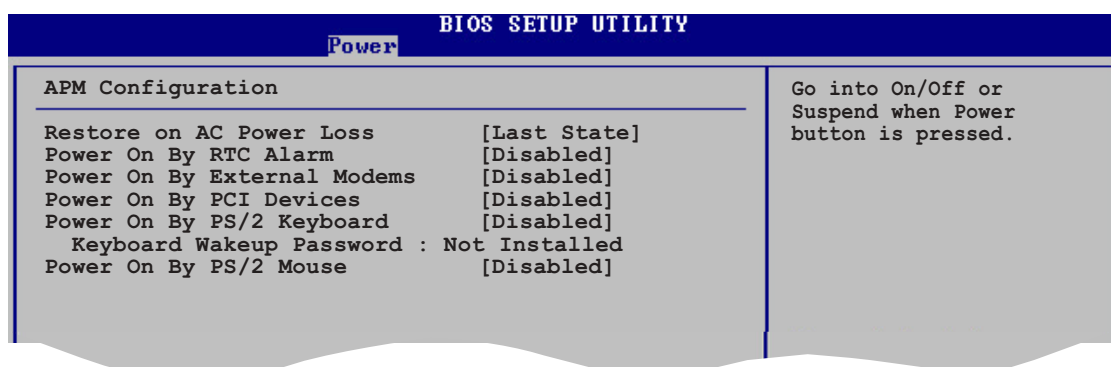
The Power menu items allow you to change the settings for the ACPI and Advanced Power Management (APM). Select an item then press <Enter> to display the configuration options.



5.5.1 ACPI APIC Support [Enabled]

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

5.5.2 APM Configuration



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 [Disabled]

Allows you to enable or disable RTC to generate a wake event. When this item is set to Enabled, the items RTC Alarm Date, 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 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 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] [Enabled]

Keyboard Wakeup Password

This item appears only when the Power On By PS/2 Keyboard is set to Enabled. Select this item to set or change the keyboard wakeup password. The **Keyboard Wakeup Password** item that appears below shows the default **Not Installed**. After you have set a password, this item shows **Installed**.

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]

5.5.3 Hardware Monitor

BIOS SETUP UTILITY		
Power		
Hardware Monitor		CPU1 Temperature
CPU Temperature	[51°C/122.5°F]	
MB Temperature	[41°C/105.5°F]	
CPU1 Fan Speed	[3813 RPM]	
CPU2 Fan Speed	[N/A]	
Front1 Fan Speed	[N/A]	
Front2 Fan Speed	[N/A]	
Rear1 Fan Speed	[N/A]	
Rear2 Fan Speed	[N/A]	
Smart Fan Control	[Disabled]	↔ Select Screen
VCORE1 Voltage	[1.320V]	↑↓ Select Item
3.3V Voltage	[3.345V]	+− Change Option
5V Voltage	[5.094V]	F1 General Help
5VSB Voltage	[4.824V]	F10 Save and Exit
VBAT Voltage	[3.040V]	ESC Exit
12V Voltage	[11.880V]	
vMM.mm <C>Copyright 1985-2002, American Megatrends, Inc.		

CPU Temperature [xxx°C/xxx°F]

MB Temperature [xxx°C/xxx°F]

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

CPU1/CPU2 Fan Speed [xxxxRPM] or [N/A]

Front1/Front2 Fan Speed [xxxxRPM] or [N/A]

Rear1/Rear2 Fan Speed [xxxxRPM] or [N/A]

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.

Smart Fan Control [Disabled]

Allows you to enable or disable the ASUS Smart Fan feature that smartly adjusts the fan speeds for more efficient system operation. When this field is set to [Enabled], the three succeeding items appear.

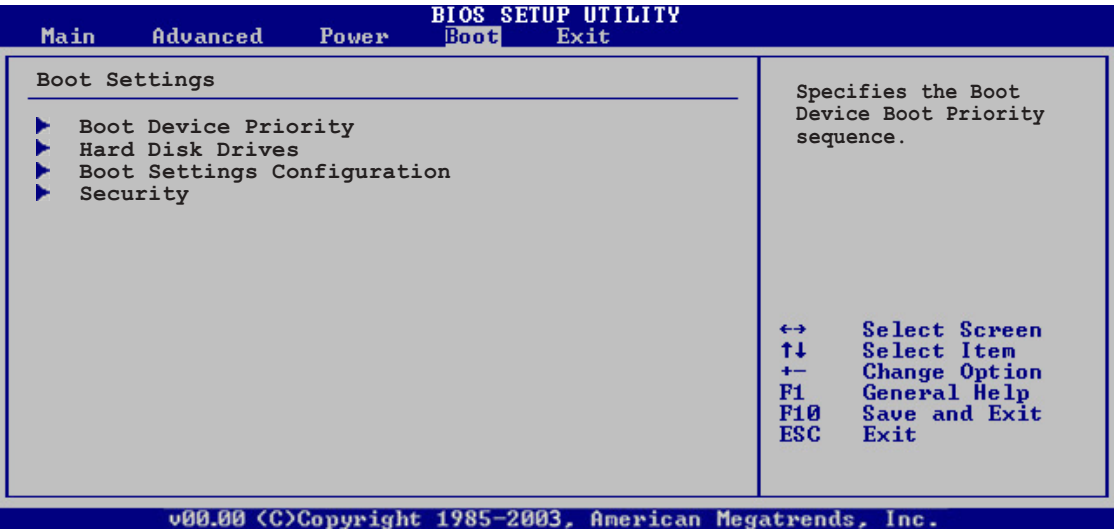
Configuration options: [Disabled] [Enabled]

VCORE1 Voltage, 3.3V Voltage, 5V Voltage, 5VSB Voltage, VBAT Voltage, 12V Voltage

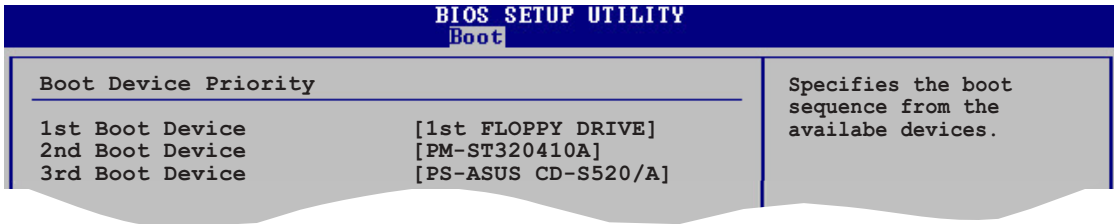
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators.

5.6 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.



