



RS100-E4/PI2

1U Rackmount Server
User Guide



E2872

First Edition V1

October 2006

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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 A 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.



WARNING! 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 A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This Class A digital apparatus complies with Canadian ICES-003.

Safety information

Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Any mechanical operation on this server must be conducted by certified or experienced engineers.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.



This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

Lithium-Ion Battery Warning

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

CAUTION! This server system is heavy. Ask for assistance when moving or carrying the system.

About this guide

Audience

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

Contents

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
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.
7. Chapter 7: Driver installation
This chapter provides instructions for installing the necessary drivers for different system components.
8. Appendix: Reference information
This appendix includes additional information that you may refer to when configuring the motherboard.

Conventions

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



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 information to aid in completing 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>+<Delete> |
| 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: <code>format A:/S</code> |

References

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

1. ASUS Server Web-based Management (ASWM) user guide
This manual tells how to set up and use the proprietary ASUS server management utility.
2. ASUS websites
The ASUS websites worldwide provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information.

Chapter 1

This chapter describes the general features of the chassis kit. It includes sections on front panel and rear panel specifications.

Product introduction

1.1 System package contents

Check your system package for the following items.

| | |
|-------------|--|
| Chassis | ASUS R09 1U rackmount chassis |
| Motherboard | ASUS P5M2-M/RS100-E4 motherboard |
| Components | 300W Single power supply 1 x Optical drive (Optional) 1 x CPU heatsink 1 x Heatsink plastic cover |
| Cables | AC power cable System cables Pre-connected device/power cables |
| Accessories | Rackmount rail kit (Optional) RS100-E4/PI2 user guide RS100-E4/PI2 support CD (includes ASWM*) CA Anti-virus software CD R09 chassis ears (left, right) Bag of screws |

* ASUS System Web-based Management



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

1.2 System specifications

The ASUS RS100-E4/PI2 is a 1U barebone server system featuring the ASUS P5M2-M/RS100-E4 motherboard. The server supports LGA775 Intel® Xeon® 3000 series processors plus other latest technologies through the chipsets onboard.

| | |
|-----------------------------|---|
| Chassis | Rackmount 1U (R09) |
| Motherboard | ASUS P5M2-M/RS100-E4 |
| Chipset | NorthBridge: Intel® Xeon 3000 chipset (Mukilteo-2) SouthBridge: Intel® ICH7R |
| CPU | LGA775 socket for Intel® Xeon® 3000 series processors Supports Intel® Enhanced Memory 64 Technology (EM64T) Supports Enhanced Intel SpeedStep® Technology (EIST) |
| Memory | Dual-channel memory architecture 4 x 240-pin DIMM sockets support unbuffered ECC/non-ECC DDR2-533/667 memory modules Supports up to 8 GB system memory |
| LAN | Dual embedded Broadcom BCM5721 Gigabit LAN controllers that comply with PCI Express 1.0a specifications |
| VGA | Volari® XGI Z7 PCI-based VGA controller with 32 MB memory |
| Storage | Intel® ICH7R Southbridge supports: - 2 x SATAII drives with RAID functionality or IAA(RAID 0, RAID 1), or LSI (RAID 0, RAID 1) |
| Expansion slots | 1 x PCI-E2 X8 slot (x8 link) (on a riser card) 1 x SO-DIMM socket for ASUS Server Management Board |
| Front panel | 1 x Optical drive (optional) 2 x USB 2.0 ports Power switch Reset switch LEDs: Power, HDD access, LAN 1, LAN 2 HDD LEDs: Status, activity |
| Rear panel | 1 x PS/2 keyboard port (purple) 1 x PS/2 mouse port (green) 2 x USB 2.0 ports 1 x Parallel port 1 x Serial port (COM1) 1 x VGA port 2 x LAN (RJ-45) ports |
| Management | ASUS Server Web-based Management (ASWM 2.0) |
| Hardware support (optional) | SM-Bus, ASMB3-SOL support IPMI 2.0 Over LAN management card |
| Hardware monitors | Voltage, temperature, and fan speed monitoring Automatic System Restart (ASR) feature |
| Power supply | 300W single power supply, 100V~240V, 50Hz~60Hz |
| Dimensions | 381 mm (l) x 430 mm (w) x 43.6 mm (h) |
| Net Weight | 6.5 kg |

1.3 Front panel features

The barebone server displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators, location switch, optical drive, and two USB ports are located on the front panel.

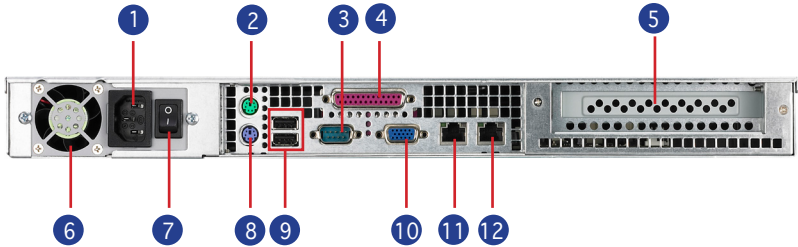


Refer to section 1.6.1 Front panel LEDs for the LED descriptions.



1.4 Rear panel features

The rear panel includes the power switch, expansion slot, system power socket, and power fan. The middle part includes the I/O shield with openings for the rear panel connectors on the motherboard.



- 1. AC power plug
- 2. PS/2 mouse port
- 3. Serial port
- 4. Parallel port
- 5. Expansion slot
- 6. Power fan
- 7. Power switch
- 8. PS/2 keyboard port
- 9. USB ports
- 10. VGA port
- 11. LAN port 1
- 12. LAN port 2



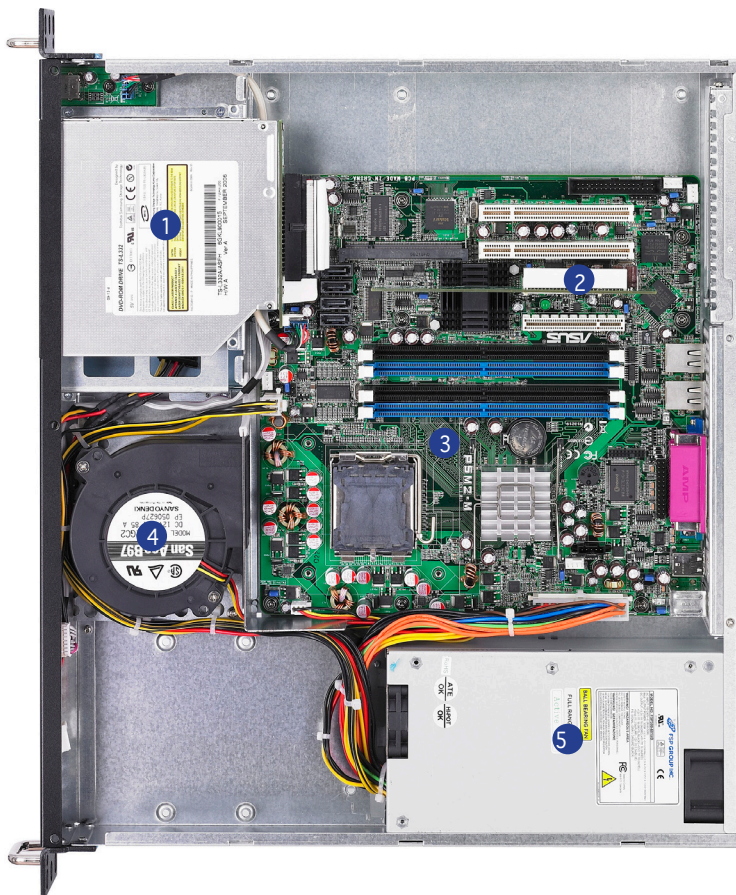
The ports for the PS/2 keyboard, PS/2 mouse, USB, VGA, and Gigabit LAN do not appear on the rear panel if motherboard is not present.



Refer to section 1.6.2 Rear panel LEDs for the LED descriptions.

1.5 Internal features

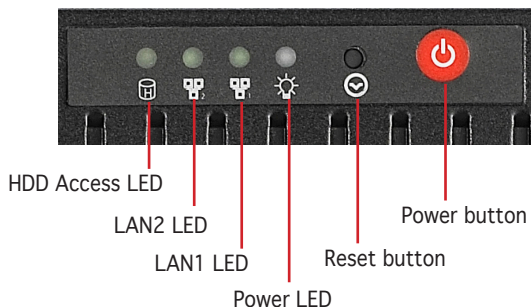
The barebone server includes the basic components as shown.



1. Optical drive (optional)
2. PCI-E Slot (riser card)
3. ASUS P5M2-M/RS100-E4 motherboard
4. System blower
5. Power supply

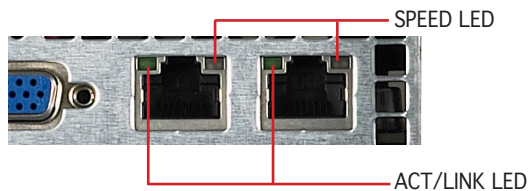
1.6 LED information

1.6.1 Front panel LEDs



| LED | Display status | Description |
|-------------------|-----------------------|---|
| Power button | ON | Press to turn system power ON |
| HDD Access LED | OFF Blinking | No activity Read/write data into the HDD |
| HDD Status access | ON OFF | HDD is present No HDD present |
| Power LED | OFF ON | System power is OFF System power is ON |
| Reset button | ON | Press to restart system |
| LAN LEDs | OFF Blinking ON | No LAN connection LAN is transmitting or receiving data LAN connection is present |

1.6.2 Rear panel LEDs



| ACT/LINK LED | | SPEED LED | |
|--------------|-------------|-----------|---------------------|
| Status | Description | Status | Description |
| OFF | No link | OFF | 10Mbps connection |
| Green | Linked | Orange | 100Mbps connection |
| Blinking | Linking | Green | 1000Mbps connection |

Chapter 2

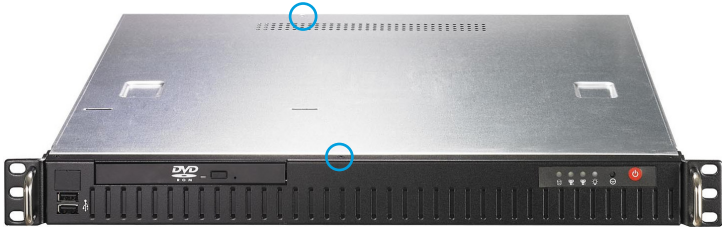
This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

Hardware setup

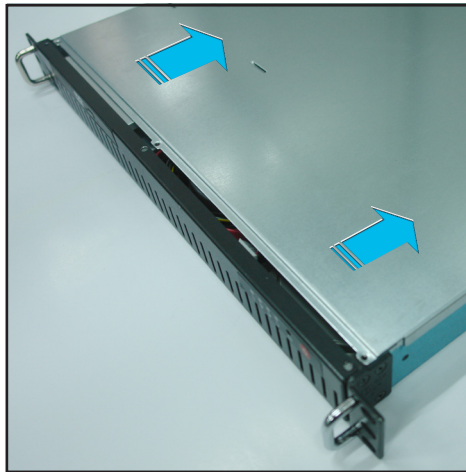
2.1 Chassis cover

2.1.1 Removing the cover

1. Use a Phillips screwdriver to remove the two screws on the top cover.



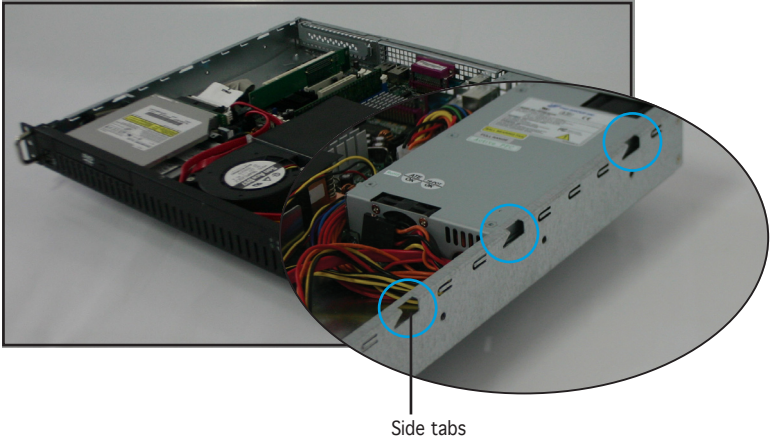
2. Firmly hold the cover and slide it toward the rear panel for about half an inch until it is disengaged from the chassis.



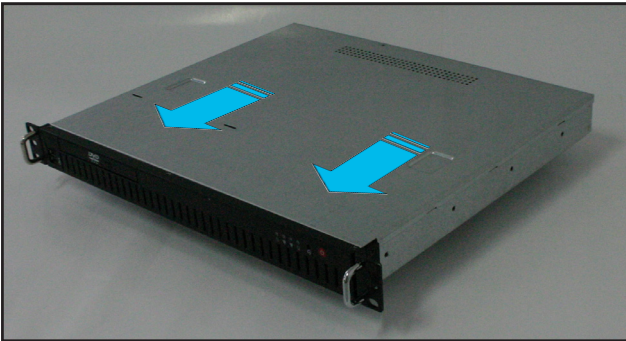
3. Lift the cover from the chassis.

2.1.2 Installing the cover

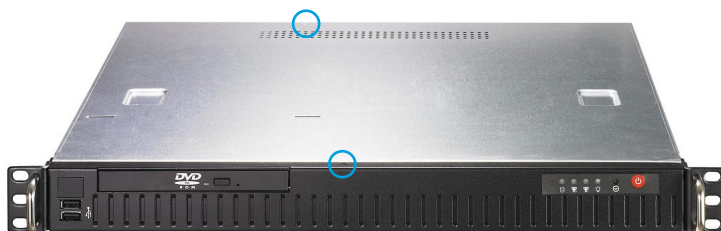
1. Position the cover on top of the chassis with the hooks aligned to the side tabs of the chassis.



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



3. Secure the cover with two screws.



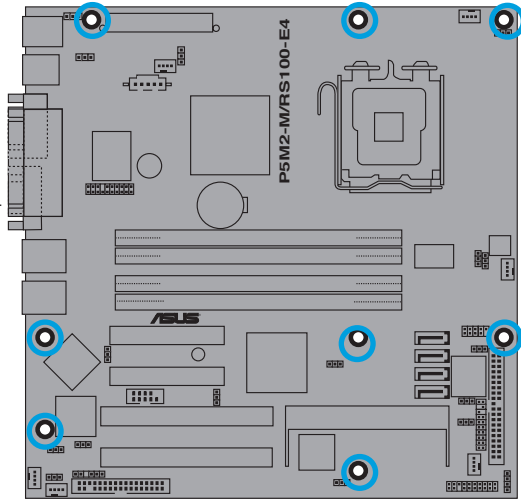
2.2 Motherboard information

Place eight (8) screws into the holes indicated by circles to secure the motherboard to the chassis.



Refer to "Chapter 4 Motherboard Information" for detailed Information.

Place this side towards
the rear of the chassis



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

2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Xeon® 3000 series processors in the 775-land package.

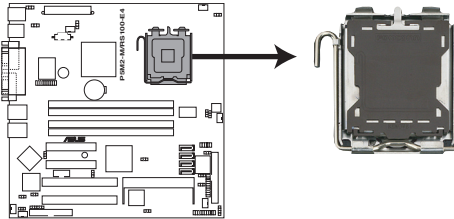


- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS shoulders the repair cost only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA775 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

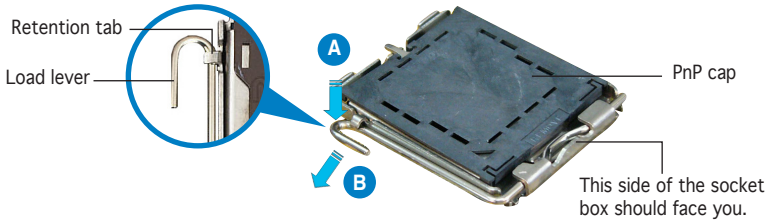


P5M2-M/RS100-E4 CPU Socket 775



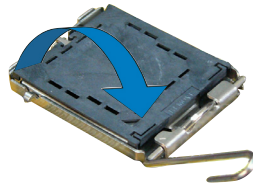
Before installing the CPU, make sure that the cam box is facing towards you and the load lever is on your left.

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

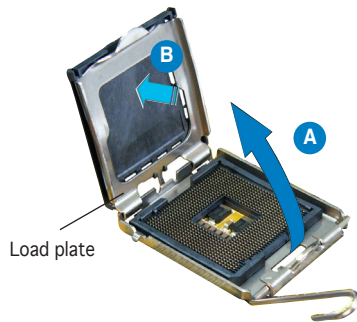


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

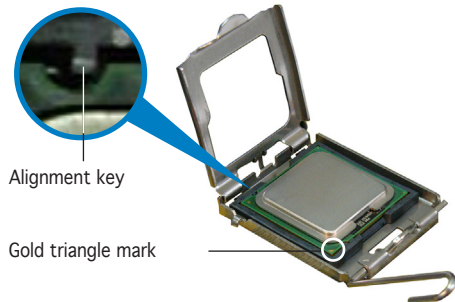
3. Lift the load lever in the direction of the arrow to a 135° angle.



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).



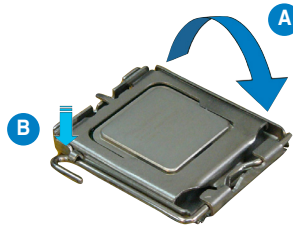
5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.





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

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



The motherboard supports Intel® Xeon® 3000 series processors with the Intel® Enhanced Memory 64 Technology (EM64T), and Enhanced Intel SpeedStep® Technology (EIST). Refer to the Appendix for more information on these CPU features.

2.3.2 Installing the CPU heatsink

The Intel® Xeon® 3000 series processors require a specially designed heatsink and fan-duct to ensure optimum thermal condition and performance.



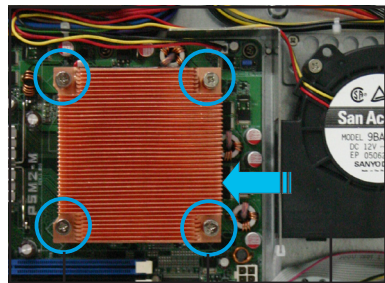
Use only qualified CPU heatsink assembly.

To install the CPU heatsink:

1. Place the heatsink on top of the installed CPU, matching the screw holes with the heatsink standoffs.



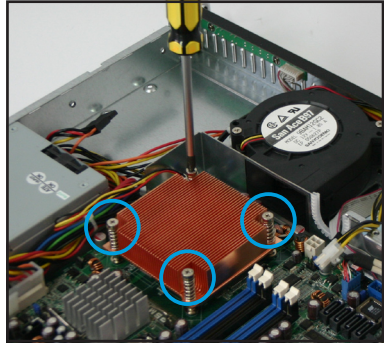
Make sure that the heatsink grill is parallel to the nozzle of the system blower as shown.



