



RS120-E4/PA2

1U Rackmount Barebone Server

User Guide



E2816

First Edition V1

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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.

Italics

Used to emphasize a word or a phrase.

<Key>

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

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

<Key1+Key2+Key3>

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

Example: <Ctrl+Alt+D>

Command

Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.

Example: At the DOS prompt, type the command line: **format A:/S**

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.



1.1 System package contents

Check your package for the following standard items.

1. ASUS R10 1U rackmount chassis with:
 - ASUS P5M2-R motherboard
 - 400 W power supply
 - SATA backplane (ASUS BP2LSA-R10) with 2 x SATA cables
 - PCI-X and PCI Express x8 riser assembly (ASUS PCI64-EXP-X8)
 - Front I/O board (ASUS FPB-AR14)
 - Optical drive with IDE cable
 - 6 x system fans (6 x 28 mm)
 - 2 x hot-swap HDD trays
 - Pre-connected device/power cables
2. CPU heatsink
3. Rackmount rail kit
4. Bundled CDs
 - RS120-E4 drivers and utilities CD
 - CA Anti-virus software CD
5. User guide



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

* The system does not include a USB floppy drive. You may have to use a USB floppy drive when creating a SATA RAID driver disk. Refer to Chapter 7 for details.

1.2 System specifications

The ASUS RS120-E4/PA2 is a 1U barebone server system featuring the ASUS P5M2-R motherboard. The server supports the Intel® Pentium® 4 and Pentium® D processor in the LGA775 package, and includes the latest technologies through the chipsets embedded on the motherboard.

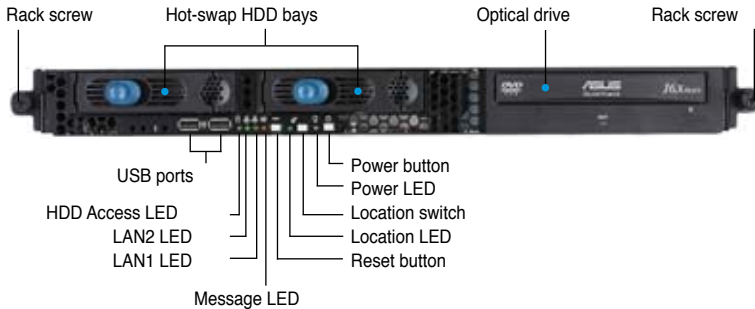
Chassis	Rackmount 1U (R10)
Motherboard	ASUS P5M2-R
Chipset	North Bridge : Intel® 3000 Memory Controller Hub (MCH) South Bridge : Intel® ICH7R I/O Bridge : Intel® 6702 PXH-V
Processor	LGA775 socket for Intel® Xeon 3000 series processor Supports Intel® Enhanced Memory 64Technology (EM64T) Supports Enhanced Intel SpeedStep® Technology (EIST)
Memory	4 x 240-pin DDR2 sockets for up to 8 GB system memory Supports DDR2-533/667 unbuffered ECC or non-ECC DIMMs Supports dual-channel memory architecture
LAN	LAN1: Broadcom® BCM5721 Gigabit Ethernet Controller LAN2: Broadcom® BCM5721 Gigabit Ethernet Controller
VGA	ATI ES1000 PCI-based VGA controller with 32 MB display memory
Expansion slots	1 x PCI Express x8 slot (PCI Express 1.0a) 1 x PCI-X 133 MHz/64-bit slot (PCI-X 1.0) 1 x SO-DIMM socket for ASUS® Server Management Board
Storage	1 x Ultra ATA 100/66/33 device (optical drive) 2 x SATAII-300 hard disk drive with <ul style="list-style-type: none">– RAID 0, RAID 1 configuration using the Intel® Matrix Storage Manager (Windows®)– RAID 0, RAID 1 configuration using the LSI Logic Embedded SATA RAID controller (Windows®/Linux®)
Management	ASUS Server Web-based Management (ASWM)
Monitoring	Voltage, temperature, and fan speed monitoring Automatic System Restart (ASR) feature
Power requirement	400 W power supply, 100V~240V, 50Hz~60Hz
Dimensions	600 mm (l) x 445 mm (w) x 43.6 mm (h)

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 “1.6.2 Front panel LEDs” for the LED descriptions.

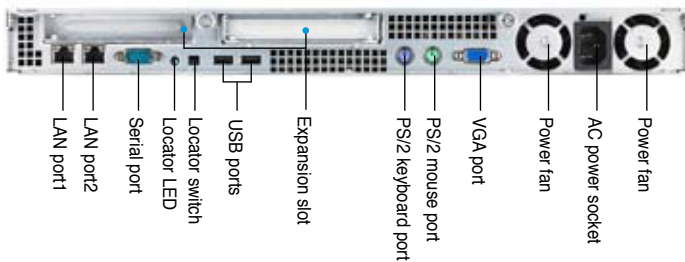


1.4 Rear panel features

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



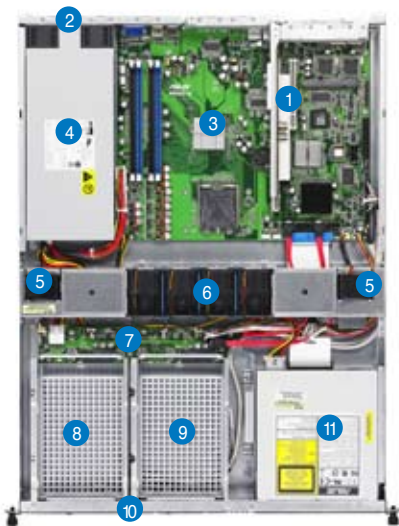
The ports for the PS/2 keyboard, PS/2 mouse, USB, VGA, and Gigabit LAN do not appear on the rear panel if motherboard is not present.



Refer to section “1.6.1 Rear panel LEDs” for the LED descriptions.

1.5 Internal features

The barebone server includes the basic components as shown.



1. PCI-X and PCI Express x8 riser card bracket
2. Power fans
3. ASUS P5M2-R motherboard
4. Power supply
5. Device fans (x 2)
6. System fans (x 4)
7. SATA backplane
8. Hot-swap HDD tray 1 - Connects to SATA1 port (Port0)
9. Hot-swap HDD tray 2 - Connects to SATA3 port (Port2)
10. Front I/O board (hidden)
11. Optical drive



- The barebone server does not include a floppy disk drive. Connect a USB floppy disk drive to any of the USB ports on the front or rear panel if you need to use a floppy disk.
- Only ASUS CD/DVD-ROMs fit the optical drive bay.

1.6 LED information

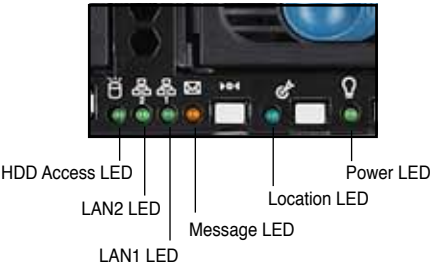
1.6.1 Rear panel LEDs



Location LED

LED	Display status	Description
Location LED	OFF	Normal status
	ON	Location switch is pressed (Press the location switch again to turn off)

1.6.2 Front panel LEDs



LED	Icon	Display status	Description
Power LED		ON	System power ON
HDD Access LED		OFF Blinking	No activity Read/write data into the HDD
Message LED		OFF Blinking	System is normal; no incoming event ASWM indicates a HW monitor event
Location LED		OFF ON	Normal status Location switch is pressed (Press the location switch again to turn off)
LAN LEDs		OFF Blinking ON	No LAN connection LAN is transmitting or receiving data LAN connection is present

1.6.3 LAN (RJ-45) LEDs



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

Chapter 2

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



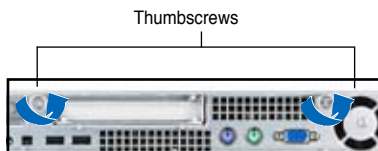
2.1 Chassis cover

2.1.1 Removing the cover

1. Use a Phillips screwdriver to remove the screw on each front end of the top cover.



2. Loosen the two thumbscrews on the rear panel to release the top cover from the chassis.



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



1/2 inch distance

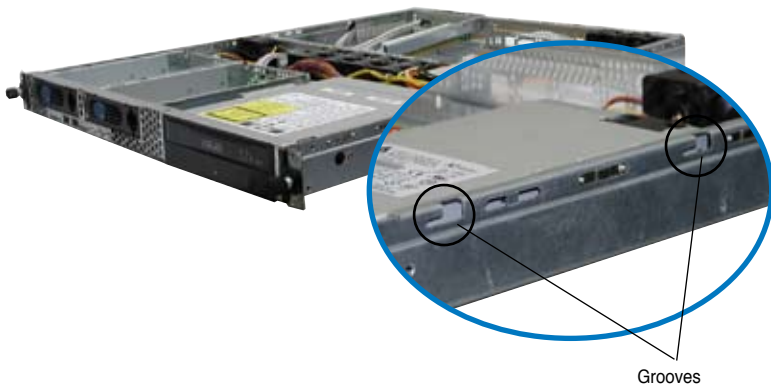
4. Lift the cover from the chassis.

2.1.2 Installing the cover

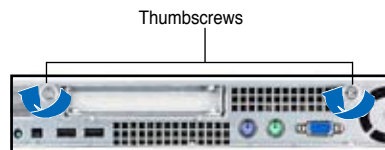
1. Position the cover on top of the chassis with the thumbscrews on the rear, and leaving a gap of about half an inch from the front panel.



2. Make sure that the side markings on the cover (two on each side) are aligned to the grooves on the chassis.



3. Slide the cover toward the front until it snaps in place.
4. Tighten the thumbscrews on the rear to secure the cover.



2.2 Central Processing Unit (CPU)

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

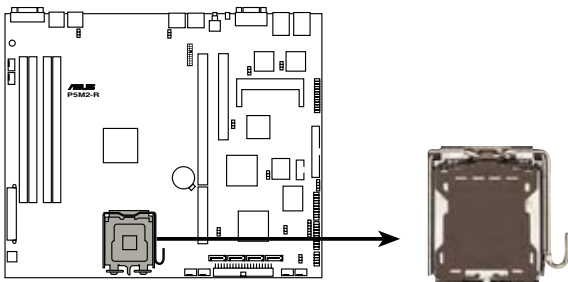


- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only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

2.2.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

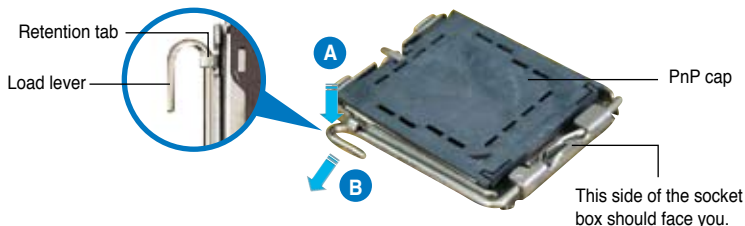


P5M2-R CPU Socket 775



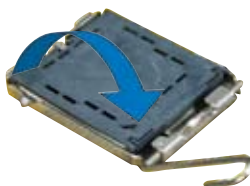
Before installing the CPU, make sure that the cam box is facing towards you and the load lever is on your left.

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

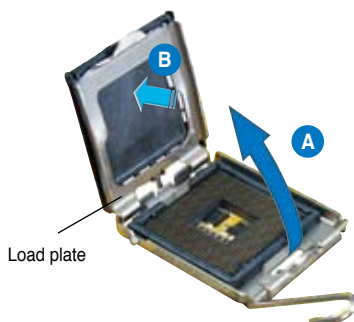


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

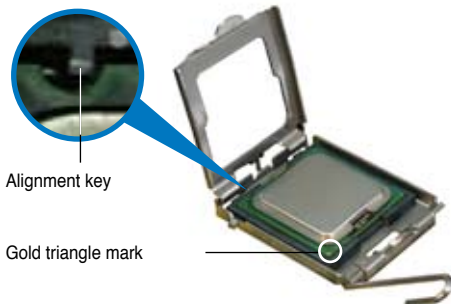
3. Lift the load lever in the direction of the arrow to a 135° angle.



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.

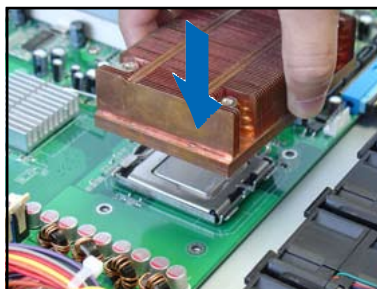


The motherboard supports Intel® Xeon 3000 processors with the Intel® Enhanced Memory 64 Technology (EM64T), Enhanced Intel SpeedStep® Technology (EIST). Refer to the Appendix for more information on these CPU features.

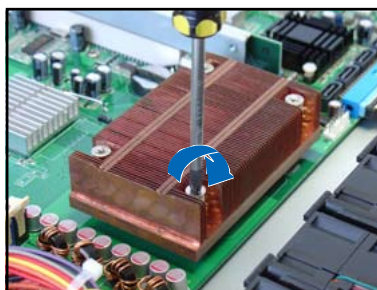
2.2.2 Installing the CPU heatsink and airduct

To install the CPU heatsink:

1. Carefully place the heatsink on top of the installed CPU.



2. Twist each of the four screws with a Philips (cross) screwdriver just enough to attach the heatsink to the motherboard. When the four screws are attached, tighten them one by one to completely secure the heatsink.

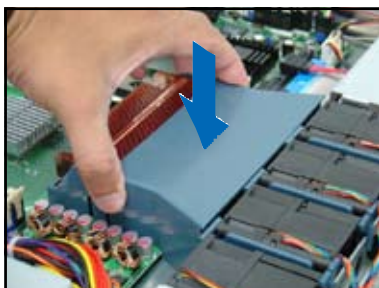


To install the airduct:

1. Position the airduct on top of the heatsink.



2. Carefully lower the airduct until it fits in place.

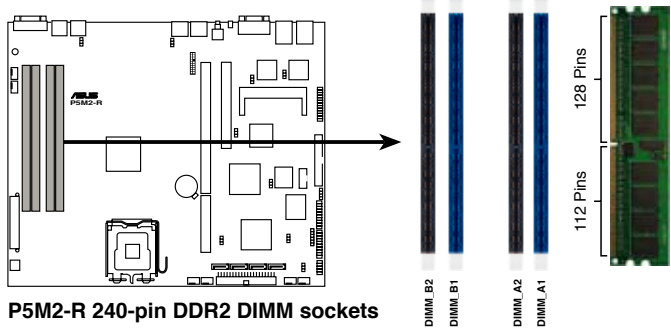


2.3 System memory

2.3.1 DIMM sockets location

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

The figure illustrates the location of the DDR2 DIMM sockets:



2.3.2 Memory configurations

You may install 256 MB, 512 MB, 1 GB, and 2 GB unbuffered ECC or non-ECC DDR2-533/667 DIMMs to the DIMM sockets.



- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor. Visit the ASUS website for an updated DDR2 Qualified Vendors List for this motherboard.
- Due to chipset resource allocation, and depending on the number of expansion cards installed, the following conditions may occur:
 - the system may detect less than 8 GB system memory when you installed four 2 GB DDR2 memory modules
 - may show an available memory space of less than 4 GB when you installed four 1 GB DDR2 memory modules
- Three DDR2 DIMMs installed into any three memory sockets will function in Dual channel asymmetric mode.
- When installing a single or two DIMMs, install the modules on the blue slots (DIMM_A1/DIMM_B1). Refer to the recommended memory configuration table below.

Recommended memory configurations

Mode	Single channel mode		Dual channel mode		Dual channel (asymmetric mode)
Number of memories	1	1	2	4	3
DIMM socket					
DIMM_A1	V		V	V	V
DIMM_A2				V	V
DIMM_B1		V	V	V	V
DIMM_B2				V	

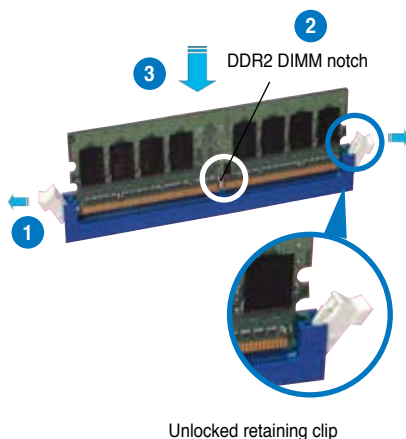
2.3.3 Installing a DIMM



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

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.

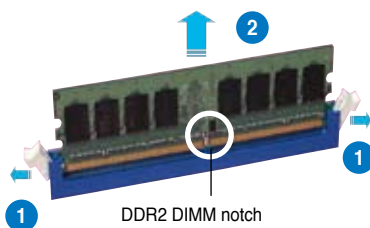
2.3.4 Removing a DIMM

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.

2.4 Hard disk drives

The system supports two hot-swap Serial ATA hard disk drives. The hard disk drive installed on the left tray connects to the motherboard SATA1 (Port0) port, while the right tray hard disk drive connects to the motherboard SATA3 (Port2) port via the SATA backplane.

To install a hot-swap SATA HDD:

1. Release a drive tray by pushing the spring lock to the right, then pulling the tray lever outward. The drive tray ejects slightly after you pull out the lever.



2. Firmly hold the tray lever and pull the drive tray out of the bay.



3. Take note of the drive tray holes. Each side has three holes to fit different types of hard disk drives. Use two screws on each side to secure the hard disk drive.



4. Place a SATA hard disk drive on the tray, then secure it with four screws.



5. Carefully insert the drive tray and push it all the way to the depth of the bay until just a small fraction of the tray edge protrudes.



SATA interface
on the backplane



When installed, the SATA connector on the drive connects to the SATA interface on the backplane.

6. Push the tray lever until it clicks, and secures the drive tray in place. The drive tray is correctly placed when its front edge aligns with the bay edge.
7. Repeat steps 1 to 6 if you wish to install a second SATA drive.



8. Connect the bundled SATA cables to the connectors on the SATA backplane. Refer to section “2.7 SATA backplane cabling” for information on the SATA backplane cable connections.

2.5 Expansion slot

2.5.1 Installing an expansion card to the riser card bracket

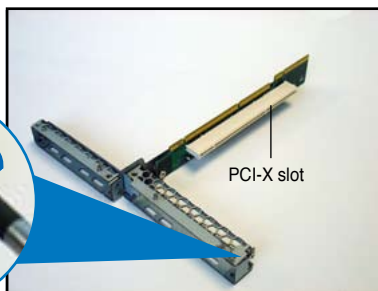
The barebone server comes with a riser card bracket. You need to remove the bracket if you want to install a PCI-X and/or a PCI Express x8 expansion cards.

To install a PCI-X card:

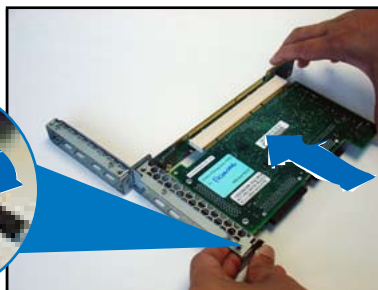
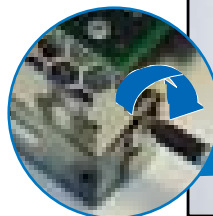
1. Firmly hold the riser card bracket, then pull it up to detach it from the PCI Express x8 and PCI-X slots on the motherboard.



2. Place the riser card bracket on a flat and stable surface, then remove the screw from the PCI-X slot bay.



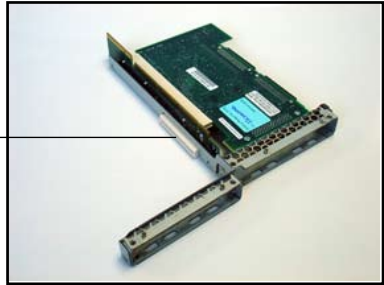
3. Install a PCI-X card to the bracket as shown, then secure the card with a screw.



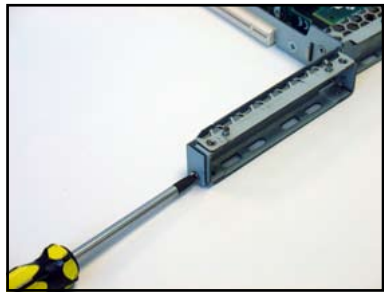
To install a PCI Express x8 card:

1. Follow steps 1 to 2 of the previous section.

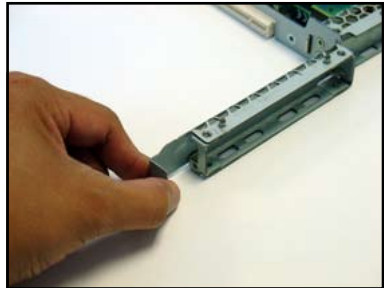
PCI Express x8 slot



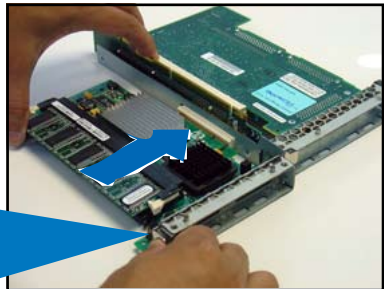
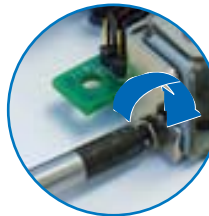
2. Use a Phillips (cross) screwdriver to remove the screw that secures the slot metal cover.