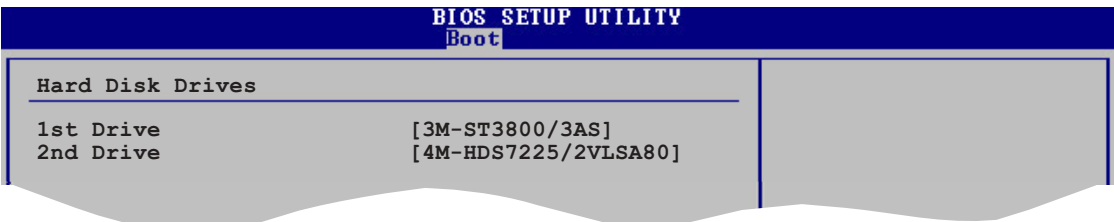
5.6.1 Boot Device Priority



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: [xxxxxx Drive] [Disabled]

5.6.2 Hard Disk Drives



1st ~ xxth Boot Device [1st Floppy Drive]

These items specify the hard disk drive priority sequence from the available drives. The number of hard disk drives that appears on the screen depends on the number of devices installed in the system.
Configuration options: [xxxxxx Drive] [Disabled]

5.6.3 Boot Settings Configuration

BIOS SETUP UTILITY		
Boot		
Boot Settings Configuration		
Quick Boot	[Enabled]	Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
Full Screen Logo	[Enabled]	
AddOn ROM Display Mode	[Force BIOS]	
Bootup Num-Lock	[On]	
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]

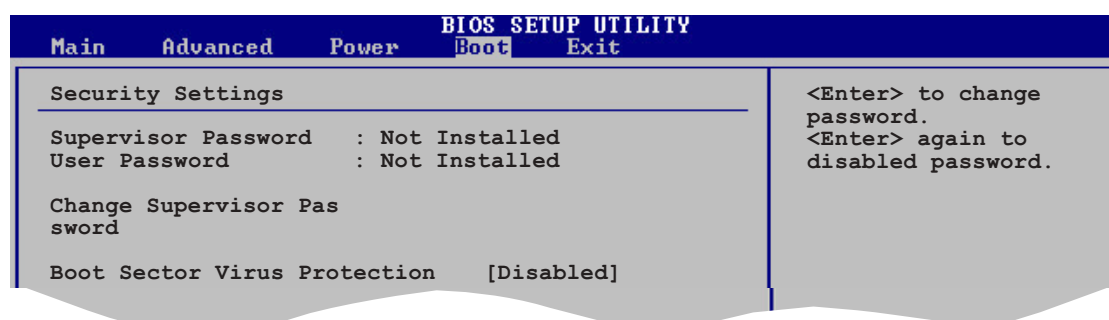
When set to Enabled, the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Disabled]

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

5.6.4 Security

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



Change Supervisor Password

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

To set a Supervisor Password:

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

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

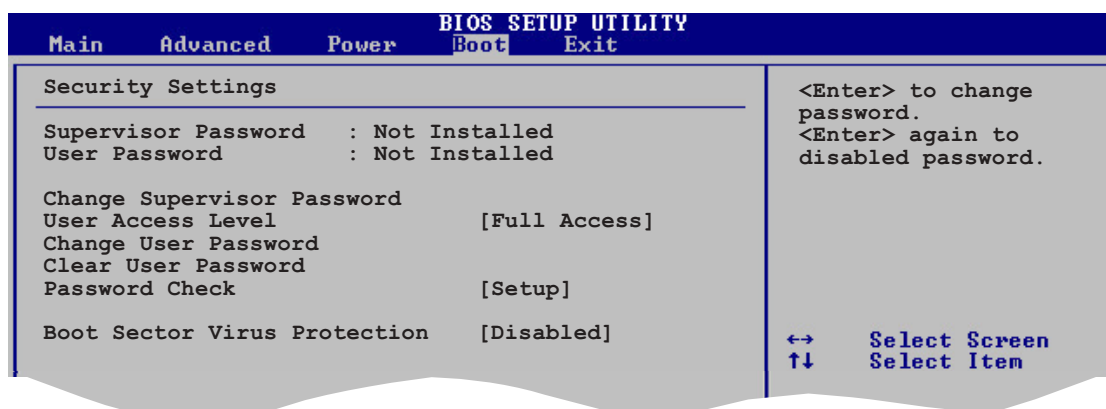
To change the supervisor password, follow the same steps as in setting a user password.

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



If you forget your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section “4.6 Jumpers” for information on how to erase the RTC RAM.

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



User Access Level (Full Access]

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

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

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

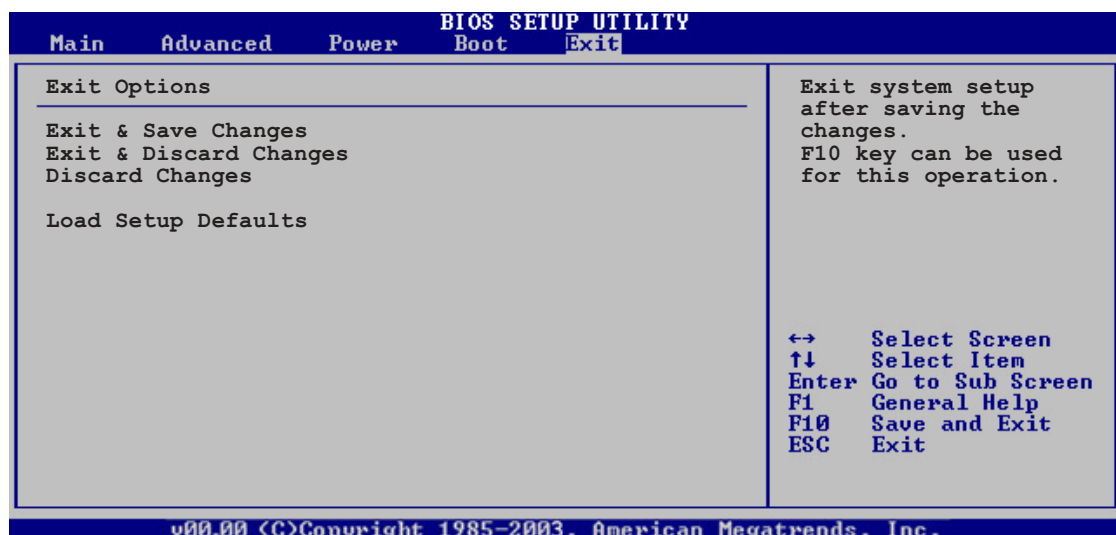
Boot Sector Virus Protection [Disabled]

Allows you to enable or disable the boot sector virus protection.

Configuration options: [Disabled] [Enabled]

5.7 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.



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

Exit & Save Changes

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



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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

Chapter 6

This chapter provides information on RAID configurations, RAID driver installation, and LAN driver installation for this motherboard.



ASUS TS15-E2

RAID configuration

6.1 RAID configurations

The server system/motherboard comes with the **Intel® ICH6R** Southbridge chip that supports up to four Serial ATA hard disk drives with RAID 0, RAID 1, or Intel® Matrix Storage configuration.

Refer to the RAID definitions below.