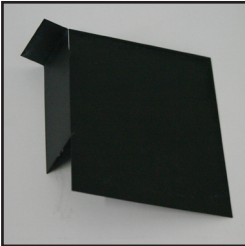
Screws

System blower

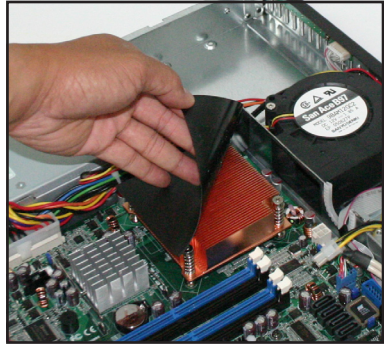
2. Tighten the screws.



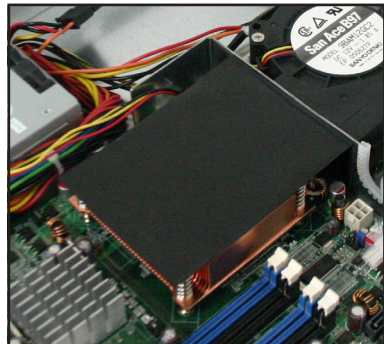
3. Peel the adhesive cover of the heatsink plastic cover and evenly attach to heatsink.



Heatsink plastic cover



The heatsink plastic cover ensures the linear airflow between the heatsink and system blower.



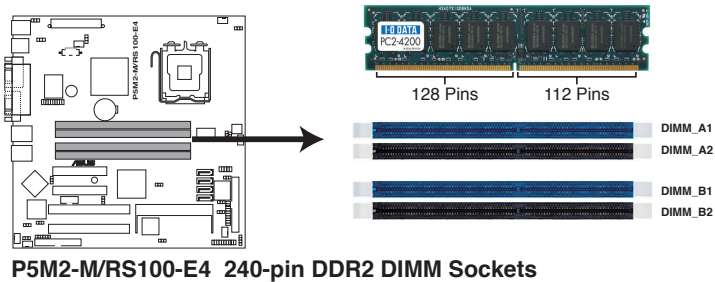
2.4 System memory

2.4.1 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 differently to prevent installation on a DDR DIMM socket.

The figure illustrates the location of the DDR2 DIMM sockets:



2.4.2 Memory configurations

You may install 512 MB, 1 GB, and 2 GB unbuffered ECC or non-ECC DDR2-533/667 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. Refer to the DDR2 Qualified Vendors List on the ASUS web site.
- When installing one or two DIMMs, install the DIMM(s) to the blue slots (DIMM_A1/DIMM_B1).
- Three DDR2 DIMMs installed into any three memory sockets will function in single-channel mode.

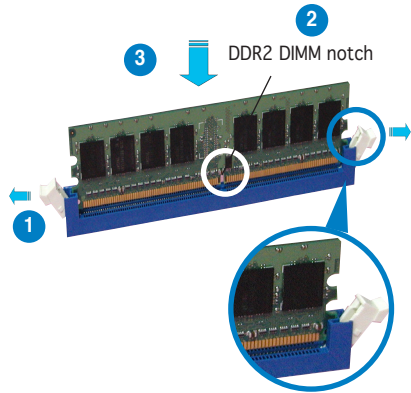
2.4.3 Installing a DIMM



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.

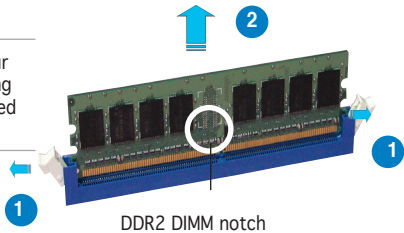
2.4.4 Removing a DIMM

Follow these steps to remove a DIMM.

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



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



2. Remove the DIMM from the socket.

2.5 Replaceable components

You may need to replace defective components or remove previously installed system components when installing or removing system devices. This section tells how to install or remove the following components:

1. System blower
2. Serial ATA hard disk drive
3. Optical disk drive

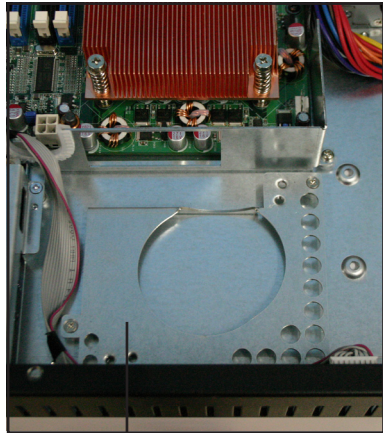
2.5.1 Installing the system blower

To install the system blower:

1. Locate the system blower plate on the chassis.

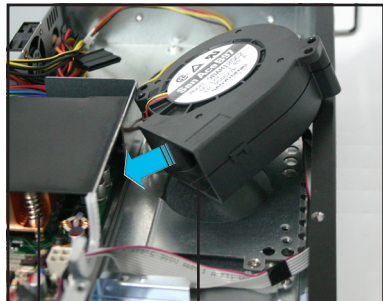


System blower



System blower plate

2. Align the nozzle of the system blower towards the heatsink.



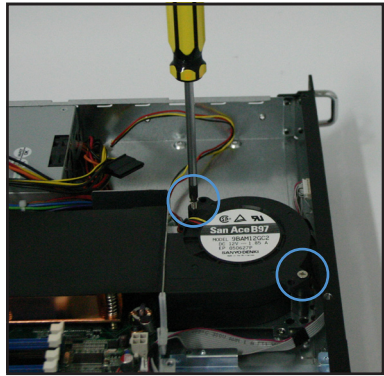
Heatsink

System blower nozzle

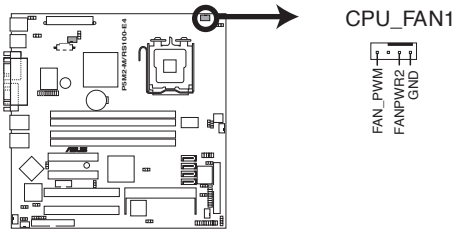
- Secure the system blower with two screws.



System blower screws



- Connect the system blower cable to the onboard fan connector labeled CPU_FAN1. Refer to the illustration below for the location of CPU_FAN1 connector.



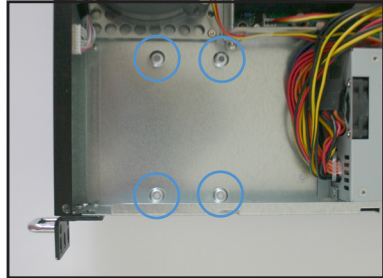
P5M2-M/RS100-E4 CPU Fan connector

2.5.2 Installing Serial ATA drives

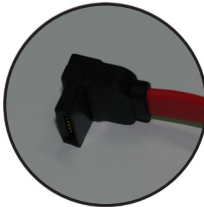
You can install up to two (2) Serial ATA hard disk drives to the system. Follow the succeeding instructions to install each of the drives.

To install primary Serial ATA drive:

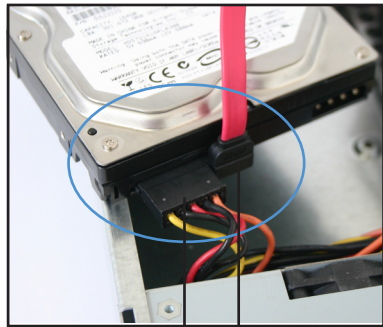
1. Locate the Serial ATA drive bay beside the power supply unit. Notice the four standard screw holes.



2. Connect the Serial ATA signal cable and ATX power connectors. Use the L-type Serial ATA connector to connect to the hard drive.



SATA L-type connector



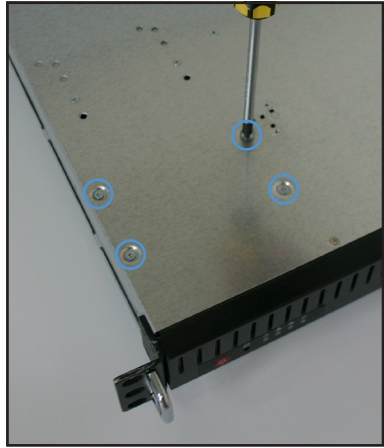
ATX power connector

SATA signal cable

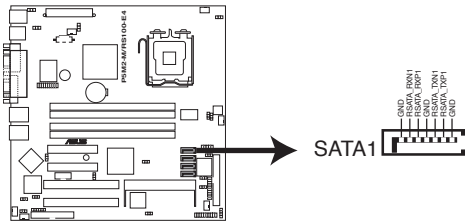
3. Place the Serial ATA drive into the drive bay matching the four screw holes with the holes on the disk drive.



- Secure the hard drive with four screws.



- Connect the other end of the Serial ATA signal connector to the onboard SATA connector labeled SATA1. Refer to illustration below for the location of SATA1 connector.

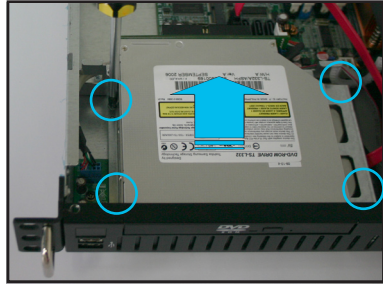


P5M2-M/RS100-E4 SATA1 connector

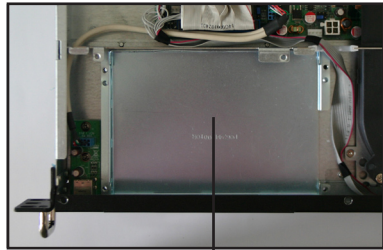
To install secondary Serial ATA drive:

1. If you have an ODD installed, remove the ODD bay first before you install a secondary SATA disk drive.

To remove, disconnect the ODD cable and power cable then use a screwdriver to remove all four screws.

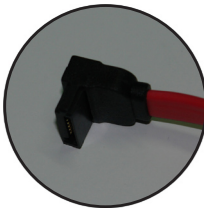


2. Locate the Serial ATA drive plate under the optical disk drive (ODD) bay.

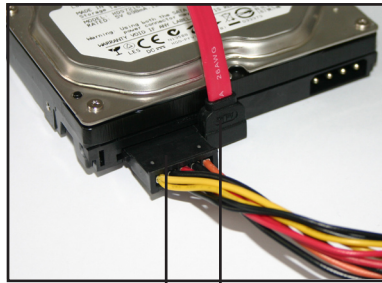


SATA drive plate

3. Connect the Serial ATA signal cable and ATX power connectors. Use the L-type Serial ATA connector to connect to the hard drive.



SATA L-type connector



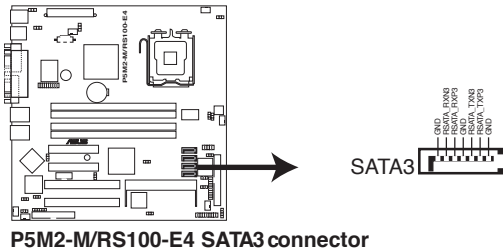
ATX power connector

SATA signal cable

4. Insert the Serial ATA drive into the drive plate as shown.



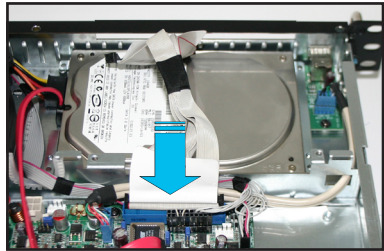
5. Connect the other end of the Serial ATA signal connector to the onboard SATA connector labeled SATA3.



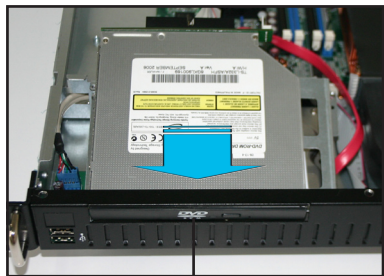
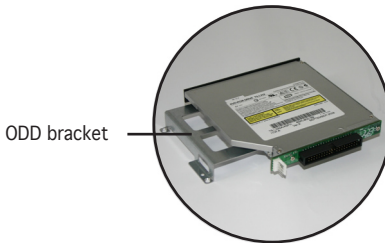
2.5.3 Installing optical disk drive (ODD)

To install ODD:

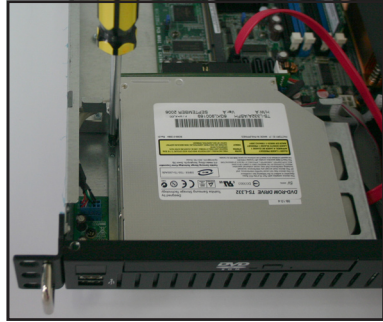
1. Connect the 80-pin IDE cable blue connector to the IDE connector onboard.



2. Align the bundled optical disk drive* (ODD) into the drive slot as shown.



3. Align the screw holes of the ODD bracket with the screw holes on the SATA drive plate then secure with four screws.



4. Connect the 80-pin IDE cable black connector to the IDE connector at the rear of the optical disk drive.



5. Connect a 4-pin ATX power connector to the power connector at the rear of the optical disk drive.



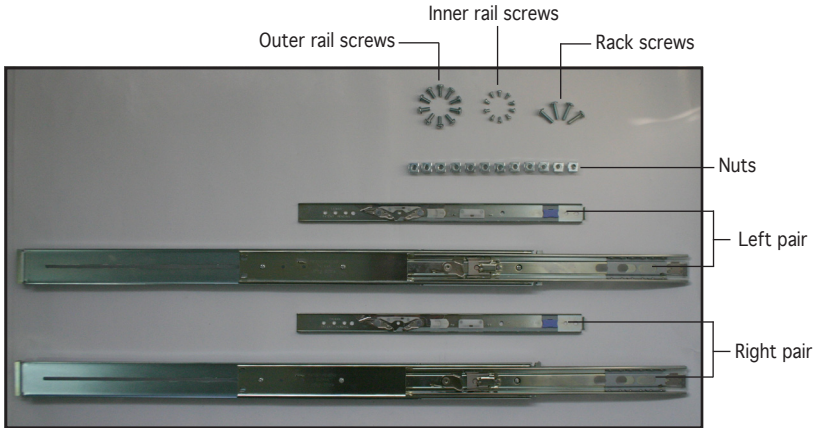
Chapter 3

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

Installation options

3.1 Rackmount rail kit items

The rackmount rail kit contains two pairs of rails (one pair for each side of the server system), twelve (12) pieces of rail nuts, ten (10) pieces of inner rail screws, ten (10) pieces of outer rail screws, and four (4) pieces of rack screws.



3.2 Attaching the rack ears

The bundled rack ears serve as handle when inserting or pulling the server from a rack cabinet.

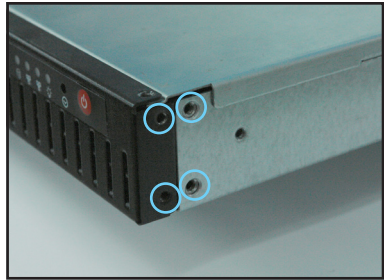
To attach rack ears:

1. Prepare the bundled pair of rack ears and set of eight (8) screws.

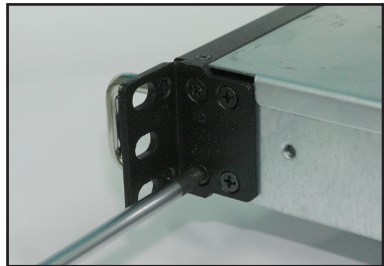


Pair of rack ears

2. Locate the four screw holes on each front-side of the chassis. Select one side for installation.



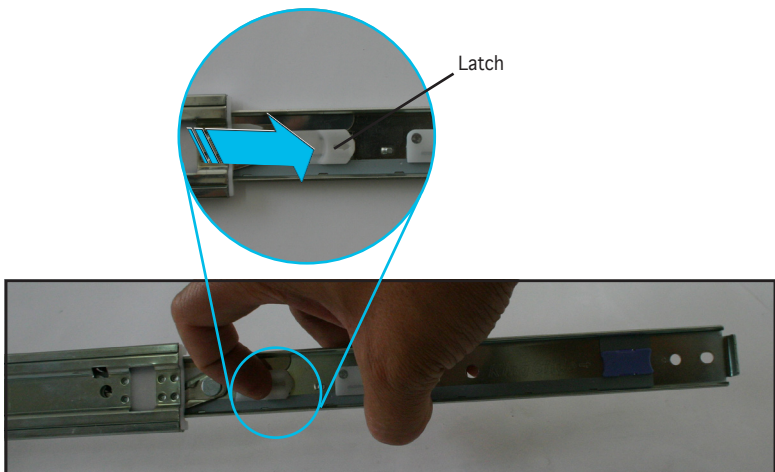
3. Get one rack ear and match the four screw holes to the screw holes on the chassis. Orient the rack ear as shown.
4. Secure the rack ear to the chassis with four screws.
5. Repeat steps 2 - 4 to attach the other rack ear.



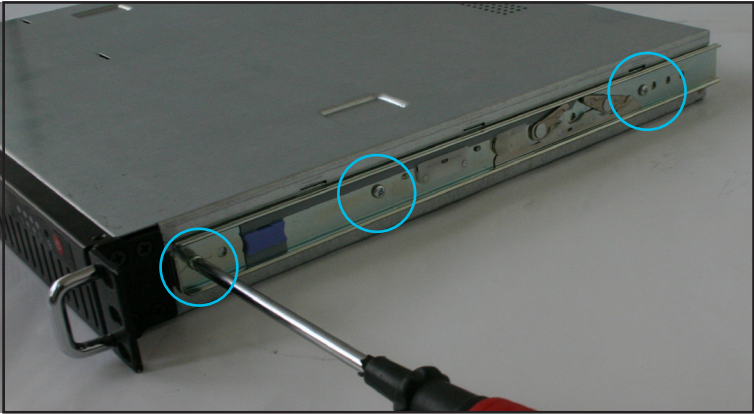
3.3 Attaching the rails to the rack

To attach the rack rails:

1. Release the inner rail on each rail set, by sliding the latch to direction as indicated by arrow. When released, pull out the inner rail.



2. Attach the inner rail to the corresponding side of the chassis and secure with three inner rail screws. Make sure the rail is oriented as shown.

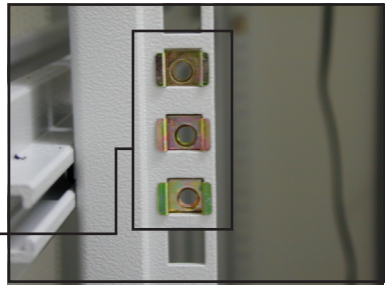


3. Attach the second inner rail to the other side of the chassis and secure with three inner rail screws.

4. Select one unit of space (1U) on the rack where you wish to install the server.

5. Place three (3) nuts on the front and three at the back. Do the same to the corresponding side of the rack.

Nuts



6. Adjust the length of the outer rail to fit the length of the rack cabinet then fasten the two screws.

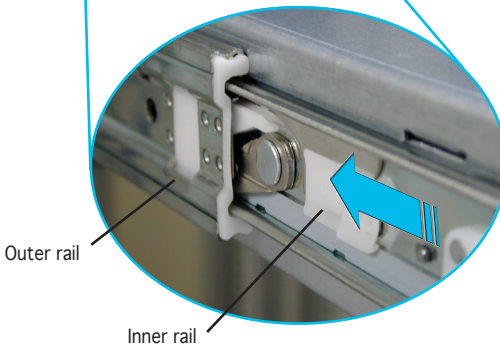


- Secure the outer rail with two screws at the front and rear of the rack cabinet .
- Find the corresponding 1U space on the other side of the rack cabinet then repeat steps 6 and 7 to attach the other outer rail.



