RS120-E5/PA2

1U Rackmount Barebone Server

User Guide

E3434

First Edition V1
October 2007

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Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class 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.

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

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.

Conventions used in this guide

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

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

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

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

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

Typography

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

Product introduction

1.1　System package contents

Check your package for the following standard items.

1.	ASUS R10 1U rackmount chassis with:
	•	ASUS P5BV-R motherboard
	•	315 W single power supply
	•	SATA backplane with 2 x SATA cables
	•	PCI Express x8 and PCI Express x4 riser assembly
	•	Front I/O board (ASUS FPB-AR14)
	•	4 x system fans (4 x 28 mm)
	•	2 x hot-swap HDD trays
	•	Pre-connected device/power cables
2.	1 x bag of screws
3.	1 x RS120-E5 drivers and utilities CD (including ASWM)
4.	2 x User guide
	•	RS120-E5/PA2 user guide
	•	ASUS ASWM 2.0 user guide
5.	Rail kit

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

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*	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-E5/PA2 is a 1U barebone server system featuring the ASUS P5BV-R motherboard. The server supports the Intel® Xeon 3000/Wolfdale Series and Xeon 3200 (G-0)/Yorkfield Series processor in the LGA775 package, and includes the latest technologies through the chipsets embedded on the motherboard.

Model Name		RS120-E5/PA2
Processor		1 * Socket LGA775
		Dual-Core Intel® Xeon® processor 3000/ Wolfdale sequence
		Quad-Core Intel® Xeon® processor 3200 (G-0)/ Yorkfield sequence
System Bus		FSB 800/1066/1333
Core Logic		Intel® 3200 MCH
		Intel® ICH7R
ASUS Features	Smart Fan	Smart Fan III
	ASWM2.0	√
Memory	Total Slots	4 (2-channel)
	Capacity	Maximum up to 8GB*
	Memory Type	DDR2 667/800 Unbuffered , ECC
	Memory Size	512 MB, 1 GB, 2GB*
Expansion Slots	Total PCI/PCI-X/ PCI-E Slots	2
	Slot Type	1 * PCI-E x 16 slot(x8 link) (Full-Height / Half-Length)+1 *PCI-E x 8 slot(x4 link) (Full-Height / Half-Length) (Default) or
		1 * PCI-E x 8 slot(x8 link) (Full-Height / Half-Length)+1 * PCI-X 64-bit/133MHz slot (Full-Height / Half-Length) (Option)
	Additional Slot 1	1* SO-DIMM socket for optional ASMB3-SOL or ASMB3-iKVM
Storage	SATA Controller	Intel® ICH7R: 2 SATA2 300MB/s ports Intel Matrix Storage (Windows only) (Support software RAID 0 and 1) LSI MegaRAID (Linux/Windows) (Support software RAID 0 and 1)
HDD Bays	I = internal A or S will be hot-swappable	2 * Hot-swap SATA2 HDDs Bays
Networking	LAN	2 * Broadcom® BCM5721 PCI-E GbE LAN
Graphic	VGA	XGI Z9s/ 32MB DDRII VRAM
Auxiliary Storage FDD / CD / DVD		1 * 5.25" Optical Device Bay Options: No Device / DVD-ROM / DVD-RW
Onboard I/O		1 * External Serial Port
		3 * RJ-45 ports (GbE port*2; 10/100Mps port for optional ASMB3-iKVM*1)
		4 * USB 2.0 ports (Fornt * 2, Rear * 2)
		1 * VGA port
		1 * PS/2 keyboard port
		1 * PS/2 mouse port

(continued on the next page)

Anti-virus Software		Optional CA® eTrust™ 7.1 anti-virus software
Management Solution	Software	ASWM 2.0
	Out of Band Remote Management	Optional (ASMB3-SOL/ASMB3-iKVM)
Dimension (HH x WW x DD)		600mm * 444mm * 43.6mm
Net Weight Kg (CPU, DRAM & HDD not included)		12Kg
Power Supply		315W Single Power Supply
Environment		Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C Non operation humidity: 20% ~ 90% (Non condensing)

*Specifications are subject to change without notice.

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.

Rack screw   Hot-swap HDD bays   Optical drive Rack screw

USB ports
HDD Access LED
LAN2 LED
LAN1 LED   Power
Message LED   button
Reset button   Power LED
Location LED
Location switch
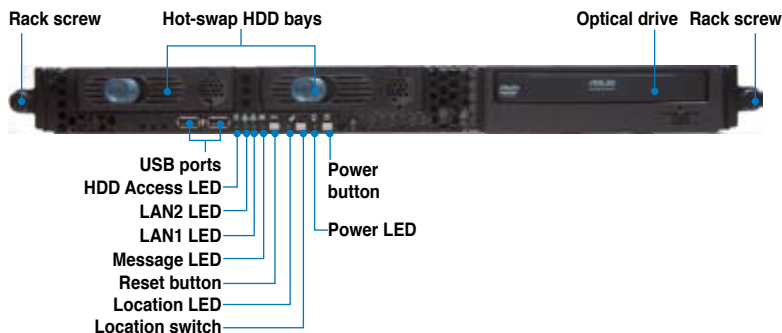
1.4   Rear panel features

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.

LAN port1
LAN port2
Serial port
Locator switch
Locator LED
USB ports
LAN port for iKVM
Expansion slot
PS/2 keyboard port
PS/2 mouse port
VGA port
Power fan
AC power socket
Power fan
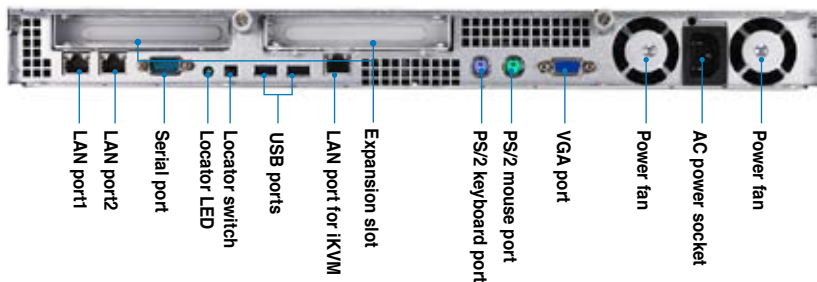
- •   Refer to section **1.6.1 Rear panel LEDs** for the LED descriptions.
- •   The LAN port for ASMB3 iKVM functions only when you install ASMB3 iKVM management card. Remove the mylar on the LAN port before using.

1.5 Internal features

The barebone server includes the basic components as shown.
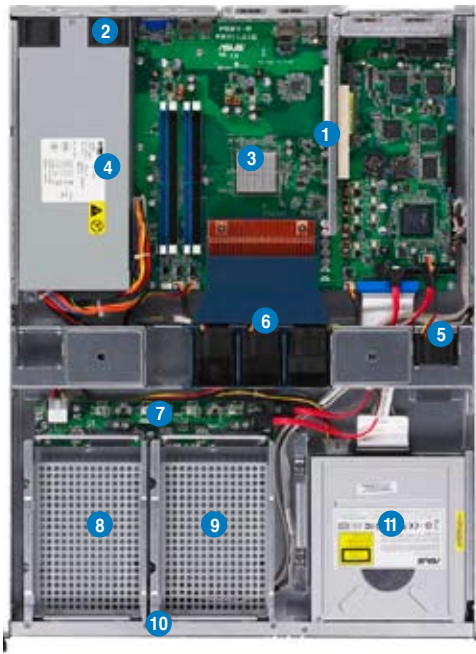
1. PCI-E x8 and PCI-E x4 riser card bracket
2. Power fans
3. ASUS P5BV-R motherboard
4. Power supply
5. Device fan (x 1)
6. System fans (x 3)
7. SATA backplane
8. Hot-swap HDD tray 1 - Connects to SATA1 port (Port0)
9. Hot-swap HDD tray 2 - Connects to SATA2 port (Port1)
10. Front I/O board (hidden)
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

HDD Access LED
LAN2 LED
Message LED
LAN1 LED
Power LED
Location LED
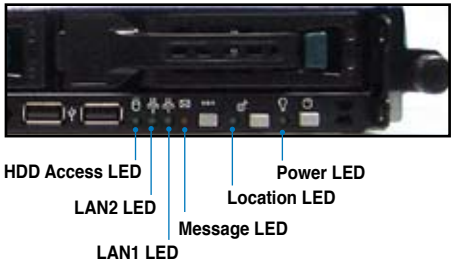
LED	Icon	Display status	Description
Power LED		ON	System power ON
HDD Access LED		OFF Blinking	No activity Read/write data into the HDD
Message LED		OFF Blinking	System is normal; no incoming event ASWM indicates a HW monitor event
Location LED		OFF ON	Normal status Location switch is pressed (Press 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

SPEED LED
ACT/LINK LED

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.
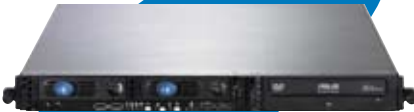
Hardware setup

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 thunbscrews 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
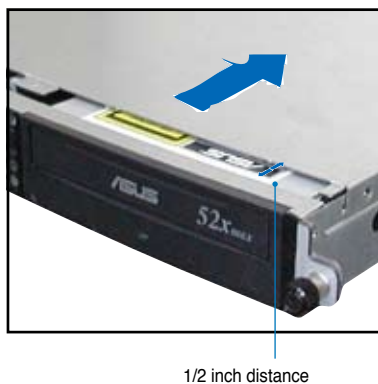
4. Lift the cover from the chassis.

2.1.2   Installing the cover

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

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

Pegs inside

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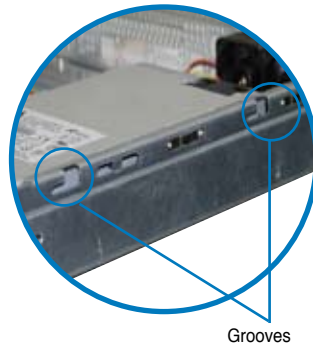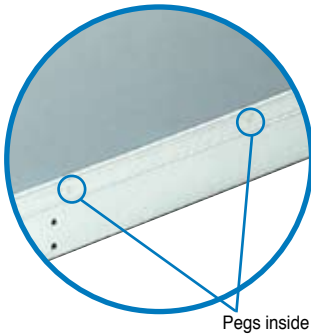
3.   Slide the cover toward the front until it snaps in place.

4.   Tighten the thumbscrews on the rear to secure the cover.

Thumbscrews
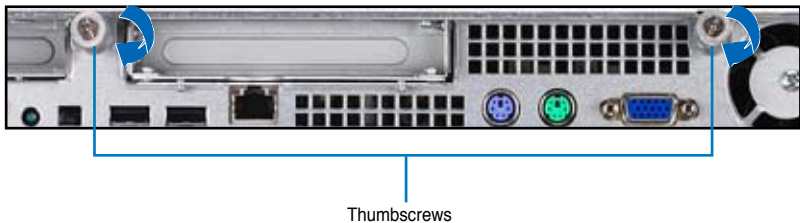
2.2   Central Processing Unit (CPU)

The system motherboard comes with a surface mount LGA775 socket designed for Intel® Xeon 3000 series and Xeon X3200 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 CPU 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.