6.1.1 RAID definitions

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

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

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

Intel® Matrix Storage. The Intel® Matrix Storage technology supported by the ICH6R chip allows you to create a RAID 0 and a RAID 1 set using only two identical hard disk drives. The Intel® Matrix Storage technology creates two partitions on each hard disk drive to create a virtual RAID 0 and RAID 1 sets. This technology also allows you to change the hard disk drive partition size without losing any data.



If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support CD to a floppy disk before you install an operating system to the selected hard disk drive. Refer to section “2. RAID driver installation” for details.

6.1.2 Installing hard disk drives

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

To install the SATA hard disks for RAID configuration:

1. Install the SATA hard disks into the drive bays following the instructions in the system user guide.
2. Connect a SATA signal cable to the signal connector at the back of each drive and to the SATA connector on the motherboard.
3. Connect a SATA power cable to the power connector on each drive.

6.1.3 Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set(s). To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main Menu**, select **IDE Configuration**, then press <Enter>.
3. Select the item **Configure SATA As**, then press <Enter> to display the configuration options.
4. Select **RAID** from the **Configure SATA As** item options, then press <Enter>.
5. Select the item **Onboard Serial-ATA BOOTROM**, press <Enter>, then select **Enabled** from the options.
6. Save your changes, then exit the BIOS Setup.



Refer to the system or the motherboard user guide for details on entering and navigating through the BIOS Setup.

6.1.4 Using the RAID configuration utility

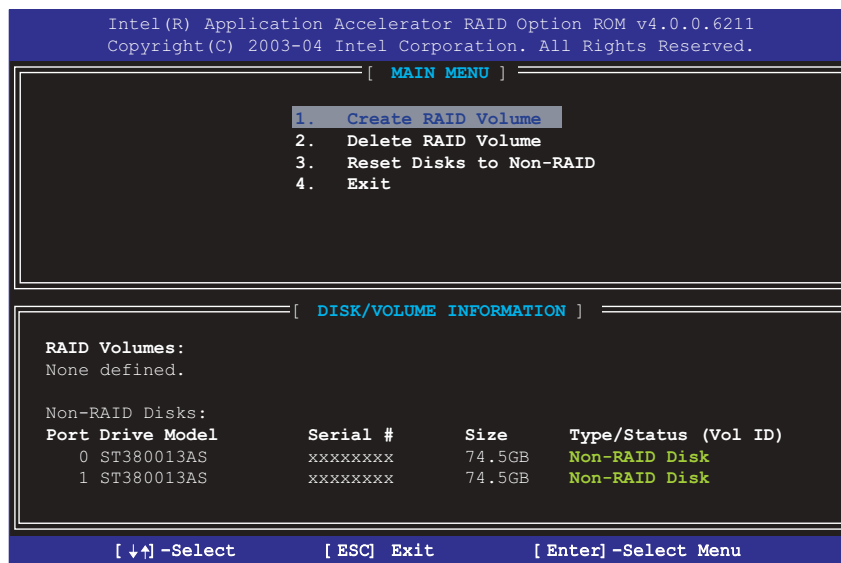
You can create a RAID set using the **Intel® Application Accelerator RAID Option ROM** embedded in the Southbridge chip. Refer to the succeeding sections for details on how to enter the RAID configuration utility.

6.1.5 Intel® Application Accelerator RAID Option ROM Utility

The Intel® Application Accelerator RAID Option ROM utility allows you to create RAID 0 and RAID 1 set(s) from SATA hard disk drives that are connected to the SATA connectors supported by the motherboard Southbridge chip.

To enter the Intel® Application Accelerator RAID Option ROM utility:

1. Turn on the system after installing all the SATA hard disk drives.
2. During POST, press <Ctrl+I> to display the utility main menu.



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

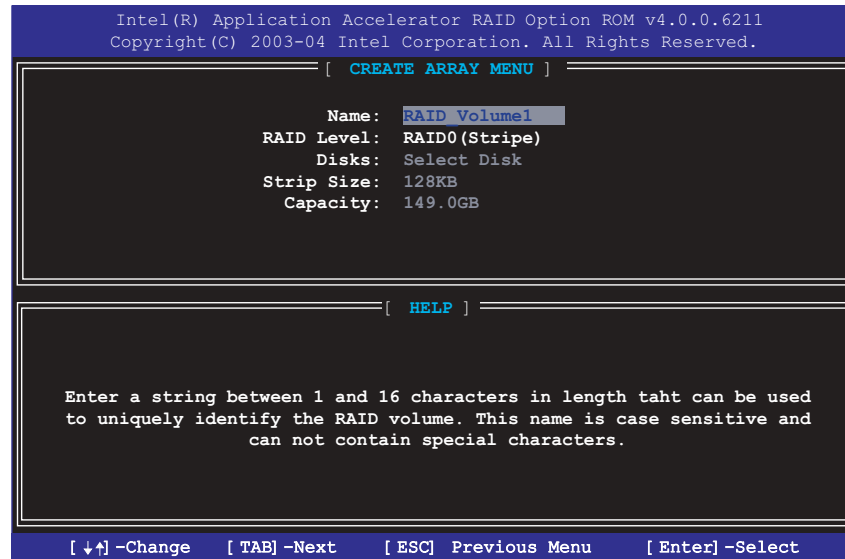
At the bottom of the screen are the navigation keys. These keys allow you to move through the menus and select the menu options.



Creating a RAID 0 set (striped)

To create a RAID 0 set:

1. From the utility main menu, select [**1. Create RAID Volume**], then press <Enter>. The following screen appears.



2. Enter a name for the RAID 0 set, then press <Enter>.
3. Use the up or down arrow keys to move to the **RAID Level** item.
4. When the **RAID Level** item is highlighted, press the up or down arrow key to select **RAID 0**, then press <Enter>.
5. Use the up or down arrow keys to move to the **Stripe Size** option.
6. When the **Stripe Size** item is highlighted, press the up or down arrow keys to select the stripe size for the RAID 0 array, then press <Enter>.

The available stripe size values range from 8KB to 128KB. The default stripe size is 128 KB. You must choose the stripe size value based on the projected drive usage. For low disk usage, select 8 KB/16 KB. For typical disk usage, select 64 KB. select 128KB for performance disk usage.

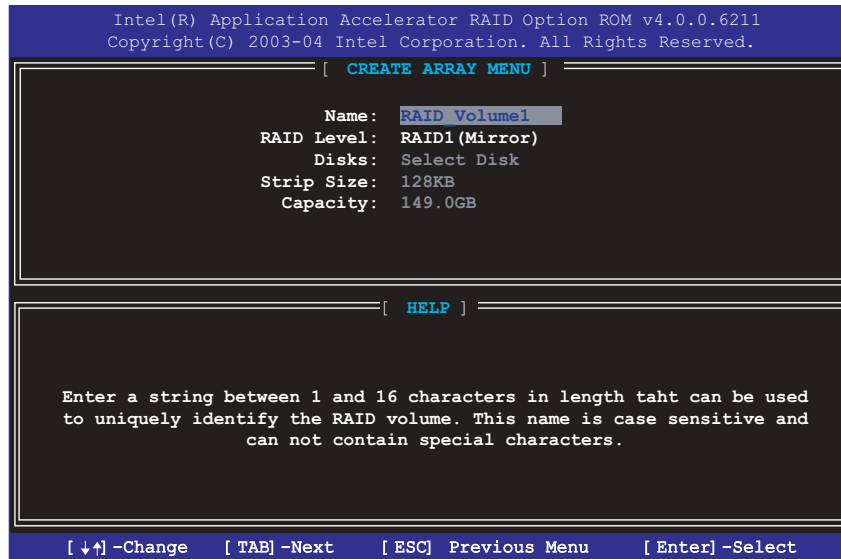


TIP: For server systems, use of a lower array block size is recommended. For multimedia computer systems used mainly for audio and video editing, a higher array block size is recommended for optimum performance.