3. Remove the slot metal cover, then set it aside.



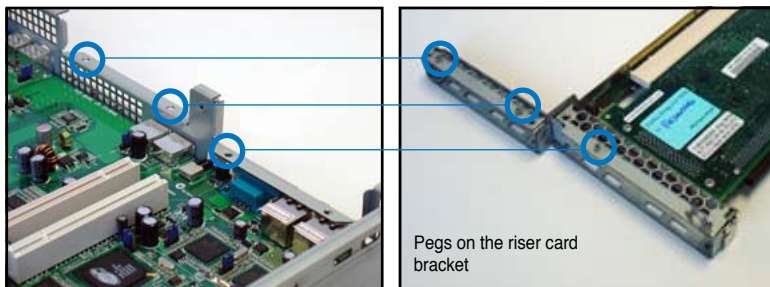
4. Install a PCI Express x8 card to the bracket as shown, then secure the card with a screw you removed earlier.



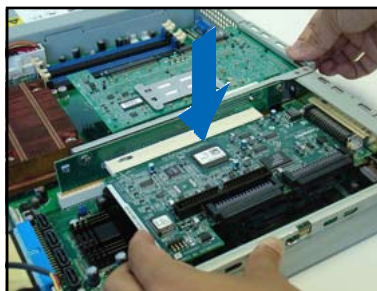
2.5.2 Reinstalling the riser card bracket

To reinstall the riser card bracket:

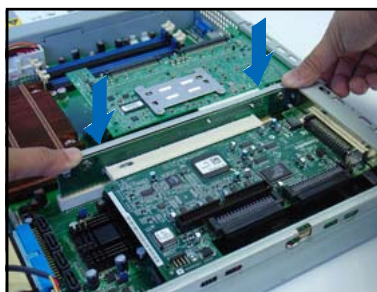
1. Take note of the holes on the riser card bay. The three pegs on the riser card bracket should match these holes to ensure that the bracket is properly in place.



2. Install the riser card bracket with the card into the PCI Express x8 and PCI-X slots on the motherboard.



3. Press the riser card bracket until the golden connectors completely fit the slot and the bracket aligns with the rear panel.
4. Connect the cable(s) to the card, if applicable.



2.5.3 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 5 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the following tables.
3. Install the software drivers for the expansion card.

Standard interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	Sound Card (sometimes LPT2)
6	14	Floppy Disk Controller
7*	15	Printer Port (LPT1)
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when used
10*	5	IRQ Holder for PCI Steering
11*	6	IRQ Holder for PCI Steering
12*	7	PS/2 Compatible Mouse Port
13	8	Numeric Data Processor
14*	9	Primary IDE Channel
15*	10	Secondary IDE Channel

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

PCI Bus Number, IDSEL, and IRQ assignments

	INTA#	INTB#	INTC#	INTD#	REQ#	GNT#
PATA controller	PIRQA#					
SATA controller	PIRQD#					
SMBus controller	PIRQB#					
USB UHCI controller 1	PIRQH#					
USB UHCI controller 2	PIRQD#					
USB 2.0 EHCI controller	PIRQH#					
BCM5721 #1	PIRQA#					
BCM5721 #2	PIRQB#					
ATI RAGE XL	PIRQD#				REQ1#	GNT1#
PCI Slot 1 (64-bit)	PIRQ0	PIRQ1	PIRQ2	PIRQ3	PXREQ0	PXGNT0
PCI Express Slot 2	PIRQA#					
PCI Slot 3 (32-bit)	PIRQE#	PIRQF#	PIRQG#	PIRQH#	REQ0#	GNT0#



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

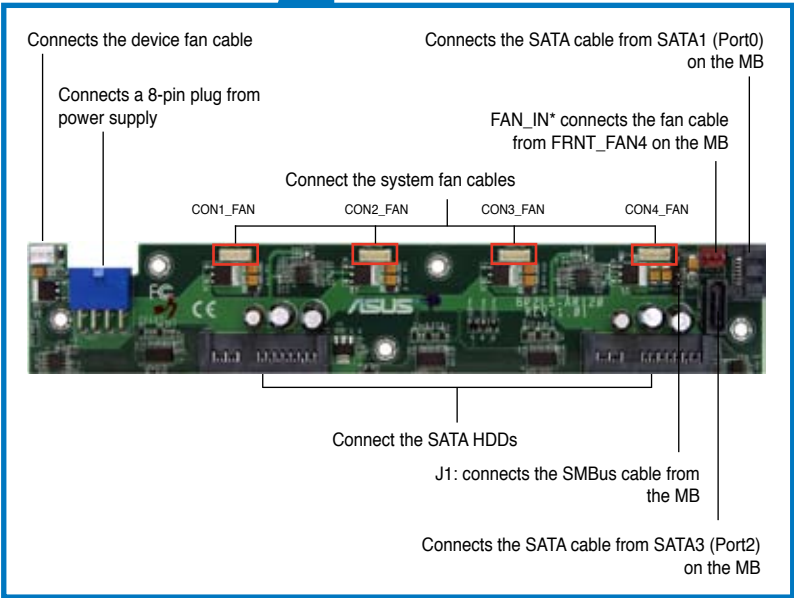
2.6 Cable connections



Pre-connected system cables

1. 24-pin SSI power connector (from power supply to motherboard)
2. 4-pin SSI power connector (power supply to motherboard)
3. SATA backplane power connector (from power supply)
4. Primary IDE connector (from motherboard to optical drive)
5. Device fan connector (from motherboard FRONT_FAN3 to device fan)
6. SATA connectors (from motherboard to SATA backplane board)
7. SMBus connector (from motherboard BPSMB1 to SATA backplane J1 connector)
8. Panel connector (from motherboard to front I/O board)
9. Auxiliary panel connector (from motherboard to front I/O board)
10. USB connector (from motherboard to front I/O board)
11. FRNT_FAN4 connector (from motherboard to FAN_IN connector on SATA backplane)

2.7 SATA backplane cabling



*The system fans rotate at full speed during power on when the backplane FAN_IN connector cable is not connected to the FRNT_FAN4 connector on the motherboard.

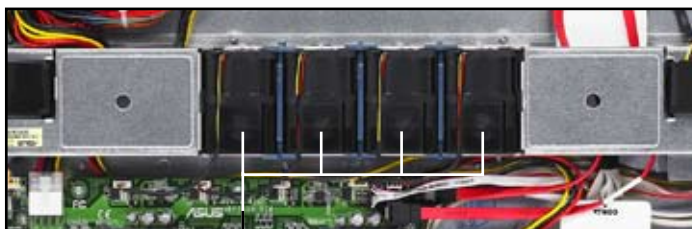
2.8 Removable components

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

1. System fans
2. Device fan
3. Power supply module
4. Optical drive
5. Motherboard

2.8.1 System fans

The system comes with four units of 28 mm x 40 mm 15500 rpm fan with dummy case. Refer to the illustration below for location of the system fans.



28 mm x 40 mm fan with dummy case



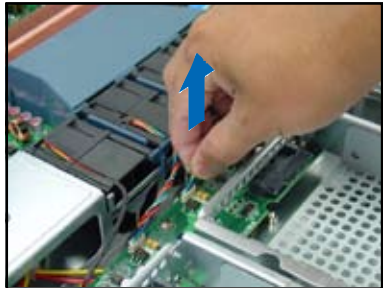
Incorrect installation of the system fan with dummy case may result to CPU overheating and/or automatic system shutdown.

To uninstall the system fans:

1. Disconnect a system fan cable from the fan connector on the backplane board.

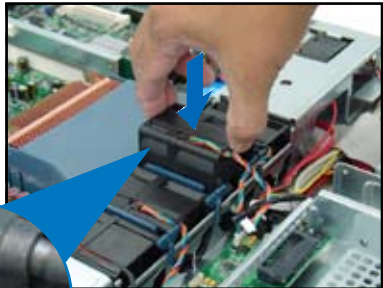


2. Lift the fan, then set aside.
3. Repeat step 1 to 2 to uninstall the other system fans.



To reinstall the system fan:

1. Insert the fan to the fan cage. The airflow directional arrow on the fan side should point towards the system rear panel.
2. Connect the system fan cable to the fan connector on the backplane board.

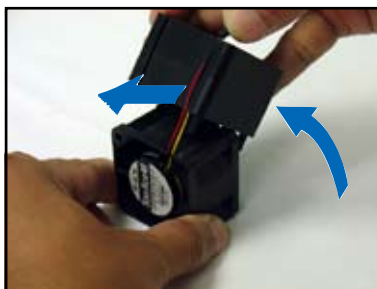
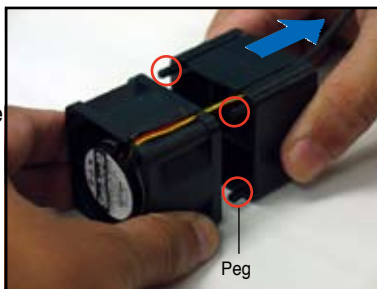


2.8.2 System fan with dummy case

The system fan for the memory module(s) comes with a dummy case that allows it to fit in the fan cage.

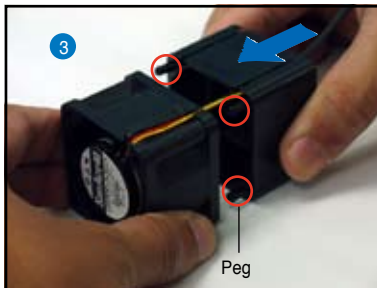
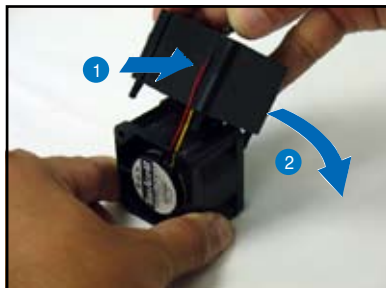
To replace the system fan with dummy case:

1. Uninstall the fan following the instructions in the previous section.
2. Pull the dummy case to the direction of the arrow just enough to disengage its pegs from the system fan.
3. Turn the dummy case above the system fan, then remove the fan cables by pulling them through the dummy case cable bay.
4. Replace the system fan.



To reinstall the system fan with the dummy case:

1. Insert the fan cables to the dummy case cable bay.
2. Turn the dummy case to the direction of the arrow.
3. Insert the dummy case pegs to the system fan holes until it fits in place.
4. Reinstall the system fan by following the instructions in the previous section.



2.8.3 Device fan

The system comes with two 28 mm * 40 mm (15500 rpm) device fans.

Refer to the illustration below for location of the device fans.

28 mm * 40 mm device fans



To uninstall the device fan:

1. Disconnect the device fan cable from the connector on the motherboard or backplane board.
2. Lift the fan, then set aside.



To reinstall the device fan:

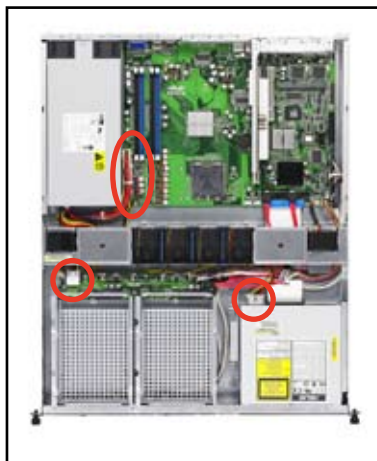
1. Insert the fan to the fan cage. The airflow directional arrow on the fan side should point towards the rear panel.
2. Connect the device fan cable to the fan connector on the backplane board or on the motherboard.



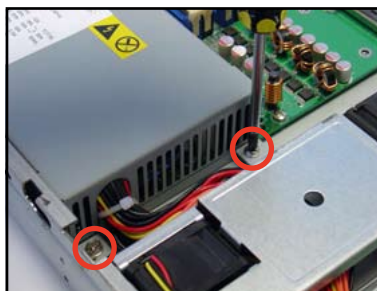
2.8.4 Power supply module

To uninstall the power supply module:

1. Disconnect all the power cables connected to the motherboard and other system devices.



2. Use a Phillips (cross) screwdriver to remove the screws that secure the front end of the power supply.



3. From the rear panel, remove two screws that secure the power supply from the chassis.



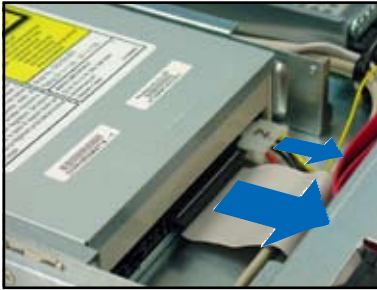
4. Slide the power supply forward for about half an inch, then carefully lift it out from the chassis.



2.8.5 Optical drive

To uninstall the optical drive:

1. Disconnect the power and signal cables connected to the rear of the optical drive.
2. Insert the optical drive emergency eject pin to the emergency eject pin hole until the drive tray ejects.



3. Pull out half of the drive tray to remove the tray bezel.
4. Pull the center of the bezel outward (A), then lift the sides (B) to remove.



Do not apply too much force when removing the bezel. Too much force may break the drive tray!

5. Replace the drive tray.



6. Remove two metal bracket screws and screws on the other side of the drive. Keep the screws for later use.



7. Pull the metal bracket to the direction of the arrow until its pegs disengage from the drive holes.
8. Lift the metal bracket, then set aside.



9. Push the drive inward, then lift it out from the chassis.



10. Remove the metal rail on the other side of the drive.



To reinstall the optical drive, follow the instructions in the previous chapter in a reverse order.



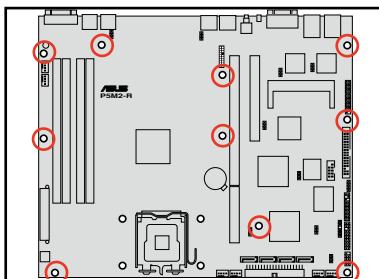
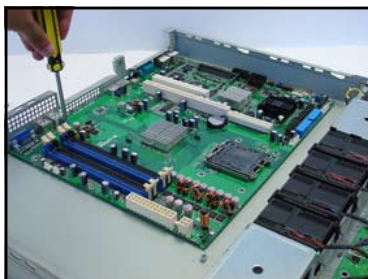
When installing a new optical drive, make sure to remove the drive front panel assembly and tray bezel before installing it to the chassis.

2.8.6 Motherboard

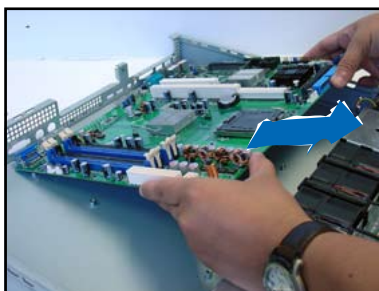
To uninstall the motherboard:

1. Disconnect all the pre-connected cables from the motherboard. See section “2.6 Cable connections” for details.
2. Uninstall all the devices from the motherboard including the CPU and heatsink, riser card bracket, and DDR DIMMs. Refer to the corresponding sections for instructions on removing these components.
3. Use a Philips (cross) screwdriver to remove the screws that secure the motherboard to the base of the chassis.

Refer to the illustration below for the location of the motherboard screws.

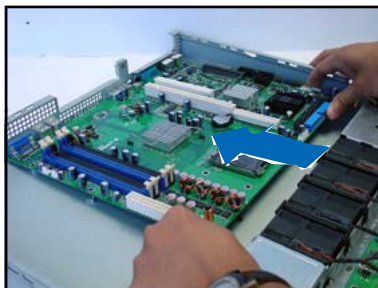


4. Carefully lift the motherboard out of the chassis as shown.



To reinstall the motherboard:

1. Firmly hold the motherboard by the sides and insert it into the chassis as shown.
2. Carefully adjust the motherboard until the rear panel ports fit in place.



3. Use a Phillips (cross) screwdriver to secure the motherboard with ten (10) screws in the holes as shown in the illustration in the previous section.
4. Reconnect all the required cables to the motherboard. See section “2.6 Cable connections” for details.
5. Reinstall all the devices that you have previously removed.



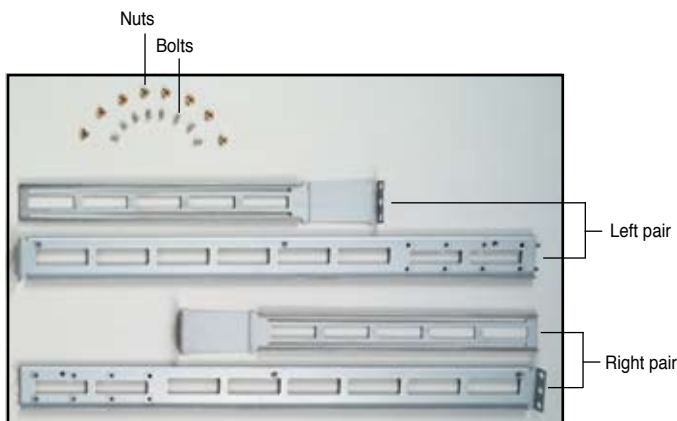
Chapter 3

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



3.1 Rackmount rail kit items

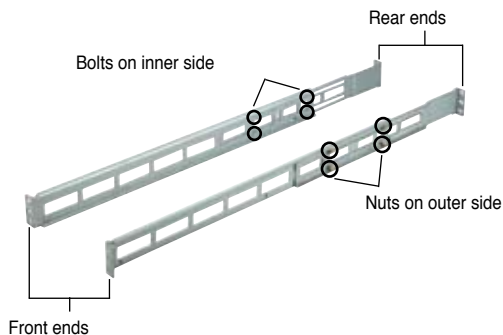
If you have the rackmount rail kit, it contains two pairs of rails (one pair for each side of the barebone system), and eight (8) pairs of nut-and-bolt type screws.



3.2 Rack rails assembly

To assemble the rack rails:

1. Determine the depth of the rack where you wish to install the system.
2. Match one long and one short rail to your desired length, and fix them together using four (4) pairs of nuts and bolts.
3. Repeat step 2 to assemble the other rail pair.



3.3 Attaching the rails to the rack

To attach the rails to the rack:

1. Select one unit of space (1U) on the rack where you wish to install the barebone server.
2. Remove the screws from the 1U space on the rack front.



1U space

3. Align the front end holes of a rack rail pair to the 1U space.
4. Drive in two screws on the outer holes to secure the front end.



5. Find the rear 1U space that corresponds to the front 1U space where you attached the rail.
6. Remove the screws from the rear 1U space, and align the rear end holes.
7. Drive in two screws on the outer holes to secure the rear end.
8. From the rack front, find the corresponding 1U space for the second rail pair.
9. Repeat steps 2 to 7 to attach the second rail pair. When properly installed, the rack rails appear as shown.



3.4 Rackmounting the server

To mount the server to the rack:

1. Firmly hold the server on both sides and insert the rear panel side to the front end of the rack rail, then carefully push the server all the way to the back until the front panel fits the front end of the rack, and the rack screws on the server match the middle hole on the rack..



2. Tighten the two rack screws to secure the server to the rack.



Rack screw

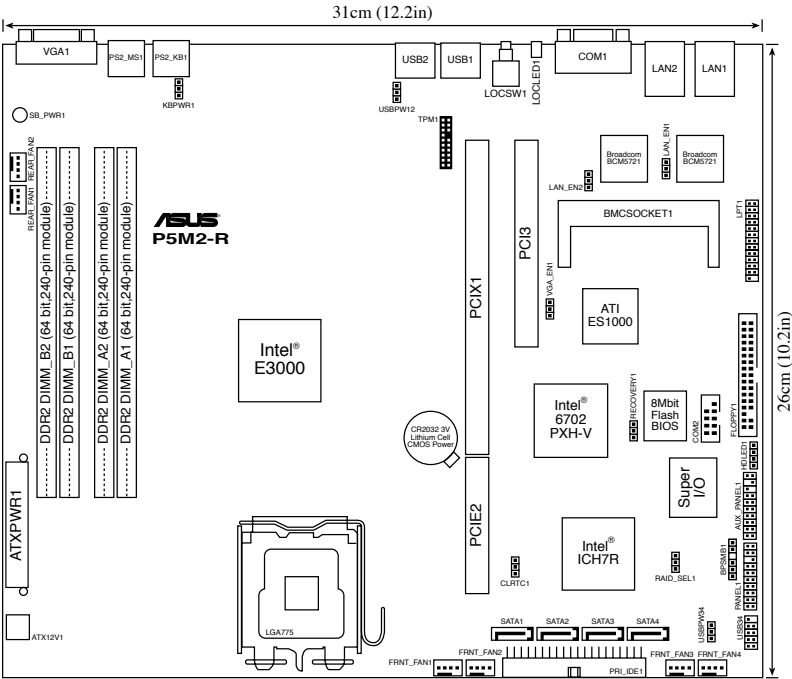
Chapter 4

This chapter includes the motherboard layout, and brief descriptions of the jumpers and internal connectors.