P5BV-R CPU Socket 775
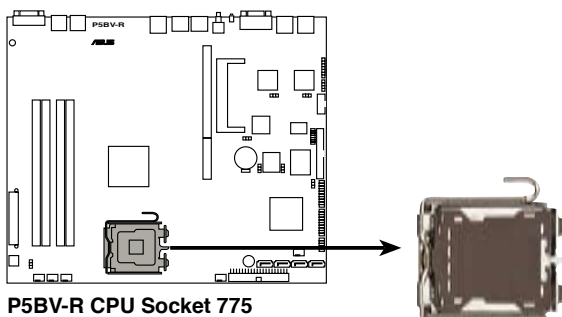
> Before installing the CPU, make sure that the cam box is facing towards you and the load lever is on your left.

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

Retention tab

Load lever

A

B

PnP cap

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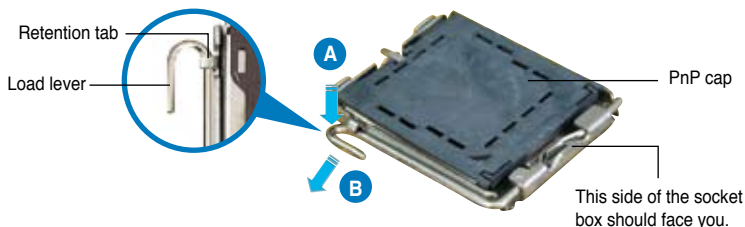
> To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

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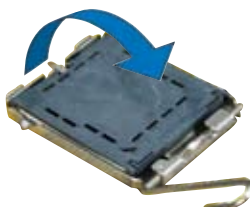
4. Lift the load plate with your thumb and forefinger to a 100º angle (A), then push the PnP cap from the load plate window to remove (B).

B

A

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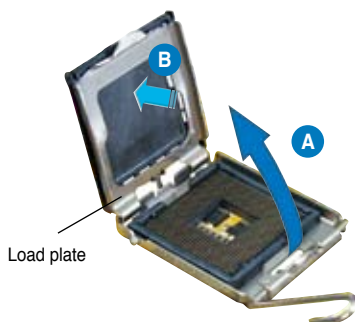
5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.

Alignment key

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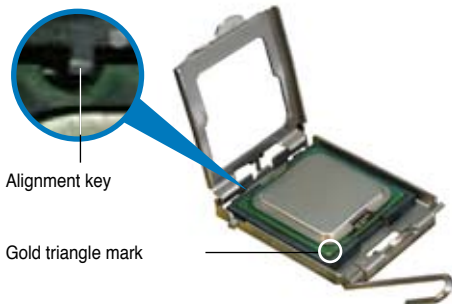
⚠️ The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

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

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.
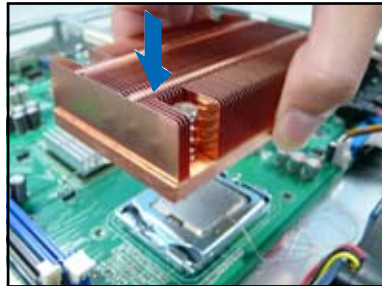
2. Insert and loosely tighten each screw in a diagonal sequence first. After all the screws have been inserted, drive the screws to completely secure the heatsink.

To install the airduct:

1. Position the airduct on top of the heatsink.

2. Carefully lower the airduct until it fits in place.
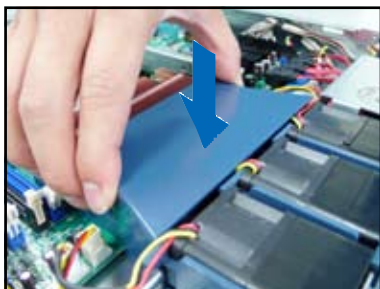
2.3 System memory

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:

P5BV-R 240-pin DDR2 DIMM sockets
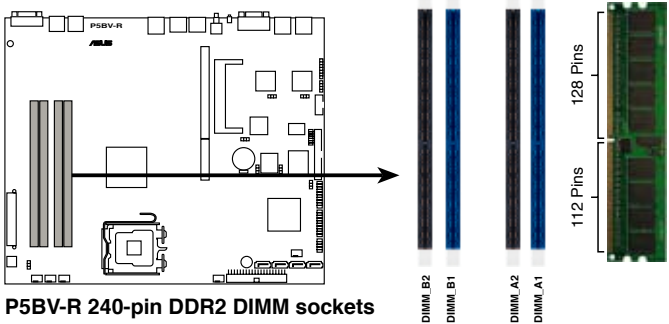
2.3.2 Memory configurations

You may install 512 MB, 1 GB, and 2 GB unbuffered ECC or non-ECC DDR2-667/800 DIMMs to the DIMM sockets.

- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend 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.
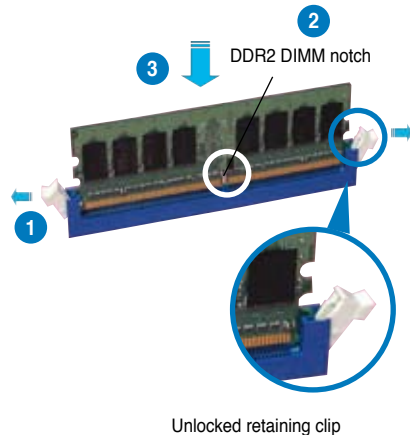
DDR2 DIMM notch

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.

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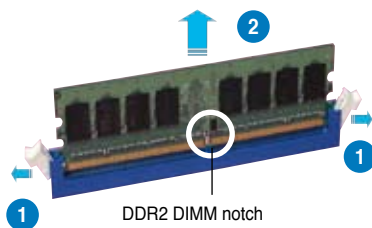
2. Remove the DIMM from the socket.

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 PCIE X16 (x8 link) and/or a PCIE x8 (x4 link) expansion cards.

To install a PCIE x8 card:

1. Firmly hold the riser card bracket, then pull it up to detach it from the PCI Express slot on the motherboard.

2. Place the riser card bracket on a flat and stable surface, then remove the screw from the PCIE x8 slot bay.

PCIE x8 slot
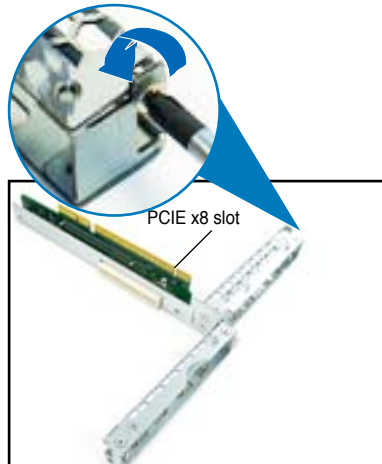
3. Install a PCIE x8 card to the bracket as shown, then secure the card with a screw.
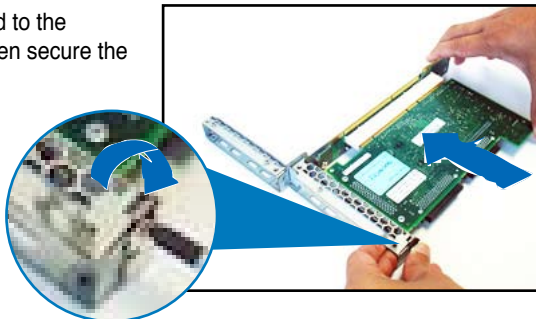
To install a PCI Express x4 card:

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

      PCI Express x4 slot
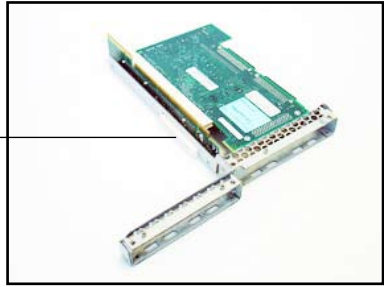
2.   Use a Phillips (cross) screwdriver
      to remove the screw that secures
      the slot metal cover.
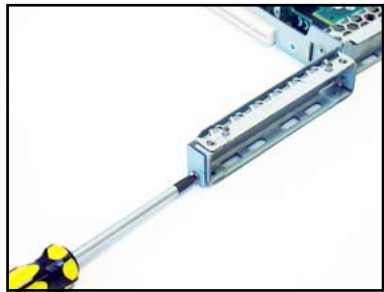
3.   Remove the slot metal cover, then
      set it aside.
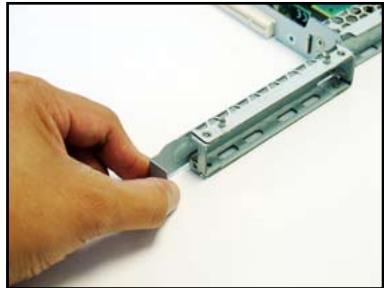
4.   Install a PCI Express x4 card to
      the bracket as shown, then secure
      the card with a screw you removed
      earlier.
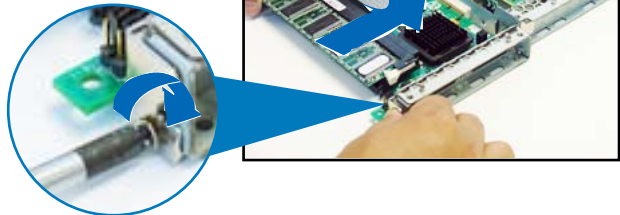
2.5.2 Reinstalling the riser card bracket

To reinstall the riser card bracket:

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

Pegs on the riser card bracket
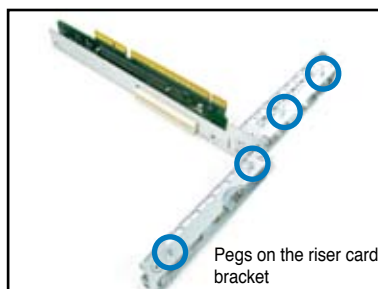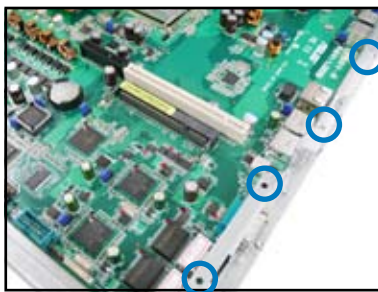
2. Install the riser card bracket with the card into the PCI Express slot on the motherboard.
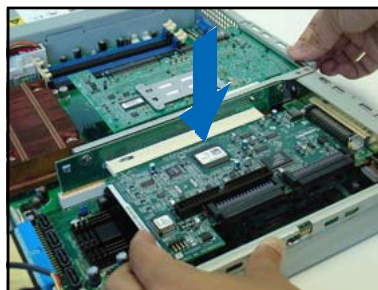
3. Press the riser card bracket until the golden connectors completely fit the slot and the bracket aligns with the rear panel.

4. Connect the cable(s) to the card, if applicable.
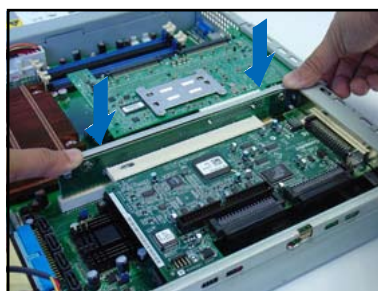
2.5.3   Replacing the optional riser card

The optional PCIX-E8-R10 riser card offers a better system expansion ability and enables the system to install different add-in cards.