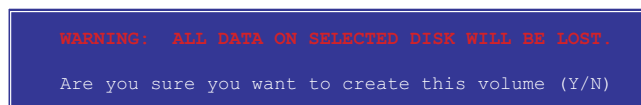
Creating a RAID 1 set (mirrored)

To create a RAID 1 set:

1. From the utility main menu, select [**1. Create RAID Volume**], then press <Enter>. The following screen appears.



2. Enter a name for the RAID 1 set, then press <Enter>.
3. Use the up or down arrow keys to move to the **RAID Level** item.
4. When the **RAID Level** item is highlighted, press the up or down arrow key to select **RAID 1**, then press <Enter>. The **Create Volume** prompt appears.
5. On the **Create Volume** prompt, press <Enter> to create the array.
6. Press <Y> when this query window appears.



7. Select [**4. Exit**], then press <Enter> to exit the RAID configuration utility. Press <Y> when the utility displays a confirmation window.

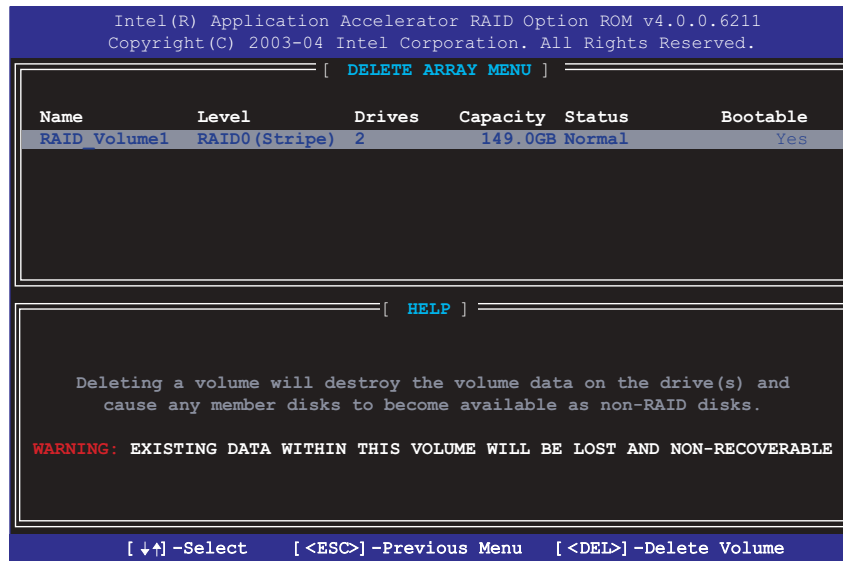
Deleting a RAID set



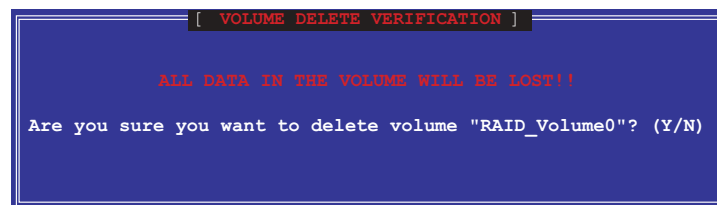
Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the utility main menu, select **[2. Delete RAID Volume]**, then press <Enter> to display the following screen.



2. Use the up or down arrow keys to select the RAID set you want to delete, then press .
3. Press to delete the RAID volume. A confirmation window appears.



4. Press <Y> to delete the RAID set; otherwise, press <N> to return to the utility main menu.

Resetting a RAID set hard disks drive



Take caution before you reset a RAID volume HDD to non-RAID. Resetting a RAID volume HDD deletes all internal RAID structure on the drive.

To reset a RAID set hard disk drive:

1. From the utility main menu, select **[3. Reset Disks to Non-RAID]**, then press <Enter> to display the following screen.

```

[ RESET RAID DATA ]

Resetting RAID data will remove the internal RAID structures
from the selected RAID disks. By removing these structures
the drive will revert back to a Non-RAID disk.

WARNING: Resetting a disk causes all data on the disk to be lost.

Port Drive Model      Serial #      Size      Status
  0 STXXXXXXXXX      XXXXXXXX     XX.0GB    Member Disk
  1 STXXXXXXXXX      XXXXXXXX     XX.0GB    Member Disk

      Select the disk that should be reset

[ ↓↑ ] -Previous/Next  [ Space ] -Selects  [ Enter ] -Selection Complete
```

2. Use the up or down arrow keys to highlight the RAID set drive you want to reset, then press <Space> to select.
3. Press <Enter> to reset the RAID set drive. A confirmation window appears.
4. Press <Y> to reset the drive; otherwise, press <N> to return to the utility main menu.
5. Follow steps 2-4 to select and reset other RAID set drives.

6.2 RAID driver installation

6.2.1 Creating a RAID driver disk

A floppy disk with the RAID driver is required when installing Windows® 2000/XP operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using FreeDOS from the support CD) or in Windows® environment.

DOS

To create a RAID driver disk in DOS environment:

1. Place the motherboard support CD in the optical drive.
2. Restart the computer, then enter the BIOS Setup.
3. Set the optical drive as the first boot priority to boot from the support CD. Save your changes, then exit the BIOS Setup.
4. Restart the computer. The following screen appears during POST.

```
1) FreeDOS command prompt
2) Create Intel Application Accelerator for Windows driver
Please choose 1 ~ 2: _
```

5. Place a blank, high-density floppy disk to the floppy disk drive, then press <2>. The following message displays on screen.

```
Warning!!
Bootable CD will delete all data in floppy
Press a key to continue. _
```

6. Press any key to continue. The RAID drivers are copied to the floppy disk.
7. Eject the floppy disk, then write-protect it to prevent computer virus infection.
8. Press any key to continue.

Windows® 2000/2003 Server

To create a RAID driver disk in Windows® 2000/2003 Server environment:

1. Restart the system from the hard disk drive, then place the system/motherboard support CD in the optical drive.
2. Browse the contents of the support CD to locate the driver disk utility. The RAID driver disk for the Intel® ICH6R is located in:

\Drivers\Chipset\Intel\IAA\F6 Install Floppy\F6flpy32

3. Insert a formatted high-density floppy disk to the floppy disk drive.
4. Follow screen instructions to complete the process.
5. After creating a RAID driver disk, eject the floppy disk, then write-protect it to prevent computer virus infection.