- Using the rack ears, firmly hold the server on both sides and insert the rear panel side to the front end of the rack rail.

Make sure that the inner rails are properly aligned with the outer rails.



10. Carefully push the server all the way to the back until the front panel fits the front end of the rack, and the rack screw holes on the server match the middle hole on the rack.



Rack screw hole

11. Secure the server to the rack with two rack screws.



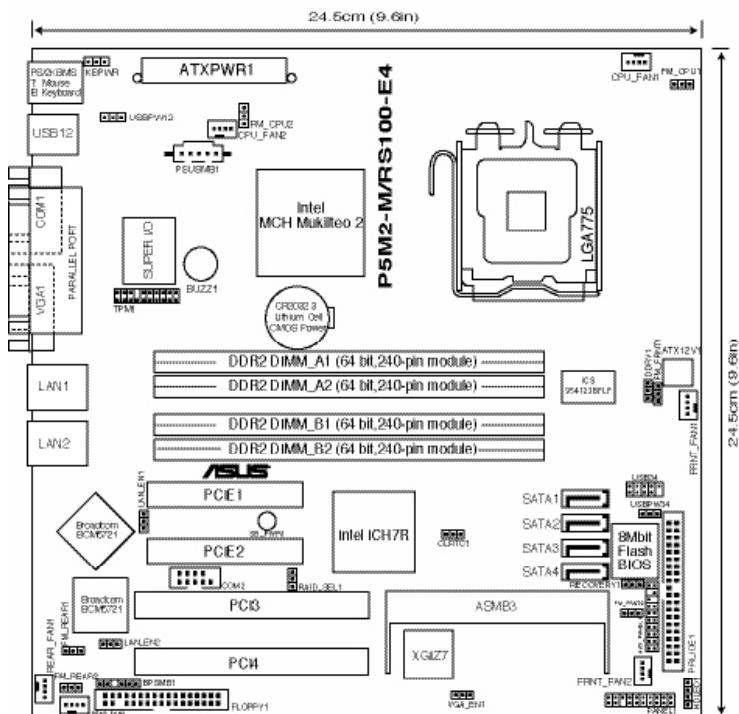
Rack screw

Chapter 4

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

Motherboard Info

4.1 Motherboard overview



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| 6. | Gigabit LAN controller setting (3-pin LAN_EN1; LAN_EN2) | 2-21 |
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| 12. | System panel connector (20-pin PANEL1) | 2-32 |

4.2 Jumpers

1. Clear RTC RAM (CLRTC1)

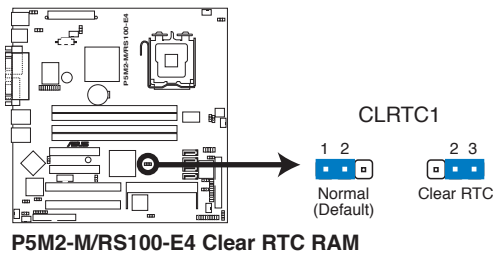
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

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

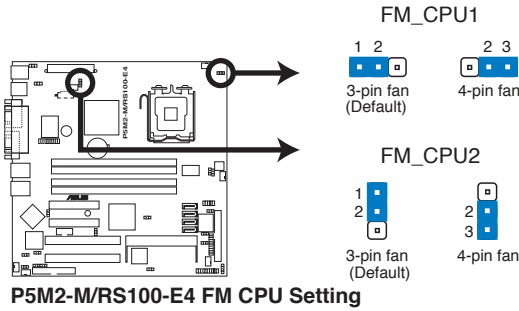


Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



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

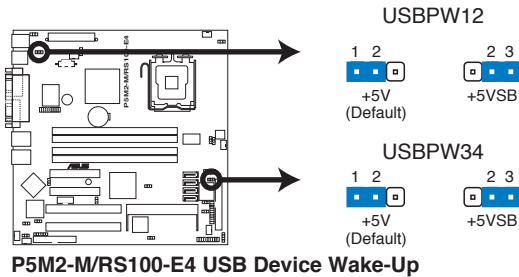
These jumpers allow you to connect either a 3-pin or a 4-pin fan cable plug to the CPU fan connectors (CPU_FAN1, CPU_FAN2). Set these jumpers to pins 1-2 if you are using a 3-pin fan cable plug, or to pins 2-3 if you are using a 4-pin plug.



P5M2-M/RS100-E4 FM CPU Setting

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

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



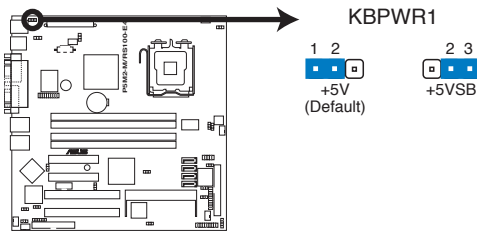
P5M2-M/RS100-E4 USB Device Wake-Up



- 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.
- If you are using Windows 2000, you need to install Service Pack 4 to wake up the system from S4 sleep mode.
- The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

4. Keyboard/Mouse power (3-pin KBPWR1)

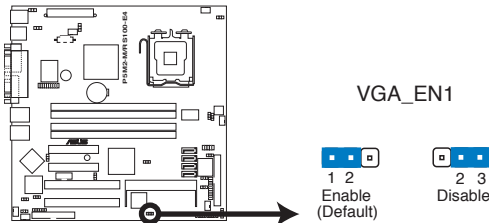
This jumper allows you to enable or disable the keyboard/mouse wake-up feature. Set this jumper to pins 2-3 (+5VSB) to wake up the computer when you press a key on the keyboard (the default is the Space Bar) or use the mouse. This feature requires an ATX power supply that can supply at least 1A on the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



P5M2-M/RS100-E4 Keyboard Power Setting

5. VGA controller setting (3-pin VGA_EN1)

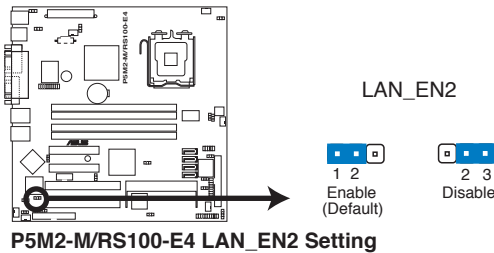
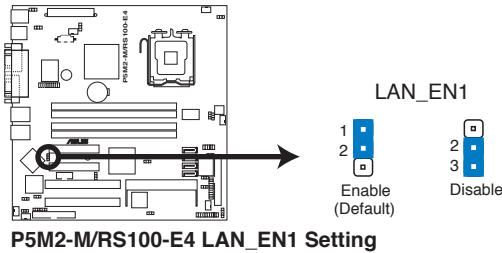
These jumpers allow you to enable or disable the onboard XGI Volari Z7® PCI VGA controller. Set to pins 1-2 to activate the VGA feature.



P5M2-M/RS100-E4 VGA Setting

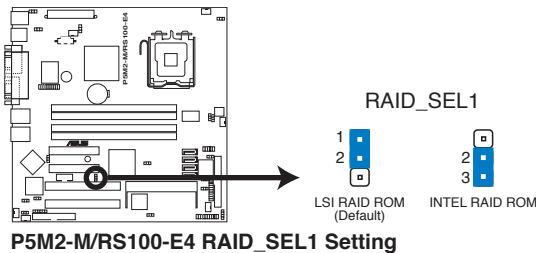
6. Gigabit LAN controller setting [3-pin LAN_EN1, LAN_EN2)

These jumpers allow you to enable or disable the onboard Broadcom® BCM5721 Gigabit LAN1 or LAN2 controller. Set to pins 1-2 to activate the Gigabit LAN controller.



7. RAID controller selection (3-pin RAID_SEL1)

This jumper allows you to select the RAID configuration utility to use when you create disk arrays. Place the jumper caps over pins 1-2 if you want to use the LSI Logic Embedded SATA RAID Setup Utility (default); otherwise, place the jumper caps to pins 2-3 to use the Intel® Matrix Storage Manager.

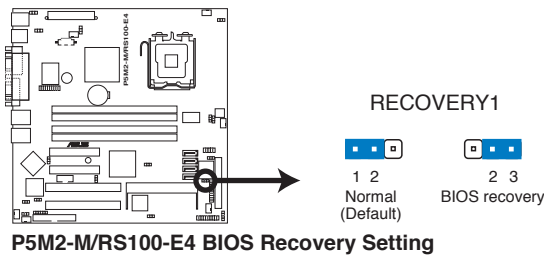


8. Force BIOS recovery setting (3-pin RECOVERY1)

This jumper allows you to quickly update or recover the BIOS when it gets corrupted.

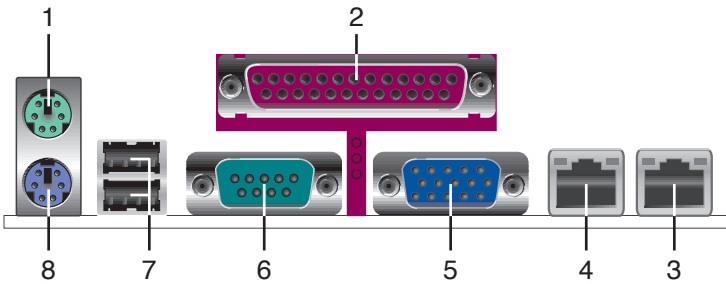
To update the BIOS:

1. Prepare a floppy disk that contains the latest BIOS for the motherboard (xxxx-xxx.ROM) and the AFUDOS.EXE utility.
2. Set the jumper to pins 2-3.
3. Insert the floppy disk then turn on the system to update the BIOS.
4. Shut down the system.
5. Set the jumper back to pins 1-2.
6. Turn on the system.



4.3 Connectors

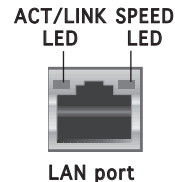
4.3.1 Rear panel connectors



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. **Gigabit LAN1 (RJ-45) port.** This ports allow Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.
4. **Gigabit LAN2 (RJ-45) port.** This ports allow Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.
5. **VGA port.** This port is for a VGA monitor or other VGA-compatible devices.
6. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.
7. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
8. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

LAN port LED indications

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



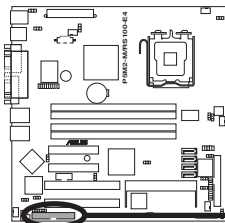
4.3.2 Internal connectors

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.



P5M2-M/RS100-E4 Floppy Disk Drive Connector



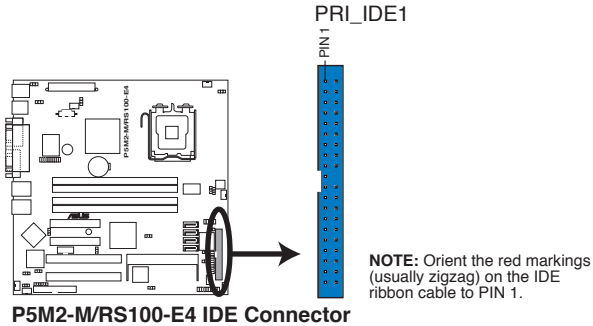
NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.

2. ICH7R primary 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.



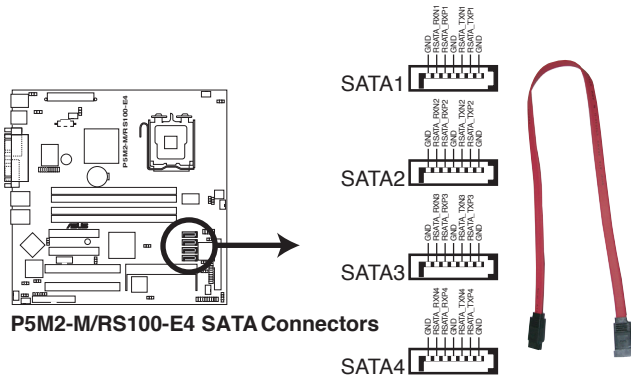
3. Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4)

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 and RAID 1 configuration using the Intel® Matrix Storage Technology or the LSI MegaRAID® utility embedded in the Intel® ICH7R Southbridge.



These connectors are set **IDE** mode by default. In **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 “4.3.4 IDE Configuration” for details.



Important notes on Serial ATA

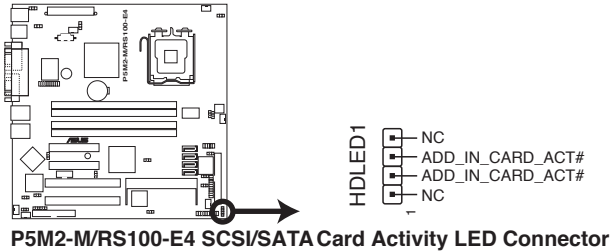
- Use only two Serial ATA RAID connectors for each RAID 0 or RAID 1 set.
- When using the connectors in **IDE** mode, connect the primary (boot) hard disk drive to the SATA1 or SATA2 connector. Refer to the table below for the recommended SATA hard disk drive connections.

Serial ATA hard disk drive connection

| Connector | Setting | Use |
|-------------|---------|-----------|
| SATA1/SATA2 | Master | Boot disk |
| SATA3/SATA4 | Slave | Data disk |

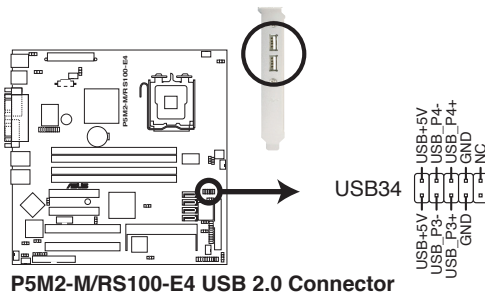
4. Hard disk activity LED connector (4-pin HDLED1)

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



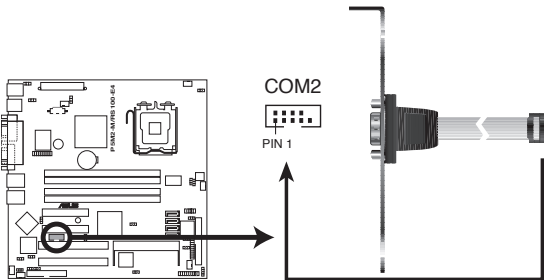
5. USB connector (10-1 pin USB34)

This connector is for USB 2.0 ports. This USB connector complies with USB 2.0 specification that supports up to 480 Mbps connection speed.



6. 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. The serial port module is purchased separately.



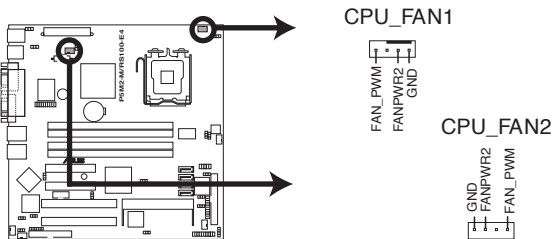
P5M2-M/RS100-E4 Serial Port2 (COM2) Connector

7. CPU and system fan connectors (3-pin CPU_FAN1, CPU_FAN2)

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.



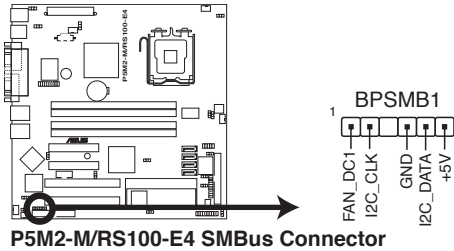
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



P5M2-M/RS100-E4 CPU Fan connectors

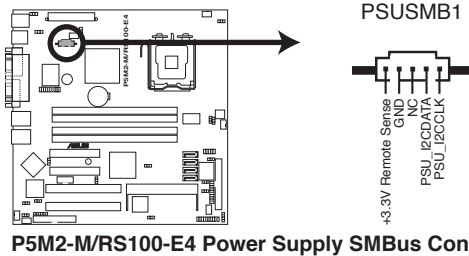
8. Backplane SMBus connector (6-1 pin BPSMB1)

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.



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

This connector is for the power supply SMB cable, if your power supply supports the SMBus function.

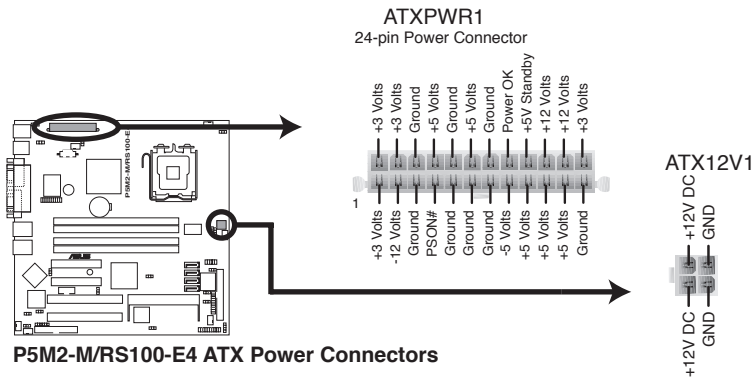


10. SSI power connectors (24-pin ATXPWR1, 8-pin ATX12V2)

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.



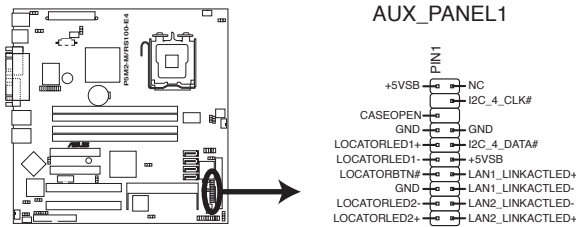
- Use of an SSI 12 V Specification 2.0-compliant power supply unit (PSU) that provides a minimum power of 450 W is recommended for a fully-configured system.
- By default, four ATX12V2 connector pins are covered to prevent incorrect insertion of a 4-pin ATX +12V power plug. Remove this cover when using a PSU with an 8-pin ATX +12V power plug.
- Do not forget to connect the 4-pin or 8-pin ATX +12 V power plug; otherwise, the system will not boot up.
- We recommend that you use a PSU with a higher power output when configuring a system with more power consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- You must install a PSU with a higher power rating if you intend to install additional devices.



11. Auxiliary panel connector (20-pin AUX_PANEL1)

This connector is for additional front panel features including front panel SMB, locator LED and switch, chassis intrusion, and LAN LEDs.

- **Front panel SMB (6-1 pin FPSMB)**
These leads connect the front panel SMBus cable.
- **LAN activity LED (2-pin LAN1_LED, LAN2_LED)**
These leads are for Gigabit LAN activity LEDs on the front panel.
- **Chassis intrusion (2-pin CHASSIS)**
These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to these leads to record a chassis intrusion event.
- **Locator LED (6-pin LOCATOR)**
These leads are for the locator switch and LED on the front panel.

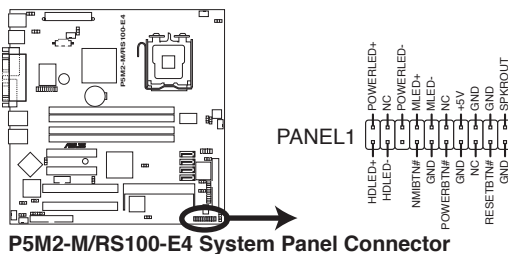


P5M2-M/RS100-E4 Auxiliary Panel Connector

12. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.