To replace the optional PCIX-E8-R10 riser card for RS120-E5:

1.   Firmly hold the riser card bracket, then pull it up to detach it from the PCI Express slot on the motherboard.

2.   Unscrew the original riser card to remove it from the card bracket and set it aside.
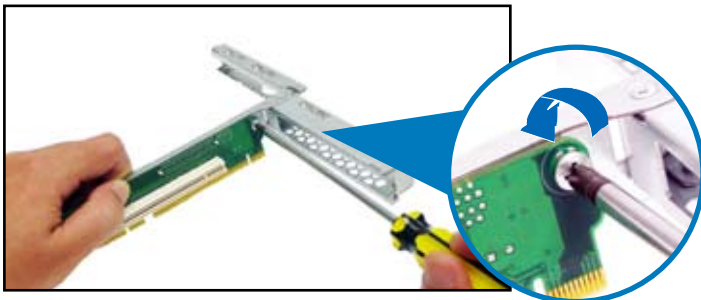
3.   Align the screw holes on thePCIX-E8-R10 riser card with the ones on the card bracket.
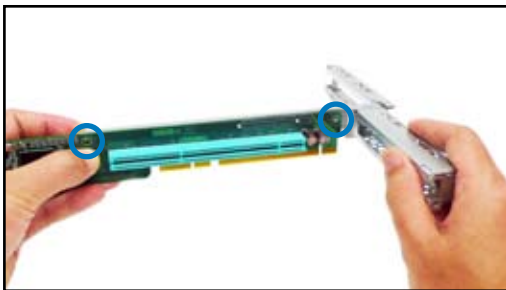
4.   Fasten the riser card to the bracket with screws.
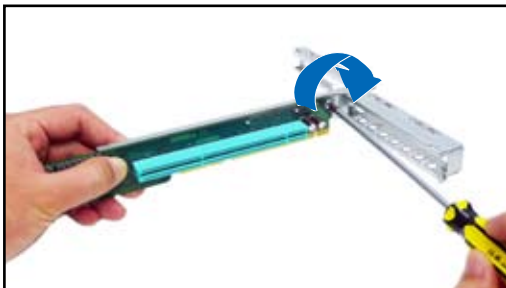
5.   Follow the previous sections to install your expansion cards and reinstall the card bracket back to the system.

2.5.4   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	--
6	14	Floppy Disk Controller
7*	15	--
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#					
XG2 Z9s	PIRQF#					
PCI Express Slot 1	PIRQA#					
PCI Express Slot 2	PIRQA#					

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 CHASSIS_FAN3 to device fan)
6. SATA connectors (from motherboard to SATA backplane board)
7. Panel connector (from motherboard to front I/O board)
8. Auxiliary panel connector (from motherboard to front I/O board)
9. USB connector (from motherboard to front I/O board)
10. System fan connectors (from motherboard CPU_FAN1-3 to system fans)

2.7   SATA backplane cabling

Connects a 8-pin plug from power supply

Connects the SATA cable from
SATA1 (Port0) on the MB

Connect the SATA HDDs

Connects the SATA cable from SATA3 (Port2) on the MB
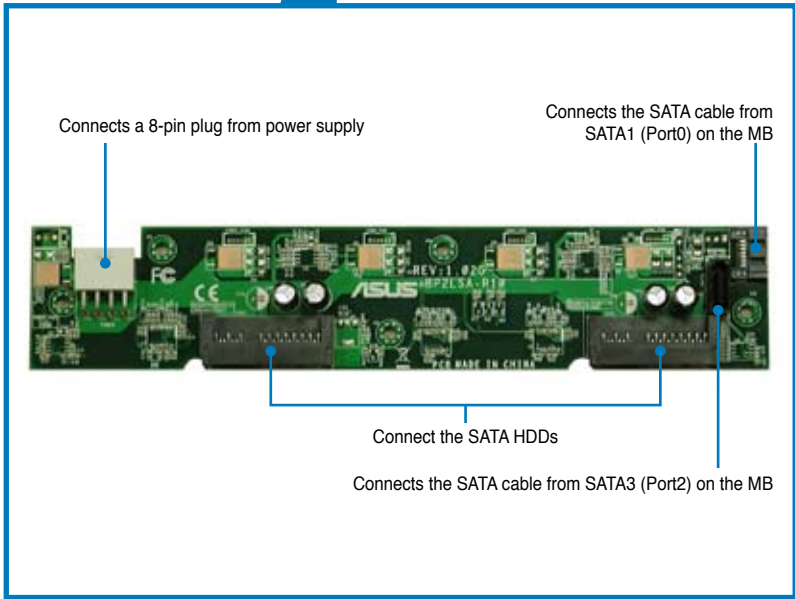
2.8 Removable components

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:

• three units 28 mm * 40 mm 15500 rpm fans

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

28 mm * 40 mm system fans
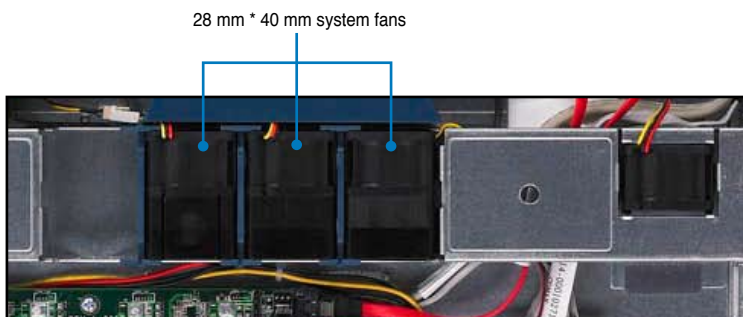
Incorrect installation of the system fan with dummy case may cause CPU overheating and automatic system shutdown.

To uninstall the system fans:

1. Disconnect a system fan cable from the fan connector on the motherboard.
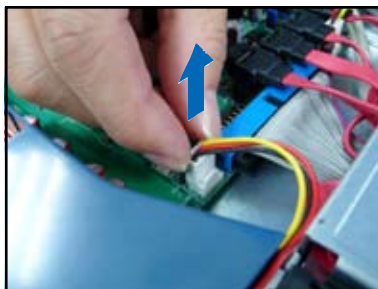
2. Lift the fan, then set aside.
3. Repeat step 1 to 2 to uninstall the other system fans.
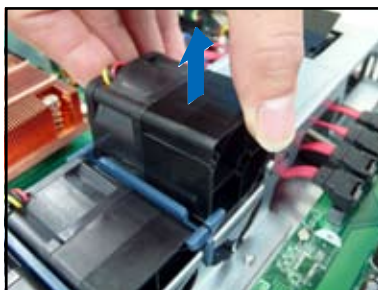
To reinstall the system fan:

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 motherboard.
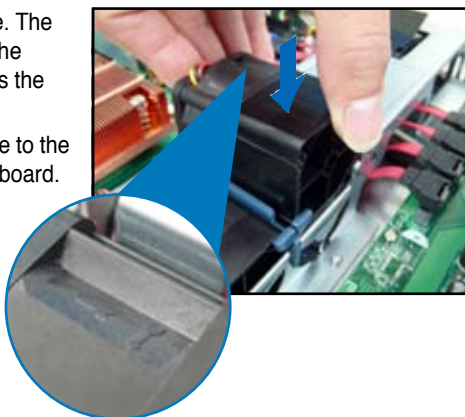
2.8.2   System fan with dummy case

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 to disengage its pegs from the system fan.
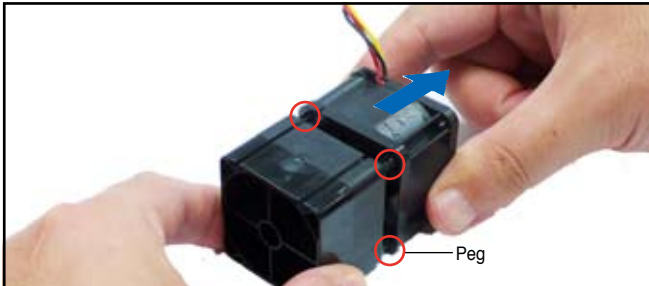
3.   Replace the system fan.

To reinstall the system fan with the dummy case:

1.   Insert the dummy case pegs to the system fan holes until it fits in place.
2.   Reinstall the system fan by following the instructions in the previous section.
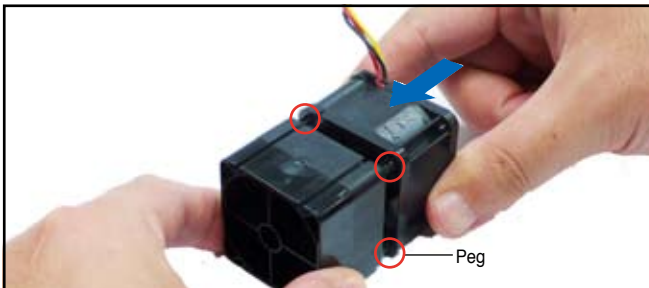
2.8.3   Device fan

The system comes with one 28 mm * 40 mm (15500 rpm) device fan.

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

28 mm * 40 mm device fan

To uninstall the device fan:

1.   Disconnect the device fan cable from the connector on the motherboard.
2.   Lift the fan, then set aside.
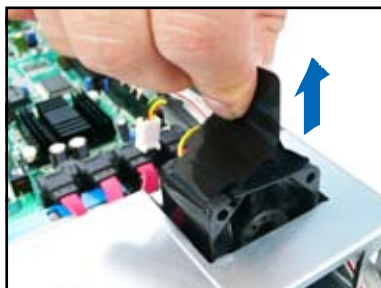
To reinstall the device fan:

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 motherboard.
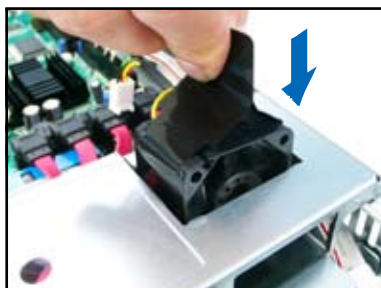
2.8.4   Power supply module

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.
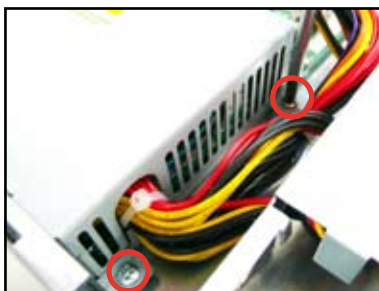
2.8.5   Optical drive

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.
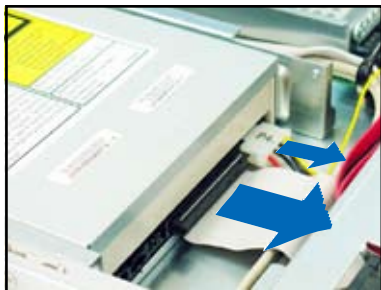
3.   Pull out half of the drive tray to remove the tray bezel.

4.   Pull the center of the bezel outward (A), then lift the sides (B) to remove.
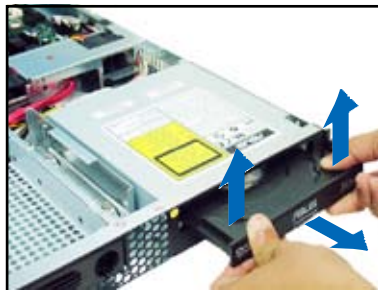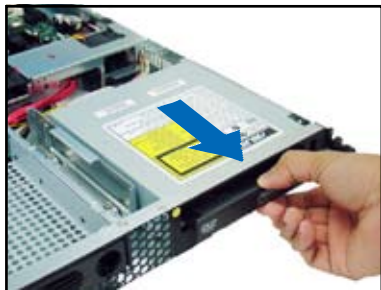
DO NOT apply too much force when removing the bezel. Too much force may break the drive tray!