Motherboard info

4.1 Motherboard layout



Layout contents

Jumpers	Page
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8. Force BIOS recovery (3-pin RECOVERY1)	4-8

Internal connectors	Page
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2. IDE connector (40-1 pin PRI_IDE1)	4-9
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6. USB port connector (10-1 pin USB34)	4-12
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8. SSI power connectors (24-pin ATXPWR1, 4-pin ATX12V1)	4-13
9. Printer port connector (26-1 pin LPT1)	4-14
10. TPM connector (20-1 pin TPM1)	4-14
11. Backplane SMBus connector (6-1 pin BPSMB1)	4-15
12. Auxiliary panel connector (20-pin AUX_PANEL1)	4-16
13. System panel connector (20-pin PANEL1)	4-17

4.2 Jumpers

1. Clear RTC RAM (CLRRTC1)

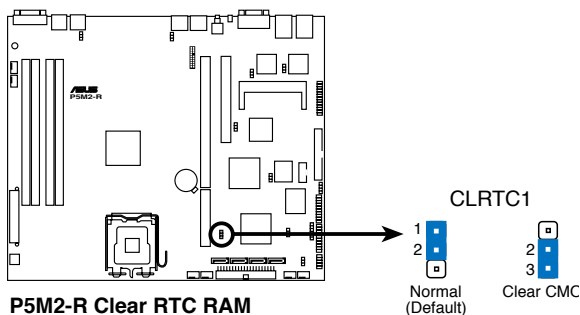
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which includes system setup information such as system passwords.

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.

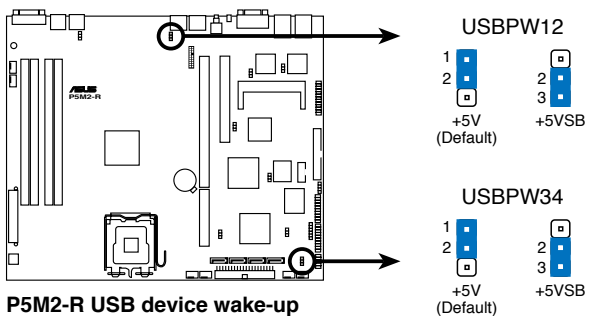


Except when clearing the RTC RAM, never remove the cap on CLRRTC jumper default position. Removing the cap will cause system boot failure!



2. 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 S3 and S4 sleep modes (no power to CPU, DRAM in slow refresh, power supply in reduced power mode).



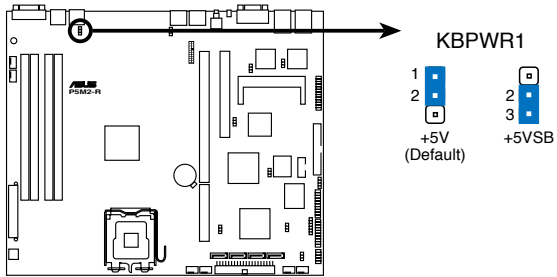
P5M2-R USB device wake-up



- The USB device wake-up feature requires a power supply that can provide 500mA on the +5VSB lead for each USB port; otherwise, the system would not power up.
- The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

3. Keyboard power (3-pin KBPWR1)

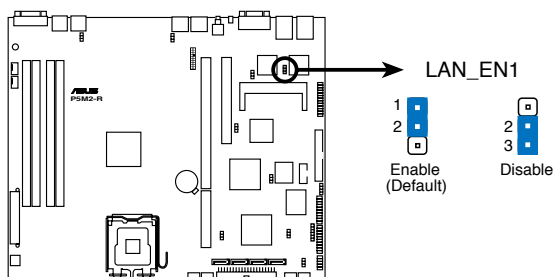
This jumper allows you to enable or disable the keyboard wake-up feature. Set this jumper to pins 2-3 (+5VSB) to wake up the computer when you press a key on the keyboard (the default is the Space Bar). This feature requires an ATX power supply that can supply at least 1A on the +5VSB lead, and a corresponding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



P5M2-R Keyboard power setting

4. Gigabit LAN1 controller setting (3-pin LAN_EN1)

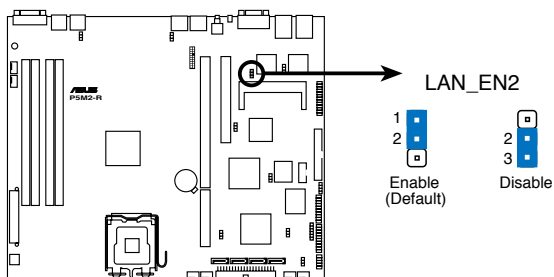
This jumper allows you to enable or disable the Broadcom® Gigabit LAN controller that controls the LAN1 port. Place a jumper cap on pins 1-2 to activate the Gigabit LAN1 controller.



P5M2-R Gigabit LAN1 setting

5. Gigabit LAN2 controller setting (3-pin LAN_EN2)

This jumper allows you to enable or disable the Broadcom® Gigabit LAN controller that controls the LAN2 port. Place a jumper cap on pins 1-2 to activate the Gigabit LAN2 controller.



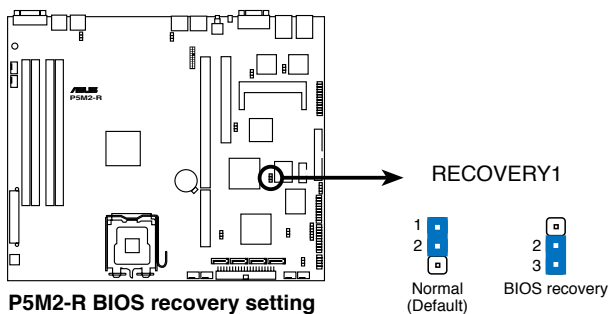
P5M2-R Gigabit LAN2 setting

8. Force BIOS recovery (3-pin RECOVERY1)

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

To update the BIOS:

1. Prepare a CD-ROM that contains the original or latest BIOS for the motherboard (P5M2R.ROM) and the AFUDOS.EXE utility.
2. Set the jumper to pins 2-3.
3. Restart the system, then insert the CD-ROM to the optical drive to recover or update the BIOS.
4. Shut down the system.
5. Set the jumper back to pins 1-2.
6. Turn on the system.



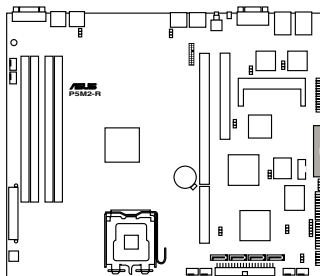
4.3 Connectors

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.

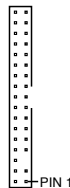


Pin 5 on the connector is removed to prevent incorrect cable connection when using a FDD cable with a covered Pin 5.



P5M2-R Floppy disk drive connector

FLOPPY1



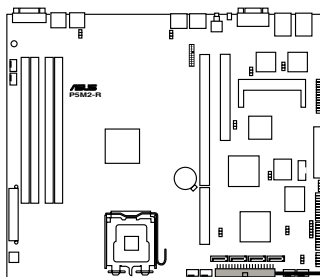
NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.

2. IDE connector (40-1 pin PRI_IDE1)

This connector is for an Ultra ATA 100/66/33 signal cable. By default, this connector supports the optical disk drive. You must configure the optical drive as master/slave device by setting its jumper accordingly. Refer to the optical disk drive documentation for the jumper settings.



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



P5M2-R IDE connector

PRI_IDE1



NOTE: Orient the red markings (usually zigzag) on the IDE ribbon cable to PIN 1.

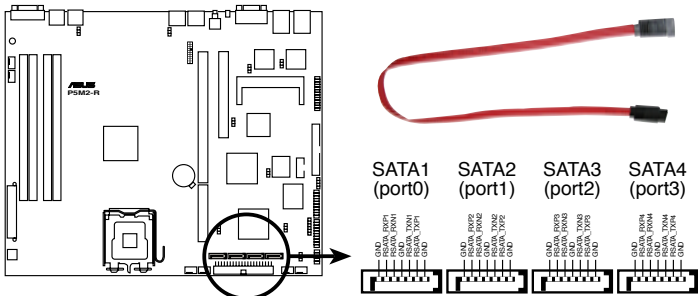
3. Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4)

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 Manager, or RAID 0, and RAID 1 configuration using the LSI Logic Embedded SATA RAID utility in the Intel® ICH7R Southbridge.



These connectors are set to 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 5.3.4 for details.



P5M2-R SATA connectors



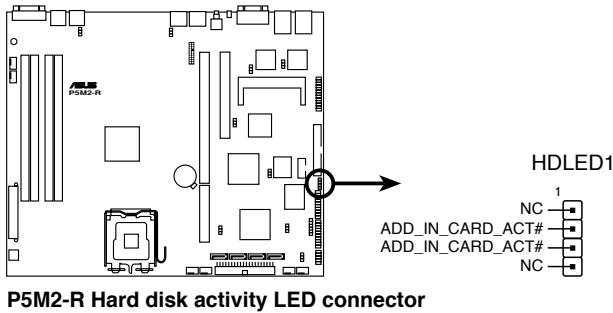
When using the connectors in IDE mode, connect the primary (boot) hard disk drive to the SATA1 or SATA2 connector. Refer to the table below for the recommended SATA hard disk drive connections.

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)**

For some storage cards, such as SCSI card, with access signals for external LEDs, this connector allows the access signals to go through the front panel IDE_LED lead.

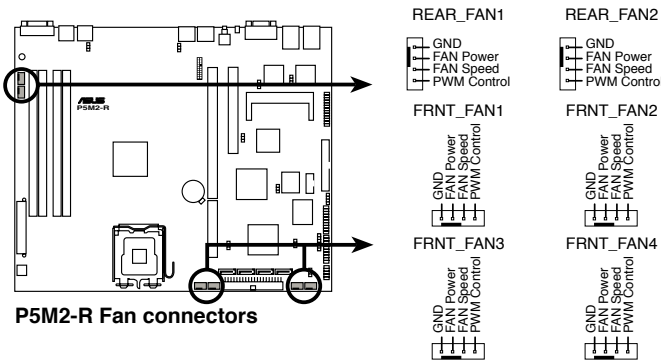


5. **System and device fan connectors (3-pin FRNT_FAN1/2/3/4; REAR_FAN1/2)**

The fan connectors support the system and device fans. Connect the backplane fan cable to the FRNT_FAN4 connector on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.

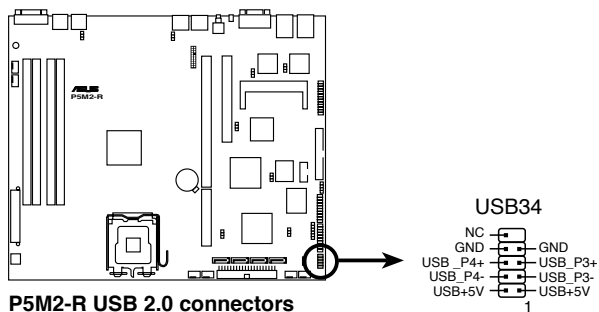


These are not jumpers! Do not place jumper caps on the fan connectors!



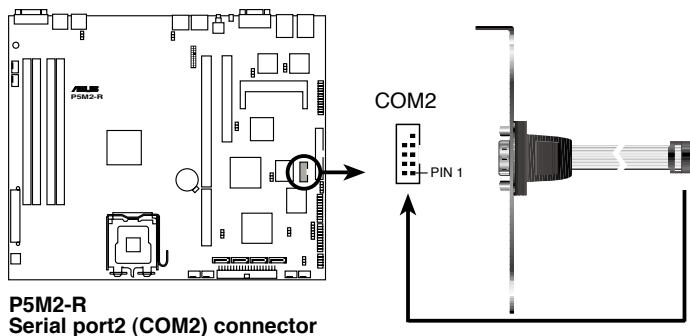
6. USB port connector (10-1 pin USB34)

By default this connects to the front panel to support two USB 2.0 ports.



7. 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.



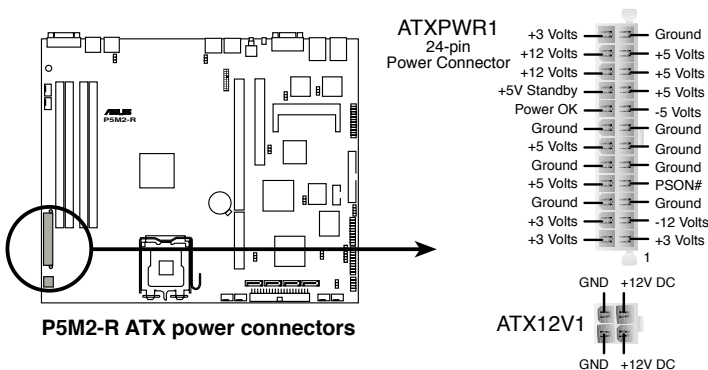
The serial port module is purchased separately.

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

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

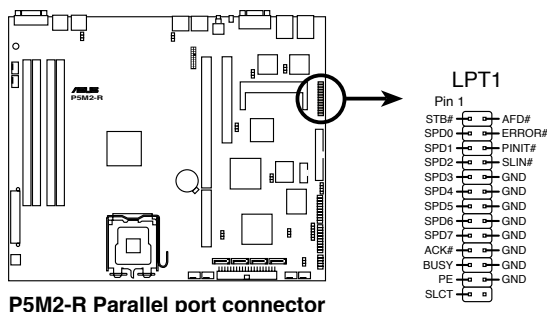


- Use of an SSI 12 V Specification 2.0-compliant power supply unit (PSU) that provides a minimum power of 400 W is recommended for a fully-configured system.
- Do not forget to connect the 4-pin ATX +12 V power plug; otherwise, the system will not boot up.
- Use of a PSU with a higher power output is recommended when configuring a system with more power consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- You must install a PSU with a higher power rating if you intend to install additional devices.



9. Printer port connector (26-1 pin LPT1)

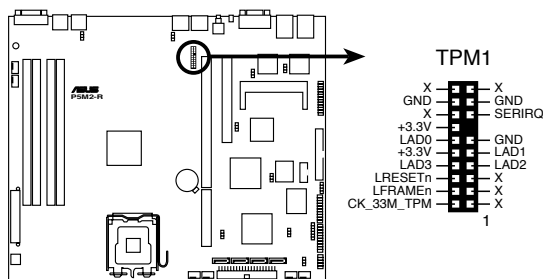
This connector is for a parallel printer port. Connect the parallel printer port module cable to this connector, then install the module to a slot opening at the back of the system chassis.



P5M2-R Parallel port connector

10. TPM connector (20-1 pin TPM1)

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



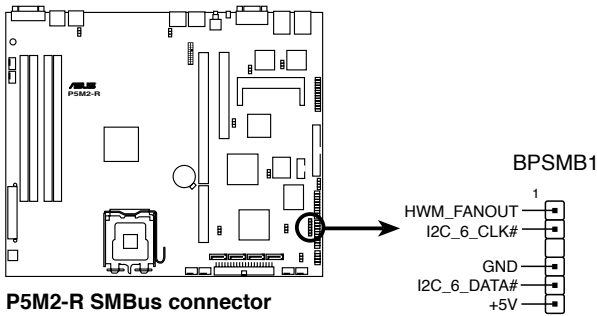
P5M2-R TPM connector



The TPM module is purchased separately.

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

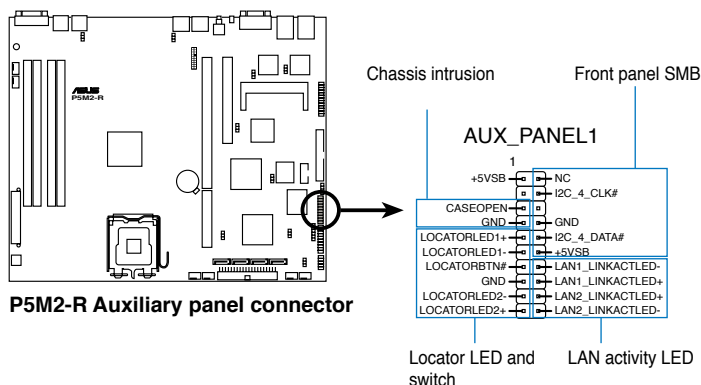
This connector allows you to connect SMBus (System Management Bus) devices. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.



12. 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.

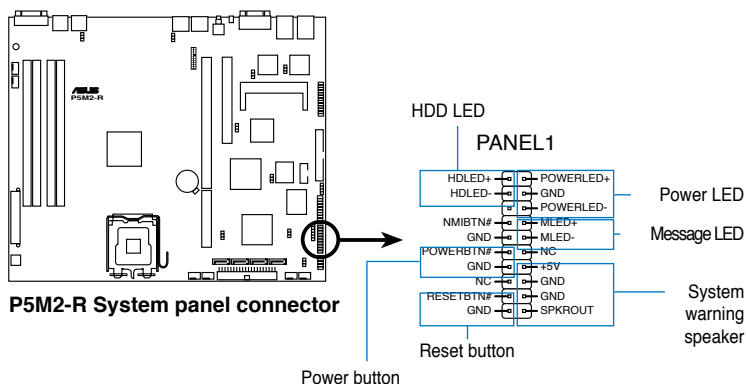
- **Front panel SMB (6-1 pin FPSMB)**
These leads connect the front panel SMBus cable.
- **LAN activity LED (2-pin LAN1_LED, LAN2_LED)**
These leads are for Gigabit LAN activity LEDs on the front panel.
- **Chassis intrusion (2-pin CHASSIS)**
These leads are for the intrusion detection feature for chassis 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.



By default, a cable plug (6x2, 12-pin) connects the AUX_PANEL1 to the front panel I/O board. The Pin1 on the cable plug is located at the top right corner and is marked by a triangle. Take note of the Pin1 when reconnecting the cable plug to prevent incorrect insertion.

13. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.



The system panel connector is color-coded for easy connection. Refer to the connector descriptions below for details.

- **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 panel 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.
- **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.
- **Hard disk drive activity LED (Red 2-pin HDD 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.
- **ATX power button/soft-off button (Yellow 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.

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.



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

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

DOS environment

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

Windows® XP and Server 2003 environment

- a. Insert a 1.44 MB floppy disk to the floppy disk drive.
 - b. Click **Start** from the Windows® desktop, then select **My Computer**.
 - c. Select the 3 1/2 Floppy Drive icon.
 - d. Click **File** from the menu, then select **Format**. A **Format 3 1/2 Floppy Disk** window appears.
 - e. Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.
2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

5.1.2 AFUDOS utility

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

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:



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

```
A:\>afudos /i8036A0.ROM
```

The utility verifies the file, then starts updating the BIOS file.

```
A:\>afudos /i8036A0.ROM
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

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

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



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

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

```
A:\>afudos /i8036A0.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:

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

To update the BIOS file:

1. Copy the original or the latest BIOS file and the AFUDOS utility (afudos.exe) to the USB flash drive.
2. Insert the USB flash drive to an available USB port, then place the motherboard support CD to the optical drive.
3. Boot the system from the support CD, then select the **FreeDOS command prompt**.
4. At the DOS prompt, replace the prompt with the USB flash disk drive letter, then type: **afudos /i [filename]** .
3. 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 according to the exact name of your motherboard, e.g. **P5M2R.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 "P5M2R.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 "P5M2R.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.

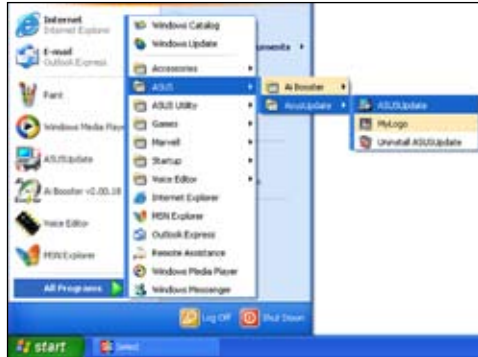


Quit all Microsoft® Windows® applications before you update the BIOS using this utility.

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**.



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



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



Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

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



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

5.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section “5.1 Managing and updating your BIOS.”