- **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.
- **Message LED (Brown 2-pin MLED)**
This connector is for the message LED cable that connects to the front message LED. The message LED indicates the booting status. The LED blinks when the system is in the boot process until the operating system is loaded.
- **Hard disk drive activity LED (Red 2-pin IDE_LED)**
This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.
- **System warning speaker (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 (Light Green 2-pin PWRSW)**
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.
- **Reset button (Blue 2-pin RESET)**
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.



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

Chapter 5

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

BIOS Setup

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

To create a bootable floppy disk in a DOS environment:

- a. Insert a 1.44MB floppy disk into the drive.
- b. At the DOS prompt, type `format A: /s` then press <Enter>.

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 /iRS100-E4.ROM
```

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

```
A:\>afudos /iRS100-E4.ROM
AMI Firmware Update Utility - Version 1.19 (ASUS V2.07 (03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

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

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



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

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

```
A:\>afudos /iRS100-E4.ROM
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

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

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

Please restart your computer

A:\>
```

Updating the BIOS file using a USB flash drive

If you have not purchased a USB floppy disk drive, you may update the BIOS file using a USB flash drive. Format the USB flash drive to FAT16 or 32 system file before updating the BIOS.

To format the USB flash drive to a FAT32/16 system file:

- Insert the USB flash drive to an available USB port.
- From the Windows desktop, click **Start**, then select **My computer**.
- Right-click the USB flash drive icon, then select **Format** from the menu.
- From the **File system** field, select **FAT32** or **FAT16**, then click the **Start** button.

To update the BIOS file:

- Copy the original or the latest BIOS file and the AFUDOS utility (afudos.exe) to the USB flash drive.
- Insert the USB flash drive to an available USB port, then place the motherboard support CD to the optical drive.
- Boot the system from the support CD, then select the **FreeDOS command prompt**.
- At the DOS prompt, replace the prompt with the USB flash disk drive letter, then type: **afudos /i[filename]**
- Follow the instructions in the previous section to update the BIOS file.

5.1.3 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 **RS100-E4.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 "RS100-E4.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 "RS100-E4.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.

5.1.4 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.

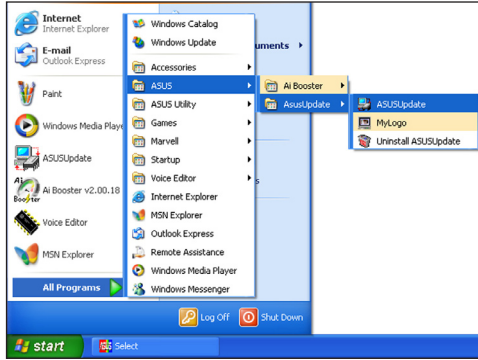


Quit all Microsoft® Windows® applications before you update the BIOS using this utility.

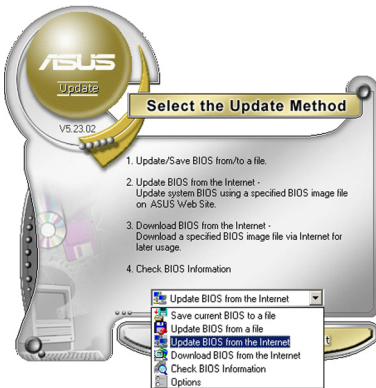
Updating the BIOS through the Internet

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**.



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



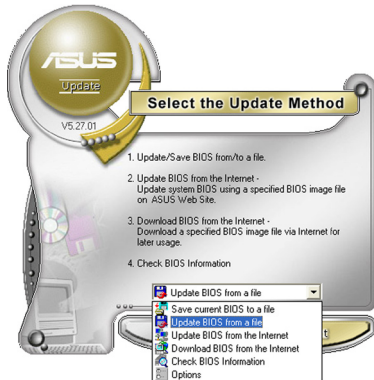
The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.



Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

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



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

5.2 BIOS setup program

This motherboard supports a programmable Low-Pin Count (LPC) chip that you can update using the provided utility described in section “4.1 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 LPC chip.

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

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

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



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

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



- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the Load Default Settings item under the Exit Menu. See section “5.8 Exit Menu.”
 - The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
 - Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.
-

5.2.1 BIOS menu screen

The screenshot shows the BIOS Setup Utility menu screen. At the top, there is a menu bar with the following items: Main, Advanced, Power, Boot, and Exit. The main area is divided into three sections: Menu items, Configuration fields, and General help. The Menu items section lists System Time, System Date, Legacy Diskette A, Primary IDE Master, Primary IDE Slave, Third IDE Master, Third IDE Slave, Fourth IDE Master, Fourth IDE Slave, IDE Configuration, and System Information. The Configuration fields section shows the current time as [11:10:19], the date as [Tue 01/01/2002], and Legacy Diskette A as [Disabled]. The General help section provides instructions on how to use the keyboard to navigate the menu, including using [ENTER], [TAB], [SHIFT-TAB], [F1], [F10], and [ESC].

Labels for the screenshot:

- Menu items:** System Time, System Date, Legacy Diskette A, Primary IDE Master, Primary IDE Slave, Third IDE Master, Third IDE Slave, Fourth IDE Master, Fourth IDE Slave, IDE Configuration, System Information.
- Menu bar:** Main, Advanced, Power, Boot, Exit.
- Configuration fields:** [11:10:19], [Tue 01/01/2002], [Disabled].
- General help:** Use [ENTER], [TAB], or [SHIFT-TAB] to select a field. Use [+] or [-] to configure system time. Select Screen, Select Item, Change Option, General Help, Save and Exit, Exit.

Sub-menu items: System Time, System Date, Legacy Diskette A, Primary IDE Master, Primary IDE Slave, Third IDE Master, Third IDE Slave, Fourth IDE Master, Fourth IDE Slave, IDE Configuration, System Information.

Navigation keys: Select Screen, Select Item, Change Option, General Help, Save and Exit, Exit.

v02.58 (C)Copyright 1985-2004, American Megatrends, Inc.

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.

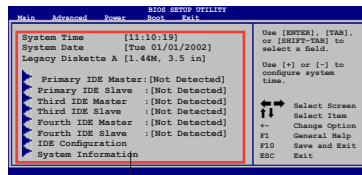


Some of the navigation keys differ from one screen to another.

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.

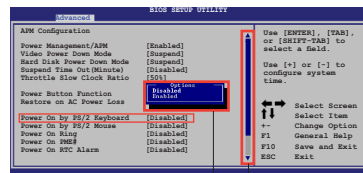
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to "5.2.7 Pop-up window."

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

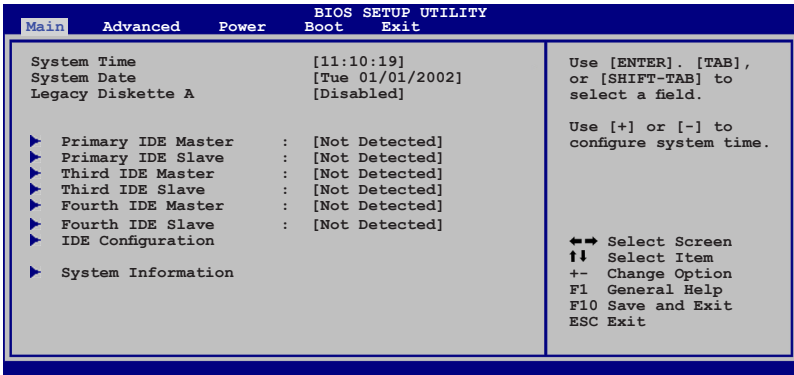
At the top right corner of the menu screen is a brief description of the selected item.

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]

Allows you to set the system time.

5.3.2 System Date [Day xx/xx/xxxx]

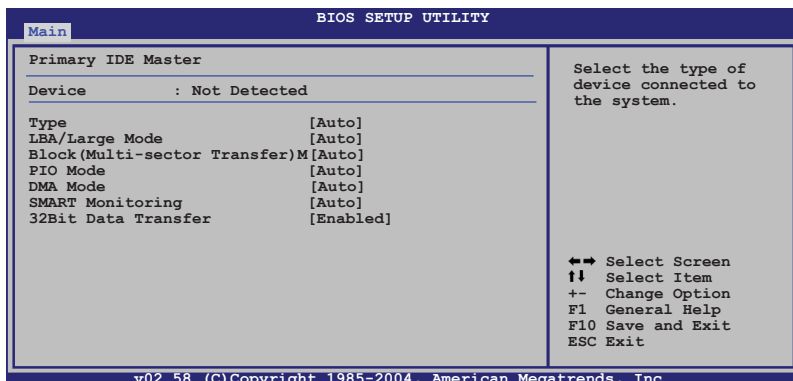
Allows you to set the system date.

5.3.3 Legacy Diskette A [Disabled]

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, Fourth IDE Master/Slave

The BIOS automatically detects the connected 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 N/A if no IDE device is installed in the system.

Type [Auto]

Selects the type of IDE drive. Setting to [Auto] allows automatic selection of the appropriate IDE device type. Select [CDROM] if you are specifically configuring a CD-ROM drive. Select [ARMD] (ATAPI Removable Media Device) if your device is either a ZIP, LS-120, or MO drive.

Configuration options: [Not Installed] [Auto] [CDROM] [ARMD]

LBA/Large Mode [Auto]

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

Block (Multi-sector Transfer) [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]

SMART Monitoring [Auto]

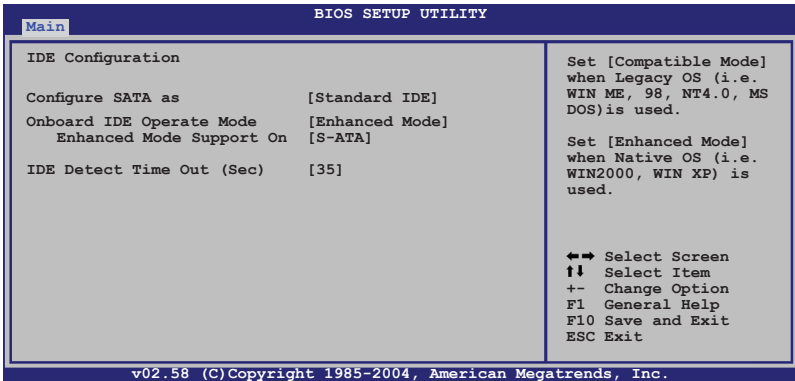
Sets the Smart Monitoring, Analysis, and Reporting Technology. Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

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

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 wish to configure the item.



Configure SATA As [Standard IDE]

Sets the configuration for the Serial ATA connectors supported by the Southbridge chip.

If you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices, set this item to [Standard IDE].

Onboard IDE Operate Mode [Enhanced Mode]

Allows selection of the onboard IDE operation mode depending on the installed operating system (OS). Set to [Enhanced] if you are using native OS, e.g. Windows® 2000/XP. Set to [Compatible] if you are using legacy OS, e.g. Windows ME/98/NT, MS-DOS. Configuration options: [Disabled] [Compatible] [Enhanced]



Set the item **Configure SATA as** to [RAID] if you want to use or configure the SATA connectors under SuSE Linux Enterprise Server 9.0 SP1 operating system environment. Due to the OS limitation, you must set a SATA RAID to use any SATA device (at least two SATA devices are needed for the RAID configuration). Refer to Chapter 5 and Chapter 6 for details on how to set a SATA RAID.

Set Configure SATA As to [RAID], if you want to create a RAID 0 or RAID1, configurations using the Intel® Matrix Storage Manager or if you want to create a RAID 0 or RAID 1 configurations using the LSI Logic Embedded SATA RAID Setup Utility.

OnBoard Serial-ATA BOOTROM [Disabled]

Allows you to enable or disable the Onboard Serial-ATA BOOTROM. Configuration options: [Disabled] [Enabled]

The AHCI allows the onboard storage driver to enable advanced Serial ATA features that enhance storage performance on random workloads by allowing the drive to internally optimize the order of commands.

If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), set this item to [AHCI]. For details on AHCI, go to:
www.intel.com/support/chipsets/imst/sb/CS-012304.htm
www.intel.com/support/chipsets/imst/sb/CS-012305.htm

The SATA controller is set to Native mode when this item is set to [RAID] or [AHCI].

ALPE and ASP [Disabled]

Allows you to enable or disable the Aggressive Link Power Management and Aggressive Slumber/Partial Enabled. Configuration options: [Disabled] [Enabled]

Stagger Spinup Support [Disabled]

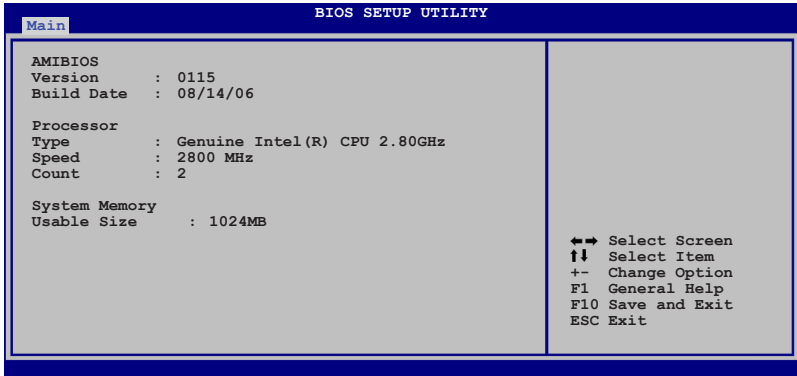
Allows you to enable or disable the Stagger Spinup support function. Configuration options: [Disabled] [Enabled]

AHCI Port 3 Interlock Switch [Disabled]

Allows you to enable or disable AHCI Port 3 Interlock Switch. Configuration options: [Disabled] [Enabled]

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

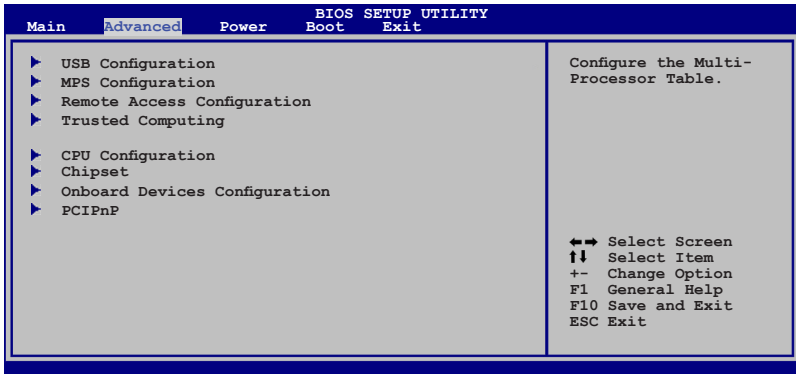
Displays the auto-detected total system memory.

5.4 Advanced menu

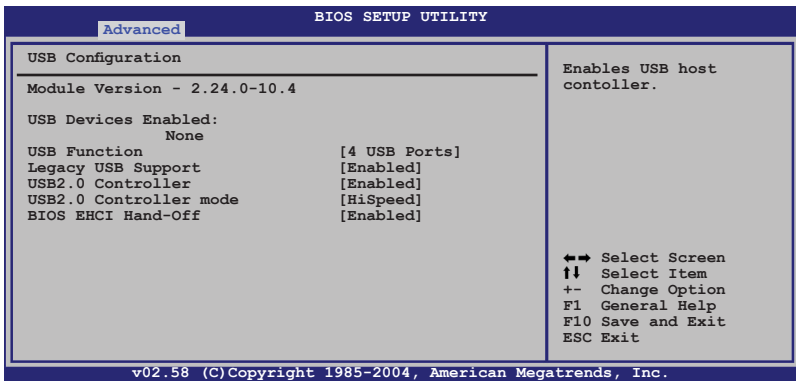
The Advanced menu items allow you to change the settings for the CPU and other system devices.



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



USB Function [4 USB Ports]

Allows you to enable a specific number of USB ports, or disable the USB function. Configuration options: [Disabled] [2 USB Ports] [4 USB Ports]



When USB Function set to 2 USB Ports or 4 USB Ports, the following items appear.

Legacy USB Support [Enabled]

Allows you to enable or disable support for legacy USB. The AUTO option disables legacy support if there is no USB device connected.
Configuration options: [AUTO] [2 USB Ports] [4 USB Ports]

USB 2.0 Controller [Enabled]

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

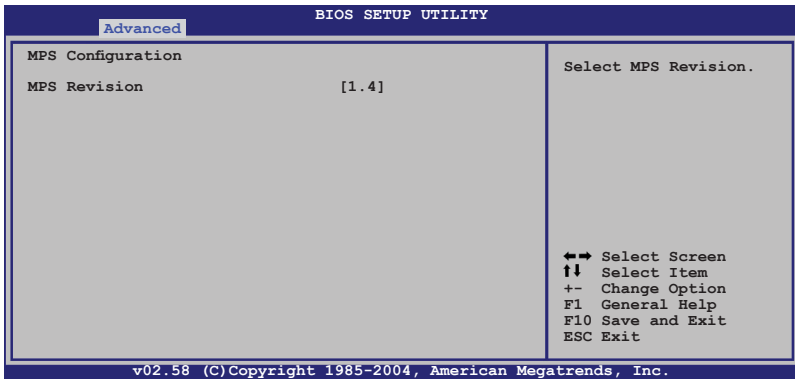
USB2.0 Controller mode [HiSpeed]

Allows you to select the USB2.0 controller mode.
Configuration options: [HiSpeed] [FullSpeed]

BIOS EHCI Hand-Off [Enabled]

Allows you to enable or disable the BIOS EHCI Hand-Off support function.
Configuration options: [Disabled] [Enabled]

5.4.2 MPS Configuration

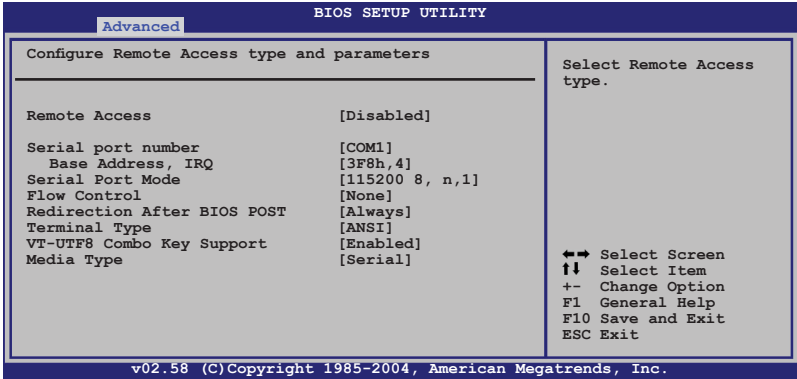


MPS Revision [1.4]

Allows you to select the multi-processor system version.
Configuration options: [1.1] [1.4]

5.4.3 Remote Access Configuration

The items in this menu allows 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 following items appear only when the **Remote Access** item is set to [Enabled].