6.2.2 Installing the Intel® ICH6R RAID controller driver

Windows® 2000/2003 Server OS

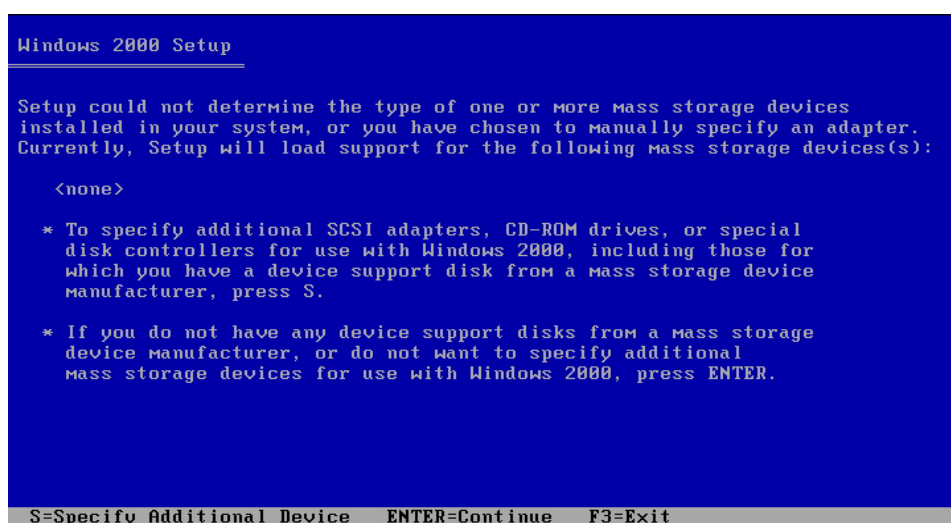
During Windows® 2000/2003 Server OS installation

To install the Intel® ICH6R RAID controller driver when installing Windows® 2000/2003 Server OS:

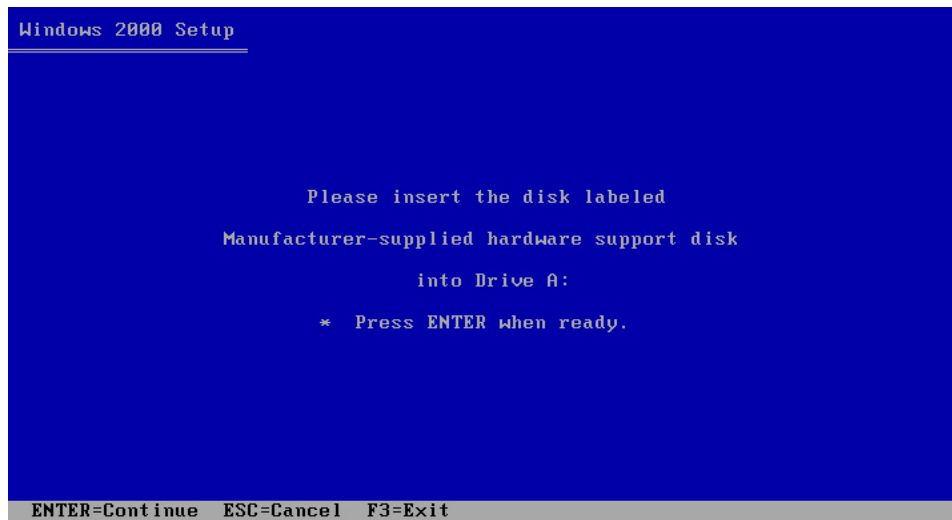
1. Boot the computer using the Windows® 2000/2003 Server installation CD. The **Windows® 2000/2003 Setup** starts.



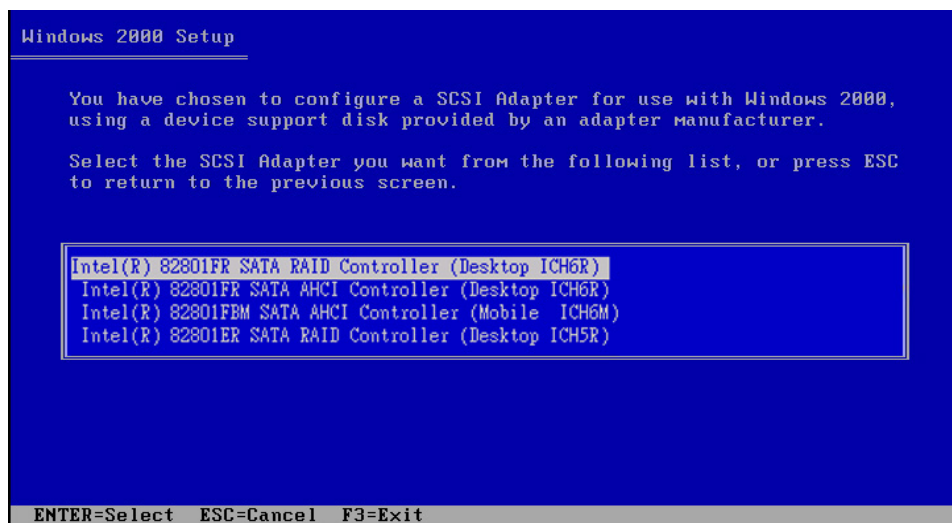
2. Press <F6> when the message “**Press F6 if you need to install a third party SCSI or RAID driver...**” appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



4. Insert the Intel® ICH6R RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.



5. Select the **Intel(R) 82801FR SATA RAID Controller (Desktop ICH6R)** from the options, then press <Enter> to select.

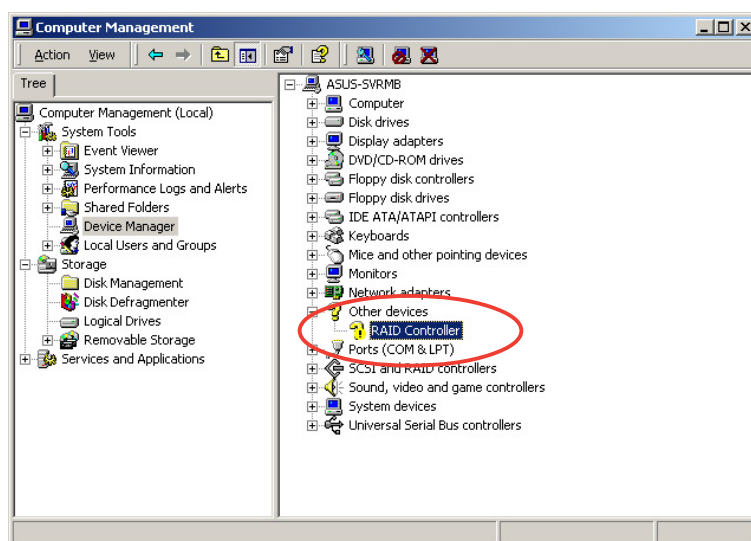


6. The Windows® 2000/2003 Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

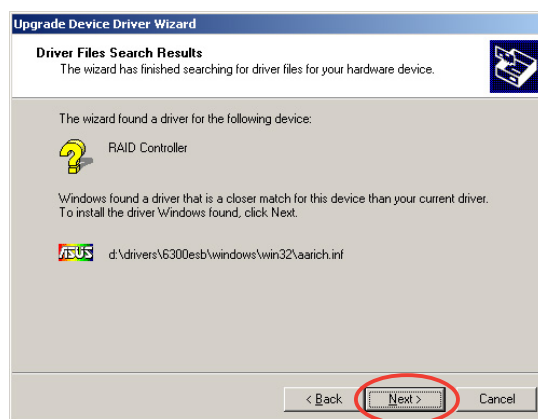
To an existing Windows® 2000/2003 Server OS