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

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

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

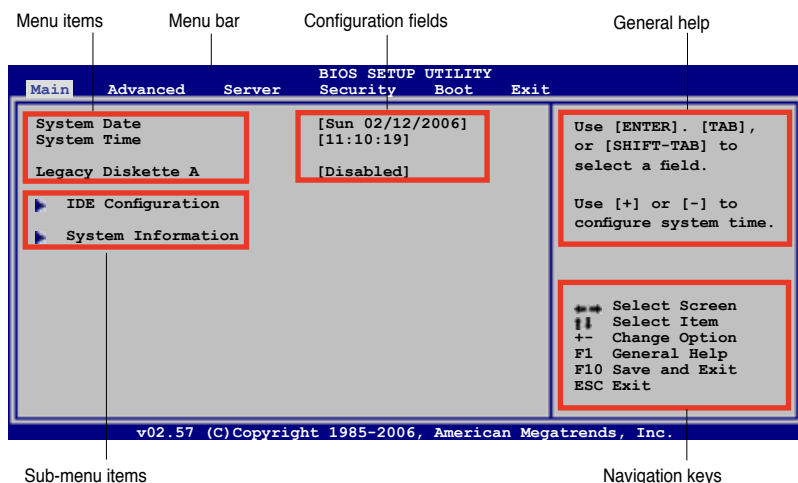
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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



- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section “5.8 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



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.

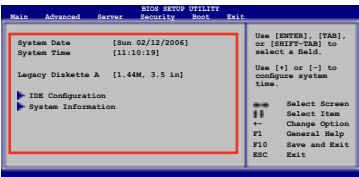


Some of the navigation keys differ from one screen to another.

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.

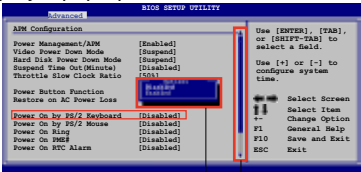
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to “5.2.7 Pop-up window.”

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

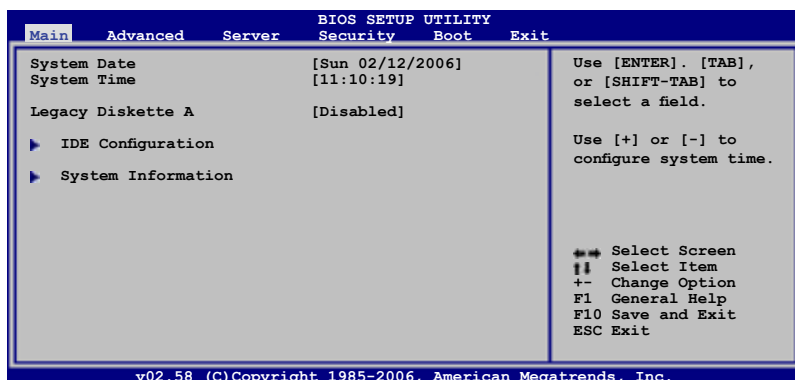
At the top right corner of the menu screen is a brief description of the selected item.

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 Date [Day xx/xx/xxxx]

Allows you to set the system date.

5.3.2 System Time [xx:xx:xx]

Allows you to set the system time.

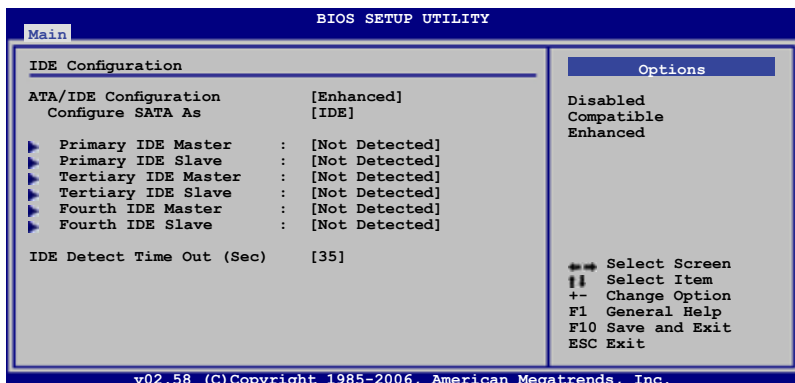
5.3.3 Legacy Diskette A [Disabled]

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 IDE Configuration

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



ATA/IDE Configuration [Enhanced]

Allows selection of the IDE operation mode depending on the installed operating system (OS). Set to [Enhanced] mode if you are using native OS, e.g. Windows® Server 2000/2003. Set to [Compatible] mode if you are using legacy OS, e.g. Windows ME/98/NT, MS-DOS.

Configuration options: [Disabled] [Compatible] [Enhanced]



The **Configure SATA As** and **Fourth IDE Master/Slave** items appear only when you set the **ATA/IDE Configuration** to [Enhanced] mode.

Configure SATA As [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 [IDE].

Set this item to [RAID] if you want to create a RAID volume from Serial ATA hard disk drives.

Place a jumper cap on pins 1-2 of the **RAID_SEL1** jumper to use the LSI Logic Embedded SATA RAID Utility (for RAID 0 or RAID 1 configuration; supported on Windows® 2000/2003 Server/XP and Red Hat® Enterprise ver. 3.0). Refer to section **4.2 Jumpers** for details.

Place a jumper cap on pins 2-3 of the **RAID_SEL1** jumper to use the Intel® Matrix Storage Manager (for RAID 0 or RAID 1 configuration; supported on Windows® 2000/2003 Server/XP).

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

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].

Onboard SATA RAID ROM [Disabled]

Allows you to enable or disable the onboard SATA RAID boot ROM.

Configuration options: [Disabled] [Enabled]



The **Onboard SATA RAID ROM** item appears only when you set the **Configure SATA As** item to [RAID].

Legacy IDE Channels [SATA Pri, PATA Sec]

Allows you to set Serial ATA, Parallel ATA, or both, to legacy mode.

Configuration options:

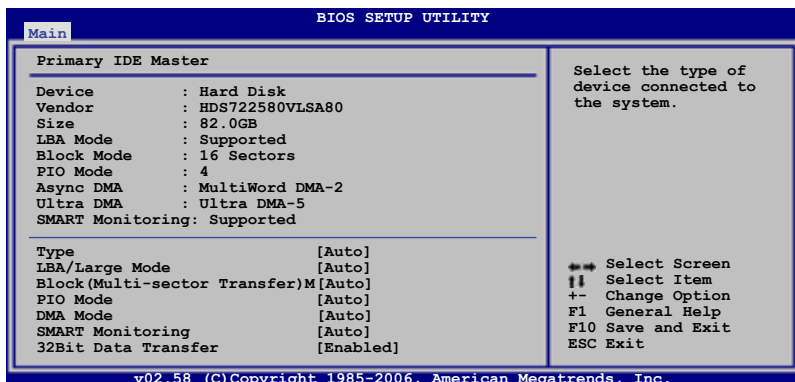
- [SATA Only] - SATA1, SATA2, SATA3, and SATA4 ports are available
- [PATA Pri, SATA Sec] - SATA2 and SATA4 ports are available
- [SATA Pri, PATA Sec] - SATA1 and SATA3 ports are available
- [PATA Only] - Only PATA ports are available



The **Legacy IDE Channels** option appears only when you set the **ATA/IDE Configuration** item to [Compatible] mode.

Primary/Tertiary/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) M [Auto]

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

Configuration options: [Disabled] [Auto]

PIO Mode [Auto]

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

DMA Mode [Auto]

Selects the DMA mode. Configuration options: [Auto] [SWDMA0] [SWDMA1] [SWDMA2] [MWDMA0] [MWDMA1] [MWDMA2] [UDMA0] [UDMA1] [UDMA2] [UDMA3] [UDMA4] [UDMA5]

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]

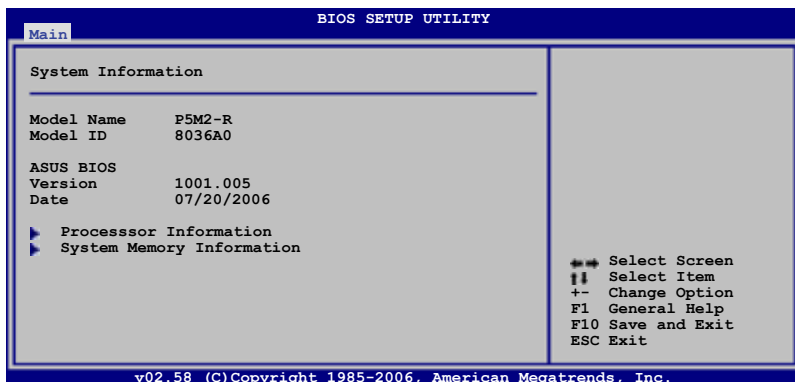
IDE Detect Time Out (Sec) [35]

Selects the time our value (in seconds) for detecting ATA/ATAPI devices.

Configuration options: [0] [5] [10] [15] [20] [25] [30] [35]

5.3.5 System Information

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



The items in this menu are non-user configurable.

Model Name/Model ID

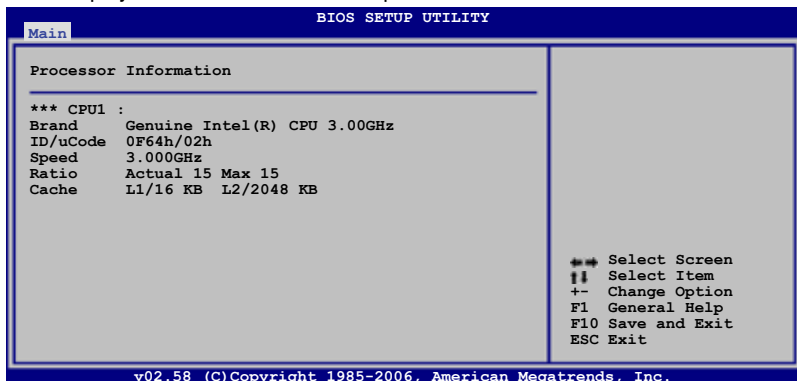
Displays the ASUS internal model information.

ASUS BIOS

Displays the BIOS revision and build date.

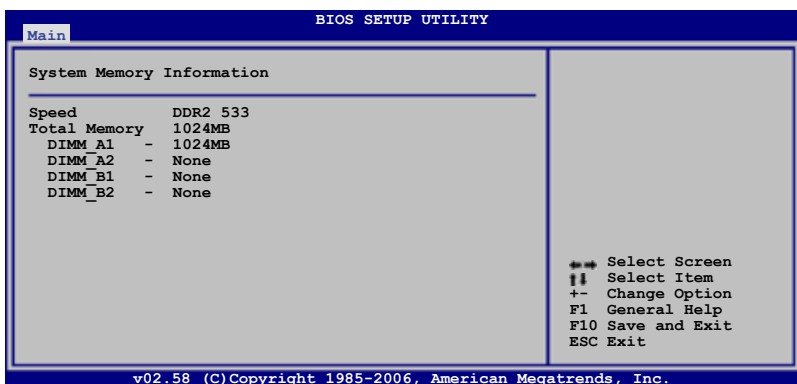
Processor Information

Displays the auto-detected CPU specification.



System Memory Information

Displays the auto-detected system memory information.

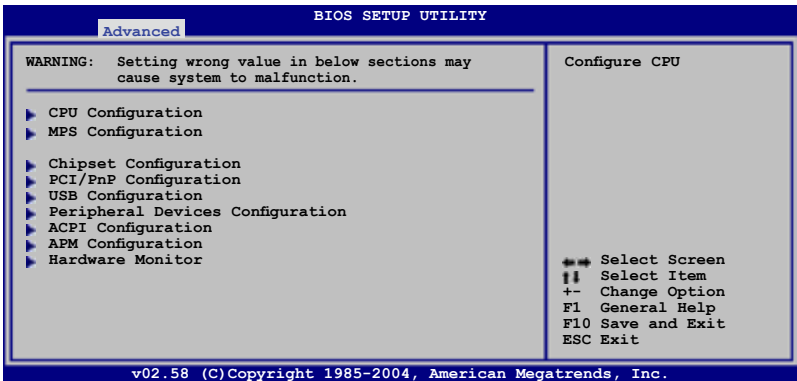


5.4 Advanced menu

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

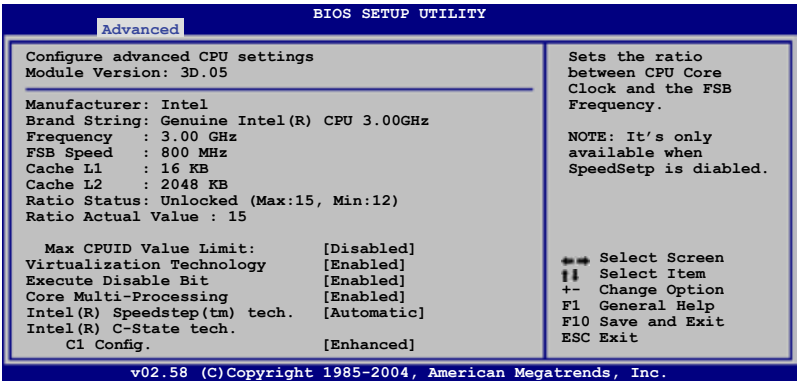


Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



5.4.1 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]

Virtualization Technology [Enabled]

Enable this item when the processor supports this feature. Reset to change its state. Configuration options: [Enabled] [Disabled]

Execute Disable Bit [Enabled]

When this item is set to [Disabled], the BIOS forces the XD feature flag to always return to (0). Configuration options: [Enabled] [Disabled]



The Hyper-Threading Technology item appears only when you installed an Intel® Pentium® 4 CPU that supports the Hyper-Threading Technology. Hyper-Threading is not supported when you installed a dual-core CPU.

Core Multi-Processing [Enabled]

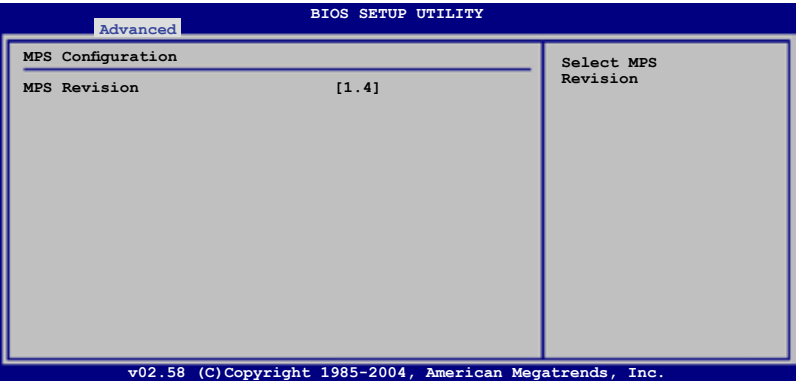
Setting this item to [Disabled] disables one execution core. Configuration options: [Enabled] [Disabled]

Intel(R) SpeedStep(tm) tech. [Automatic]

Allows you to enable or disable the Intel SpeedStep Technology. Refer to the Appendix for more information on the Intel SpeedStep Technology. Configuration options: [Automatic] [Disabled]

C1 Config. [Enhanced]
[Standard] means the conventional C-State; [Enhanced] means the enhanced C-State. Configuration options: [Standard] [Enhanced]

5.4.2 MPS Configuration

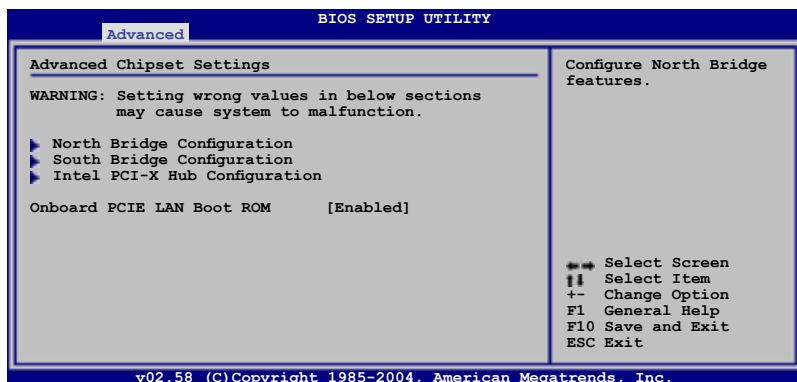


MPS Revision [1.4]

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

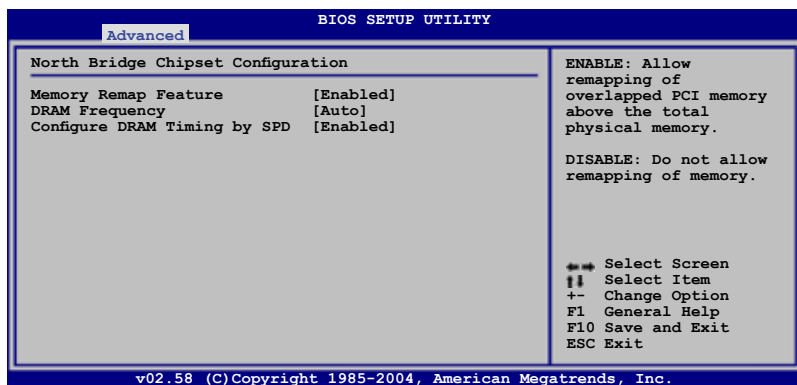
5.4.3 Chipset Configuration

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



NorthBridge Configuration

The NorthBridge Configuration menu allows you to change the Northbridge related settings.



Memory Remap Feature [Enabled]

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

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]

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

DRAM RAS# to CAS# Delay [6 DRAM Clocks]

Controls the latency between the DDR SDRAM active command and the read/write command.

Configuration options: [2 DRAM Clocks] [3 DRAM Clocks] [4 DRAM Clocks] [5 DRAM Clocks] [6 DRAM Clocks]

DRAM RAS# Precharge [6 DRAM Clocks]

Controls the idle clocks after issuing a precharge command to the DDR SDRAM.

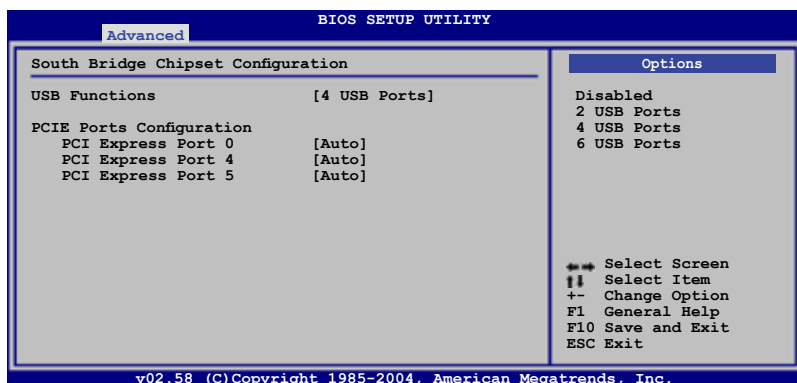
Configuration options: [2 DRAM Clocks] [3 DRAM Clocks] [4 DRAM Clocks] [5 DRAM Clocks] [6 DRAM Clocks]

DRAM RAS# Activate to Precha [15 DRAM Clocks]

Configuration options: [4 DRAM Clocks] [5 DRAM Clocks] ~ [15 DRAM Clocks]

SouthBridge Configuration

The SouthBridge Configuration menu allows you to change the Southbridge related settings.



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] [6 USB Ports]

PCIE Port Configuration

PCI Express Port 0 [Auto]

Allows you to set or disable the PCI Express Port 0.

Configuration options: [Auto] [Disabled]

PCI Express Port 4 [Auto]

Allows you to set or disable the PCI Express Port 4.

Configuration options: [Auto] [Disabled]

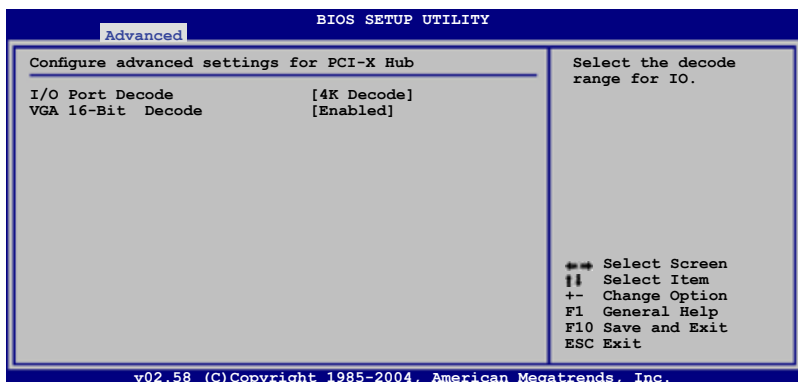
PCI Express Port 5 [Auto]

Allows you to set or disable the PCI Express Port 5.