Serial port number [COM1]

Allows you to select a serial port for console redirection. Configuration options: [COM1] [COM2]

Serial Port Mode [115200 8, n,1]

Allows you to select a serial port mode. Configuration options: [115200 8,n,1] [57600 8,n,1] [38400 8,n,1] [19200 8,n,1] [9600 8,n,1]

Flow Control [None]

Allows you to set 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]

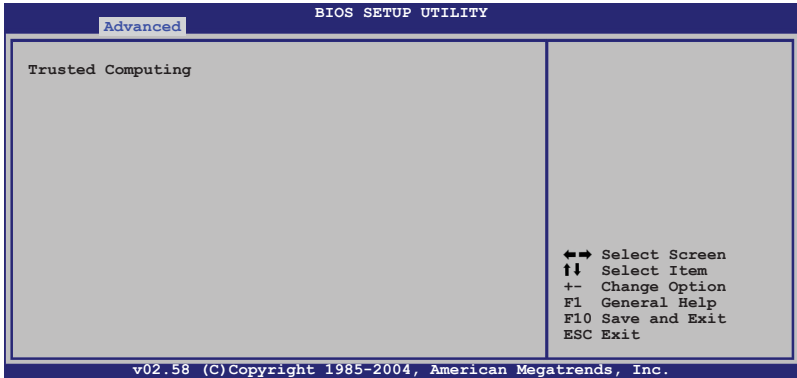
VT-UTF8 Combo Key Support [Enabled]

Allows you to enable or disable VT-UTF8 Combination Key Support for ANSI/VT100 terminals. Configuration options: [Enabled] [Disabled]

Media Type [Serial]

Allows you to select the media for console redirection. Configuration options: [Serial] [LAN] [Serial + LAN]

5.4.4 Trusted Computing



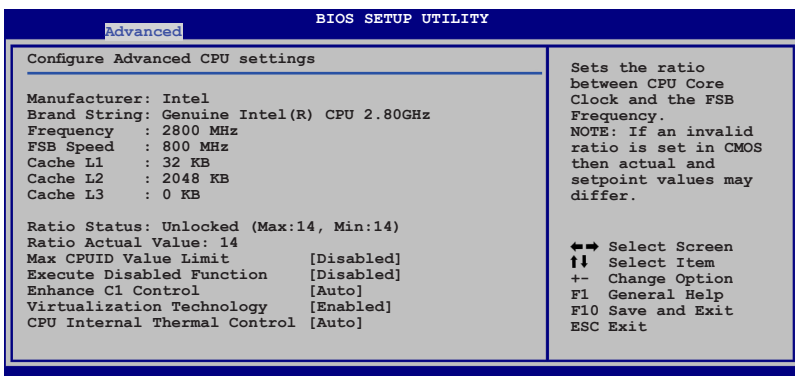
Use this option to configure settings related to trusted computing innovations.



You need to install ASUS TPM card to make this feature function.

5.4.5 CPU Configuration

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



Max CPUID Value Limit [Disabled]

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

Configuration options: [Disabled] [Enabled]

Execute Disabled Function [Disabled]

Allows you to enable or disable the Execute Disabled function.

Configuration options: [Disabled] [Enabled]

Enhanced C1 Control [Auto]

Allows you to disable or set to Auto the Enhanced C1 Control.

Configuration options: [Auto] [Disabled]

Virtualization Technology [Enabled]

Allows you to enable or disable the Virtualization Technology feature.

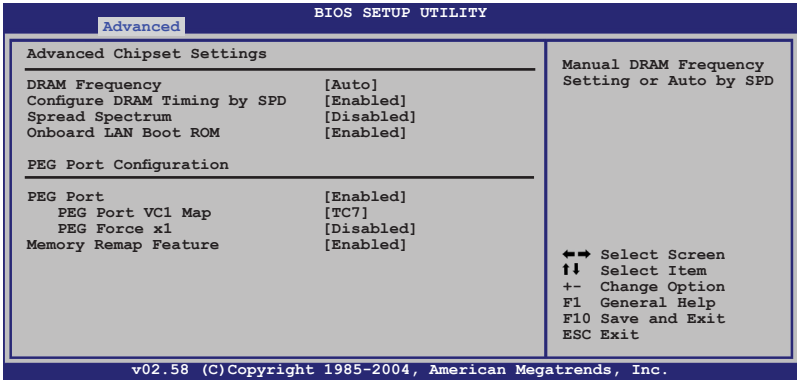
Configuration options: [Disabled] [Enabled]

CPU Internal Thermal Control [Auto]

Allows you to set CPU internal thermal control. If set to Auto, BIOS automatically check CPU's capability to enable TM or TM2 support. In TM mode, CPU power consumption is reduced; in TM2 mode, CPU core ratio and VID is reduced. Configuration options: [Auto] [Disabled]

5.4.6 Chipset Configuration

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



DRAM Frequency [Auto]

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

Configure DRAM Timing by SPD [Enabled]

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

DRAM CAS# Latency [5 Clocks]

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

DRAM RAS# to CAS# Delay [4 Clocks]

Controls the latency between the DDR SDRAM active command and the read/write command. Configuration options: [2 Clocks] [3 Clocks] [4 Clocks] [5 Clocks]

DRAM RAS# Activate to Precharge Delay [15 DRAM Clocks]

Configuration options: [1 Clocks] [2 Clocks] ~ [15 Clocks]

DRAM Write Recovery Time [4 Clocks]

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

Spread Spectrum [Disabled]

Allows you to enable or disable the spread spectrum. Configuration options: [Disabled] [Enabled]

Onboard LAN Boot ROM [Enabled]

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

PEG Port Configuration

PEG Port [Enabled]

Allows you to enable or disable the PCI Express Graphic port.
Configuration options: [Enabled] [Disabled]

Memory Remap Feature [Enabled]

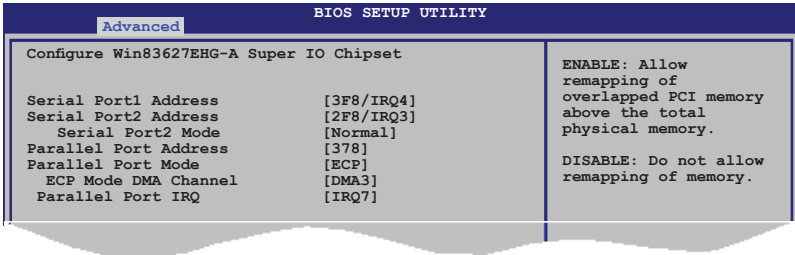
Allows you to remap the overlap PCI memory over the total physical memory. Configuration options: [Disabled] [Enabled]



Disable this item if you are using RedHat Linux Advanced Server 3.0 UP5/UP6 operating system.

5.4.7 Onboard Devices Configuration

The Onboard Devices Configuration menu allows you to change the onboard devices settings. Select an item then press <Enter> to display the sub-menu.



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 Port2 base address.

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

Serial Port2 Mode [Normal]

Allows you to select the Serial Port2 mode.

Configuration options: [Normal] [IrDA] [ASK IR]

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] [ECP] [EPP]

EPP Version [1.9]

Allows selection of the Parallel Port EPP version. This item appears when the Parallel Port Mode is set to [EPP] or [ECP & EPP].

Configuration options: [1.9] [1.7]

ECP Mode DMA Channel [DMA3]

Appears when the Parallel Port Mode is set to [ECP] or [ECP & EPP].

This item allows you to set the Parallel Port ECP DMA.

Configuration options: [DMA0] [DMA1] [DMA3]

Parallel Port IRQ [IRQ7]

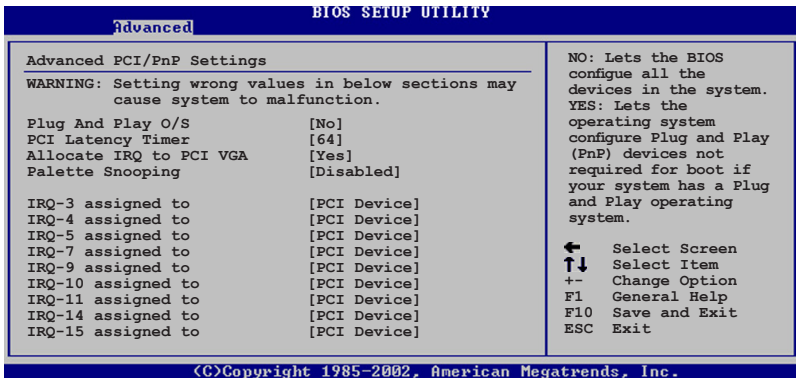
Sets the Parallel port IRQ. Configuration options: [IRQ5] [IRQ7]

5.4.8 PCI PnP

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



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



Plug And Play O/S [No]

When 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: [No] [Yes]

Palette Snooping [Disabled]

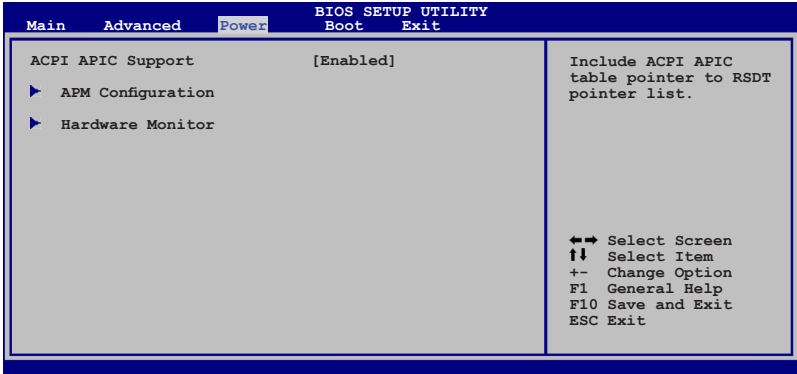
When set to [Enabled], the palette snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

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]

5.5 Power Configuration

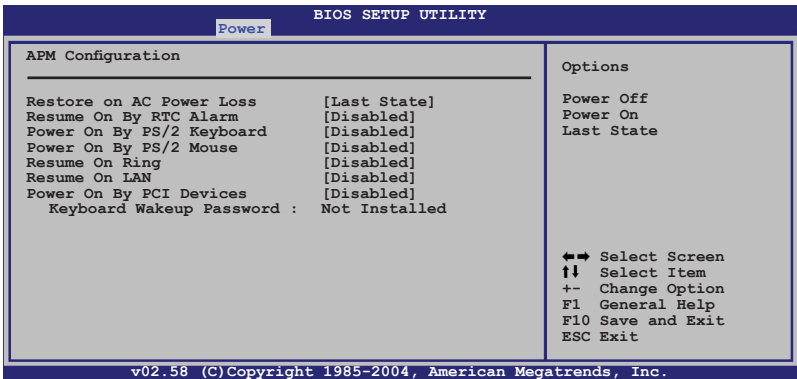
The Power Configuration menu items allow you to change the settings for the ACPI and Advanced Power Management (APM) features. Select an item then press <Enter> to display the configuration options.



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]

5.5.1 APM Configuration



Restore on AC Power Loss [Last State]

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]

Resume 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]



The following items appear only when the **Resume On By RTC Alarm** item is set to Enabled.

RTC Alarm Date (Days) [15]

To set the alarm date, highlight this item and press the <+> or <-> key to make the selection. Configuration options: [Everyday] [1] [2] [3]...[31]

System Time [12:30:30]

To set the alarm time, highlight this item and press the <+> or <-> key to make the selection.

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]

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]

Resume On Ring [Disabled]

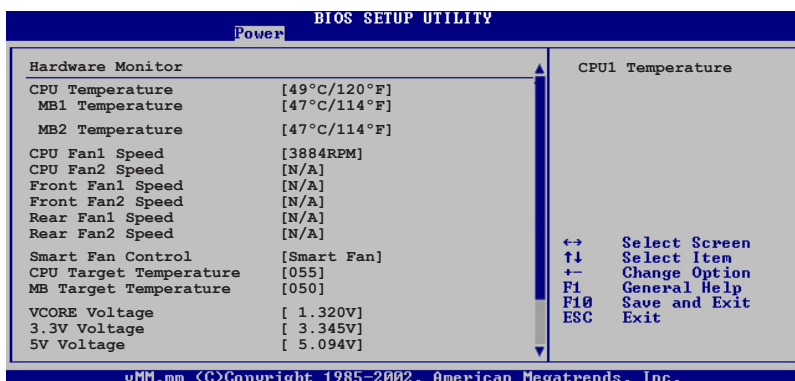
When set to [Enabled], the system enables the RI to generate a wake event while the computer is in Soft-off mode.
Configuration options: [Disabled] [Enabled]

Power on By PCI Devices [Disabled]

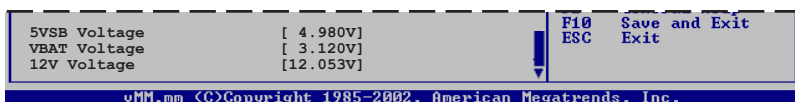
When set to [Enabled], this parameter allows you to turn on the system through a PCI LAN or Modem card. This Feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Configuration options: [Disabled] [Enabled]

5.5.2 Hardware Monitor



Use the arrow down key to display additional items.



CPU Temperature [xxx°C/xxx°F]

MB1 Temperature [xxx°C/xxx°F]

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

CPU Fan1/2 Speed [xxxxRPM] or [N/A]

Front Fan1/2 Speed [xxxxRPM] or [N/A]

Rear Fan1/2 Speed [xxxxRPM] or [N/A]

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

Smart Fan Control [Enabled]

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



The **CPU Temperature** and **MB Temperature** items appear when you set the **Smart Fan Control** item to [Enabled].

CPU Target Temperature [XXX] MB1 Target Temperature [XXX]

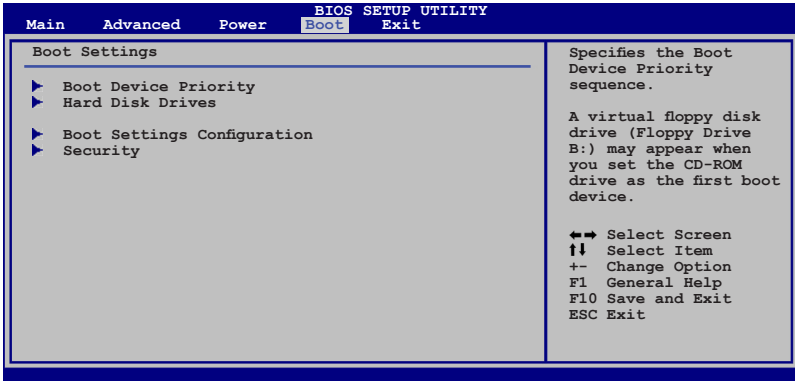
Displays the detected CPU and system threshold temperature when the Smart Fan Control is enabled.

VCORE1 Voltage, VCORE2 Voltage, 3.3V Voltage, 5V Voltage, 5VSB Voltage, VBAT Voltage, 12V Voltage

The onboard hardware monitor automatically detects the voltage outputs 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

| BIOS SETUP UTILITY | |
|----------------------|-----------------------|
| Boot | |
| Boot Device Priority | |
| 1st Boot Device | [Removable dev.] |
| 2nd Boot Device | [ATAPI CD-ROM] |
| 3rd Boot Device | [RAID LSI Logic MB] |
| 4th Boot Device | [Network: MBA V8.3.9] |
| 5th Boot Device | [Network: MBA V8.3.9] |

1st Boot Device [1st FLOPPY Drive]

2nd Boot Device [Network: MBA v7.7.5]

3rd Boot Device [Network: MBA v7.7.5]

These items specify the boot device priority sequence from the available devices. Configuration options: [xxxxx Drive] [Disabled]

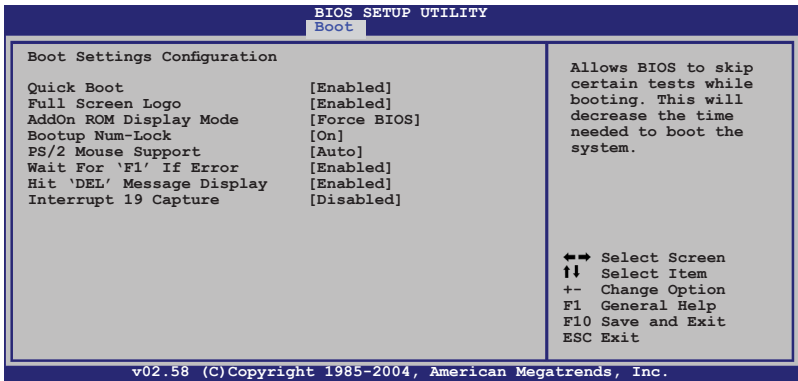
5.6.2 Hard Disk Drives

| BIOS SETUP UTILITY | |
|---|-----------------------|
| Boot | |
| Boot Device Priority | |
| 1st Drive | [HDD: XXXXXXXX Drive] |
| 2nd Drive | [HDD: XXXXXXXX Drive] |
| Specifies the Boot Device Priority sequence from available Hard Drives. | |

1st ~ xxth Drive [HDD: XXXXXXXX Drive]

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

5.6.3 Boot Settings Configuration



Quick Boot [Enabled]

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

Configuration options: [Disabled] [Enabled]

Full Screen Logo [Enabled]

Allows you to enable or disable the full screen logo display feature.

Configuration options: [Disabled] [Enabled]



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

AddOn ROM Display Mode [Force BIOS]

Allows you to set display mode for optional 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]

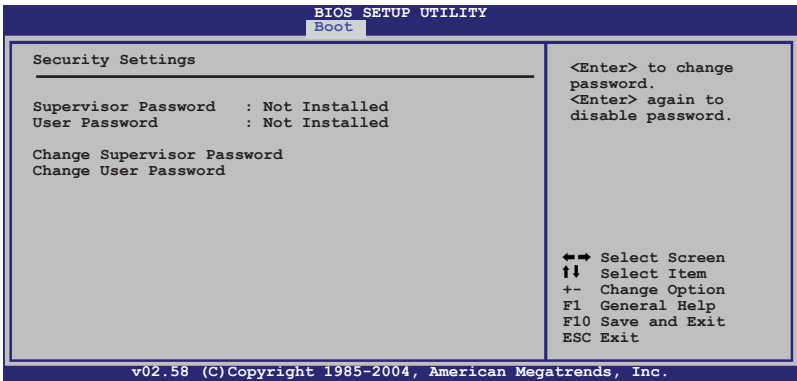
When set to Enabled, the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

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

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

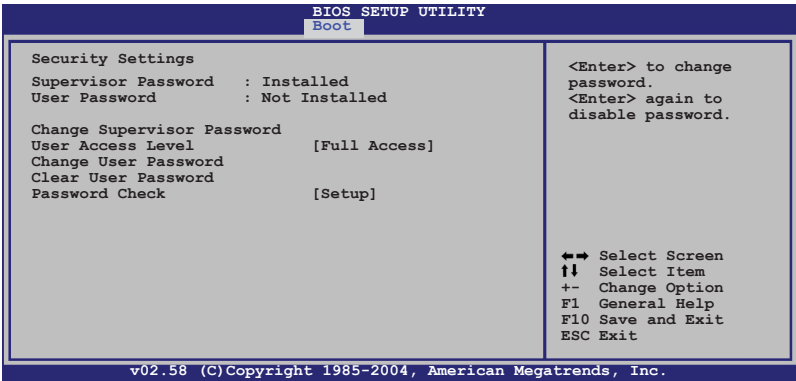
To change the supervisor password, follow the same steps as in setting a user password.