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.
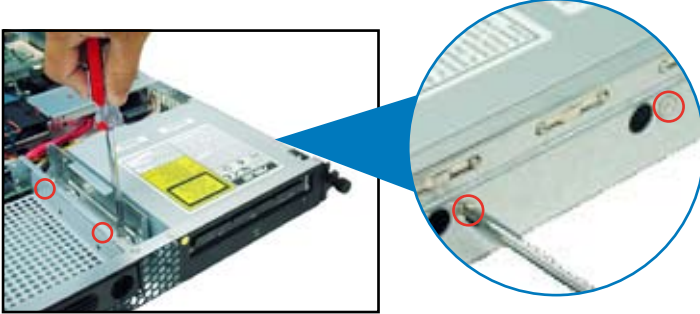
7. Pull the metal bracket to the direction of the arrow until its pegs disengage from the drive holes.

8. Lift the metal bracket, then set aside.

9. Push the drive inward, then lift it out from the chassis.
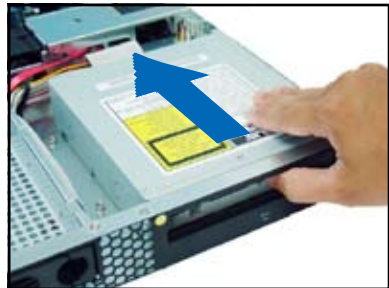
10. Remove the metal rail on the other side of the drive.

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 DDR2 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.
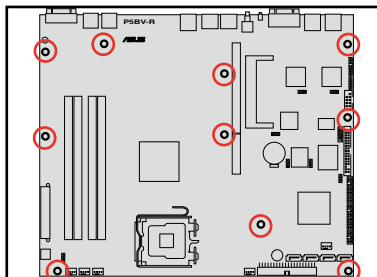
4.   Carefully lift the motherboard out of the chassis as shown.
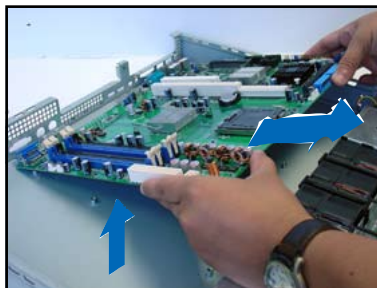
To reinstall the motherboard:

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.
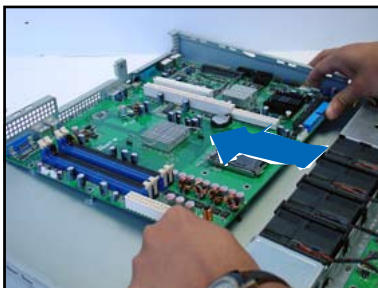
3. Use a Phillips (cross) screwdriver to secure the motherboard with ten (10) screws in the holes as shown in the illustration in the previous section.

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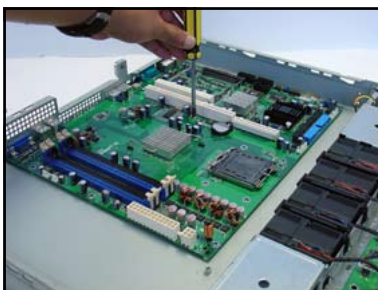
This chapter describes how to install the optional components and devices into the barebone server.

Installation options

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.

Nuts

Bolts

Left pair

Right pair
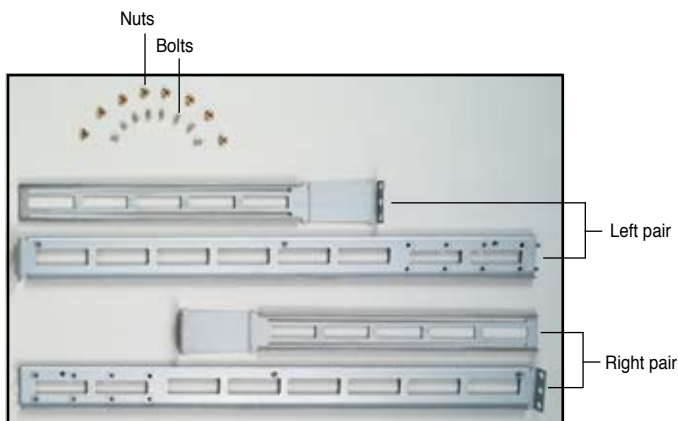
3.2   Rack rails assembly

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.

Rear ends

Bolts on inner side

Nuts on outer side
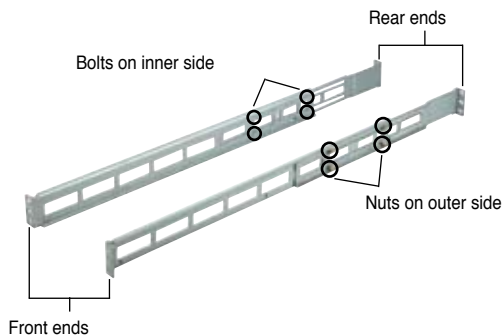
Front ends

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.
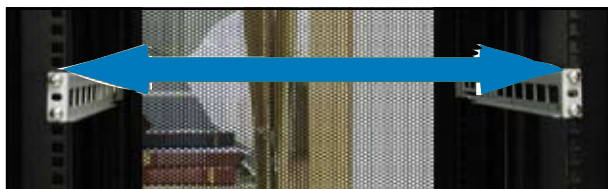
3.4 Rackmounting the server

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

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

Motherboard info

4.1 Motherboard layout

Layout contents

4.2 Jumpers

1. **Clear RTC RAM (CLRTC1)**

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

    To erase the RTC RAM:

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

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

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

CLRTC1

1
2
Normal
(Default)

2
3
Clear CMOS
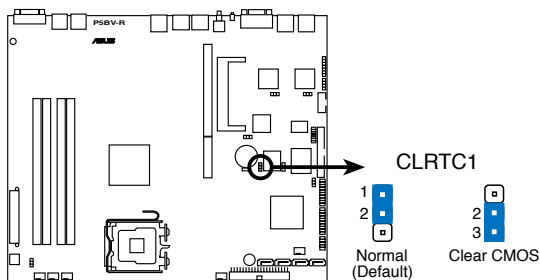
P5BV-R Clear RTC RAM

2. **Gigabit LAN1 controller setting (3-pin L1_EN)**

   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.

   L1_EN

   3 2   2 1

   Disable   Enable
                (Default)
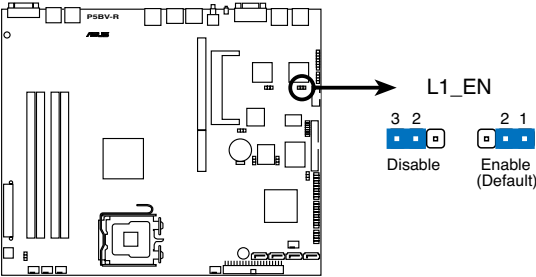
   P5BV-R Gigabit LAN1 setting

3. **Gigabit LAN2 controller setting (3-pin L2_EN)**

   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.

   L2_EN

   3 2   2 1

   Disable   Enable
                (Default)
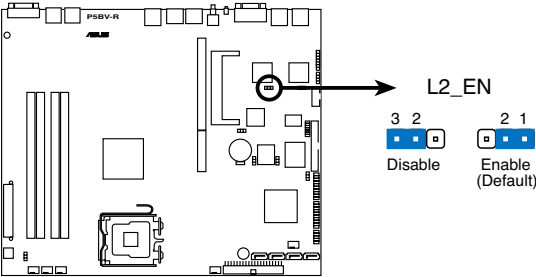
   P5BV-R Gigabit LAN2 setting

4. Integrated graphics controller (3-pin VGA_EN1)

This jumper allows you to enable or disable the onboard graphics controller.

VGA_EN1

3 2   2 1

Disable   Enable
            (Default)
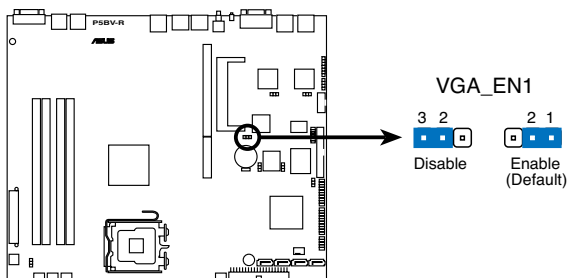
P5BV-R VGA setting

5. RAID controller selection (3-pin RAID_SEL1)

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

RAID_SEL1

1
2   2
                   3

INTEL RAID ROM   LSI RAID ROM
                  (Default)
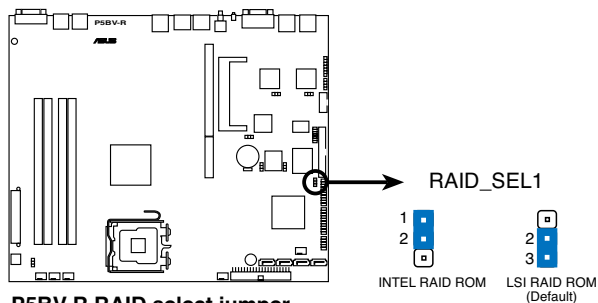
P5BV-R RAID select jumper

6. 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 (P5BV-R.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.

RECOVERY1

1
2
Normal
(Default)

2
3
BIOS recovery

P5BV-R BIOS recovery setting
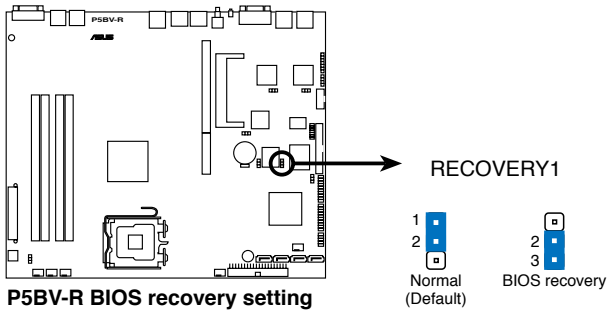
4.3 Connectors

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.

   FLOPPY1
   NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.

   PIN 1

   P5BV-R Floppy disk drive connector
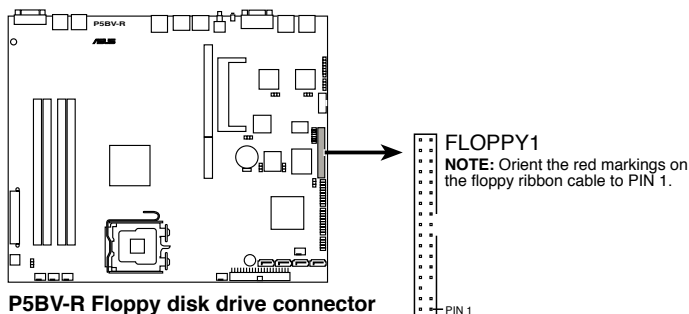
2. **IDE connector (40-1 pin PRI_IDE1)**

   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.

   PRI_IDE1
   NOTE: Orient the red markings (usually zigzag) on the IDE ribbon cable to PIN 1.