Configuration options: [Auto] [Disabled]

Intel PCI-X Hub Configuration

The Intel PCI-X Hub Configuration menu allows you to change the Intel PCI Express controller related settings.



I/O Port Decode [4K Decode]

Allows you to set the decode range for the I/O controller.

Configuration options: [4K Decode] [1K Decode]

VGA 16-Bit Decode [Enabled]

Allows you to enable or disable the decode for the VGA controller.

Configuration options: [Disabled] [Enabled]

Onboard PCIE LAN Boot ROM [Enabled]

Allows you to enable or disable the option ROM in the onboard LAN controller.

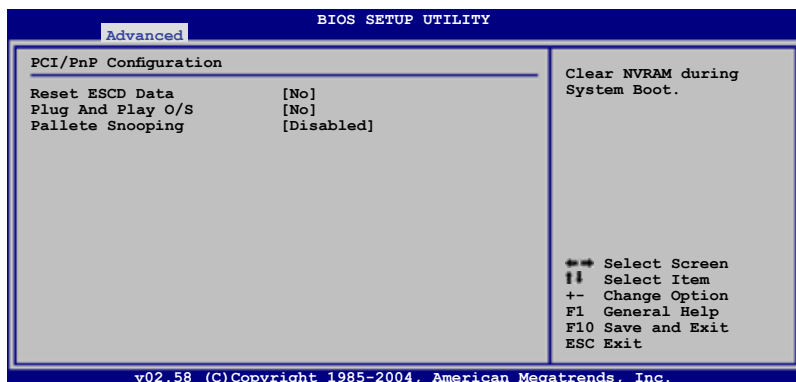
Configuration options: [Disabled] [Enabled]

5.4.4 PCI/PnP Configuration

The PCI/PnP Configuration menu items allow you to change the advanced settings for PCI/PnP devices.



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



Reset ESCD Data [No]

Allows you to clear NVRAM during the system booting.

Configuration options: [No] [Yes]

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.

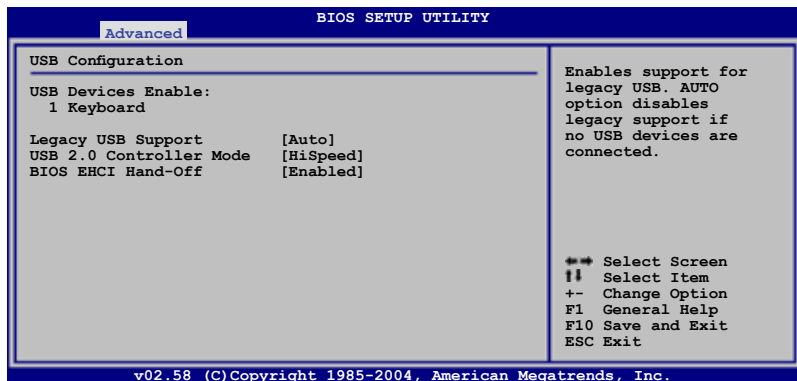
Configuration options: [No] [Yes]

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]

5.4.5 USB Configuration

The items in this menu allows you to configure the USB settings. Select an item, then press <Enter> to display the configuration options.



USB Devices Enable

This item auto-detects and displays the USB devices connected to the system. This is not user-configurable.

Legacy USB Support [Auto]

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

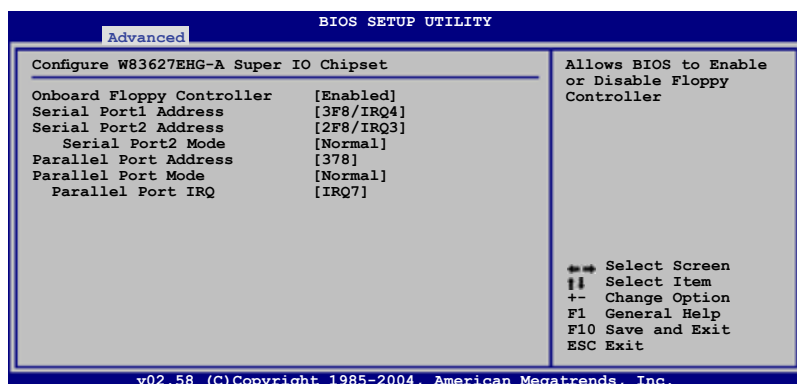
USB 2.0 Controller Mode [HiSpeed]

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

BIOS EHCI Hand-Off [Enabled]

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

5.4.6 Peripheral Devices Configuration



Onboard Floppy Controller [Enabled]

Allows you to enable the onboard floppy disk drive controller.

Configuration options: [Disabled] [Enabled]

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 [Normal]

Allows you to select the Parallel Port mode.

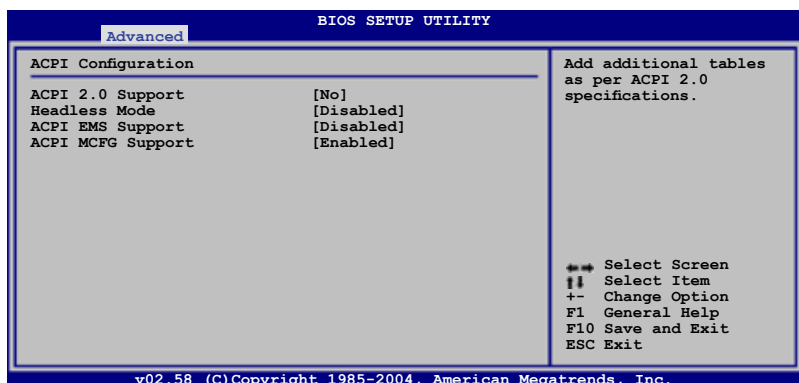
Configuration options: [Normal] [Bi-directional] [ECP] [EPP] [ECP and EPP]

Parallel Port IRQ [IRQ7]

Allows you to specify the Parallel Port IRQ.

Configuration options: [IRQ5] [IRQ7]

5.4.7 ACPI Configuration



ACPI 2.0 Support [No]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) 2.0 support. Configuration options: [No] [Yes]

Headless Mode [Disabled]

Allows you to enable or disable the headless operation mode through ACPI. Configuration options: [Disabled] [Enabled]

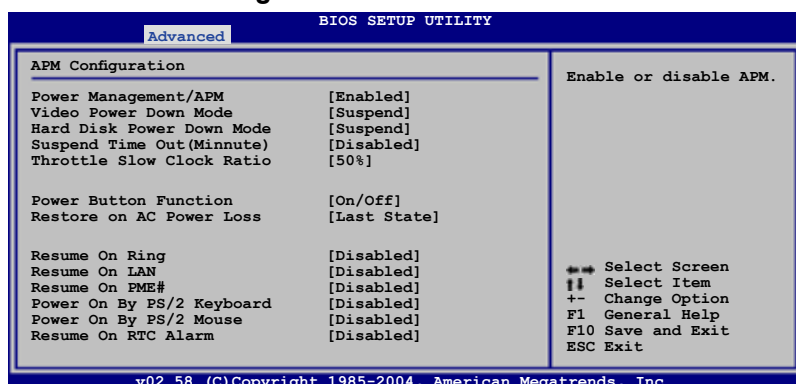
ACPI EMS Support [Disabled]

Allows you to enable or disable the ACPI EMS support. Configuration options: [Disabled] [Enabled]

ACPI MCFG Support [Enabled]

Allows you to enable or disable the ACPI MCFG support. When set to [Enabled], the BIOS will report ACPI MCFG table and [Disabled] will not. Configuration options: [Disabled] [Enabled]

5.4.8 APM Configuration



Power Management/APM [Enabled]

Allows you to enable or disable the motherboard Advance Power Management (APM) feature. Configuration options: [Enabled] [Disabled]

Video Power Down Mode [Suspend]

Allows you to select the video power down mode
Configuration options: [Disabled] [Standby] [Suspend]

Hard Disk Power Down Mode [Suspend]

Allows you to select the hard disk power down mode
Configuration options: [Disabled] [Standby] [Suspend]

Suspend Time Out(Minnute) [Disabled]

Allows you to select the specified time at which the system goes on suspend mode.
Configuration options: [Disabled] [1 Min] [2 Min] [4 Min] [8 Min] [10 Min] [20 Min] [30 Min] [40 Min] [50 Min] [60 Min]

Throttle Slow Clock Ratio [50%]

Allows you to select duty cycle in throttle mode.
Configuration options: [87.5%] [75.0%] [62.5%] [50%] [37.5%] [25%] [12.5%]

Power Button Mode [On/Off]

Allows the system to go into On/Off mode or suspend mode when the power button is pressed. Configuration options: [On/Off] [Suspend]

Restore on AC Power Loss [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 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]

Resume On LAN [Disabled]

When set to [Enabled], the system enables the LAN to generate a wake event while the computer is in Soft-off mode.

Configuration options: [Disabled] [Enabled]

Resume On PME# [Disabled]

When set to [Enabled], the system enables the PME to generate a wake event while the computer is in Soft-off mode.

Configuration options: [Disabled] [Enabled]

Power On By PS/2 Keyboard [Disabled]

Allows you to use specific keys on the keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Configuration options: [Disabled] [Enabled]

Power On By PS/2 Mouse [Disabled]

When set to [Enabled], this parameter allows you to use the left button of a 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 RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake event.

Configuration options: [Disabled] [Enabled]



The **RTC Alarm Date** and **System Time** items appear only when the **Resume On RTC Alarm** item is enabled.

RTC Alarm Date [15]

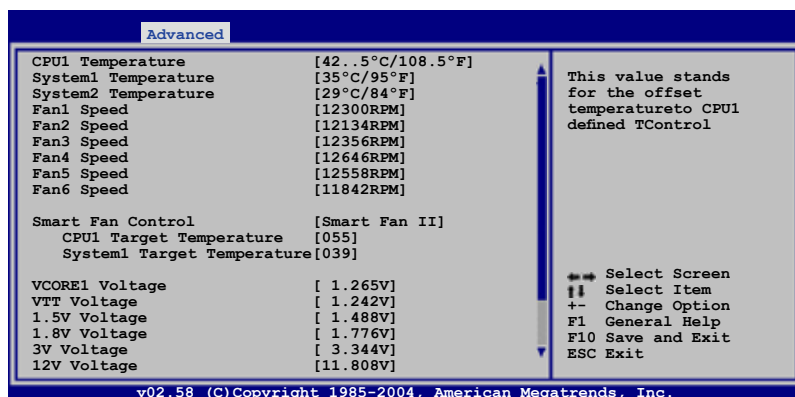
To set the alarm date, highlight this item and press the <+> or <-> key to make the selection. Configuration options: [Everyday] [1] [2] [3]... ~ [31]

System Time [XX:XX:XX]

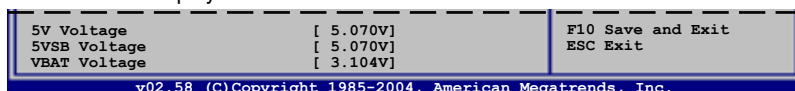
To set the system time, use <Enter>, <Tab> or <Shift-Tab> to highlight the hour/minute/second fields and press the <+> or <-> key to configure the system time.

Configuration options: [00] [1]... ~ [23]

5.4.9 Hardware Monitor



Scroll down to display the additional item.



CPU1 Temperature [xxx°C/xxx°F] System1/2 Temperature [xxx°C/xxx°F]

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

Fan1/2/3/4/5/6 Speed [xxxxRPM] or [N/A]

The onboard hardware monitor automatically detects and displays the system and device fan speeds in rotations per minute (RPM). If a fan is not connected to the connector on the motherboard, the field shows [N/A].

Smart Fan Control [Smart Fan II]

Allows you to enable or disable the ASUS Smart Fan Control feature that smartly adjusts the fan speeds for more efficient system operation.

Configuration options: [Disabled] [Smart Fan] [Smart Fan II]



The System Target Temperature items do not appear when the Smart Fan Control item is disabled.

CPU1 Target Temperature [XXX]

Allows you to set the target CPU temperature at which the CPU fans will start running if the fan is not yet turned on. Configuration options: [50]~[70]

System1 Target Temperature [XXX]

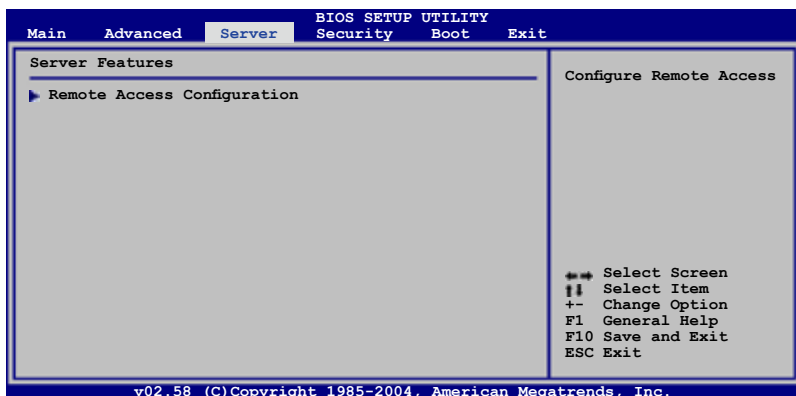
Allows you to set the target system temperature at which the system fans will start running if the fan is not yet turned on. Configuration options: [35]~[55]

VCORE1, VTT, 1.5V, 1.8V, 3V, 12V, 5V, 5VSB, VBAT Voltage

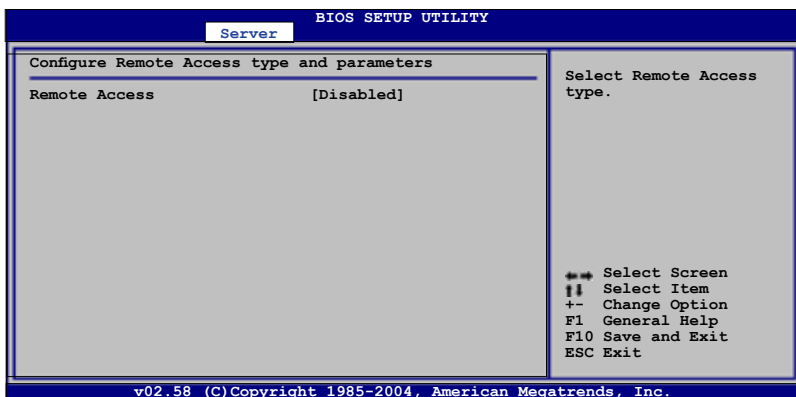
The onboard hardware monitor automatically detects the voltage outputs through the onboard voltage regulators.

5.5 Server menu

The Server menu items allows you to customize the server features.



5.5.1 Remote Access Configuration



Remote Access [Disabled]

Allows you to select Remote Access type.
Configuration options: [Disabled] [Enabled]



The following items appear when you enable the **Remote Access** item.

Serial port number [COM1]

Allows you to select the serial port for console redirection. Make sure the selected port is enabled. Configuration options: [COM1] [COM2]

Baudrate [19200]

Allows you to select the serial port settings.

Configuration options: [115200] [57600] [338400] [19200] [9600]

Flow Control [None]

Allows you to select the Flow Control for console redirection.

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

Redirection after BIOS POST [Always]

Allows you to select the Redirection settings.

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

Terminal Type [ANSI]

Allows you to select the target terminal type.

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

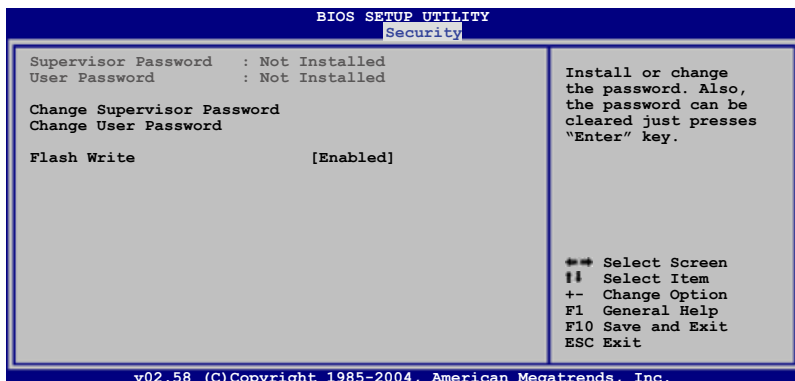
VT-UTF8 Combo Key Support [Disabled]

Allows you to enable the VT-UTF8 combination key support for ANSI/VT100 terminals.

Configuration options: [Disabled] [Enabled]

5.6 Security menu

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 or change 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.

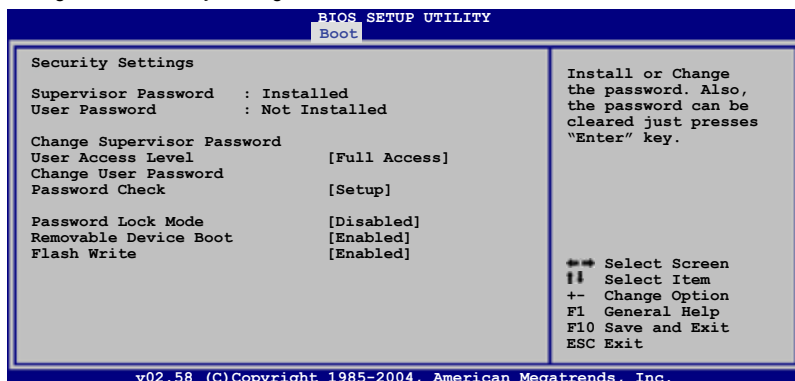
To clear the supervisor password:

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 "4.2 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.

To clear the user password:

Select the **Change User Password** then press <Enter>. The message "Password Uninstalled" appears.

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]

Password Lock Mode [Disabled]

When set to [Enabled], the keyboard is locked during the installation of adapter cards. Configuration options: [Disabled] [Enabled]

Removable Device Boot [Enabled]

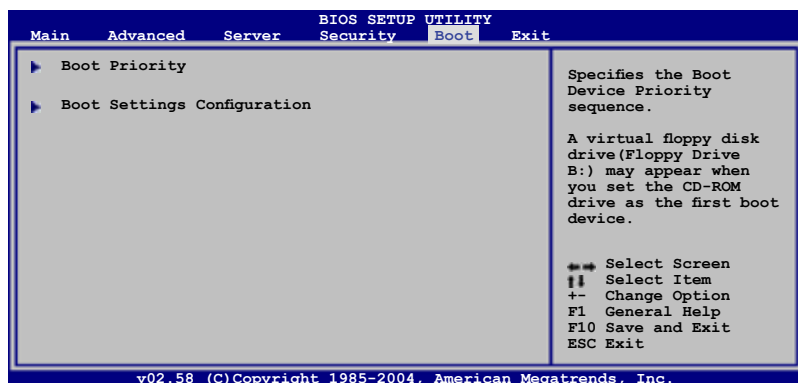
When set to [Disabled], the system cannot boot from the diskette or the ATAPI CDROM. Configuration options: [Disabled] [Enabled]

Flash Write [Enabled]

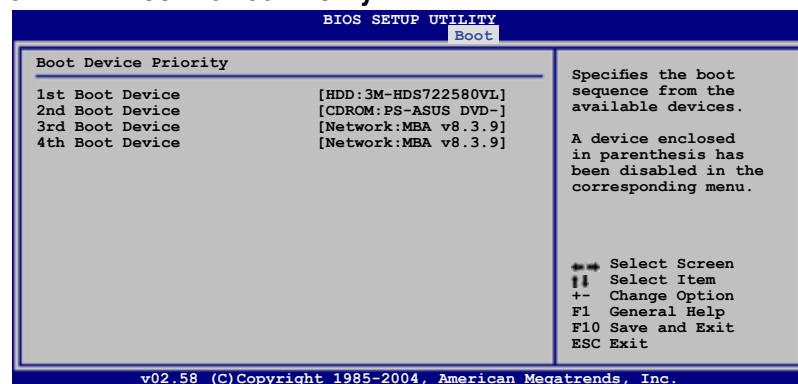
When set to [Disabled], the BIOS Flash Memory will be write-protected. Configuration options: [Disabled] [Enabled]

5.7 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.



5.7.1 Boot Device Priority



1st Boot Device [HDD:3M-HDS722580VL]

2nd Boot Device [CDROM:PS-ASUS DVD-]

3rd Boot Device [Network: MBA v8.3.9]

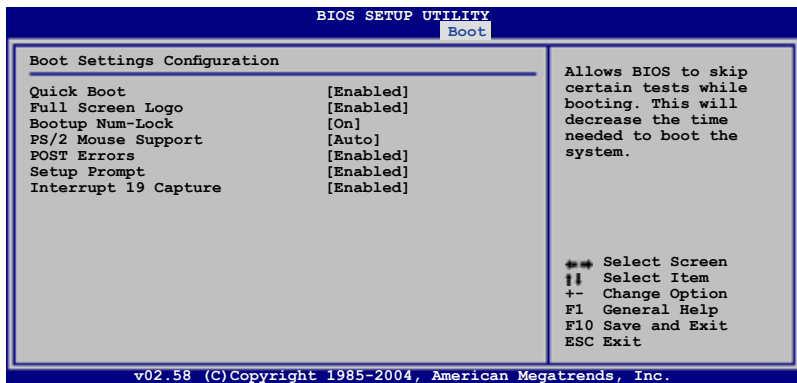
4th Boot Device [Network: MBA v8.3.9]

These items specify the boot device priority sequence from the available devices.