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



If you forget your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section “2.6 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.

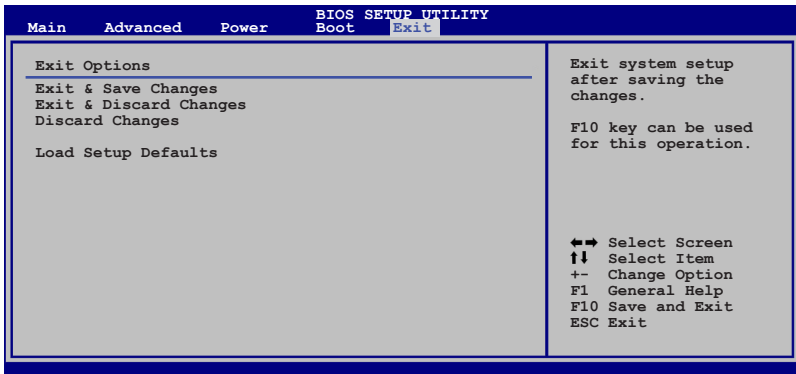
Password Check [Setup]

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]

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.



If you made changes to any of the settings in the menus, pressing <Esc> does not immediately exit this menu. A confirmation window appears and prompts you to either save your changes or cancel the command. Select one of the options from this menu to exit.

Exit & Save Changes

Select this option then press <Enter>, or simply press <F10>, to save your changes to CMOS before exiting the Setup utility.

When a confirmation window appears, select [OK] then press <Enter> to save your changes and exit Setup. If you wish to cancel the command, select [Cancel] then press <Enter> to return to the Exit menu.

Exit & Discard Changes

Select this option then press <Enter> to exit the Setup utility without saving your changes.

When a confirmation window appears, select [OK] then press <Enter> to discard your changes and exit Setup. If you wish to cancel the command, select [Cancel] then press <Enter> to return to the Exit menu.

Discard Changes

Select this option then press <Enter> to discard the changes that you made, and restore the previously saved settings.

When a confirmation window appears, select [OK] then press <Enter> to discard the changes, and load the previously saved settings. If you wish to cancel the command, select [Cancel] then press <Enter> to return to the Exit menu.

Load Setup Defaults

Select this option then press <Enter> to load the optimized settings for each of the Setup menu items.

When a confirmation window appears, select [OK] then press <Enter> to load the default settings. If you wish to cancel the command, select [Cancel] then press <Enter> to return to the Exit menu.

Chapter 6

This chapter provides instructions for setting up, creating and configuring RAID sets using the available utilities.

RAID Configuration

6.1 RAID configurations

The server system/motherboard comes with the Intel® ICH7R and the LSI Logic Embedded SATA RAID technology built-in the Intel® ICH7R SouthBridge chipset that allows you to configure IDE and Serial ATA hard disk drives as RAID sets. The motherboard supports the following RAID configurations:

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.

Intel® Matrix Storage. The Intel® Matrix Storage technology supported by the ICH7R 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 “6.1 RAID driver installation” for details.

6.1.2 Installing Serial ATA hard disks

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

To install the SATA hard disks for a RAID configuration:

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

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 Chapter 4 for details on entering and navigating through the BIOS Setup.

6.1.4 RAID configuration utility

Depending on the RAID_SEL1 jumper setting and the operating system, you can select a utility to create a RAID set. Refer to section “2.6 Jumpers” for details on the RAID_SEL1 jumper settings.

Use the Intel® Matrix Storage Manager to create a RAID 0 or RAID 1 set under Windows® 2000/2003 Server/XP operating system.

Use the LSI Logic Embedded SATA RAID Setup Utility to create a RAID 0 or RAID 1 under Windows® 2000/2003 Server or Red Hat® Enterprise ver. 3.0 operating system.

Refer to the succeeding sections for details on how to use the RAID configuration utilities.

6.2 Intel® Matrix Storage Manager Option ROM Utility

The Intel® Matrix Storage Manager Option ROM utility allows you to create RAID 0 or RAID 1 from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

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

1. Install all the Serial ATA hard disk drives.
2. Turn on the system.
3. During POST, press <Ctrl> + <I> to display the utility main menu.

```
Intel(R) Matrix Storage Manager Option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
None defined.

Physical Disks:
Port Drive Model      Serial #      Size      Type/Status (Vol ID)
0  XXXXXXXXXXXX      XXXXXXXX    XX.XXGB   Non-RAID Disk
1  XXXXXXXXXXXX      XXXXXXXX    XX.XXGB   Non-RAID Disk
2  XXXXXXXXXXXX      XXXXXXXX    XX.XXGB   Non-RAID Disk
3  XXXXXXXXXXXX      XXXXXXXX    XX.XXGB   Non-RAID Disk

[↑↓]-Select      [ESC]-Exit      [ENTER]-Select Menu
```

The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.

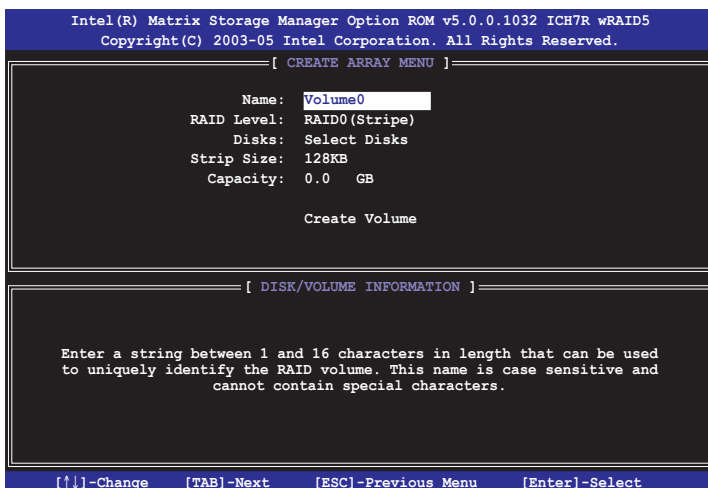


The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

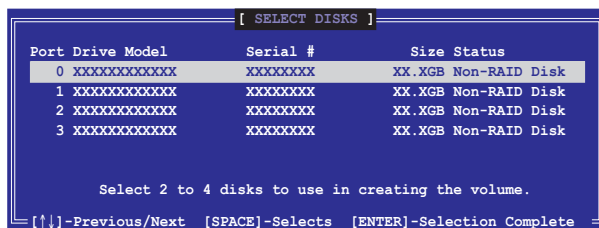
6.2.1 Creating a RAID 0 set (striped)

To create a RAID 0 set:

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



2. Enter a name for the RAID 0 set, then press <Enter>.
3. When the **RAID Level** item is highlighted, press the up/down arrow key to select **RAID 0(Stripe)**, then press <Enter>.
4. When the **Disks** item is highlighted, press <Enter> to select the hard disk drives to configure as RAID. This **SELECT DISKS** screen appears.



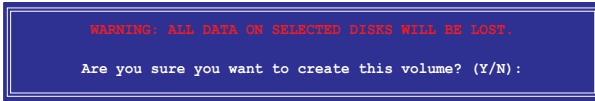
5. Use the up/down arrow key to highlight a drive, then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.

6. Use the up/down arrow key to select the stripe size for the RAID 0 array, then press <Enter>. The available stripe size values range from 8 KB to 128 KB. The default stripe size is 128 KB.



TIP: We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

7. Key in the RAID volume capacity that you want, then press <Enter>. The default value indicates the maximum allowed capacity.
8. Press <Enter> when the **Create Volume** item is highlighted. This warning message appears.

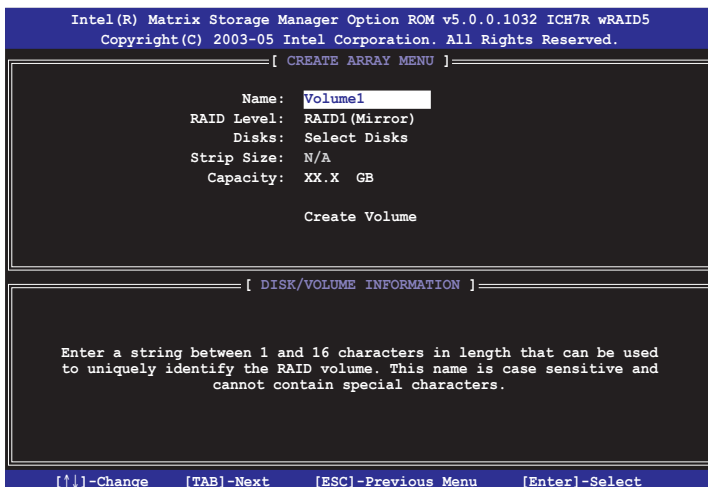


9. Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the Create Volume menu.

6.2.2 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>. This screen appears.



2. Enter a name for the RAID 1 set, then press <Enter>.
3. When the **RAID Level** item is highlighted, press the up/down arrow key to select **RAID 1 (Mirror)**, then press <Enter>.
4. When the **Disks** item is highlighted, press <Enter> to select the hard disk drives to configure as RAID. The **SELECT DISKS** screen appears.
5. Use the up/down arrow key to highlight a drive, then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.
6. When the **Capacity** item is highlighted, key in the RAID volume capacity that you want, then press <Enter>. The default value indicates the maximum allowed capacity.
7. Press <Enter> when the **Create Volume** item is highlighted. This warning message appears.



8. Press <Y> to create the RAID volume and return to main menu or <N> to go back to Create Volume menu.

6.2.3 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 this screen.

```
Intel(R) Matrix Storage Manager Option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

[ DELETE VOLUME MENU ]

Name          Level          Drives          Capacity        Status          Bootable
Volume0       RAIDX (xxxxx)   X               XXX.XGB        Normal          Yes

[ HELP ]

Deleting a volume will destroy the volume data on the drive(s) and
cause any member disks to become available as non-RAID disks.

WARNING: EXISTING DATA WITHIN THIS VOLUME WILL BE LOST AND NON-RECOVERABLE.

[↑↓]-Select      [ESC]-Previous Menu      [Del]-Delete Volume
```

2. Use the up/down arrow key to select the RAID set you want to delete, then press . This window appears.

```
[ DELETE VOLUME VERIFICATION ]

ALL DATA IN THE VOLUME WILL BE LOST!

Are you sure you want to delete volume "VolumeX"? (Y/N):
```

3. Press <Y> to delete the RAID set and return to the utility main menu; otherwise, press <N> to return to the Delete Volume menu.

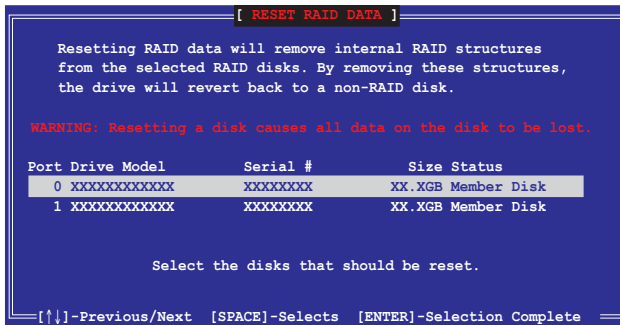
6.2.4 Resetting Disks to Non-RAID



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 this screen.

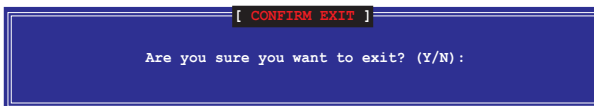


2. Use the up/down arrow key to highlight the RAID set drive you want to reset, then press <Space> to select.
3. Press <Enter> to reset the RAID set drive. A confirmation message appears.
4. Press <Y> to reset the drive or press <N> to return to the utility main menu.
5. Follow steps 2 to 4 to select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

6.2.5 Exiting the Intel® Matrix Storage Manager utility

To exit the utility:

1. From the utility main menu, select **4. Exit**, then press <Enter>. This window appears.



2. Press <Y> to exit or press <N> to return to the utility main menu.

6.2.6 Rebuilding the RAID



This option is only for the RAID 1, RAID 5 and RAID 10 sets.

Rebuilding the RAID with other non-RAID disk

If any of the SATA hard disk drives included in the RAID array failed, the system displays the status of the RAID volume as **“Degraded”** during POST. You can rebuild the RAID array with other installed non-RAID disks.

To rebuild the RAID with other non-RAID disk:

1. At the prompt, press <Ctrl> + <l> to enter the Intel Matrix Storage Manager RAID configuration.
2. If there is a non-RAID SATA Hard Disk available, the utility will prompt to rebuild the RAID. Press <Enter>, then use up/down arrow keys to select the destination disk or press <ESC> to exit.

```
[ DEGRADED VOLUME DETECTED ]
"Degraded" volume and disk available for rebuilding detected.
Selecting a disk initiates a rebuild. Rebuild completes in the
operating system.

Select the port of destination disk for rebuilding (ESC to exit):

Port Drive Model      Serial#      Size
3HDS722580VLSA80     VN6Bxxxx    76.7GB

[↑↓]- Previous/Next  [Enter]- Selects  [ESC]- Exit
```



Select a destination disk with the same size as the original hard disk.

3. The utility immediately starts rebuilding after the disk is selected. The status of the degraded RAID volume is changed to **“Rebuild”**.

```
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
*****[ MAIN MENU ]*****
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
*****

*****[ DISK/VOLUME INFORMATION ]*****
RAID Volumes:
* ID Name Level Strip Size Status Bootable *
* 0 Volume0 RAID1(Mirror) N/A 74.5GB Rebuild Yes *
*
* Physical Disks:
* Port Drive Model Serial # Size Type/Status(Vol ID) *
* 1 ST380013AS 5JV7KSE9 74.5GB Member Disk(0) *
* 3 HDS722580VLSA80 VN6BHECBW1EKMC 76.7GB Member Disk(0) *
*
*
* Volumes with "Rebuild" status will be rebuilt within the operating system. *
*****
[**]-Select [ESC]-Exit [ENTER]-Select Menu
```


4. Exit the RAID configuration utility and reboot the system.
5. Select **Start > Programs > Intel Matrix Storage > Intel Matrix Storage Console** or click the **Intel Matrix Storage Manager** tray icon to load the Intel Matrix Storage Manager utility.
6. From the **View** menu, select **Advanced Mode** to display the details of the Intel Matrix Storage Console.
7. From the **Volumes view** option, select **RAID volume** to view the rebuilding status. When finished, the status is changed to **“Normal”**.

Rebuilding the RAID with a new hard disk

If any of the SATA hard disk drives included in the RAID array failed, the system displays the status of the RAID volume as **“Degraded”** during POST. You may replace the disk drive and rebuild the RAID array.

To rebuild the RAID with a new hard disk:

1. Remove the failed SATA hard disk and install a new SATA hard disk of the same specification into the same SATA Port.



Select a destination disk with the same size as the original hard disk.

2. Reboot the system and then follow the steps in section **“Rebuilding the RAID with other non-RAID disk”** on page 5-12.

6.2.7 Setting the Boot array in the BIOS Setup Utility

You can set the boot priority sequence in the BIOS for your RAID arrays when creating multi-RAID using the Intel® Matrix Storage Manager.



Set at least one of the arrays bootable to boot from the hard disk.

To set the boot array in the BIOS:

1. Reboot the system and press to enter the BIOS setup utility during POST.
2. Go to the **Boot** menu and select the option **Boot Device Priority**.
3. Use up/down arrow keys to select the boot priority and press <Enter>. Refer to “4.6.1 Boot Device Priority” for details.
4. From the **Exit** menu, select **Exit & Save Changes**, then press <Enter>.
5. When the confirmation window appears, select **OK**, then press <Enter>.

6.3 LSI Logic Embedded SATA RAID Setup Utility

The LSI Logic Embedded SATA RAID Setup Utility allows you to create RAID 0 or RAID 1 set(s) from SATA hard disk drives connected to the SATA connectors supported by the motherboard Southbridge chip.



The LSI Logic Embedded SATA RAID automatically configures a RAID 1 (Mirrored) set when the SATA is configured as **RAID** in the BIOS and you installed two hard disk drives without a RAID configuration.

To enter the LSI Logic Embedded SATA RAID Setup Utility:

1. Turn on the system after installing all the SATA hard disk drives.
2. During POST, the LSI Logic Embedded SATA RAID Setup Utility automatically detects the installed SATA hard disk drives and displays any existing RAID set(s). Press <Ctrl> + <M> to enter the utility.

```
LSI Logic Embedded SATA RAID BIOS Version 5.4.06091652R
(c)2004 Copyright LSI Logic Corporation. All Rights Reserved.

LSI Logic Embedded SATA RAID Found at PCI Bus No:00 Dev No:1F
Scanning for Port 0 ... Responding. ST380013AS      76319MB      UDMA 6
Scanning for Port 1 ... Responding. ST380013AS      76319MB      UDMA 6
Scanning for Port 2 ... Responding. ST380023AS      76319MB      UDMA 6
Scanning for Port 3 ... Responding. ST380023AS      76319MB      UDMA 6

LSI Logic Embedded SATA RAID Not Configured!

New Drive(s) Found.

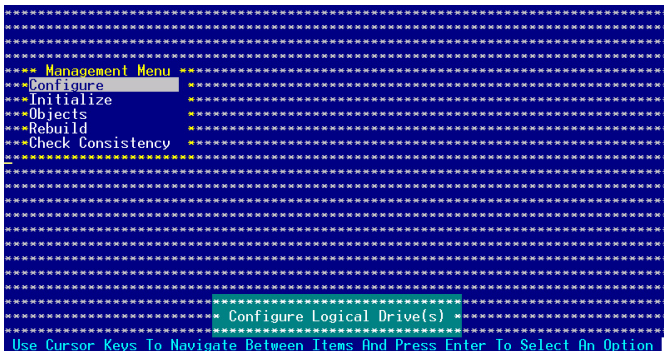
Press Ctrl-M to run LSI Logic Embedded SATA RAID Setup Utility.
```



You may also create a RAID set(s) in a Windows® operating environment using the Global Array Manager (GAM) application. Refer to the GAM user guide in the motherboard support CD for details.

- The utility main window appears. Use the arrow keys to select an option from the **Management Menu**, then press <Enter>. Refer to the Management Menu descriptions below.

At the bottom of the screen is the legend box. The keys on the legend box allow you to navigate through the setup menu options or execute commands. The keys on the legend box vary according to the menu level.



| Menu | Description |
|-------------------|--|
| Configure | Allows you to create RAID 0 or RAID 1 set using the Easy Configuration or the New Configuration command. This menu also allows you to view, add, or clear RAID configurations or select the boot drive |
| Initialize | Allows you to initialize the logical drives of a created RAID set |
| Objects | Allows you to initialize logical drives or change the logical drive parameters |
| Rebuild | Allows you to rebuild failed drives |
| Check Consistency | Allows you to check the data consistency of the logical drives of a created RAID set |

6.3.1 Creating a RAID set

The LSI Logic Embedded SATA RAID Setup Utility allows you to create a RAID 0 or RAID 1 set using two types of configurations: **Easy** and **New**.

In **Easy Configuration**, the logical drive parameters are set automatically including the size and stripe size (RAID 1 only).