   P5BV-R IDE connector
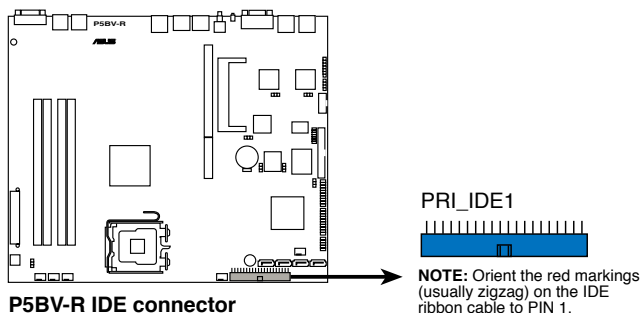
3. **Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4)**

    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, RAID 5 and RAID10 configuration using the Intel® Matrix Storage Manager, or RAID 0, RAID 1, and RAID 10 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.
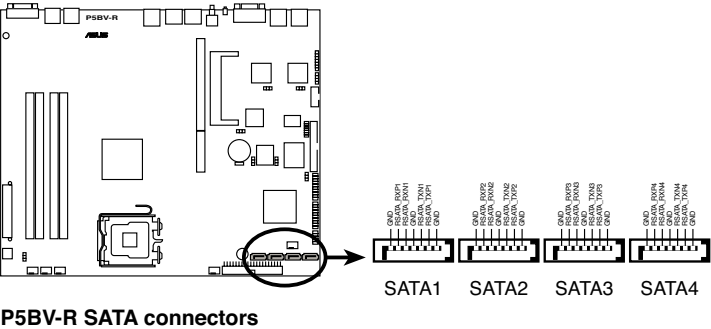
    P5BV-R SATA connectors

    > 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
SATA1/SATA2	Master
SATA3/SATA4	Slave

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.
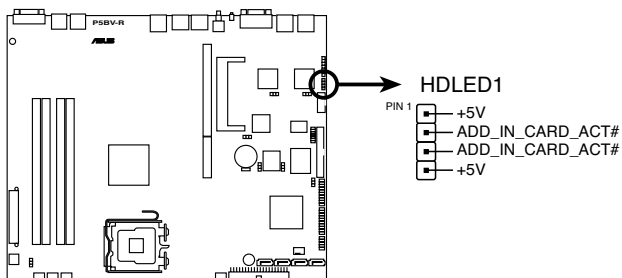
P5BV-R Hard disk activity LED connector

5.   System and device fan connectors (3-pin CPU_FAN1/2/3/4; CHASSIS_FAN1)

The fan connectors support the system and device fans.

These are not jumpers! DO NOT place jumper caps on the fan connectors!
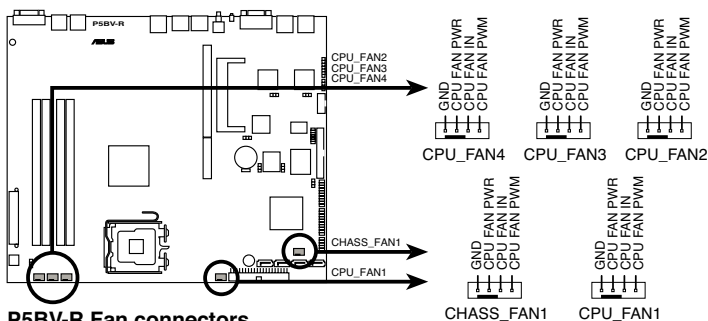
P5BV-R Fan connectors

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

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

USB34

NC — GND
GND — GND
USB _P4+ — USB_P3+
USB_P4- — USB_P3-
USB+5V — USB+5V
PIN1

P5BV-R USB 2.0 connectors
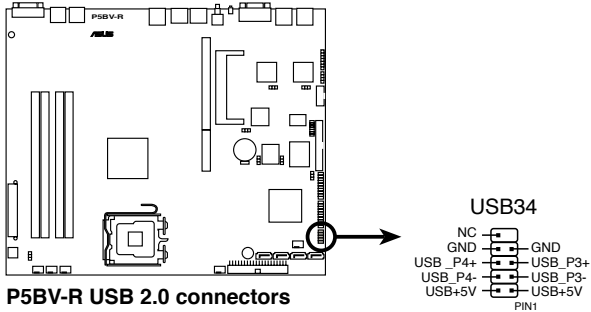
7. Serial port connector (10-1 pin COM2)

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.

COM2

PIN 1

P5BV-R
Serial port2 (COM2) connector
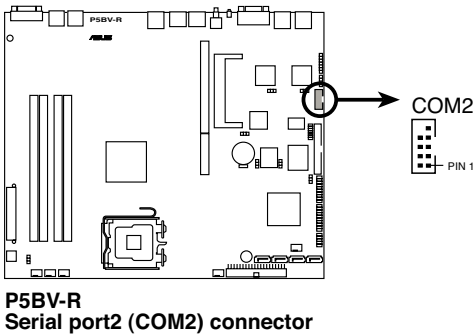
The serial port module is purchased separately.

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.

ATXPWR1
24-pin
Power Connector

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

ATX12V1

GND   +12V DC

GND   +12V DC

P5BV-R ATX power connectors
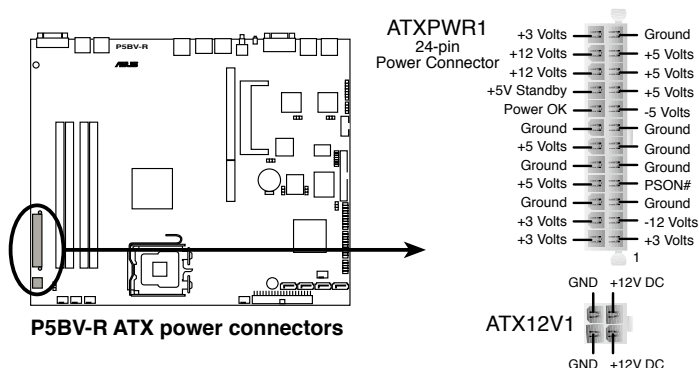
9. LPC debug card connector (14-1 pin LPC1)

This is a low pin count interface used to plug in the LPC debug card.

P5BV-R LPC debug card connector
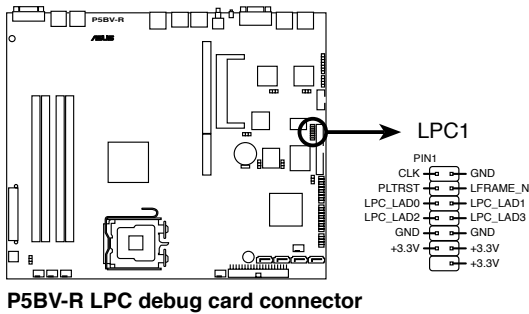
10. Backplane SMBus connector (6-1 pin BPSMB1)

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

P5BV-R SMBus connector
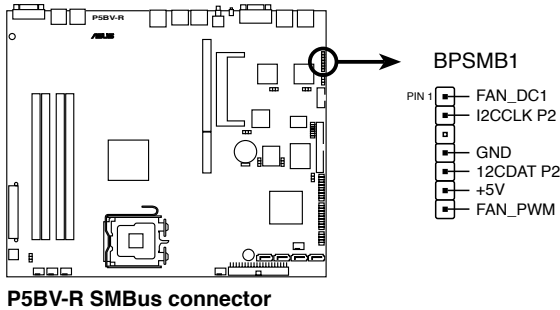
11. Auxiliary panel connector (20-pin AUX_PANEL1)

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

- **Front panel SMB (6-1 pin FPSMB)**
  These leads connect the front panel SMBus cable.

- **LAN activity LED (2-pin LAN1_LED, LAN2_LED)**
  These leads are for Gigabit LAN activity LEDs on the front panel.

- **Chassis intrusion (2-pin CHASSIS)**
  These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to these leads to record a chassis intrusion event.

- **Locator LED (6-pin LOCATOR)**
  These leads are for the locator switch and LED on the front panel.

P5BV-R Auxiliary panel connector

Chassis intrusion   Front panel SMB

AUX_PANEL1

PIN 1

+5VSB		NC
		I2C_4_CLK#
CASEOPEN		
GND		GND
LOCATORLED1+		I2C_4_DATA#
LOCATORLED1-		+5VSB
LOCATORBTN#		LAN1_LINKACTLED-
GND		LAN1_LINKACTLED+
LOCATORLED2-		LAN2_LINKACTLED+
LOCATORLED2+		LAN2_LINKACTLED-

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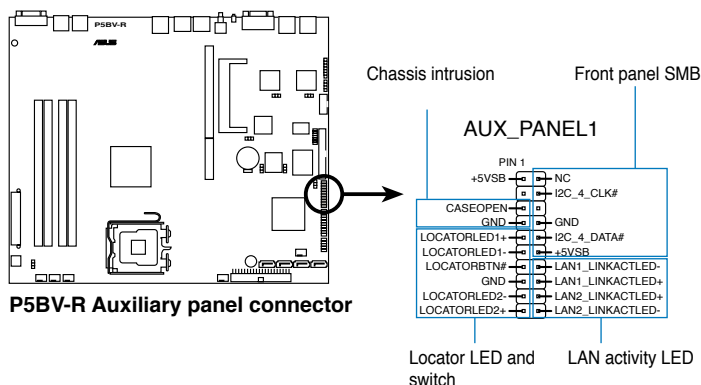
By default, a cable plug (6x2, 12-pin) connects the AUX_PANEL1 to the front panel I/O board. The Pin1 on the cable plug is located at the top right corner and is marked by a triangle. Take note of the Pin1 when reconnecting the cable plug to prevent incorrect insertion.

12. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.

HDD LED

PANEL1

PIN 1

HDLED+ — POWERLED+
HDLED- — GND
— POWERLED-
— MLED+
GND — MLED-
POWERBTN# — NC
GND — +5V
NC — GND
RESETBTN# — GND
GND — SPKROUT

Power LED
Message LED
System warning speaker

P5BV-R System panel connector

Power button   Reset button
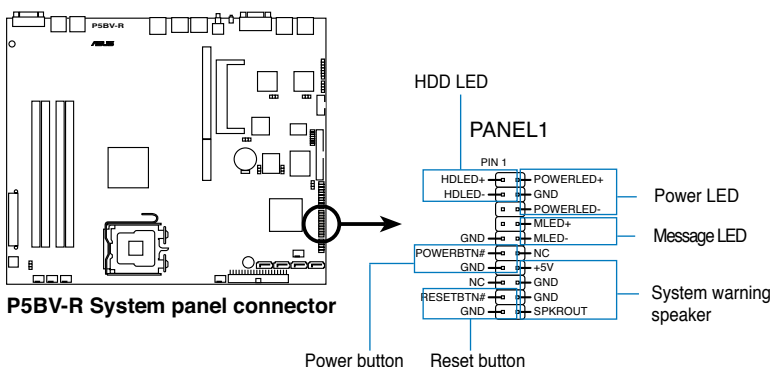
The sytem panel connector is color-coded for easy connection. Refer to the connector descriptions below for details.

- **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.

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

BIOS setup

5.1 Managing and updating your BIOS

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

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

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

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 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 3 utility

The ASUS CrashFree BIOS 3 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using a floppy disk or a USB flash drive that contains the updated BIOS file.

> Prepare a floppy disk or a USB flash drive containing the updated motherboard BIOS before using this utility.

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 will automatically recover the BIOS. It resets the system when the BIOS recovery finished.

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1.   Remove any floppy disk from the floppy disk drive and turn on the system.
2.   Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.
3.   The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.

> DO NOT shut down or reset the system while recovering the BIOS! Doing so would cause system boot failure!

> 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.