Configuration options: [HDD:3M-HDS722580VL] [CDROM:PS-ASUS DVD-E616A2]

[Network: MBA v8.3.9 Slot 0400] [Network: MBA v8.3.9 Slot 0300] [Disabled]

5.7.2 Boot Settings Configuration



Quick Boot [Enabled]

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

Full Screen Logo [Enabled]

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.

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]

POST Errors [Enabled]

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

Setup Prompt [Enabled]

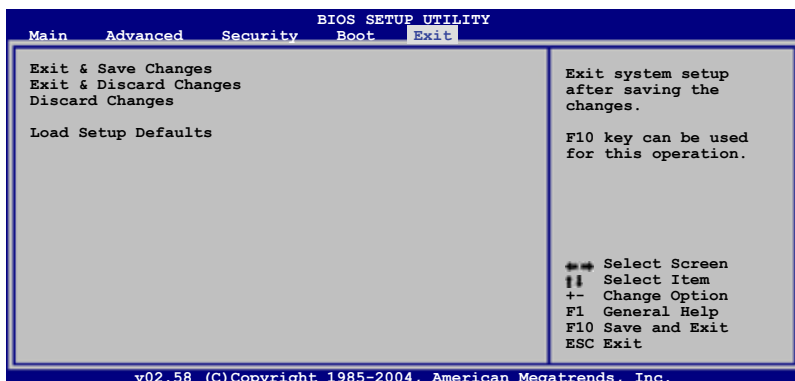
When set to [Enabled], the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Enabled]

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

5.8 Exit menu

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



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.



ASUS RS120-E4/PA2

RAID configuration

6.1 Setting up RAID

The Intel® ICH7R Southbridge chip comes with the LSI Logic Embedded SATA RAID Utility and the Intel® Matrix Storage Manager. These utilities support SATA hard disk drives and allow creation of RAID 0, RAID 1 configuration.

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.



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 Chapter 7 for details.

6.1.2 Installing hard disk drives

The system supports two hot-swap Serial ATA hard disk drives for RAID configuration.

By default, the SATA hard disk drives are connected to the motherboard SATA1 (Port0) and SATA3 (Port1) connectors via the SATA backplane and SATA cables.

Refer to sections "1.5 Internal components" and "2.4 Hard disk drives" for details on SATA hard disk drive connection and installation.

For optimal performance, install identical drives of the same model and capacity when creating a disk array.

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 from SATA hard disk drives attached to the SATA connectors supported by the Intel® ICH7R Southbridge chip. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main Menu**, select **IDE Configuration**, then press <Enter>.
3. Set the **ATA/IDE Configuration** item to [Enhanced Mode], then press <Enter>.
4. Set the **Configure SATA As** item to [RAID].
5. Save your changes, then exit the BIOS Setup.



Refer to Chapter 5 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 4.2 Jumpers for details on the RAID_SEL1 jumper settings.

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

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

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

6.2 LSI Logic Embedded SATA RAID Setup Utility

The LSI Logic Embedded SATA RAID Setup Utility allows you to create RAID 0 and RAID 1 set(s) from SATA hard disk drives supported by the motherboard ICH7R Southbridge chip.

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 5.4.05091647R
(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. HD0:722512H.S0B0 11780MB UDMA 5
Scanning for Port 2 ... Responding. HD2:722512H.S0B0 11780MB UDMA 5

0! Logical drive(s) Configured.
Array# Mode Stripe Size No. Of Stripes DriveSize Status
00 Reliability 64KB(128 Sectors) 02 114376MB Online

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



The LSI Logic Embedded SATA RAID auto configures to RAID 1 when the SATA to RAID Mode is enabled.

3. 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 on the next page.

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.

```
-----
Management Menu
-----
*Configure
*Initialize
*Objects
*Rebuild
*Check Consistency
-----

-----
* Configure logical Drive(s) *
-----

Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

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

6.2.1 Creating a RAID 0 or RAID 1 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**.

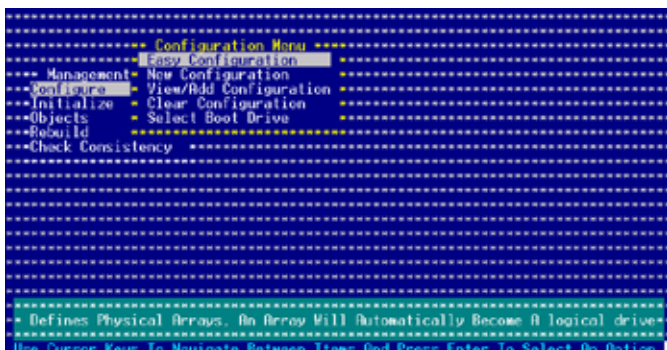
In **Easy Configuration**, the logical drive parameters are set automatically including the size and stripe size (RAID 1 only).

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

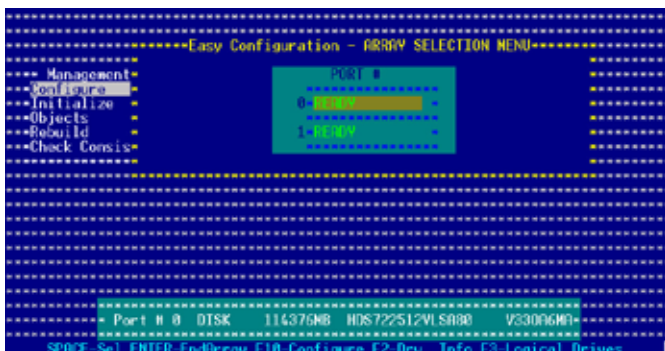
Using Easy Configuration

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>.

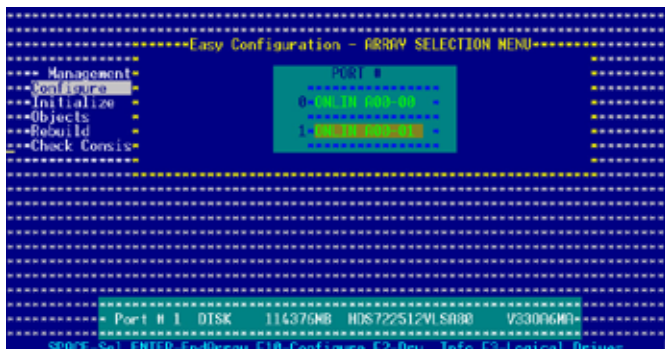


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drives you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

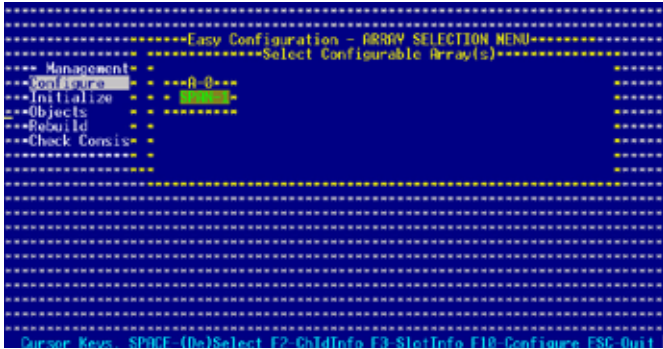


The information of the selected hard disk drive displays at the bottom of the screen.

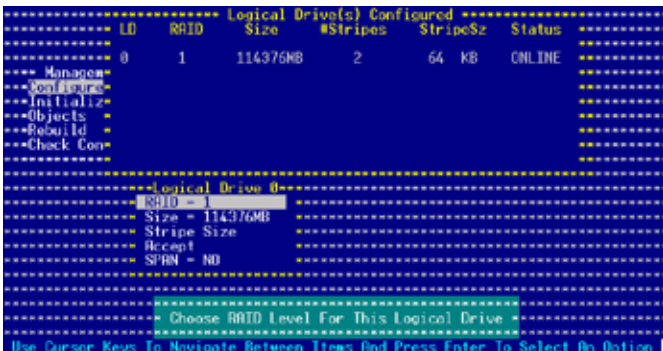
4. Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.



5. Press <F10>, select the configurable array, then press <SpaceBar>.



Press <F10> again, the logical drive information appears including a Logical Drive menu that allows you to change the logical drive parameters.



- 

```

----- Logical Drive(s) Configured -----
-----
LD      RAID  Size      #Stripes  StripeSz  Status
-----
0      1      114376MB  2         64 KB    ONLINE

Management Functions:
-Format-----
-Initialize--
-Objects-----
-Rebuild-----
-Check Cons--
-----

----- Logical Drive 0 ----- RAID Level -----
RAID 0 = 1      RAID 0
Size = 114376MB  RAID 1
Stripe Size
Recpt
SPRN = NO
-----

----- Choose RAID Level For This Logical Drive -----
-----
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option

```

- 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.

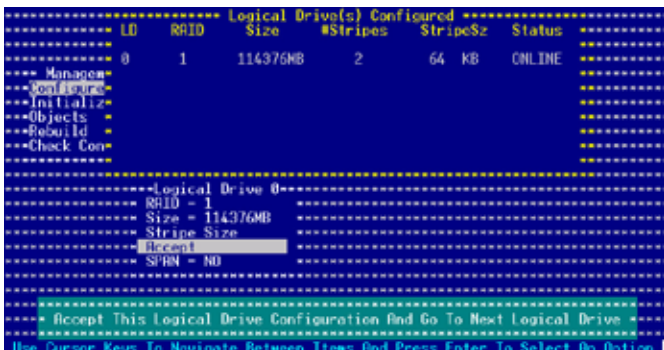
9. Key-in the stripe size, then press <Enter>.