To install the Intel® ICH6R RAID controller driver on an existing Windows® 2000/2003 Server OS:

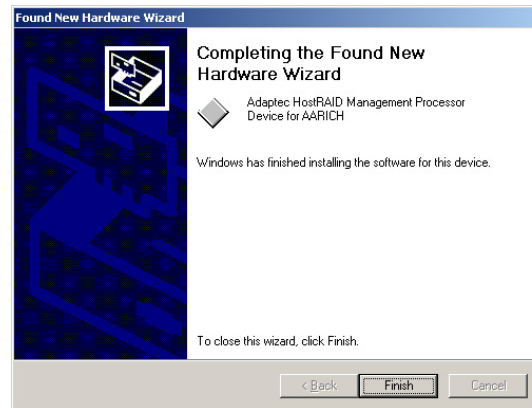
1. Restart the computer, then log on with **Administrator** privileges.
2. Windows® automatically detects the RAID controller and displays a **New Hardware Found** window. Click **Cancel**.
3. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
4. Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.



5. Right-click the **RAID controller** item, then select **Properties**.
6. Click the **Driver** tab, then click the **Update Driver** button.
7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.
8. Insert the RAID driver disk you created earlier to the floppy disk drive.
9. Select the option “**Search for a suitable driver for my device (recommended)**”, then click **Next**.
10. The wizard searches the RAID controller drivers. When found, click **Next** to install the drivers.

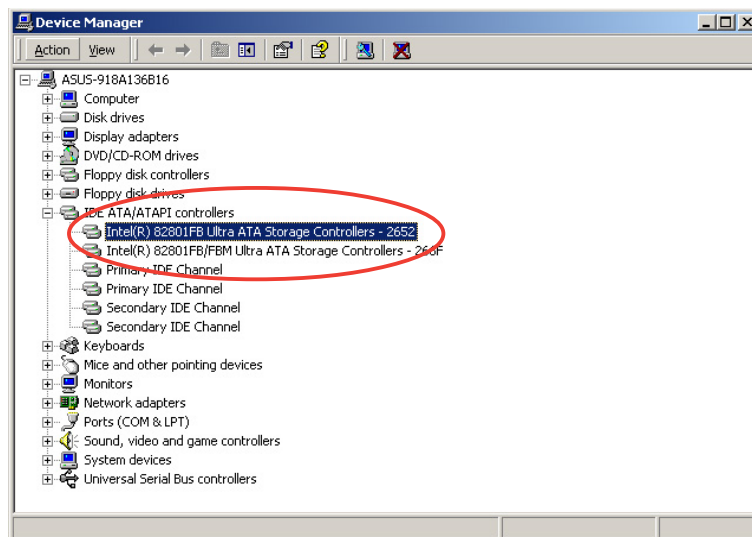


11. Click **Finish** after the driver installation is done.

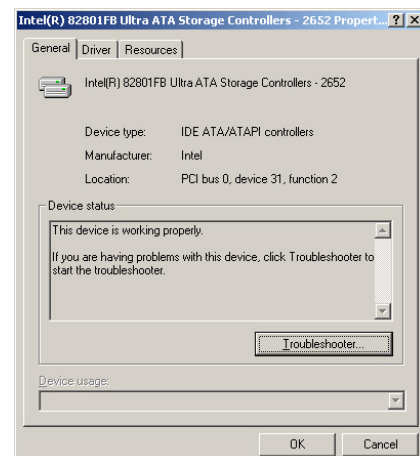


To verify the Intel® ICH6R RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the “+” sign before the item **IDE ATA/ATAPI controllers**.
The **Intel(R) 82801FB Ultra ATA Storage Controllers-2652** item should appear.



4. Right-click the **Intel(R) 82801FB Ultra ATA Storage Controllers-2652** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.



6.3. LAN driver installation

This section provides instructions on how to install the Broadcom® Gigabit LAN controller drivers.

6.3.1 Windows® 2000/2003 Server

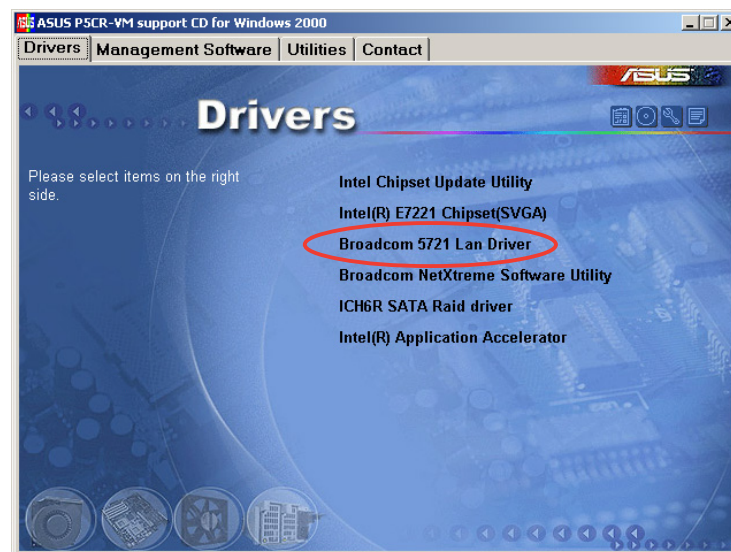
To install the Broadcom® Gigabit LAN controller driver on a Windows® 2000/2003 Server OS:

1. Restart the computer, then log on with **Administrator** privileges.
2. Insert the motherboard/system support CD to the optical drive. The CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