5.2 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 <Del> during the Power-On-Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

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

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

• The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load 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

Menu items   Menu bar   Configuration fields   General help

```
                            BIOS SETUP UTILITY
  Main    Advanced    Server    Power    Boot    Exit

  System Time                [11:10:19]              Use [ENTER]. [TAB],
  System Date                [Thu 09/13/2007]        or [SHIFT-TAB] to
  Legacy Diskette A          [Disabled]              select a field.

  ▶ Primary IDE Master       [Not Detected]          Use [+] or [-] to
  ▶ Primary IDE Slave        [Not Detected]          configure system time.
  ▶ Third IDE Master         [Not Detected]
  ▶ Third IDE Slave          [Not Detected]
  ▶ Fourth IDE Master        [Not Detected]
  ▶ Fourth IDE Slave         [Not Detected]
  ▶ IDE Configuration

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

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```

Sub-menu items   Navigation keys

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
Server	For changing the advanced server 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.
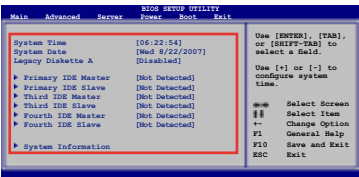
Main menu items

5.2.5 Sub-menu items

A solid triangle before each item on any menu screen means that the iteam 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.
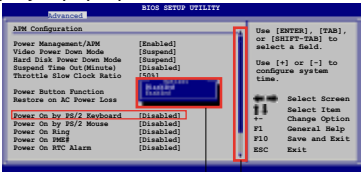
Pop-up window

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.

```
                           BIOS SETUP UTILITY
  Main    Advanced    Server    Power    Boot    Exit

  System Time              [11:10:19]               Use [ENTER]. [TAB],
  System Date              [Thu 09/13/2007]         or [SHIFT-TAB] to
  Legacy Diskette A        [Disabled]               select a field.

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

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```

5.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

5.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

5.3.3 Legacy Diskette A [Disabled]

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

5.3.4   Primary/Third/Fourth IDE Master/Slave

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

```
                           BIOS SETUP UTILITY
  Main

  Primary IDE Master                              Select the type
                                                  of device connected
  Device    :Hard Disk                            to the system.
  Vendor    :xxxxxxxxx
  Size      :xx.xGB
  LBA Mode  :Supported
  Block Mode:16Sectors
  PIO Mode  :4
  Async DMA :MultiWord DMA-2
  Ultra DMA :Ultra DMA-6
  SMART Monitoring.:Supported
                                                →←   Select Screen
  Type                        [Auto]            ↑↓   Select Item
  LBA/Large Mode              [Auto]            +-   Change Field
  Block(Multi-sector Transfer) M  [Auto]        Tab  Select Field
  PIO Mode                    [Auto]            F1   General Help
  DMA Mode                    [Auto]            F10  Save and Exit
  SMART Monitoring            [Auto]            ESC  Exit
  32Bit Data Transfer         [Enabled]

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```

The BIOS automatically detects the values opposite the dimmed items (Device, Vendor, Size, LBA Mode, Block Mode, PIO Mode, Async DMA, Ultra DMA, and S.M.A.R.T. 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] [CD/DVD] [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]

Allows you to select the data transfer mode.
Configuration options: [Auto] [0] [1] [2] [3] [4]

DMA Mode [Auto]

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

SMART Monitoring [Auto]

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

32Bit Data Transfer [Disabled]

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

5.3.5 IDE Configuration

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

```
                              BIOS SETUP UTILITY
  Main

  IDE Configuration                                        Options

  ATA/IDE Configuration          [Enhanced]        Disabled
    Configure SATA As            [IDE]             Compatible
                                                   Enhanced
  Hard Disk Write Protect        [Disabled]
  IDE Detect Time Out (Sec)      [35]
  ATA(PI) 80Pin Cable Detection[Host]

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

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```
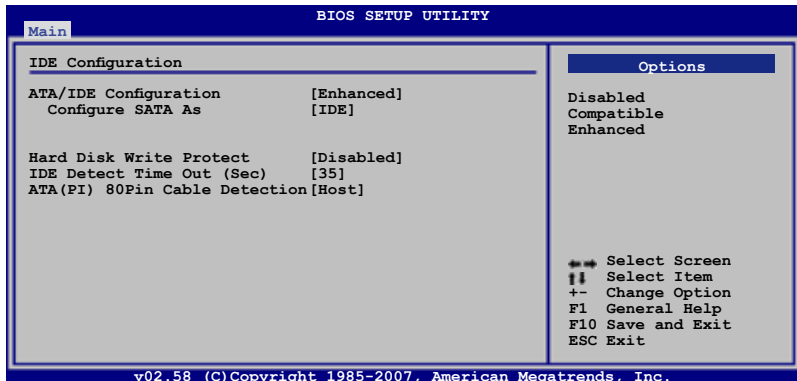
ATA/IDE Configuration [Enhanced]

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

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 to create a RAID 0, RAID 1, RAID 5, RAID 10, or the Intel® Matrix Storage Technology configuration from the Serial ATA hard disk drives, set this item to [RAID].

If you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices, keep the default setting [IDE].

If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), set this item to [AHCI].

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

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

Hard Disk Write Protect [Disabled]

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

IDE Detect Time Out (Sec) [35]

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

ATA(PI) 80Pin Cable Detection [Host]

Allows you to select the mechanism for detecting 80Pin ATA(PI) cable.
Configuration options: [Host & Device] [Host] [Device]

5.3.6   System Information

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

```
                            BIOS SETUP UTILITY
  Main

 AMIBIOS
 Version    : 0107
 Build Date : 10/08/07

 Processor
 Type       : Intel(R) Core(TM)2 Quad CPU Q6700 @
              2.66GHz
 Speed      : 2666 MHz
 Count      : 4

 System Memory
 Available  : 1024 MB
                                            ←→    Select Screen
                                            ↑↓    Select Item
                                            F1    General Help
                                            F10   Save and Exit
                                            ESC   Exit


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```
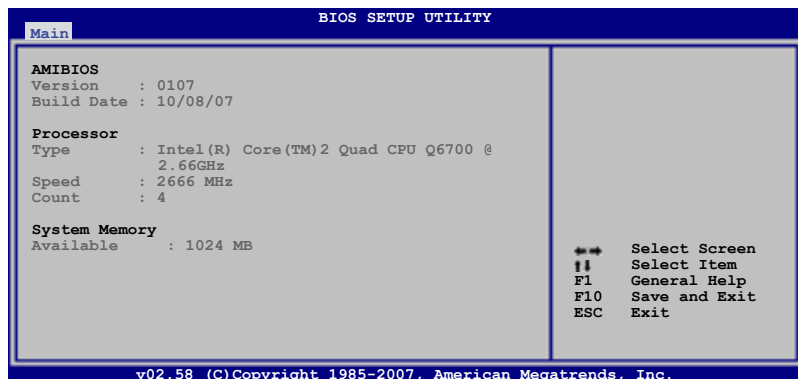
The items in this menu are non-user configurable.

AMIBIOS

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

Displays the auto-detected system memory.

5.4 Advanced menu

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

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

```
                          BIOS SETUP UTILITY
  Main    Advanced    Server    Power    Boot    Exit
┌─────────────────────────────────────────┬──────────────────────────┐
│                                          │                          │
│  ▶  USB Configuration                    │  Configure the USB       │
│  ▶  MPS Configuration                    │  support.                │
│                                          │                          │
│  ▶  CPU Configuration                    │                          │
│  ▶  Chipset                              │                          │
│  ▶  Onboard Devices Configuration        │                          │
│  ▶  PCIPnP                               │                          │
│                                          │                          │
│                                          │                          │
│                                          │                          │
│                                          │  ←→    Select Screen     │
│                                          │  ↑↓    Select Item       │
│                                          │  Enter Go to Sub Screen  │
│                                          │  F1    General Help      │
│                                          │  F10   Save and Exit     │
│                                          │  ESC   Exit              │
│                                          │                          │
├──────────────────────────────────────────────────────────────────┤
│     v02.58 (C)Copyright 1985-2007, American Megatrends, Inc.       │
└────────────────────────────────────────────────────────────────────┘
```
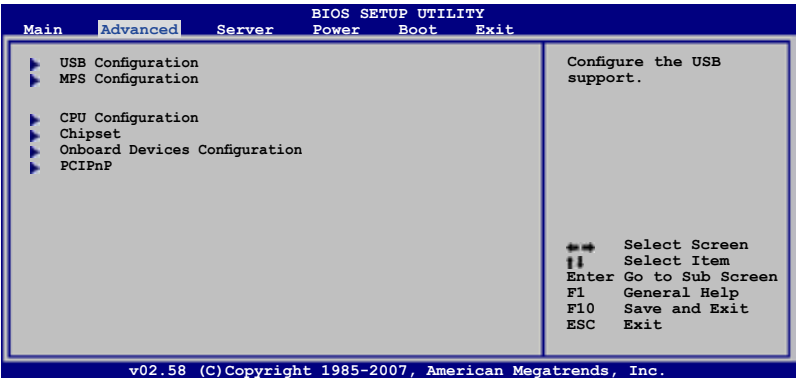
5.4.1 USB Configuration

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

```
                          BIOS SETUP UTILITY
      Advanced
┌─────────────────────────────────────────┬──────────────────────────┐
│  USB Configuration                       │         Options          │
│                                          │                          │
│  Module Version - 2.24.3-13.4            │  Disabled                │
│  USB Devices Enabled:                    │  2 USB ports             │
│        None                              │  4 USB ports             │
│                                          │                          │
│  USB Functions            [4 USB ports]  │                          │
│  USB 2.0 Controller       [Enabled]      │                          │
│  Legacy USB Support       [Auto]         │                          │
│  USB 2.0 Controller Mode  [HiSpeed]      │                          │
│  BIOS EHCI Hand-off       [Enabled]      │                          │
│                                          │  ←→    Select Screen     │
│                                          │  ↑↓    Select Item       │
│                                          │  +-    Change Option     │
│                                          │  F1    General Help      │
│                                          │  F10   Save and Exit     │
│                                          │  ESC   Exit              │
├──────────────────────────────────────────────────────────────────┤
│     v02.58 (C)Copyright 1985-2007, American Megatrends, Inc.       │
└────────────────────────────────────────────────────────────────────┘
```
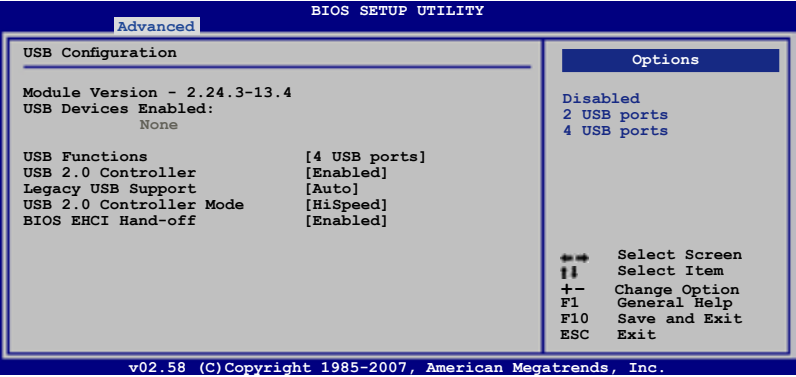
🖉 The **USB Devices Enabled** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

USB Functions [Enabled]

Allows you to enable or disable the USB Host Controllers.
Configuration options: [Disabled] [2 USB ports] [4 USB ports]

> The following three items appear only when you set **USB Functions** to
> [2 USB ports] or [4 USB ports].

USB 2.0 Controller [Enabled]

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

Legacy USB Support [Auto]

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

USB 2.0 Controller Mode [HiSpeed]

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

> The **USB 2.0 Controller Mode** item appears only when you enable **USB 2.0
> Controller**.

BIOS EHCI Hand-off [Enabled]

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

5.4.2   MPS Configuration