```
----- 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
```

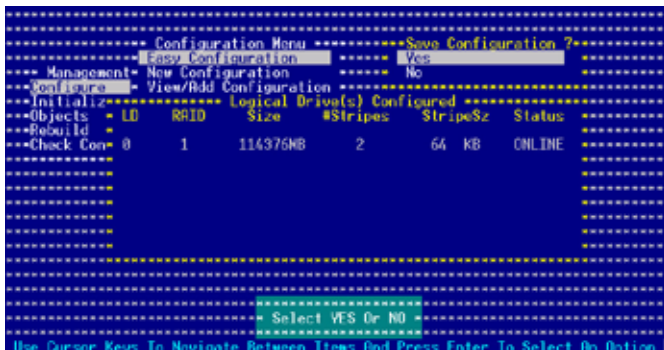


9 1 1 1 1

10. When finished setting the selected logical drive configuration, select **Accept** from the menu, then press <Enter>.



11. When finished setting the selected logical drive configuration, select **Accept** from the menu, then press <Enter>.
12. Follow steps 5 to 10 to configure additional logical drives.
13. When prompted, save the configuration, then press <Esc> to return to the **Management** Menu.



Using New Configuration



When a RAID set is already existing, using the **New Configuration** command erases the existing RAID configuration data. If you do not want to delete the existing RAID set, use the **View/Add Configuration** command to view or create another RAID configuration.

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

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

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

+-----+
+ Clear Existing Configuration And Start A New Configuration +-----+
+-----+
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

3. Follow steps 3 to 7 of the previous section.
4. Select **Size** from the **Logical Drive** menu, then press <Enter>.
5. 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 - +-----+
+ Configure - +-----+
+ Initialize - +-----+
+ Objects - +-----+
+ Rebuild - +-----+
+ Check C - +-----+
+-----+
+ Enter Logical Drive Size (MB) = 114376 +-----+
+-----+
+ Logical Drive 0: +-----+
+ RAID = 1 +-----+
+ Size = 114376MB +-----+
+ Stripe Size +-----+
+ Accept +-----+
+ SPIN = NO +-----+
+-----+
+ Enter Logical Drive Size (MB) +-----+
+-----+
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

6. Follow steps 8 to 13 of the previous section to create the RAID set.

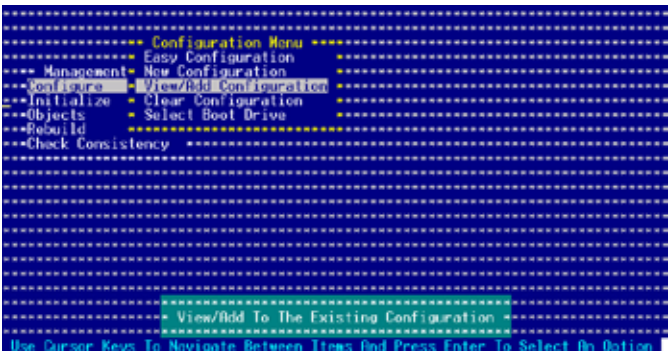
6.2.2 Adding or viewing a RAID configuration

You can add a new RAID configuration or view an existing configuration using the **View/Add Configuration** command.

Adding a new RAID configuration

To add a new RAID configuration:

1. From the **Management Menu**, highlight **Configure**, then press <Enter>.
2. Use the arrow keys to select **View/Add Configuration**, then press <Enter>.

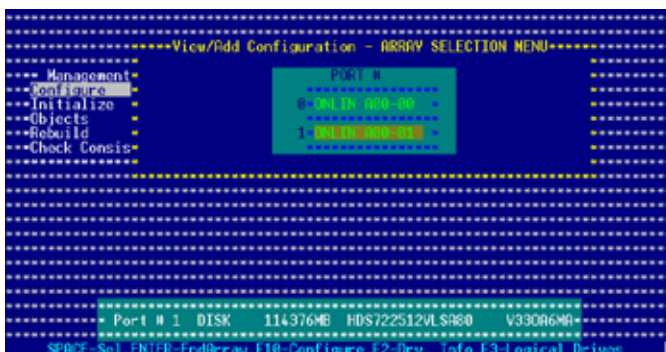


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

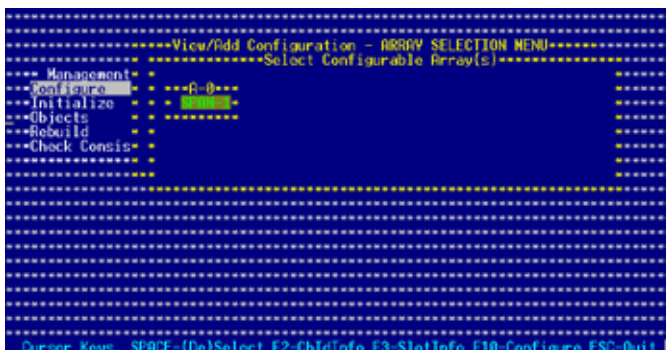


The information of the selected hard disk drive displays at the bottom of the screen.

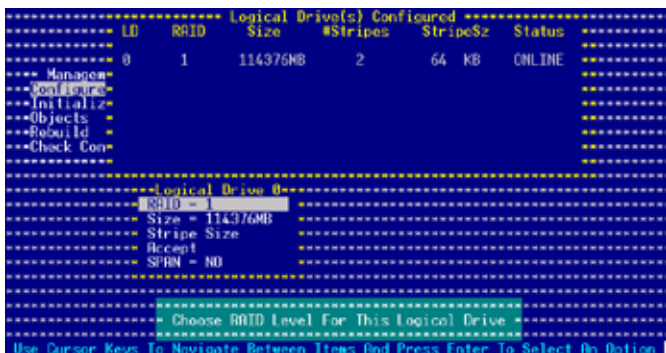
4. Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.



5. Press <F10>, select the configurable array, then press <SpaceBar>.



Press <F10> again, the logical drive information appears including a **Logical Drive** menu that allows you to change the logical drive parameters.



9. Follow steps 8 to 13 of the **Creating a RAID set: Using Easy Configuration** section to add the new RAID configuration.

Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option

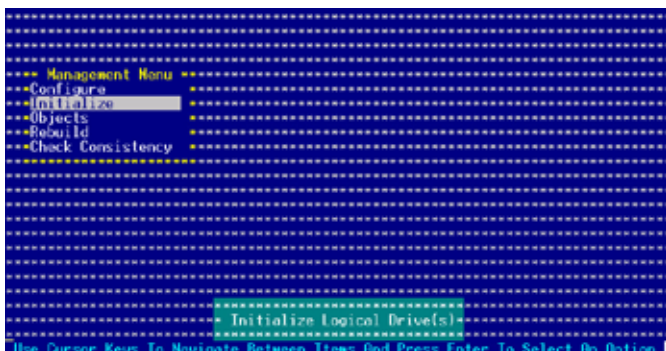
6.2.3 Initializing the logical drives

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 on the **Management Menu**.

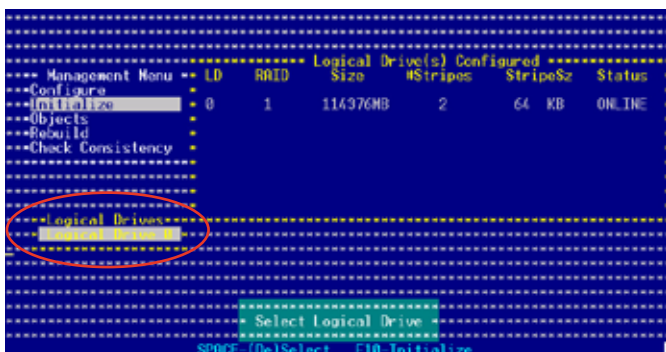
Using the Initialize command

To initialize the logical drive using the Initialize command:

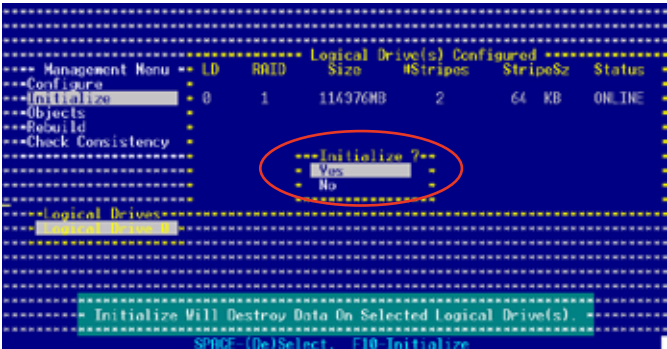
1. From the **Management Menu**, highlight **Initialize**, then press <Enter>.



2. The screen displays the available RAID set(s) and prompts you to select the logical drive to initialize. Press the <Spacebar> to select the logical drive from the **Logical Drive** selection, then press <F10>.

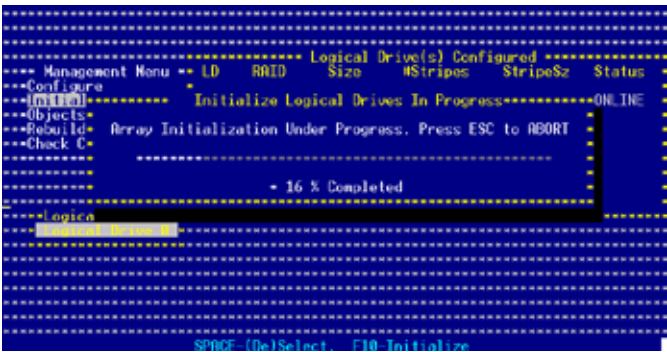


3. When prompted, use the arrow keys to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.

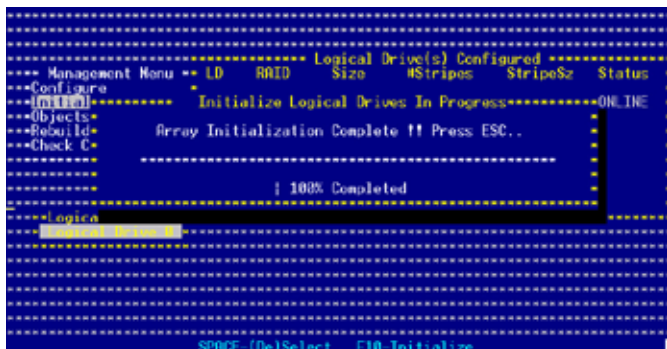


Initializing a logical drive(s) erases all data on the drive.

4. A progress bar appears on screen. If desired, press <Esc> to abort initialization.



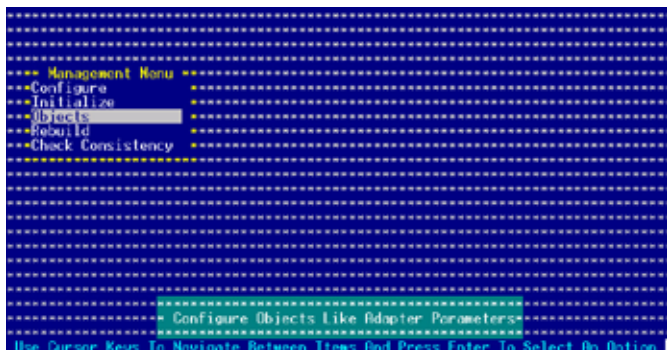
5. When initialization is completed, press <Esc>.



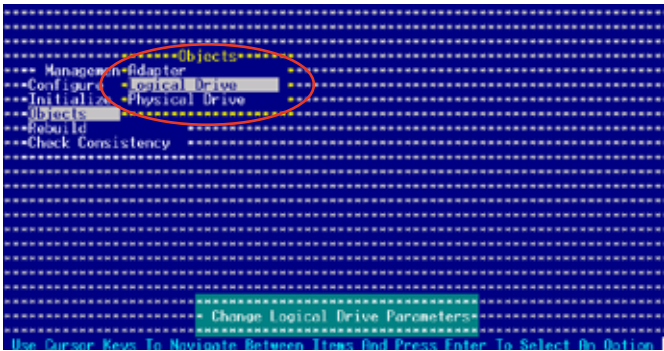
Using the Objects command

To initialize the logical drives using the Objects command:

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



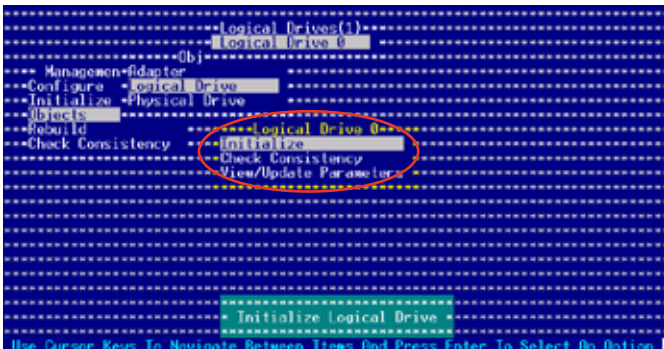
2. Select **Logical Drive** from the **Objects** sub-menu, then press <Enter>.



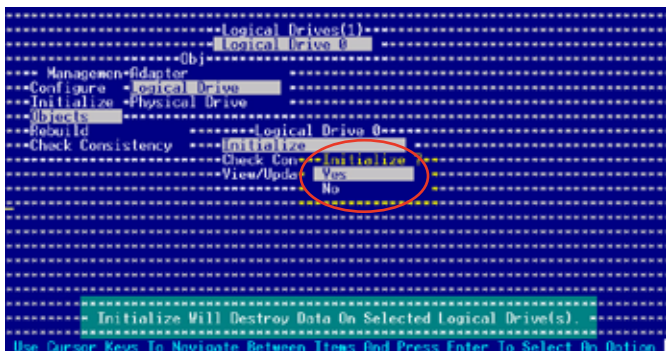
3. Select the logical drive to initialize from the **Logical Drives** sub-menu, then press <Enter>.



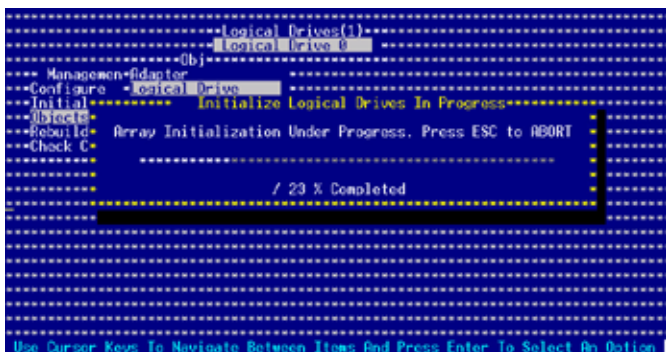
4. Select **Initialize** from the pop-up menu, then press <Enter> to start initialization.



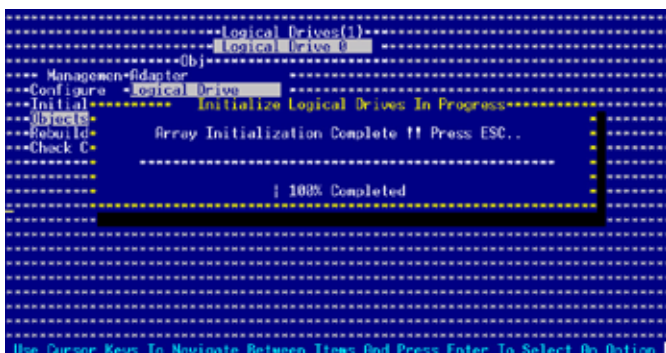
5. When prompted, use the arrow keys to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.



6. A progress bar appears on screen. If desired, press <Esc> to abort initialization.



7. When initialization is completed, press <Esc>.



6.2.4 Rebuilding failed drives

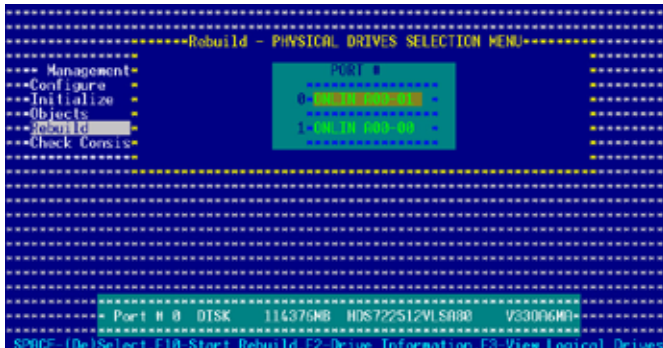
You can manually rebuild failed hard disk drives using the Rebuild command in the Management Menu.

To rebuild a failed hard disk drive:

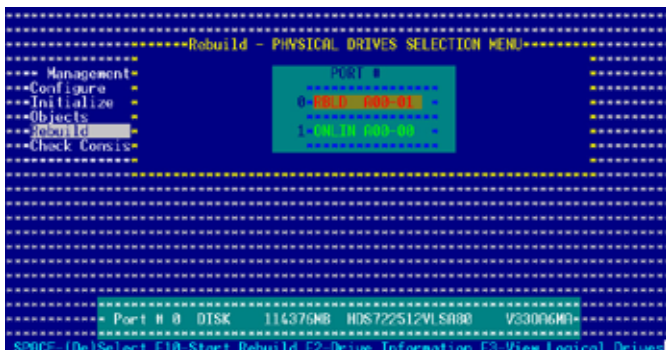
1. From the **Management Menu**, highlight **Rebuild**, then press <Enter>.



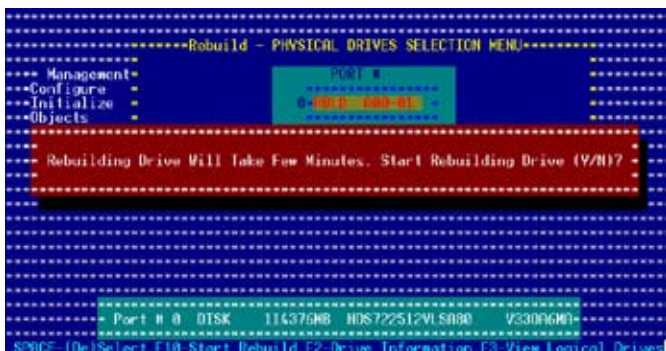
2. The **PHYSICAL DRIVES SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive you want to rebuild, then press <SpaceBar>.



- After selecting the drive to rebuild, press <F10>. The indicator for the selected drive now shows **RBLD**.



- When prompted, press <Y> to to rebuild the drive.



- When rebuild is complete, press any key to continue.

6.2.5 Checking the drives for data consistency

You can check and verify the accuracy of data redundancy in the selected logical drive. The utility can automatically detect and/or detect and correct any differences in data redundancy depending on the selected option in the **Objects > Adapter** menu.



The **Check Consistency** command is available only for logical drives included in a RAID 1 set.

Using the Check Consistency

To check data consistency using the **Check Consistency** command:

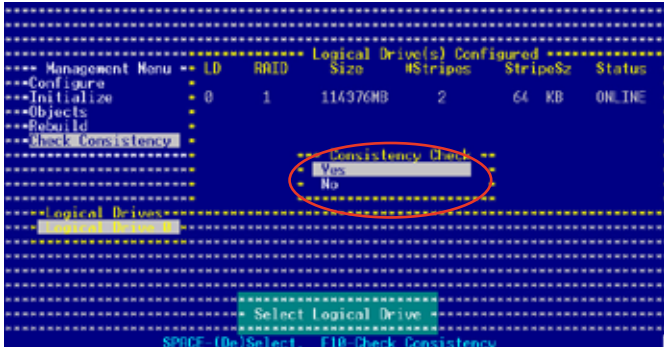
1. From the **Management Menu**, select **Check Consistency**, then press <Enter>.



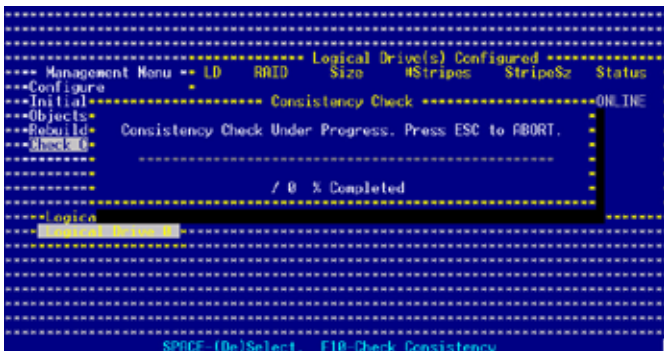
2. The screen displays the available RAID set(s) and prompts you to select the logical drive to check. Press the <Spacebar> to select the logical drive from the **Logical Drive** selection, then press <F10>.



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



A progress bar appears on screen.



4. 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 p ercentage 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.
5. 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, use the arrow keys to select **Yes** from the dialog box to check the drive.
5. When checking is complete, press any key to continue.

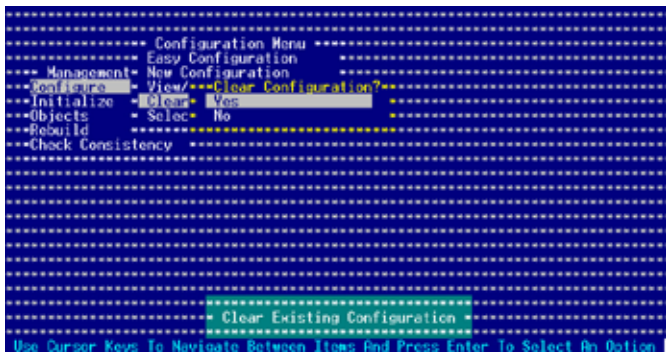
6.2.6 Deleting a RAID configuration

To delete a RAID configuration:

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



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



The utility clears the current array.

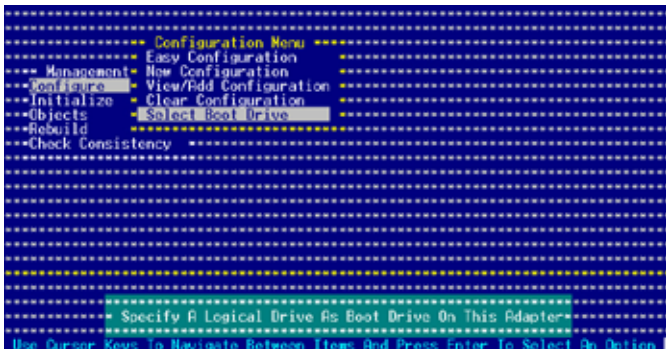
3. Press any key to continue.

6.2.7 Selecting the boot drive from a RAID set

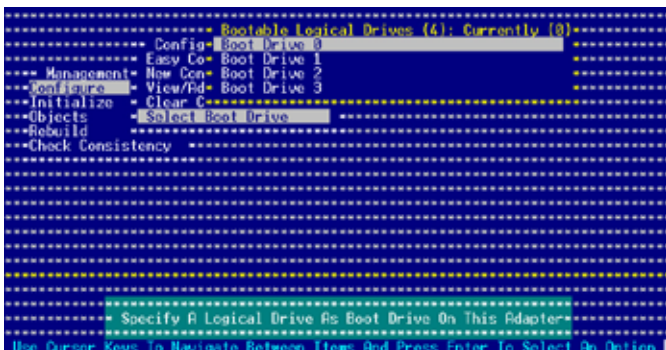
You must have created a new RAID configuration before you can select the boot drive from a RAID set. Refer to the **Creating a RAID set: Using New Configuration** section for details.

To select the boot drive from a RAID set:

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



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



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

6.2.8 Enabling the WriteCache

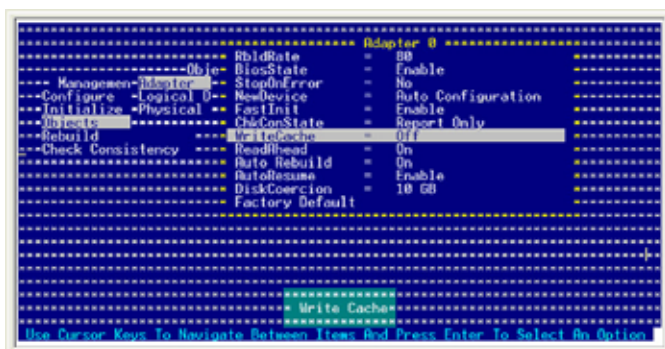
You may enable the RAID controller's **WriteCache** option to improve the data transmission performance.



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).



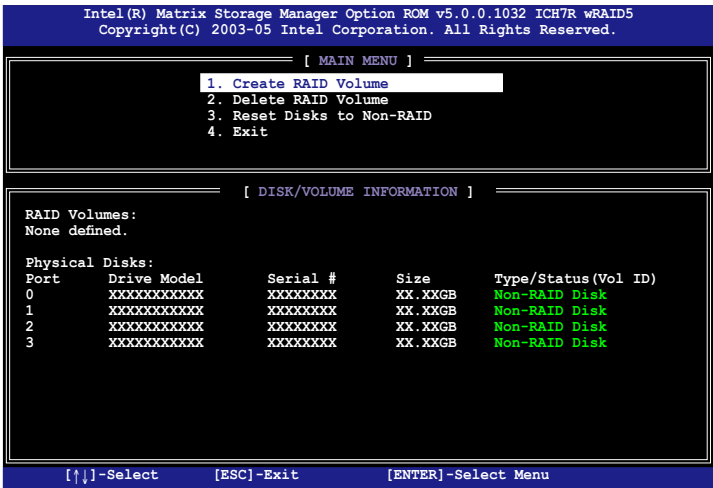
3. When finished, press any key to continue.

6.3 Intel® Matrix Storage Manager Option ROM Utility

The Intel® Matrix Storage Manager Option ROM utility allows you to create RAID 0, RAID 1 set(s) from Serial ATA hard disk drives.

To enter the Intel® Matrix Storage Manager Option ROM Utility:

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

6.3.1 Creating a RAID 0 set (Stripe)

To create a RAID 0 set:

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

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

[ CREATE ARRAY MENU ]

Name: Volume0
RAID Level: RAID0 (Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 0.0 GB

Create Volume

[ DISK/VOLUME INFORMATION ]

Enter a string between 1 and 16 characters in length that can be used
to uniquely identify the RAID volume. This name is case sensitive and
cannot contain special characters.

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

2. Enter a name for the RAID 0 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select **RAID 0 (Stripe)**, then press <Enter>.
4. Highlight the **Disks** item, then press <Enter> to select the hard disk drives you want to include in the RAID set. The **SELECT DISKS** screen appears.

```
[ SELECT DISKS ]

Port  Drive  Model  Serial #  Size  Status
0  XXXXXX  XXXXXX  XXXXXX  XX.XGB  Non-RAID Disk
1  XXXXXX  XXXXXX  XXXXXX  XX.XGB  Non-RAID Disk
2  XXXXXX  XXXXXX  XXXXXX  XX.XGB  Non-RAID Disk
3  XXXXXX  XXXXXX  XXXXXX  XX.XGB  Non-RAID Disk

Select 2 to 4 disks to use in creating the volume.