In **New Configuration**, you manually set the logical drive parameters and assign the set size and stripe size (RAID 1 only).

Using Easy Configuration

To create a RAID set using the **Easy Configuration** option:

1. From the utility main menu, highlight **Configure**, then press <Enter>.
2. Use the arrow keys to select **Easy Configuration**, then press <Enter>.

```
***** Configuration Menu *****
***** Easy Configuration *****
***** Management *****
***** Configure *****
***** Initialize *****
***** Objects *****
***** Rebuild *****
***** Check Consistency *****
***** New Configuration *****
***** View/Add Configuration *****
***** Clear Configuration *****
***** Select Boot Drive *****
***** Defines Physical Arrays. An Array Will Automatically Become A Logical Drive *****
***** Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option *****
```

3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drives you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

```
***** Easy Configuration - ARRAY SELECTION MENU *****
***** Management *****
***** Configure *****
***** Initialize *****
***** Objects *****
***** Rebuild *****
***** Check Consis *****
***** PORT # *****
***** 0 *****
***** 1 *****
***** Port # 0 DISK 114376MB HDS722512VLSA80 V930A6MA *****
***** SPACE-Sel, ENTER-EndArray, F10-Configure, F2-Drv. Info, F9-Logical Drives *****
```



The information of the selected hard disk drive displays at the bottom of the screen.

6. Select **RAID** from the **Logical Drive** menu, then press <Enter>.
7. Select the RAID level from the menu, then press <Enter>.



You need at least two identical hard disk drives when creating a RAID 1 set.

```

***** Logical Drive(s) Configured *****
***** LD  RAID  Size  #Stripes  StripeSz  Status *****
***** 0    1    114376MB  2        64 KB    ONLINE *****
***** Manage *****
***** Configure *****
***** Initialize *****
***** Objects *****
***** Rebuild *****
***** Check Con *****
*****
***** Logical Drive 0 ***** RAID Level *****
***** RAID = 1 ***** RAID 0 *****
***** Size = 114376MB ***** RAID 1 *****
***** Stripe Size *****
***** Accept *****
***** SPAN = NO *****
*****
***** Choose RAID Level For This Logical Drive *****
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option

```

8. When creating a RAID 1 set, select **Stripe Size** from the **Logical Drive** menu, then press <Enter>.
When creating a RAID 0 set, proceed to step 10.
9. Key in the stripe size, then press <Enter>.

```

***** Logical Drive(s) Configured *****
***** LD  RAID  Size  #Stripes  StripeSz  Status *****
***** 0    1    114376MB  2        64 KB    ONLINE *****
***** Manage *****
***** Configure *****
***** Initialize *****
***** Objects *****
***** Rebuild *****
***** Check C *****
***** Enter Stripe Size In KB (4,8,16,32,64,128)? :64 *****
*****
***** Logical Drive 0 *****
***** RAID = 1 *****
***** Size = 114376MB *****
***** Stripe Size *****
***** Accept *****
***** SPAN = NO *****
*****
***** Enter Stripe Size In KB (4,8,16,32,64,128)? : *****
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option

```



For server systems, we recommend that you use a lower array block size. For multimedia computer systems used mainly for audio and video editing, we recommend a higher array block size for optimum performance.

6. Follow steps 6 to 7 of the **Creating a RAID set: Using Easy Configuration** section.
7. Select **Size** from the **Logical Drive** menu, then press <Enter>.
8. Key in the desired logical drive size, then press <Enter>.

```

***** Logical Drive(s) Configured *****
***** LD   RAID   Size   #Stripes   StripeSz   Status *****
***** 0     1     114376MB   2          64 KB     ONLINE *****
***** Management *****
***** Configuration *****
***** Initialize *****
***** Objects *****
***** Rebuild *****
***** Check C*****
***** Enter Logical Drive Size (MB) :114376 *****
***** Logical Drive 0*****
***** RAID = 1 *****
***** Size = 114376MB *****
***** Stripe Size *****
***** Accept *****
***** SPAN = NO *****
***** Enter Logical Drive Size (MB) :*****
***** Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option *****

```

9. Follow steps 8 to 12 of the **Creating a RAID set: Using Easy Configuration** section to add the new RAID configuration.

6.3.3 Initializing the logical drives

After creating the RAID set(s), you must initialize the logical drives. You may initialize the logical drives of a RAID set(s) using the **Initialize** or **Objects** command in the Management Menu.

Using the Initialize command

To initialize the logical drive using the **Initialize** command:

1. From the Management Menu, highlight **Initialize**, then press <Enter>.

```
*****
*****
***** Management Menu *****
***** Configure *****
***** Initialize *****
***** Objects *****
***** Rebuild *****
***** Check Consistency *****
*****
*****
*****
***** Initialize Logical Drive(s) *****
***** Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option *****
```

2. The screen displays the available RAID set(s) and prompts you to select the logical drive to initialize. Use the arrow keys to select the logical drive from the **Logical Drive** selection, then press <Enter>.

```
*****
***** Logical Drive(s) Configured *****
***** Management Menu ***** LD RAID Size #Stripes StripeSz Status *****
***** Configure *****
***** Initialize ***** 0 1 114376MB 2 64 KB ONLINE *****
***** Objects *****
***** Rebuild *****
***** Check Consistency *****
*****
*****
***** Logical Drives *****
***** Logical Drive *****
*****
*****
***** Select Logical Drive *****
***** SPACE-(De)Select, F10-Initialize *****
```


- When prompted, press the <SpaceBar> to select **Yes** from the **Consistency Check** dialog box, then press <Enter>. You may also press <F10> to check the drive consistency.

```

*****
***** Logical Drive(s) Configured *****
Management Menu ** LD  RAID  Size  #Stripes  StripeSz  Status
*****
** Configure
** Initialize * 0  1  114376MB  2  64  KB  ONLINE
** Objects
** Rebuild
** Check Consistency
*****
***** Consistency Check *****
*****
***** Yes *****
***** No *****
*****
***** Logical Drives *****
*****
***** Select Logical Drive *****
*****
SPACE-(De)Select. F10-Check Consistency

```

A progress bar appears on screen.

```

*****
***** Logical Drive(s) Configured *****
Management Menu ** LD  RAID  Size  #Stripes  StripeSz  Status
*****
** Configure
** Initial ***** Consistency Check ***** ONLINE
** Objects
** Rebuild Consistency Check Under Progress. Press ESC to ABORT.
** Check
*****
***** / 0 % Completed *****
*****
***** Logical *****
*****
***** Select Logical Drive *****
*****
SPACE-(De)Select. F10-Check Consistency

```

- While checking the disk consistency, press <Esc> to display the following options.
 - Stop - Stops the consistency check. The utility stores the percentage of disk checked. When you restart checking, it continues from the last percentage completed rather than from zero percent.
 - Continue - Continues the consistency check.
 - Abort - Aborts the consistency check. When you restart checking, it continues from zero percent.
- When checking is complete, press any key to continue.

Using the Objects command

To check data consistency using the **Objects** command:

1. From the Management Menu, select **Objects**, then select **Logical Drive** from the menu.
2. Use the arrow keys to select the logical drive you want to check, then press <Enter>.
3. Select **Check Consistency** from the pop-up menu, then press <Enter>.
4. When prompted, press <Y> to to check the drive.
5. When checking is complete, press any key to continue.

6.3.6 Deleting a RAID configuration

To delete a RAID configuration:

1. From the Management Menu, select **Configure > Clear Configuration**, then press <Enter>.

```
***** Configuration Menu *****
***** Easy Configuration *****
***** Management *****
***** Configure *****
***** Initialize *****
***** Objects *****
***** Rebuild *****
***** Check Consistency *****

***** Clear Existing Configuration *****
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

2. When prompted, press the <SpaceBar> to select **Yes** from the **Clear Configuration?** dialog box, then press <Enter>.

```
***** Configuration Menu *****
***** Easy Configuration *****
***** Management *****
***** Configure *****
***** Initialize *****
***** Objects *****
***** Rebuild *****
***** Check Consistency *****

***** Clear Existing Configuration *****
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

The utility clears the current array.

3. Press any key to continue.

6.3.7 Selecting the boot drive from a RAID set

You must have created a new RAID configuration before you can select the boot drive from a RAID set. Refer to the **Creating a RAID set: Using New Configuration** section for details.

To select the boot drive from a RAID set:

1. From the Management Menu, select **Configure > Select Boot Drive**, then press <Enter>.

```
***** Configuration Menu *****
** Easy Configuration **
** Management **
** Configure View/Add Configuration **
** Initialize Clear Configuration **
** Objects Select Boot Drive **
** Rebuild **
** Check Consistency **
*****

***** Specify A Logical Drive As Boot Drive On This Adapter *****
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

2. When prompted, press the <SpaceBar> to select the bootable logical drive from the list, then press <Enter>.

```
***** Bootable Logical Drives (4): Currently (0) *****
** Config Boot Drive 0 **
** Easy Co Boot Drive 1 **
** Management New Con Boot Drive 2 **
** Configure View/Ad Boot Drive 3 **
** Initialize Clear C **
** Objects Select Boot Drive **
** Rebuild **
** Check Consistency **
*****

***** Specify A Logical Drive As Boot Drive On This Adapter *****
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

3. The logical drive is selected as boot drive. Press any key to continue.

6.3.8 Enabling the WriteCache

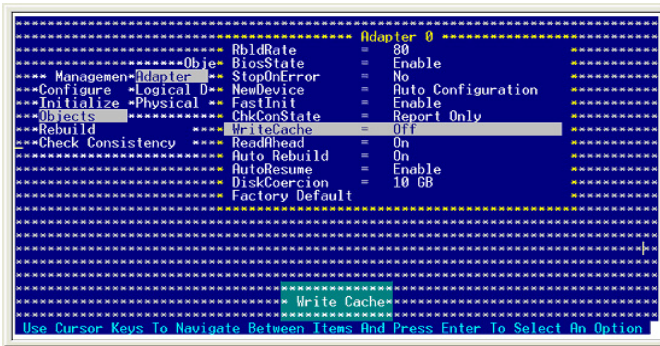
You may enable the RAID controller's **WriteCache** option to improve the data transmission performance.



When you enable WriteCache, you may lose data when a power interruption occurs while transmitting or exchanging data among the drives.

To enable WriteCache:

1. From the Management Menu, select **Objects > Adapter**, then press <Enter> to display the adapter properties.
2. Select **WriteCache**, then press <Enter> to turn the option **On** (enabled).



3. When finished, press any key to continue.

6.4 Global Array Manager

You may also create a RAID set(s) in Windows® operating environment using the Global Array Manager (GAM) application. The GAM application is available from the motherboard support CD.



Refer to the GAM user guide in the motherboard support CD for details.

Chapter 7

This chapter provides instructions for installing the necessary drivers for different system components.

Driver installation

7.1 RAID driver installation

After creating the RAID sets for your server system, you are now ready to install an operating system to the independent hard disk drive or bootable array. This part provides instructions on how to install the RAID controller drivers during OS installation.

7.1.1 Creating a RAID driver disk



You may have to use another system to create the RAID driver disk from the system/motherboard support CD or from the Internet.

A floppy disk with the RAID driver is required when installing Windows® 2000 or Red Hat® Enterprise ver. 3.0/SuSE operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support CD).

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. Select 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.
5. Press any key when prompted to boot from CD.

```
Loading FreeDOS FAT KERNEL GO!  
Press any key to boot from CDROM...
```

The Makedisk menu appears.

```
A) FreeDOS command prompt  
B) Make Intel ICH7R LSI MegaRAID for Win32/64 bit driver disk  
C) Make Intel ICH7R LSI MegaRAID for RHEL 3 32/64 bit driver disk  
D) Make Intel ICH7R LSI MegaRAID for RHEL 4 32/64 bit driver disk  
E) Flash AMI BIOS for RS100-E4/PI2  
F) Broadcom ASF Firmware Update  
G) Write RS100-E4/PI2 FRU  
Please choose A To G:
```

6. Place a blank, high-density floppy disk to the floppy disk drive, then select the type of RAID driver disk you want to create by typing the number before the option
7. Press <Enter>.
8. Follow screen instructions to create the driver disk.



For systems with Red Hat® Enterprise versions that are not listed in the Makedisk menu, explore the support CD and copy the RAID driver disk from the following path: `\NCH7R LSI RAID\Driver\Linux`.

7.1.2 Installing the RAID controller driver

Windows® 2000/2003 Server OS

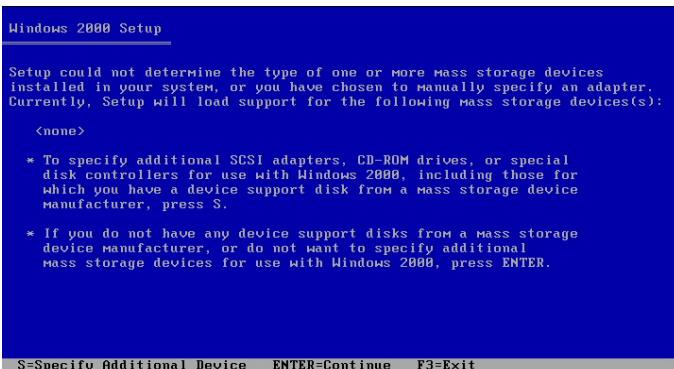
During Windows® 2000/2003 Server OS installation

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

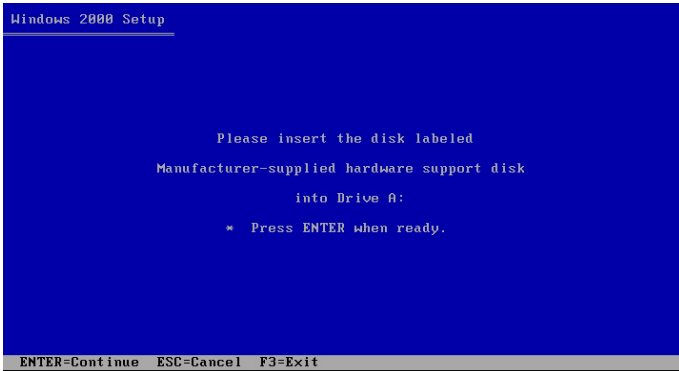
1. Boot the computer using the Windows® 2000/2003 Server installation CD. The **Windows® 2000/2003 Setup** starts.



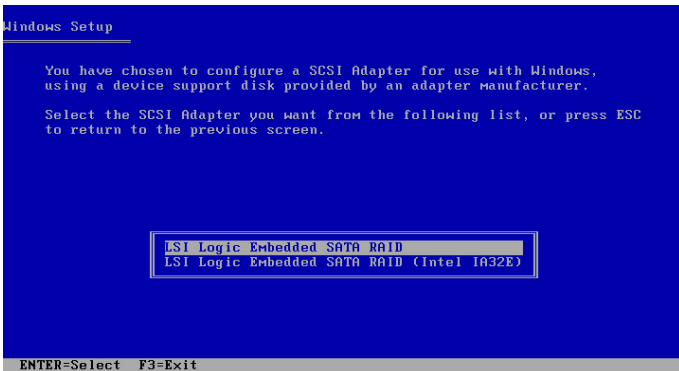
2. Press <F6> when the message “**Press F6 if you need to install a third party SCSI or RAID driver...**” appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



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

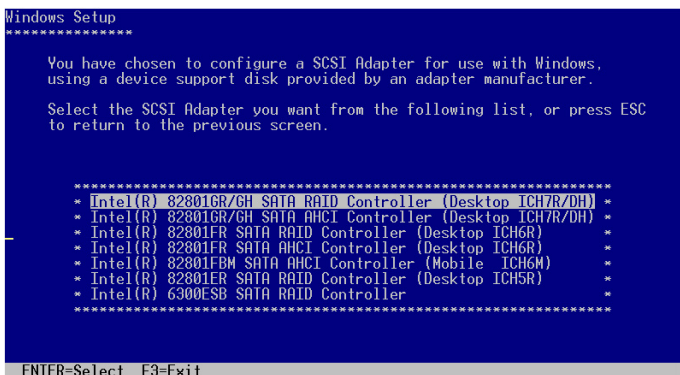


5. Select the RAID controller driver from the list, then press <Enter>.



LSI Logic SATA RAID

Select **“LSI Logic Embedded SATA RAID”** for Windows 2000 or 32bit Windows 2003 Server OS from the list, then press <Enter>. For 64bit Windows 2003 Server OS, please select **“LSI Logic Embedded SATA RAID (Intel IA32E)”** item.



Intel Matrix Storage

Select **"Intel(R) 82801GR/GH SATA RAID Controller (Desktop ICH7RDH)"** for Intel Matrix Storage RAID mode from the list, then press <Enter>.

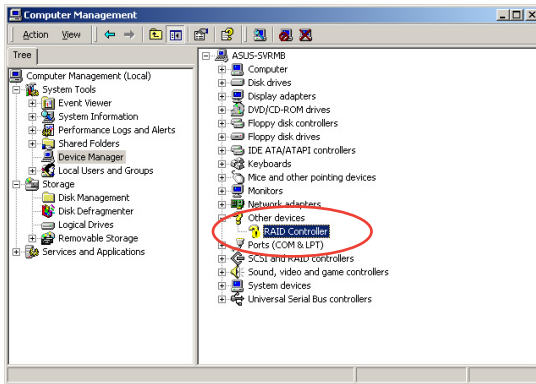
If you configured SATA as AHCI Mode in the BIOS setup utility of IDE Configuration, first install the **Intel SATA AHCI Driver** during windows setup. Then, select the **"Intel(R) 82801GR/GH SATA AHCI Controller (Desktop ICH7RDH)"** from the list. Refer to section "7.1.1 Creating a RAID driver disk" to create the Intel SATA Driver for windows system.

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.

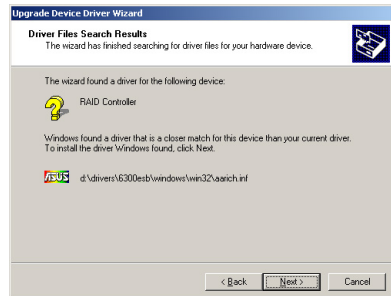
To an existing Windows® 2000/2003 Server OS

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

1. Restart the computer, then log in 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.

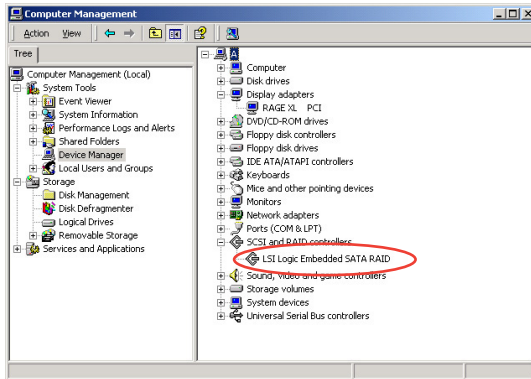


5. Right-click the **RAID controller** item, then select **Properties**.
6. Click the **Driver** tab, then click the **Update Driver** button.
7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.
8. Insert the RAID driver disk you created earlier to the floppy disk drive.
9. Select 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 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 **SCSI and RAID controllers**. The **LSI Logic Embedded SATA RAID** or **Intel® 8201 GR/GH SATA RAID** items should appear.