```
                          BIOS SETUP UTILITY
         Advanced

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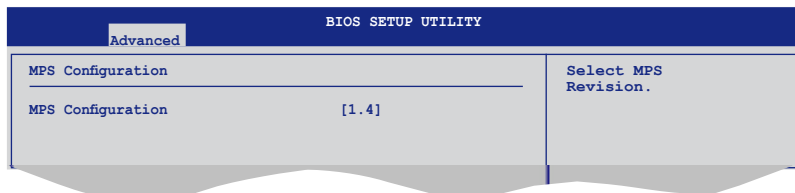
MPS Revision [1.4]
Allows you to select the multi-processor system version.
Configuration options: [1.1] [1.4]

5.4.3 CPU Configuration

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

```
                      BIOS SETUP UTILITY
      Advanced
 Configure advanced CPU settings              Sets the ratio
 Module Version: 3D.06                         between CPU Core
                                               Clock and the FSB
 Manufacturer: Intel                           Frequency.
 Brand String: Intel(R) Xeon(R) CPU X3220 @ 2.40GHz
 Frequency   : 2.40 GHz                        NOTE: It's only
 FSB Speed   : 1066 MHz                         available when
 Cache L1    : 128 KB                           SpeedSetp is diabled.
 Cache L2    : 8192 KB
 Ratio Status: Unlocked (Max:09, Min:06)
 Ratio Actual Value : 9
 CPUID        :6FB
                                               ←→  Select Screen
 CPU ratio adjustment          [Auto]          ↑↓  Select Item
 C1E Support                   [Enabled]        +-  Change Option
 Hardware Prefetcher           [Enabled]        F1  General Help
 Adjacent Cache Line Prefetch  [Enabled]        F10 Save and Exit
 Max CPUID Value Limit         [Disabled]       ESC Exit
 Vanderpool Technology         [Enabled]

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```

Scroll down for more items.

```
 CPU TM function:              [Enabled]        ←→  Select Screen
 Excute Disable Bit            [Enabled]        ↑↓  Select Item
 Core Multi-Processing         [Enabled]        +-  Change Option
 Intel(R) SpeedStep(tm) tech.  [Automatic]      F1  General Help
                                                F10 Save and Exit
                                                ESC Exit

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```
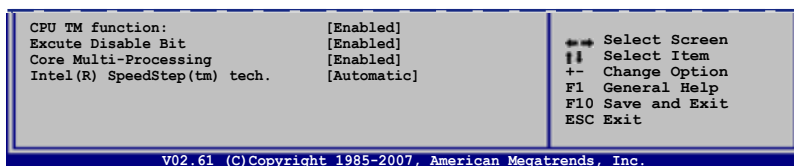
CPU ratio adjustment [Auto]

Configuration options: [Auto] [MANUAL]

> The following item appears when the item **CPU Ratio Control** is set to [MANUAL].

Ratio CMOS Setting: [9]
Allows you to set the ratio between the CPU Core Clock and the FSB Frequency. Use <+> and <-> to adjust the value.
Configuration options: [6] [7]

C1E Support [Enabled]

Allows you to enable or disable C1E Support.
Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

Enables or disables the Hardware Prefetcher feature.
Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefetch [Enabled]

Enables or disables the Adjacent Cache Line Prefetch feature.
Configuration options: [Disabled] [Enabled]

Max CPUID Value Limit [Disabled]

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

Vanderpool Technology [Enabled]

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

CPU TM function: [Enabled]

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

Execute Disable Bit [Enabled]

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

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]

5.4.6 Chipset Configuration

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

```
                        BIOS SETUP UTILITY
        Advanced

 Advanced Chipset Settings                          Configure North Bridge
                                                    features.
 WARNING: Setting wrong values in below sections
          may cause system to malfunction.

 ▶  North Bridge Configuration



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

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```
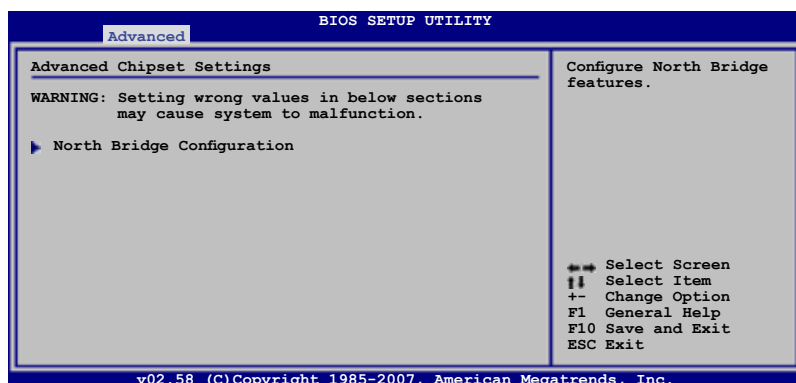
NorthBridge Configuration

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

```
                        BIOS SETUP UTILITY
        Advanced

 North Bridge Chipset Configuration                 ENABLE: Allow
                                                    remapping of
 Memory Remap Feature         [Enabled]             overlapped PCI memory
   PCI MMIO Allocation: 4GB To 3840MB               above the total
 DRAM Frequency               [Auto]                physical memory.
 Configure DRAM Timing by SPD [Enabled]
                                                    DISABLE: Do not allow
 Initiate Graphic Adapter     [PEG/PCI]             remapping of memory.

 PEG Port Configuration
   PEG Port                   [Auto]
                                                    ←→   Select Screen
                                                    ↑↓   Select Item
                                                    +-   Change Option
                                                    F1   General Help
                                                    F10  Save and Exit
                                                    ESC  Exit

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```

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] [667 MHz] [800 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 set to [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: [3] [4] [5] [6]
>
> *DRAM RAS# to CAS# Delay [6 DRAM Clocks]*
> Controls the latency between the DDR SDRAM active command and the read/write command.
> Configuration options: [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: [3 DRAM Clocks] [4 DRAM Clocks] [5 DRAM Clocks]
> [6 DRAM Clocks]
>
> *DRAM RAS# Activate to Precha [15 DRAM Clocks]*
> Configuration options: [9 DRAM Clocks] ~ [15 DRAM Clocks]

Initiate Graphic Adapter [PEG/PCI]

Allows you to select which graphics controller as the primary boot device.
Configuration options: [PCI/PEG] [PEG/PCI]

> *PEG Port [Auto]*
> Configuration options: [Auto] [Disabled]

5.4.7 Onboard Devices Configuration

```
                          BIOS SETUP UTILITY
    Advanced
─────────────────────────────────────────────────────────────────────
  Configure Win83627EHG-A Super IO Chipset          Allows BIOS to Select
                                                     Serial Port1 Base
  Serial Port1 Address              [3F8/IRQ4]       Addresses.
  Serial Port2 Address              [2F8/IRQ3]
    Serial Port2 Mode               [Normal]

  OnBoard LAN1 Boot ROM             [Enabled]
  OnBoard LAN2 Boot ROM             [Enabled]



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

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```
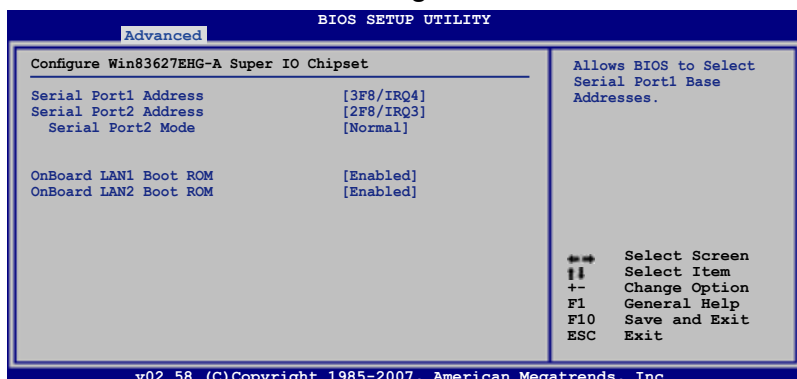
Serial Port1 Address [3F8/IRQ4]

Allows BIOS to select serial port1 base address.
Configuration options: [Disabled] [3F8/IRQ4] [3E8/IRQ4]

Serial Port2 Address [3F8/IRQ4]

Allows BIOS to select serial port2 base address.
Configuration options: [Disabled] [2F8/IRQ3] [2E8/IRQ3]

> *Serial Port2 Mode [Normal]*
> Allows BIOS to select a mode for serial port2.
> Configuration options: [Normal] [IrDA] [ASK IR]

> The following two items appear when you set **Serial Port2 Mode** to [IrDA] and [ASK IR].

> **IR I/O Pin Select [SINB/SOUTB]**
> Allows BIOS to select the receiver or transmit pin for the serial port2.

> **IR Duplex Mode [Half Suplex]**
> Allows BIOS to select full or half Duplex for the serial port2.

> *OnBoard LAN1/2 Boot ROM [Enabled]*
> Enables or disables the LAN Boot ROM.

5.4.8   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!

```
                          BIOS SETUP UTILITY
   Advanced

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

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```

Plug And Play O/S [No]

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

PCI Latency Timer [64]

Allows you to set the PCI device latency timer.
Configuration options: [32] [64] [96] [128] [160] [192] [224] [248]

Allocate IRQ to PCI VGA [Yes]

Assigns IRQ to PCI VGA card if the card requests IRQ.
Configuration options: [Yes] [No]

Palette Snooping [Disabled]

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

IRQ-XX assigned to [PCI Device]

When set to [PCI Device], the specific IRQ available to PCI/PnP devices. When set to [Reserved], the IRQ is reserved for Legacy ISA devices.
Configuration options: [PCI Device] [Reserved]

5.5 Server menu

This Server menu items allow you to customize the server features.

```
                          BIOS SETUP UTILITY
    Main    Advanced    Server    Power    Boot    Exit

                                                          Include ACPI APIC
    ASF Support                [Enabled]                  table pointer to RSDT
                                                          pointer list
       Remote Access Configuration




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

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```
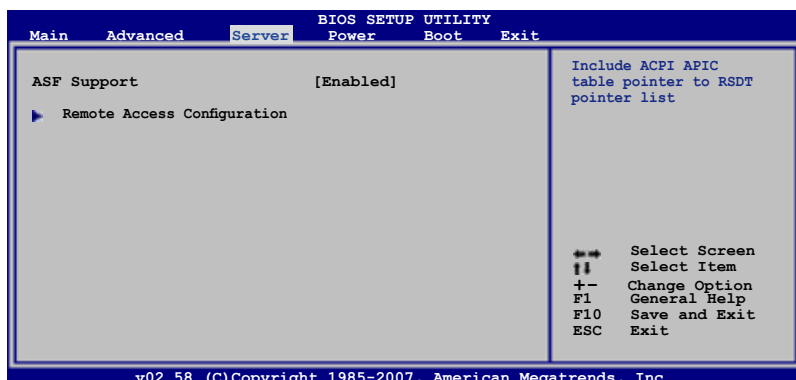
ASF Support [Enabled]

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

5.5.1 Remote Access Configuration