[↑↓]-Previous/Next [SPACE]-Selects [ENTER]-Selection Complete
```

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 4 KB to 128 KB. The default stripe size is 128 KB.



A lower stripe size is recommended for server systems. A higher stripe size is recommended for multimedia computer systems used mainly for audio and video editing.

7. Highlight the **Capacity** item, enter the desired RAID volume capacity, then press <Enter>. The default value indicates the maximum allowed capacity.
8. When the **Create Volume** item is highlighted, press <Enter>. A warning message appears.

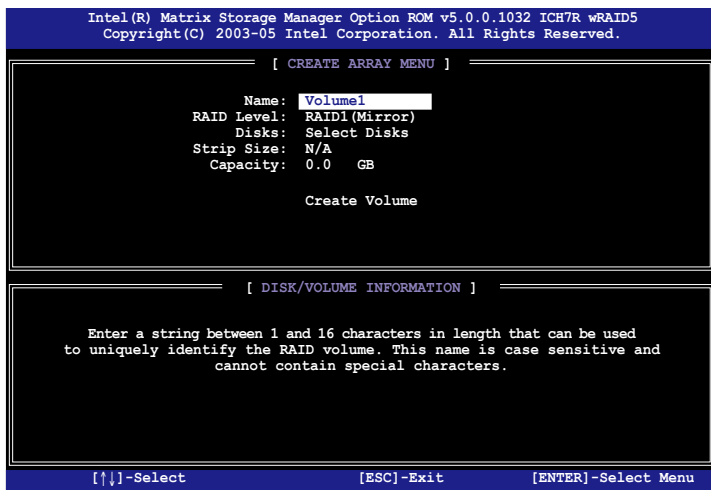
WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.
Are you sure you want to create this volume? (Y/N):

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

6.3.2 Creating a RAID 1 set (Mirror)

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. Highlight **RAID Level**, press the up/down arrow key to select **RAID 1 (Mirror)**, then press <Enter>.
4. Follow steps 4 to 5 and 7 to 9 of the previous section to create the RAID 1 set.

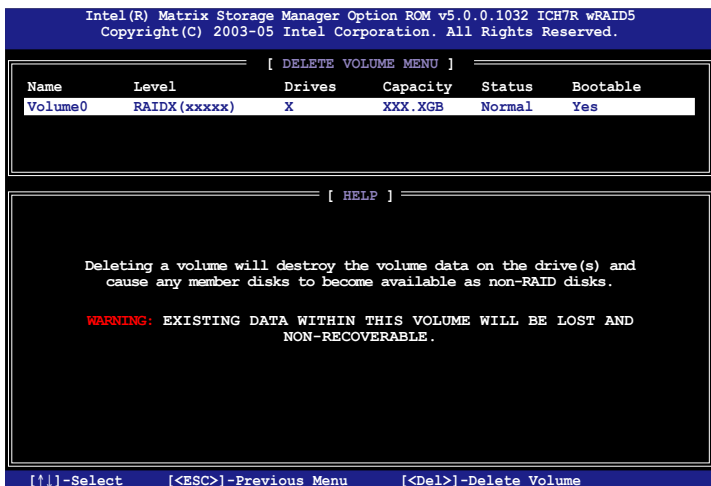
6.3.3 Deleting a RAID set



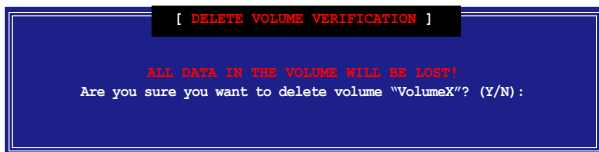
Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

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



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



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.

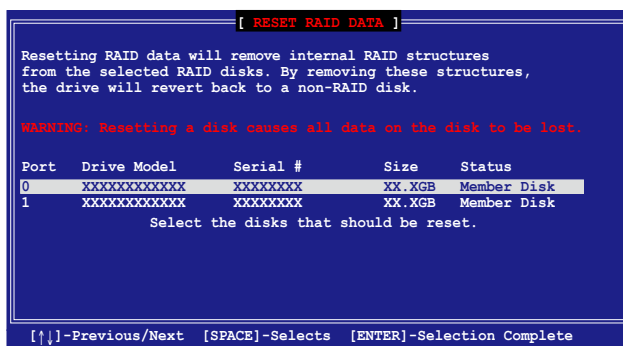
6.3.4 Resetting disks to Non-RAID



Take caution before you reset a RAID volume hard disk drive to non-RAID. Resetting a RAID volume hard disk drive 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.

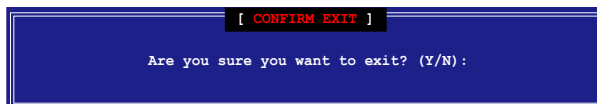


2. Use the up/down arrow key to highlight the RAID set drive you want to reset, then press <Space> to select.
3. Press <Enter> to reset the RAID set drive. A confirmation message appears.
4. Press <Y> to reset the drive or press <N> to return to the utility main menu.
5. Follow steps 2 to 4 to select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

6.3.5 Exiting the Intel® Matrix Storage Manager

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.

6.4 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.



ASUS RS120-E4/PA2

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/XP 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 RS120-E4/PA2  
F) Broadcom ASF Firmware Update  
G) Write RS120-E4/PA2 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: `\Drivers\Chipset\CHLS\Driver\Linux`.

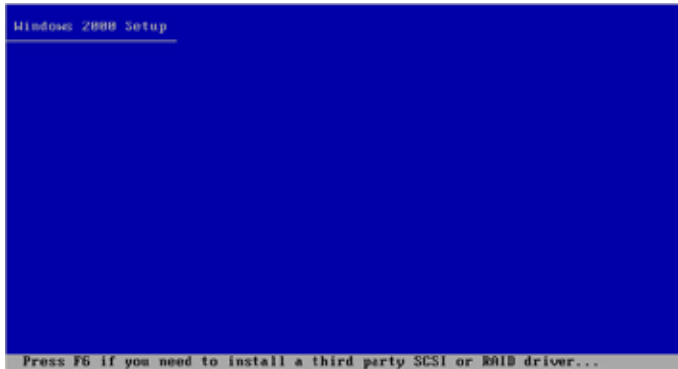
7.1.2 Installing the RAID controller driver

Windows® 2000/2003 Server OS

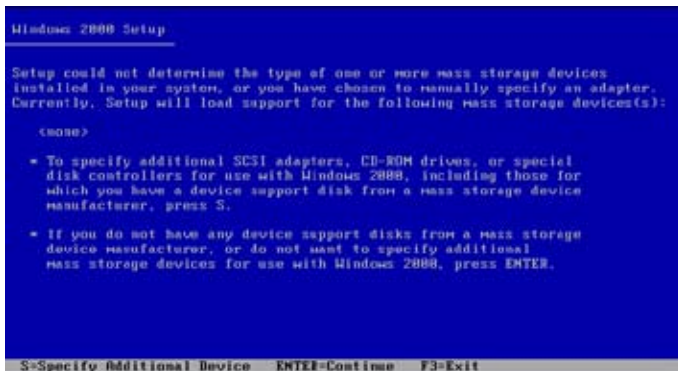
During Windows® 2000/2003 Server OS installation

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

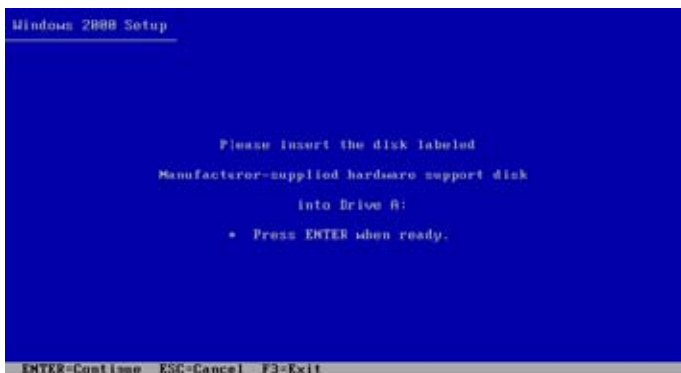
1. Boot the computer using the Windows® 2000/2003 Server installation CD. The Windows® 2000/2003 Setup starts.



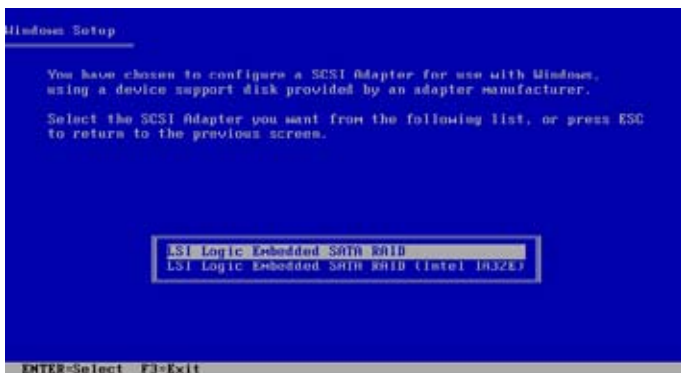
2. Press <F6> when the message “Press F6 if you need to install a third party SCSI or RAID driver...” appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



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



5. Select **LSI Logic Embedded SATA RAID** from the list, then press <Enter>.

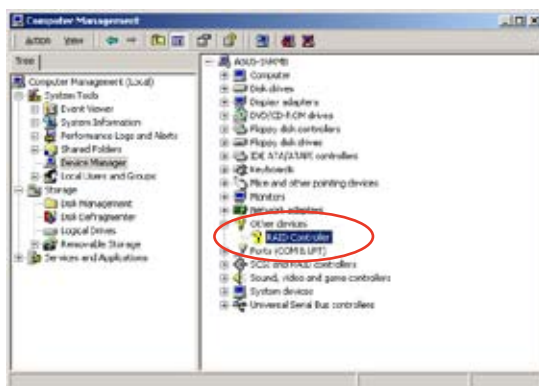


6. The Windows® 2000/2003 Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

To an existing Windows® 2000/2003 Server OS

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

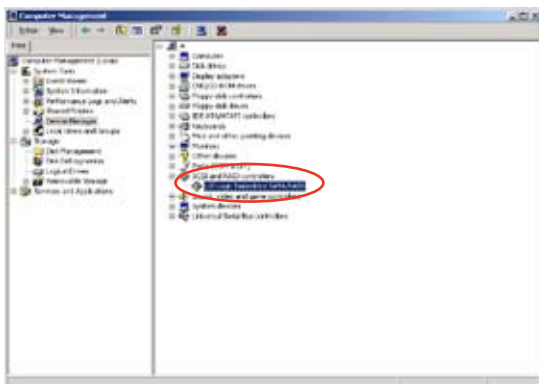
1. Restart the computer, then log in with **Administrator** privileges.
2. Windows® automatically detects the RAID controller and displays a **New Hardware Found** window. Click **Cancel**.
3. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
4. 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.



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** item 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.

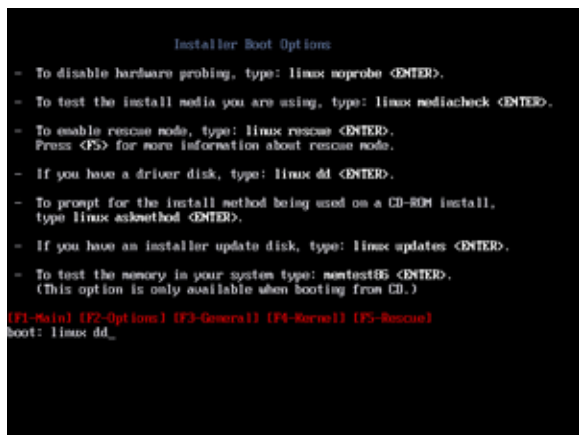
Red Hat® Enterprise ver. 3.0

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

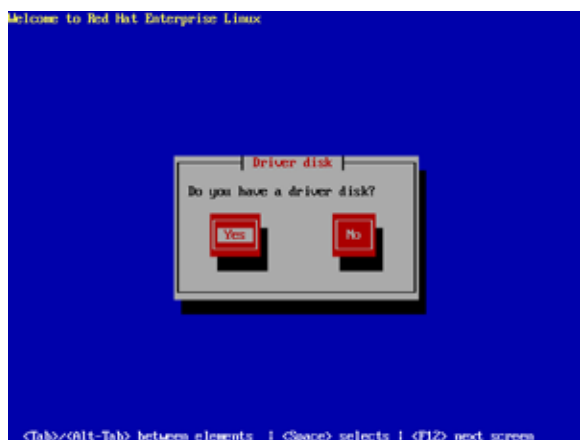
1. Boot the system from the Red Hat® Installation CD.



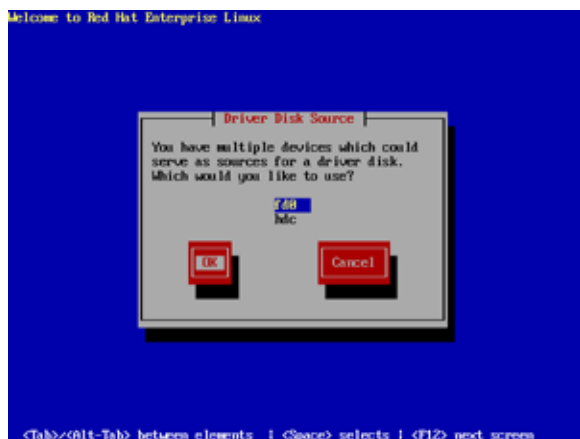
2. At the **boot:**, type **linux dd** , then press <Enter>.



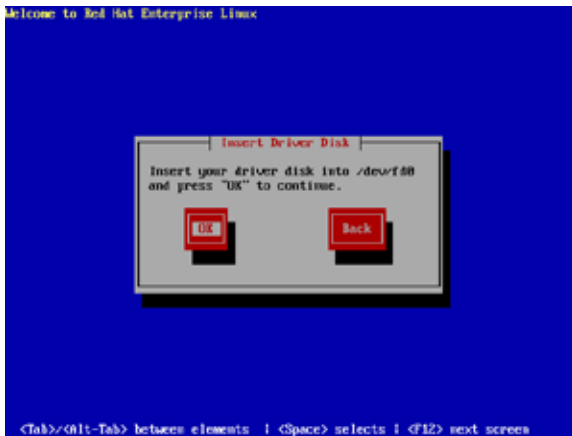
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>



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>.

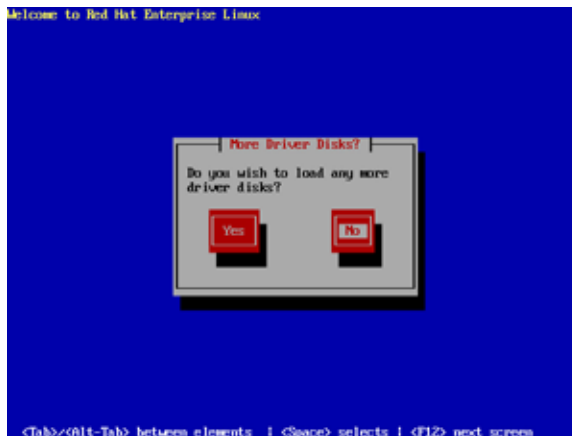


- When prompted, insert the Red Hat® Enterprise ver. 3.0 RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



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

- When asked if you will load additional RAID controller drivers, select **No**, then press <Enter>.

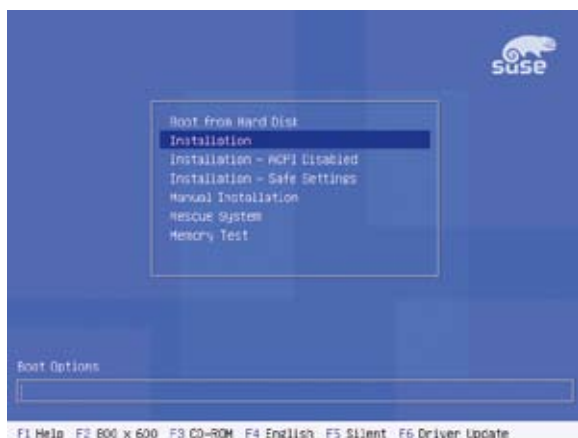


- Follow screen instructions to continue the OS installation.

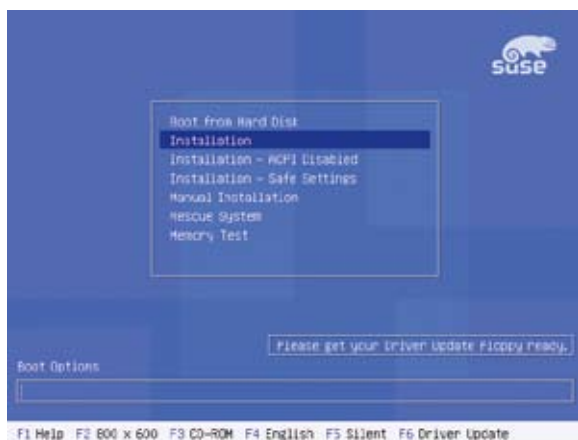
SuSE Linux

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>.



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



5. 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.

Installing source RPM package

1. Install the source RPM package:

```
rpm -ivh tg3-<version>.src.rpm
```

2. CD to RPM path and build the binary driver for your kernel:

```
cd/usr/src{redhat,OpenLinux,turbo,packages,rpm ..}  
rpm -bb SPECS/tg3.spec or  
rpmbuild -bb SPECS/tg3.spec (for RPM version 4.x.x)
```



The RPM path is different for different Linux distributions.

3. Install the newly built packages (driver and main page):

```
rpm -ivh RPMS/<arch>tg3-<version>.<arch>.rpm
```



- <arch> is the architecture of the machine, e.g. i386:

```
rpm -ivh RPMS/<arch>tg3-<version>.<arch>.rpm
```
 - Force option may be needed on some Linux distributions if conflicts are reported.
-

The driver will be install in the following path:

```
/lib/modules/<kernel_version>/<kernel/drivers/net/tg3.o  
(on 2.4.x kernels)
```

```
/lib/modules/<kernel_version>/<kernel/drivers/net/tg3.o  
(on 2.6.x kernels)
```

4. Load the driver:

```
insmod tg3.o  
insmod tg3.ko (on 2.6.x kernels)  
modprobe tg3
```

5. To configure network protocol and address, refer to various Linux documentations.

Building the driver from the TAR file



Install first the source RPM package 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 tg3-<version>.tar.gz
```

2. Build the driver tg3.o (or tg3.ko) as a loadable module for the running kernel:

```
cd src
make
```

3. Test the driver by loading it:

```
insmod tg3.o or
insmod tg3.ko (on 2.6.x kernels) or
insmod tg3
```

4. Install the driver and man page:

```
make install
```

5. Refer to various Linux documentations to configure the network protocol and address.

7.3 VGA driver installation

This section provides instructions on how to install the ATI® ES1000 Video Graphics Adapter (VGA) driver.

7.3.1 Windows 2000/Server 2003

You need to manually install the ATI® ES1000 VGA driver on a Windows 2000 / Server 2003 operating system. To install the ATI® ES1000 VGA driver:

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

The **Drivers** menu if Autorun is enabled in your computer.

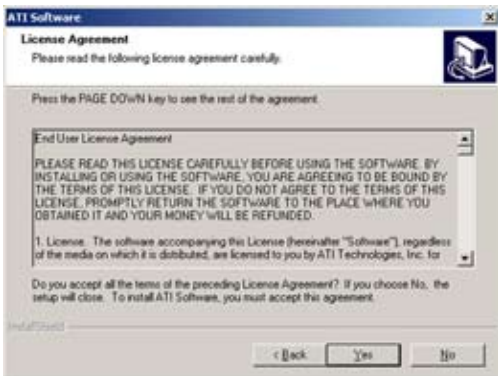


3. Click the item ATI ES1000 from the menu.

4. The **ATI Software** window appears. Follow the screen instructions to complete installation.



5. Select **Yes** to accept the terms of the **License Agreement** and continue the process.



6. Press the  button to activate quick installation.



7. After completing the installation, restart the computer.



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 applications. Click an item to install.



7.4.4 Utilities menu

The **Utilities** menu displays the software applications and utilities that the motherboard supports. Click 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.



[illegible]

Appendix

This appendix includes additional information that you may refer to when configuring the motherboard.



ASUS RS120-E4/PA2

A.1 Intel® EM64T



- The motherboard is fully compatible with Intel® Xeon 3000 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® Xeon 3000 CPU that supports the Intel® EM64T.
2. Install a 64-bit operating system (Windows® XP Professional x64 Edition or Windows® Server 2003 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.2.1 System requirements

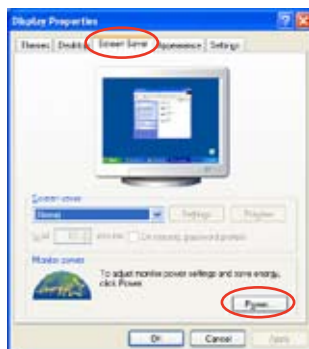
Before using EIST, check your system if it meets the following requirements:


- Intel® Xeon 3000 processor with EIST support
- BIOS file with EIST support
- Operating system with EIST support (Windows® XP SP2/Windows® Server 2003 SP1/Linux 2.6 kernel or later versions)

A.2.2 Using the EIST

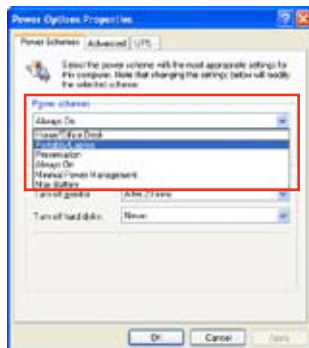
To use the EIST feature:

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(tm) tech.** item to [Automatic], then press <Enter>. See page 5-22 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.



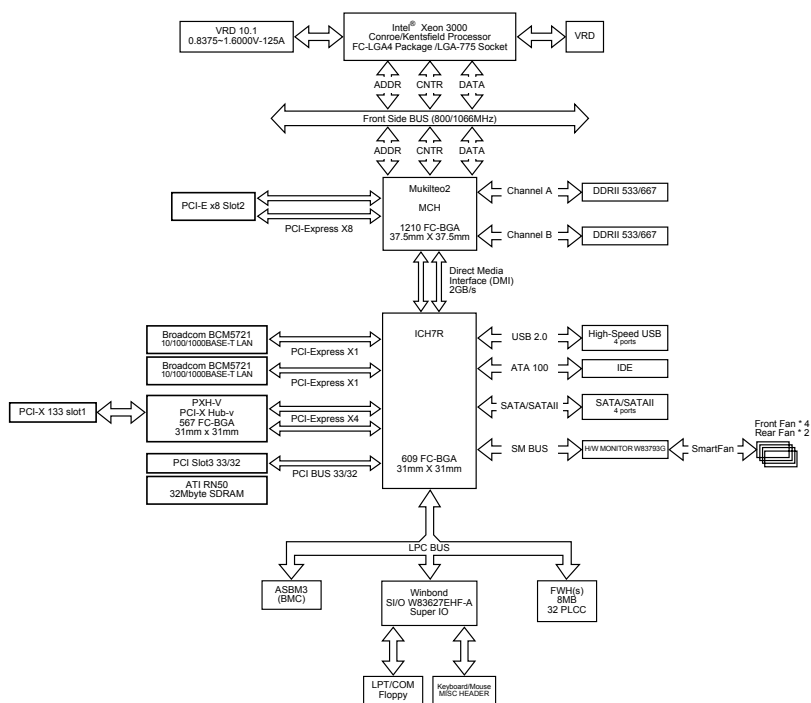
8. On the **Power schemes** section, click , then select any option **EXCEPT Home/Office Desktop or Always On**.
9. Click **Apply**, then click **OK**.
10. Close the **Display Properties** window.

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.

A.3 Block diagram



A.4 Power supply specifications

A.4.1 General description

The 400 W SSI-type single power supply with universal AC input includes PFC and ATX-compliant output cables and connectors. The power supply has four plugs labeled P1 to P4. Take note of the devices to which you should connect the plugs.

P1	Motherboard 24-pin ATX power connector
P2	Motherboard 4-pin +12V AUX power connector
P3	Connects to the 8-pin SATA backplane power connector
P4	Peripheral device (optical drive)

A.4.2 Specifications

Output voltage regulation

Output Voltage	Min (V)	Nom (V)	Max (V)	Ripple/Noise
+3.3V	3.20	3.30	3.46	50/80mVp-p
+5V	4.80	5.00	5.25	50/100mVp-p
+12V1	11.52	12.00	12.60	120/200mVp-p
+12V2	11.52	12.00	12.60	120/200mVp-p
-12V	-11.40	-12.20	-13.08	120/200mVp-p
+5VSB	4.85	5.00	5.20	50/80mVp-p

Output current capacity

Output Voltage	Min (A)	Max (A)	Peak (A)
+3.3V	0.5	16.0	
+5V	0.5	12.0	
+12V1	0.2	18.0	19.0
+12V2	0.5	16.0	17.0
-12V	0.0	0.5	
+5VSB	0.1	2.0	

Over-voltage limit

Voltage	Min (V)	Max (V)
+3.3V	3.9	4.5
+5V	5.7	6.5
+12V1	13.3	14.5
+12V2	13.3	14.5
-12V	-13.3	-14.5
-5VSB	5.7	6.5

[illegible]