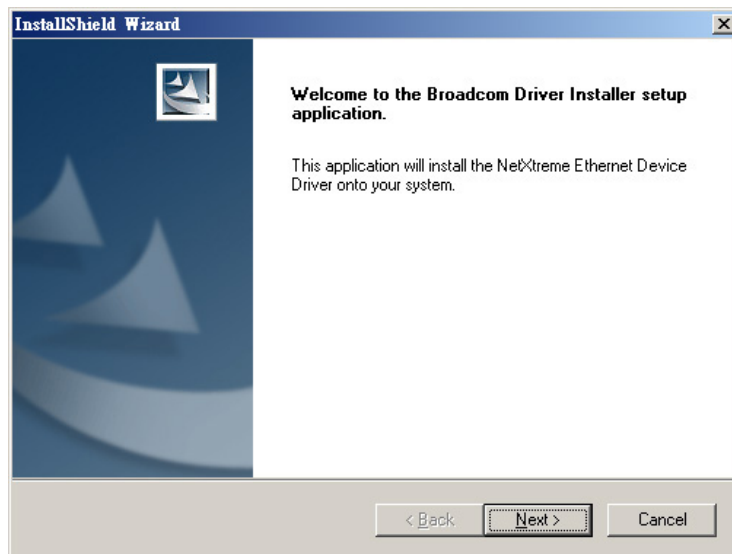


- Windows® automatically detects the LAN controllers and displays a **New Hardware Found** window. Click **Cancel** to close this window.
- If **Autorun** is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the **ASSETUP.EXE** to run the CD.

3. Click the **Broadcom 5721 LAN Driver** option to begin installation.



4. Click **Next** when the InstallShield Wizard window appears. Follow screen instructions to continue installation.



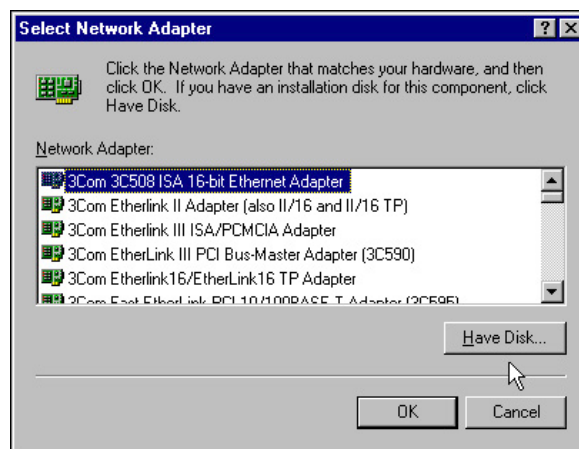
6.3.2 Windows® NT



- You must install a network device driver before you can use the LAN adapter on a Windows® NT system.
- You must upgrade the system to Windows® NT Service Pack 4 or later before you install the LAN adapter drivers.
- BACS2 Help files require Internet Explorer 4.0 or later to work properly. We recommend using Internet Explorer 5.0 to view help files.

To install the Broadcom® Gigabit LAN controller driver on a Windows® NT OS:

1. Restart the computer, then log on with **Administrator** privileges.
2. Open the **Control Panel**.
3. From the Control Panel, double-click the **Network** icon.
4. When the **Network** window appears, click the **Adapters** tab.
5. Select the adapter, then click **Add**.
6. When the **Select Network Adapter** window appears, click **Have Disk...**



7. When prompted, place the support CD to the optical drive.
8. Type the path to the driver, and click **OK**. For example, to install the driver from the support CD, type **e:** in the **Insert Disk** location box (where e: is the optical drive letter).
9. With **Gigabit Ethernet Controller** highlighted in the **Select OEM Option** window, click **OK**. When the drivers are successfully installed, the LAN adapter appears in the **Network** window.
10. Click **Close**. The **TCP/IP Properties** window appears.
11. Configure the TCP/IP protocol, then click **OK**.
12. Restart the computer when prompted.

6.3.3 Red Hat® Linux 9.0

Follow these instructions when installing the Broadcom® Gigabit LAN controller base driver for the Red Hat® Linux version 5.2.x operating system. The following procedures were tested for 2.4.x kernels through 2.4.20.

Installing the source RPM package

To install the source RPM package:

1. Install the source RPM package:

```
rpm -ivh bcm5700-<version>.src.rpm
```
2. Change the directory to the RPM path and build the binary driver for your kernel:

```
cd /usr/src/{redhat,OpenLinux,turbo,packages,rpm ..}  
rpm -bb SPECS/bcm5700.spec or rpmbuild -bb SPECS/  
bcm5700.spec
```



The RPM path is different for different Linux distributions.

3. Install the newly built package (driver and man page):

```
rpm -ivh RPMS/i386/bcm5700-<version>.i386.rpm
```



You need the force option when installing the driver on some distributions that has an older version of the driver.

For **2.2.x kernels**, the driver is installed in:

```
/lib/modules/<kernel_version>/net/bcm5700.o
```

For **2.4.x kernels**, the driver is installed in:

```
/lib/modules/<kernel_version>/kernel/drivers/net/  
bcm5700.o
```

For **2.4.x kernels with bcm5700 driver patched in**, the driver is installed in:

```
/lib/modules/<kernel_version>/kernel/drivers/net/bcm/  
bcm5700.o
```

or

```
/lib/modules/<kernel_version>/kernel/drivers/addon/  
bcm5700/bcm5700.o
```

4. Load the driver:

```
insmod bcm5700
```
5. Refer to Linux distribution documentation to configure the network protocol and address.

Building the driver from the TAR file

To build the driver from the TAR file:

1. Create a directory and extract the TAR files:
`tar xvzf bcm5700-<version>.tar.gz`
2. Build the driver bcm5700.o as a loadable module for the running kernel:
`cd bcm5700-<version>/src`
`make`
3. Test the driver by loading it:
`insmod bcm5700.o`
4. Install the driver and man page:
`make install`



See the RPM instructions on the previous page for the location of the installed driver.

5. Refer to Linux distribution documentation to configure the network protocol and address.

6.4 VGA driver installation

This section provides instructions on how to install the Intel® E7221 Super Video Graphics Adapter (SVGA) driver.

6.4.1 Windows® 2000 Server

You need to manually install the Intel® E7221 SVGA driver on a Windows® 2000 Server operating system.

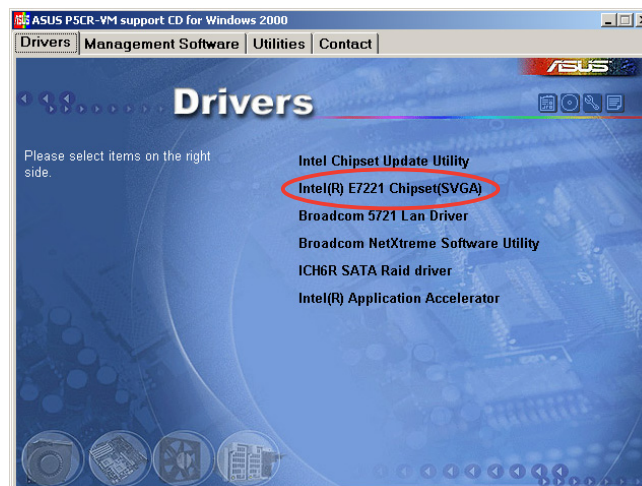
To install the Intel® E7221 SVGA driver:

1. Restart the computer, then log on with **Administrator** privileges.
2. Insert the motherboard/system support CD to the optical drive. The support CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

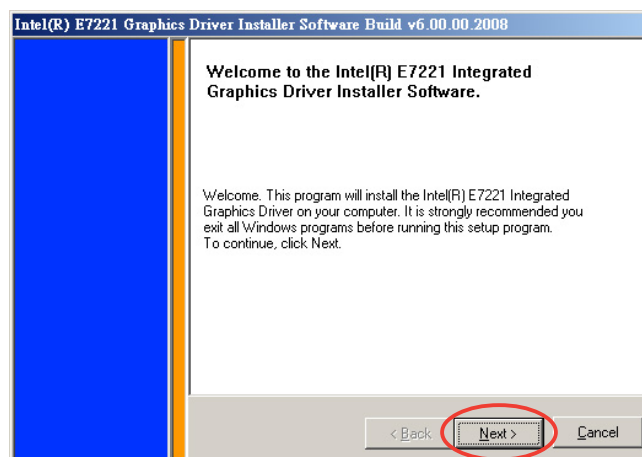


Windows® automatically detects the VGA controller and displays a **New Hardware Found** window. Click **Cancel** to close this window.

3. Click the item **Intel(R) E7221 Chipset (SVGA)** item from the **Drivers** menu.



4. The **Intel(R) E7221 Graphics Driver Installer Software** window appears. Click **Next**. Follow screen instructions to complete installation.



6.4.2 Windows® 2003 Server

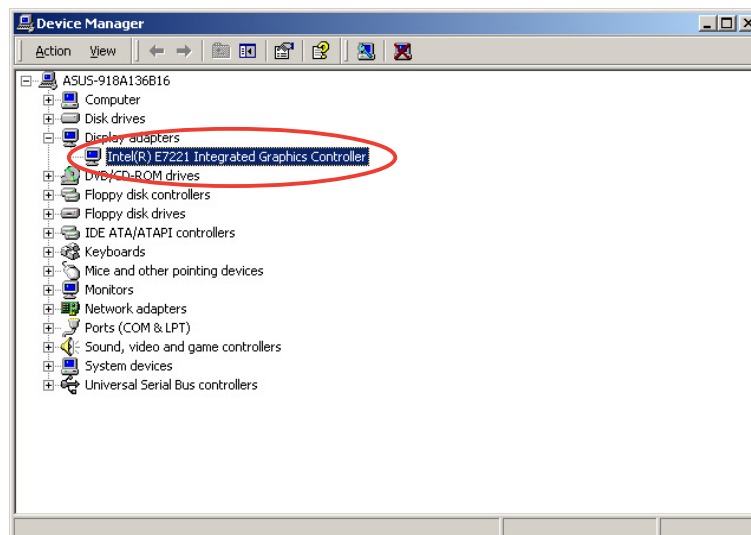
The Windows® 2003 Server operating system automatically recognizes the Intel® E7221 SVGA driver during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

Verifying the VGA driver installation

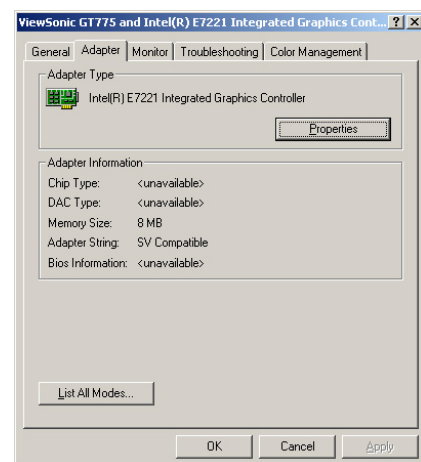
To verify if the Intel® E7221 SVGA driver is properly installed in a Windows® 2000/2003 Server operating system:

1. Right-click the **My Computer** icon on the Windows® desktop, then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the “+” sign before the item **Display adapters**.

The **Intel(R) E7221 Integrated Graphics Controller** item should appear.



4. Right-click the **Intel(R) E7221 Integrated Graphics Controller** item, then select **Properties** from the menu.
5. Click the **Adapter** tab, then click the **properties** button to display the VGA drivers.
6. Click **OK** when finished.



6.4.3 Red Hat® Linux 9.0

The Red Hat® Linux 9.0 (2.4.x kernels) operating system automatically recognizes the Intel® E7221 SVGA driver during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

Appendix

This appendix gives information on the standard and redundant power supply that came with the barebone server. This section also provides a troubleshooting guide for solving common problems when using the barebone server.



ASUS TS150-E2

A.1 Simple fixes



Some problems that you may encounter are not due to defects on the system or the components. These problems only requires simple troubleshooting actions that you can perform by yourself.

Problem	Action
The power LED on the server or on the monitor do not light up	<ol style="list-style-type: none">1. Check if the power cable is properly connected to the power connector in the system rear panel.2. Make sure that the power cables are connected to a grounded power outlet.3. Press the power button to make sure that the system is turned on.
The keyboard does not work	Check if the keyboard cable is properly connected to the PS/2 keyboard port.
The mouse does not work	Check if the mouse cable is properly connected to the mouse port.
The system does not perform power-on self tests (POST) after it was turned on	<ol style="list-style-type: none">1. Check the memory modules and make sure you installed the DIMMs the system supports.2. Make sure that the DIMMs are properly installed on the sockets.

Problem	Action
The system continuously beeps after it was turned on	<ol style="list-style-type: none"> 1. Check the memory modules and make sure you installed supported DIMMs. 2. Make sure that the DIMMs are properly installed on the sockets.
The message “Non-system disk or disk error” appears	<ol style="list-style-type: none"> 1. Check if a bootable HDD is active. 2. Check if the HDDs are properly installed.
Network connection not available	<ol style="list-style-type: none"> 1. Make sure that the network cable is connected to the LAN port on the rear panel. 2. Make sure that you have installed the LAN drivers from the support CD.

A.2 Power supply specification

A.2.1 Input characteristics

Voltage Range		
230V		
Parameter	Min	Max
Input Voltage Range	180 V	265 V
Nominal Voltage	200 V	240 V
Current Nominal	-	4.0 A
Vin Frequency	47 Hz	63 Hz

A.2.2 Output Characteristics

Outputs	Min	Max	Regulation	Ripple (PARD)
+5 V	0.5 A	25 A	4.75 ~ 5.25	50 mV
+12 V1	0.0 A	18 A	11.4 ~ 12.6	120 mV
+3.3 V	0.3 A	25 A	3.135 ~ 3.465	50 mV
-12 V	0.0 A	0.8 A	-10.8 ~ -13.2	120 mV
+5V stb	0.0 A	2.0 A	4.75 ~ 5.25	50 mV
+12V2	0.0 A	18 A	11.4 ~ 12.6	120 mV

A.2.3 Over-Voltage Protection (OVP)

Output Voltage	Maximum Voltage
+5 V	6.5 V
+12 V	15.6 V
+3.3 V	4.3 V