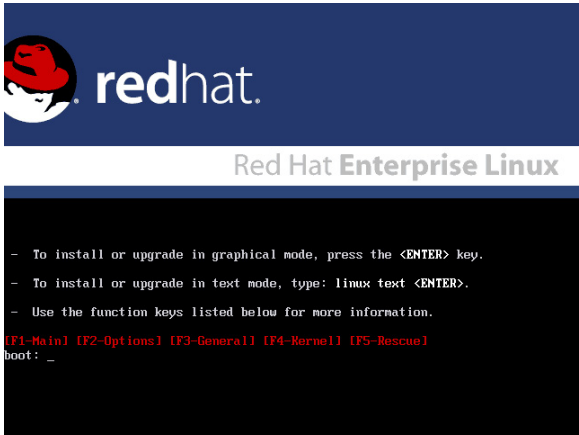


4. Right-click the **RAID controller driver** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

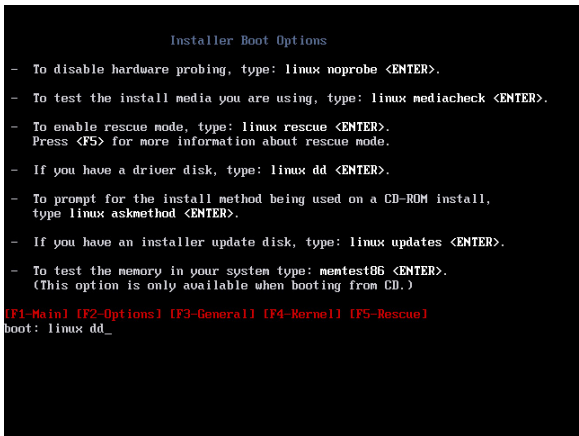
Red Hat® Enterprise ver. 3.0

To install the Intel® ICH7R LSI Logic Embedded SATA RAID controller driver when installing Red Hat® Enterprise ver. 3.0 operating system:

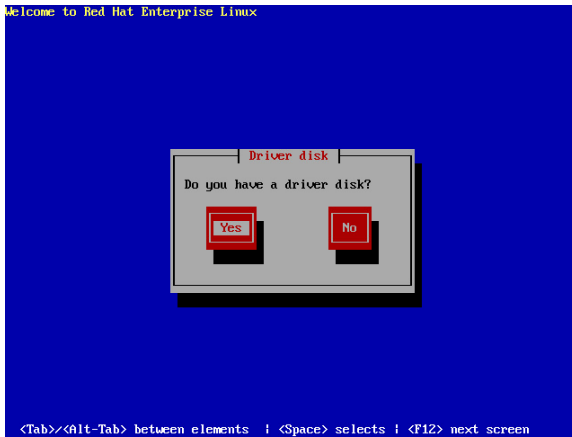
1. Boot the system from the Red Hat® Installation CD.



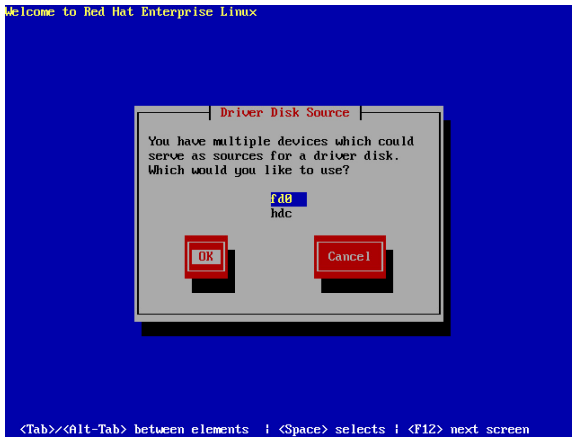
2. At the `boot:`, type `linux dd` , then press <Enter>.



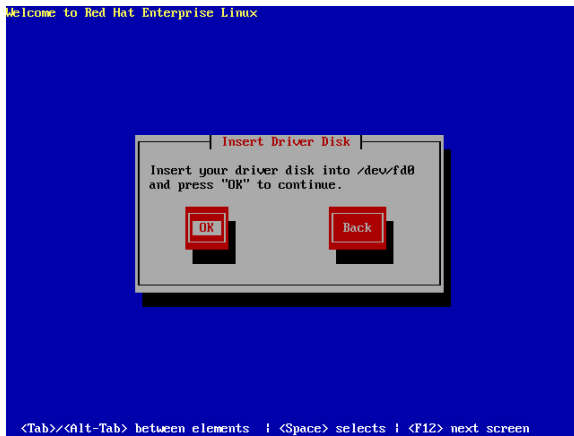
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>



4. Select **fd0** using the <Tab> key when asked to select the driver disk source. Press <Tab> to move the cursor to **OK**, then press <Enter>.

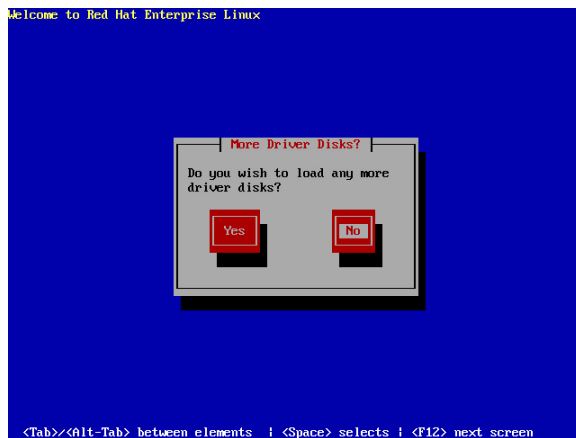


- When prompted, insert the Red Hat® Enterprise ver. 3.0 RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



The drivers for the RAID controller are installed to the system.

- When asked if you will load additional RAID controller drivers, select **Yes**, then install the additional RAID controller drivers.

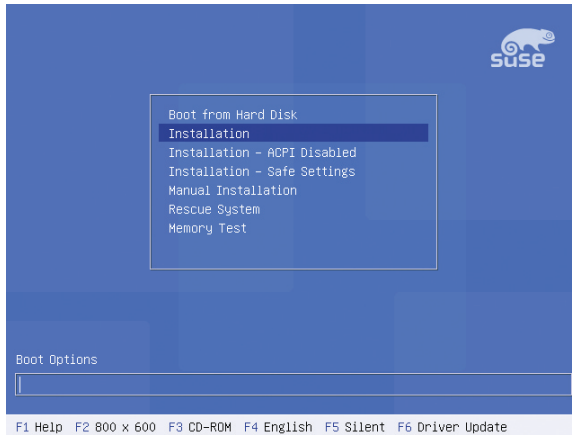


- Follow screen instructions to continue the OS installation.

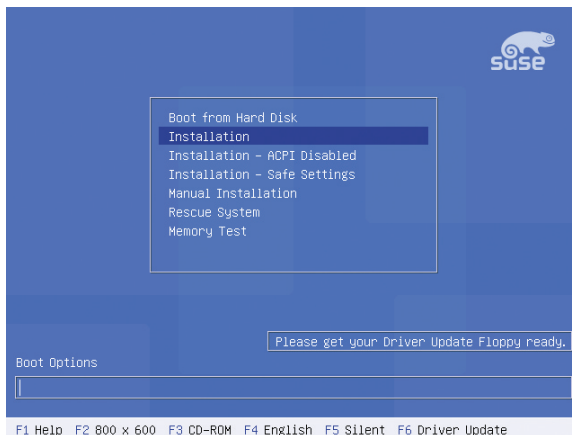
SuSE Linux

To install the RAID controller driver when installing SuSE Linux OS:

1. Boot the system from the SuSE Installation CD.
2. Select **Installation** from the **Boot Options** menu, then press <Enter>.

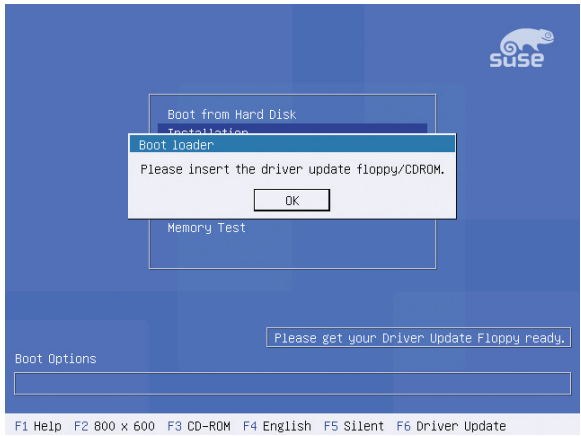


3. A message instructs you to prepare the RAID driver disk. Press <F6>.

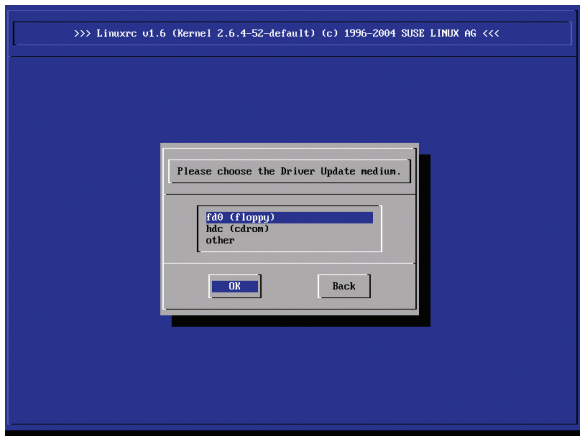


For SuSE Linux Enterprise Server 9.0 SP1 operating system, do not use OS bundled driver, otherwise your computer may become unstable due to OS limitation.

- When prompted, insert the RAID driver disk to the floppy disk drive, then press <Enter>.



- When prompted, select the floppy disk drive (fd0) as the driver update medium, select **OK**, then press <Enter>.



The drivers for the RAID controller are installed to the system.

7.2 LAN driver installation

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

7.2.1 Windows® 2000/2003 Server

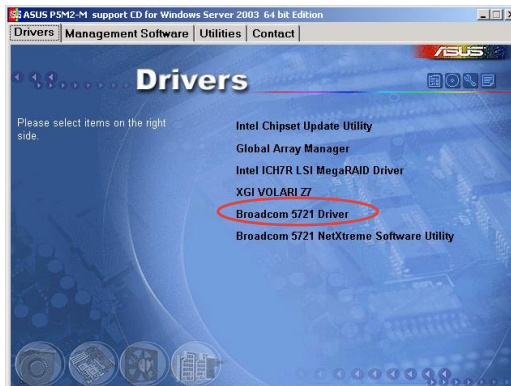
To install the Broadcom® Gigabit LAN controller driver on a Windows® 2000/2003 Server OS:

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.

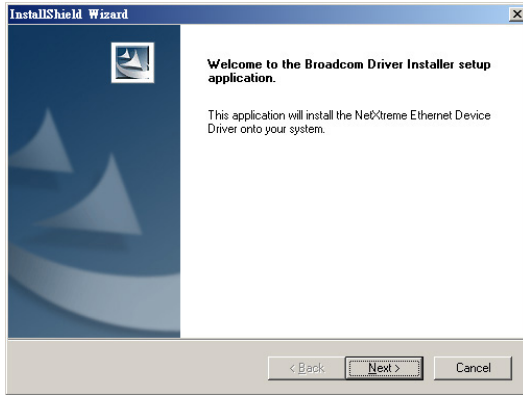


- Windows® automatically detects the LAN controllers and displays a **New Hardware Found** window. Click **Cancel** to close this window.
- If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the **ASSETUP.EXE**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

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



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



7.2.2 Red Hat® Enterprise ver. 3.0

Follow these instructions when installing the Broadcom® Gigabit LAN controller base driver for the Red Hat® Enterprise ver. 3.0 operating system.

Building the driver from the TAR file



Install first the Kernel Development tools before 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`
5. Refer to Red Hat distribution documentation to configure the network protocol and address.

7.3 VGA driver installation

This section provides instructions on how to install the XGI Graphics driver.

7.3.1 Windows® 2000 Server

You need to manually install the XGI Graphics driver on a Windows® 2000 Server operating system.

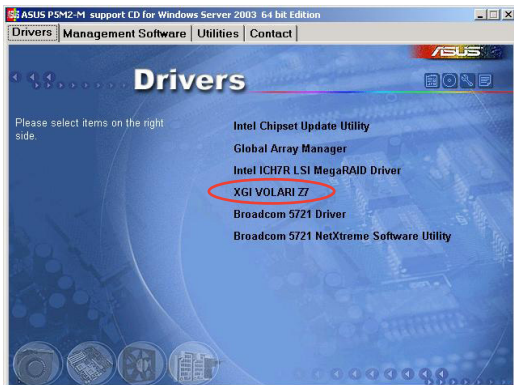
To install the XGI Graphicsdriver:

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.

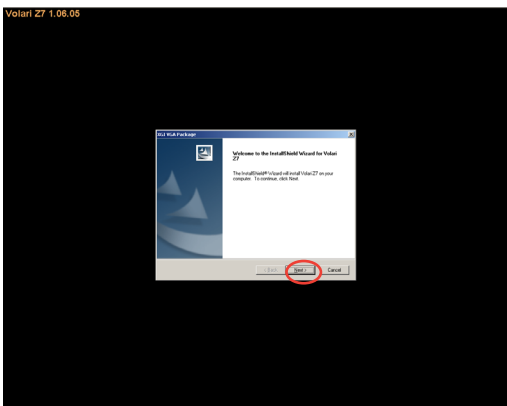


Windows® automatically detects the VGA controller and displays a **New Hardware Found** window. Click **Cancel** to close this window.

3. Click the item **XGI VOLARI Z7** from the Drivers menu.



4. The **XGI VOLARI Z7** window appears. Click **Next**. Follow screen instructions to complete installation.



The VGA server does not obtain the authorization from Microsoft® WHQL 2000, but it supports Microsoft® Windows® 2000 Server.

7.3.2 Windows® 2003 Server

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

7.3.3 Red Hat® Enterprise ver. 3.0

The Red Hat® Enterprise ver. 3.0 operating system automatically recognizes the XGI Graphics driver during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

7.4 Management applications and utilities installation

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



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

7.4.1 Running the support CD

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



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.

7.4.2 Drivers menu

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

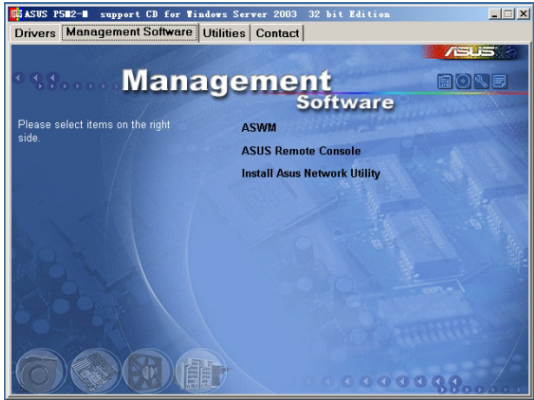


The screen display and driver options vary under different operating system versions.



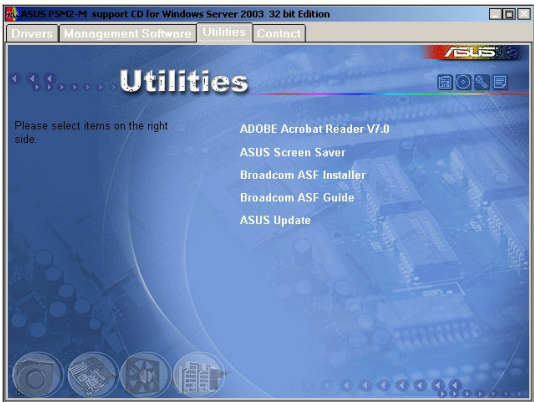
7.4.3 Management Software menu

The **Management Software** menu displays the available network and server monitoring application. Click on an item to install.



7.4.4 Utilities menu

The **Utilities** menu displays the software applications and utilities that the motherboard supports. Click on an item to install.




7.4.5 Contact information

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



The Appendix describes the CPU features that the motherboard supports.

Reference information

A large, light gray, stylized letter 'A' graphic is positioned behind the text 'Reference information'. The 'A' is composed of two thick, slightly curved lines that meet at the top and bottom, with a horizontal bar across the middle. It is centered horizontally behind the text.

A.1 Intel® EM64T



- The motherboard is fully compatible with Intel® Pentium® 4 LGA775 processors running on 32-bit operating systems.
 - The motherboard comes with a BIOS file that supports EM64T. You can download the latest BIOS file from the ASUS website (www.asus.com/support/download/) if you need to update the BIOS file. See Chapter 5 for details.
 - Visit www.intel.com for more information on the EM64T feature.
 - Visit www.microsoft.com for more information on Windows® 64-bit OS.
-

Using the Intel® EM64T feature

To use the Intel® EM64T feature:

1. Install an Intel® Pentium® 4 CPU that supports the Intel® EM64T.
2. Install a 64-bit operating system (Windows® XP Professional x64 Edition).
3. Install the 64-bit drivers for the motherboard components and devices from the support CD.
4. Install the 64-bit drivers for expansion cards or add-on devices, if any.



Refer to the expansion card or add-on device(s) documentation, or visit the related website, to verify if the card/device supports a 64-bit system.

A.2 Enhanced Intel SpeedStep® Technology (EIST)



- The motherboard comes with a BIOS file that supports EIST. You can download the latest BIOS file from the ASUS website (www.asus.com/support/download/) if you need to update the BIOS. See Chapter 5 for details.
 - Visit www.intel.com for more information on the EIST feature.
-

A.1 System requirements

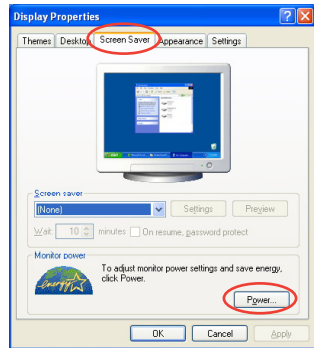
Before using EIST, check your system if it meets the following requirements:


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

A.2.2 Using the EIST

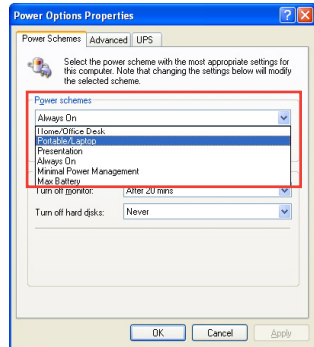
To use the EIST feature:

1. Turn on the computer, then enter the BIOS Setup.
2. Go to the Advanced Menu, highlight CPU Configuration, then press <Enter>.
3. Set the Intel(R) SpeedStep Technology item to [Automatic], then press <Enter>. See page 5-24 for details.
4. Press <F10> to save your changes and exit the BIOS setup.
5. After the computer restarts, right click on a blank space on the desktop, then select Properties from the pop-up menu.
6. When the Display Properties window appears, click the Screen Saver tab.
7. Click the Power button on the Monitor power section to open the Power Options Properties window.



8. On the Power schemes section, click , then select any option **except** Home/Office Desktop or Always On.
9. Click Apply, then click OK.
10. Close the Display Properties window.

After you adjust the power scheme, the CPU internal frequency slightly decreases when the CPU loading is low.



The screen displays and procedures may vary depending on the operating system.