```
                          BIOS SETUP UTILITY
                       Server

    Configure Remote Access type and parameters         Select Remote Access
                                                         type.
    Remote Access                [Disabled]
```
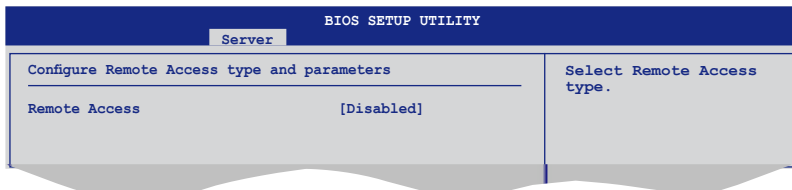
Remote Access [Disabled]

Allows you to enable or disable the remote access.
Configuration options: [Disabled] [Enabled]

The following items appear only when **Remote Access** is set to [Enabled].

Serial port number [COM1]

Selects the serial port for console redirection.
Configuration options: [COM1] [COM2]

Baudrate [19200 8,n,1]

Sets the baudrate. Configuration options: [115200 8,n,1] [57600 8,n,1]
[38400 8,n,1] [19200 8,n,1]

Flow Control [None]

Allows you to select the flow control for console redirection.
Configuration options: [None] [Hardware] [Software]

Redirection After BIOS POST [Always]

Sets the redirection mode after the BIOS Power-On Self-Test (POST). Some
operating system may not work when set to Always.
Configuration options: [Disabled] [Boot Loader] [Always]

Terminal Type [ANSI4]

Allows you to select the target terminal type.
Configuration options: [ANSI4] [VT100] [VT-UTF83] [Extended VT100]

VT-UTF8 Combo Key Support [Disabled]

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

5.6   Power menu

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

```
                            BIOS SETUP UTILITY
   Main    Advanced    Server    Power    Boot    Exit
 ─────────────────────────────────────────────────────────────────────
                                                   Include ACPI APIC
                                                   table pointer to RSDT
   ACPI APIC Support              [Enabled]        pointer list
 ▶ APM Configuration
 ▶ Hardware Monitor



                                               ⬅➡    Select Screen
                                               ⬆⬇    Select Item
                                               +-     Change Option
                                               F1     General Help
                                               F10    Save and Exit
                                               ESC    Exit

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```
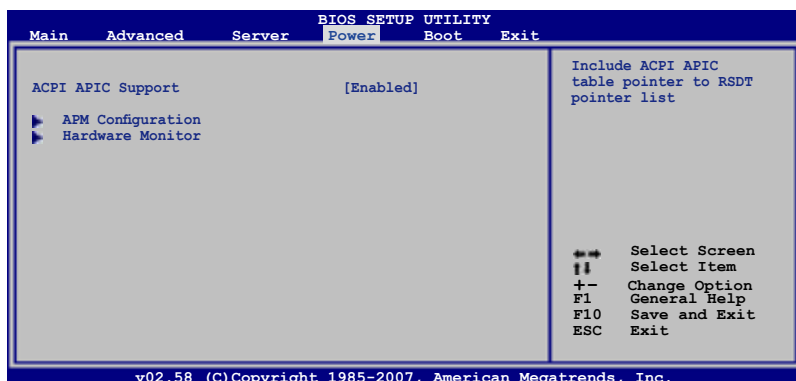
5.6.1   ACPI APIC Support [Enabled]

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

5.6.2 APM Configuration

```
                          BIOS SETUP UTILITY
                           Power

APM Configuration                                      <Enter> to select
                                                       whether or not to
Restore on AC Power Loss      [Last State]             restart the system
                                                       after AC power loss.
Power On By PCIE Devices      [Enabled]
Resume On RTC Alarm           [Disabled]




                                                       ⬌  Select Screen
                                                       ⬍  Select Item
                                                       +- Change Option
                                                       F1  General Help
                                                       F10 Save and Exit
                                                       ESC Exit

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```
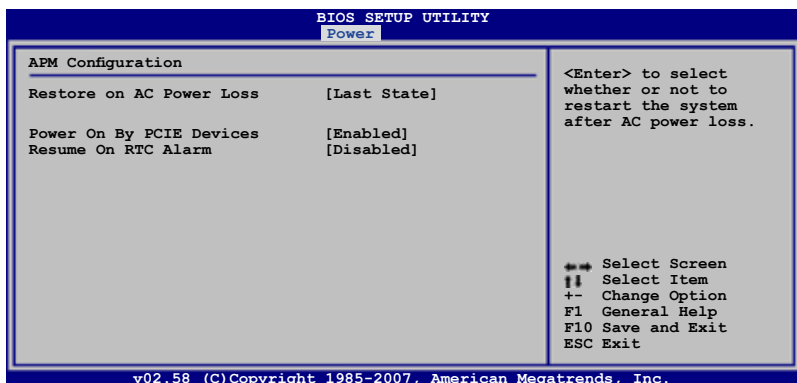
Restore on AC Power Loss [Last State]

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]

Power On By PCIE Devices [Enabled]

Allows you to use PCIE devices 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. When this item is set to [Enabled], the items **RTC Alarm Date/ RTC Alarm Hour/ RTC Alarm Minute/ RTC Alarm Second** will become user-configurable with set values.
Configuration options: [Disabled] [Enabled]

5.6.3   Hardware Monitor

```
                                    Power

    CPU Temperature             [42..5°C/108.5°F]      CPU Temperature
    MB Temperature              [35°C/95°F]

    CPU Fan1                    [12300RPM]
    CPU Fan2                    [12134RPM]
    CPU Fan3                    [12356RPM]
    CPU Fan4                    [12646RPM]
    Chassis Fan                [12558RPM]
    Smart Fan Control          [Enabled]

    VCORE Voltage              [ 1.208V]
    3.3V Voltage               [ 3.264V]              ←→  Select Screen
    5V Voltage                 [ 5.068V]              ↑↓  Select Item
    12V Voltage                [11.932V]              +-  Change Option
    VBAT Voltage               [ 3.088V]              F1  General Help
                                                      F10 Save and Exit
                                                      ESC Exit

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```

CPU Temperature [xxxºC/xxxºF]
MB Temperature [xxxºC/xxxºF]

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

CPU Fan1/2/3/4; Chassis Fan [xxxxRPM] or [N/A]

The onboard hardware monitor automatically detects and displays the system and CPU 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 [Enabled]

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] [Enabled]

VCORE, 3.3V, 5V, 12V, VBAT Voltage

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

5.7 Boot menu

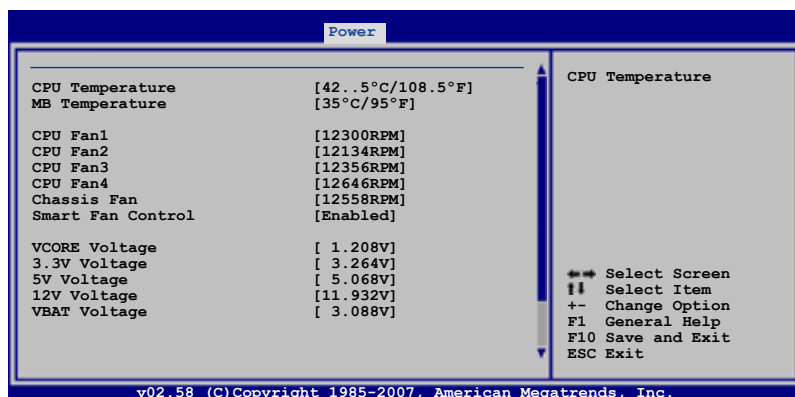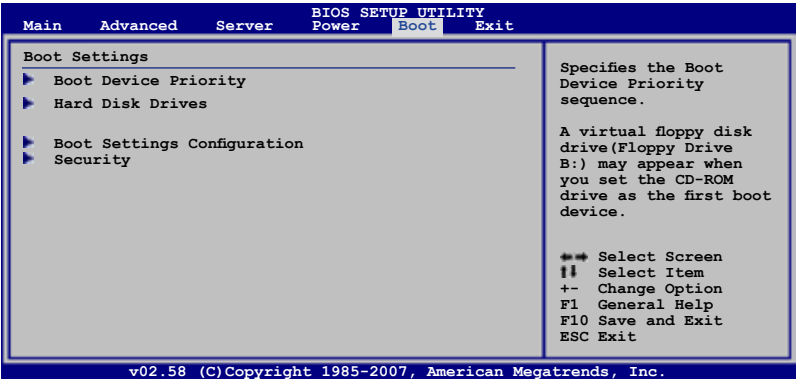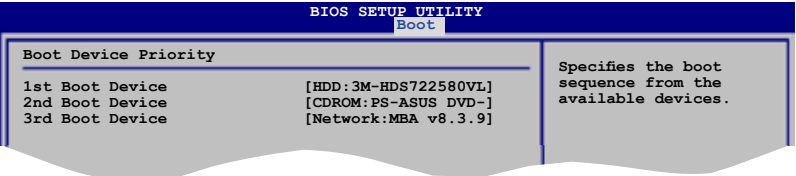The Boot menu items allow you to change the system boot options. Select an item then press <Enter> to display the sub-menu.
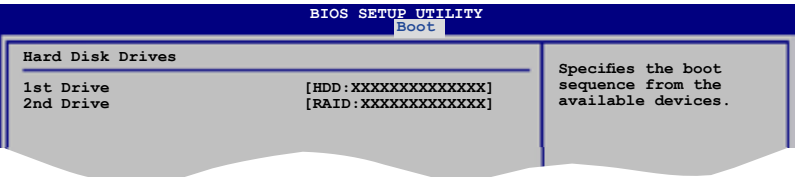
```
                         BIOS SETUP UTILITY
  Main    Advanced    Server    Power    Boot    Exit

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


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

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```

5.7.1 Boot Device Priority

```
                         BIOS SETUP UTILITY
                              Boot

  Boot Device Priority                             Specifies the boot
                                                   sequence from the
  1st Boot Device        [HDD:3M-HDS722580VL]      available devices.
  2nd Boot Device        [CDROM:PS-ASUS DVD-]
  3rd Boot Device        [Network:MBA v8.3.9]
```

1st ~ xxth Boot Device [xxx Drive]

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

5.7.2 Hard Disk Drives

```
                         BIOS SETUP UTILITY
                              Boot

  Hard Disk Drives                                 Specifies the boot
                                                   sequence from the
  1st Drive              [HDD:XXXXXXXXXXXXX]        available devices.
  2nd Drive              [RAID:XXXXXXXXXXXXX]
```

1st ~ xxth Drive [xxx Drive]

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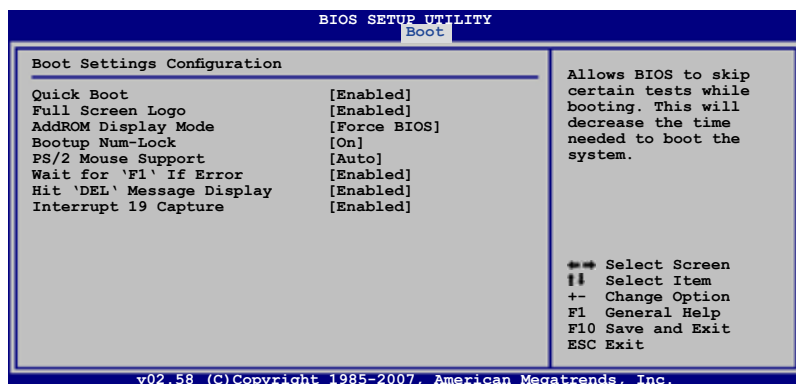
5.7.3   Boot Settings Configuration

```
                          BIOS SETUP UTILITY
                               Boot

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

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

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```

Quick Boot [Enabled]

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

Full Screen Logo [Enabled]

This allows you to enable or disable the full screen logo display feature.
Configuration options: [Disabled] [Enabled]

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

AddOn ROM Display Mode [Force BIOS]

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

Bootup Num-Lock [On]

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

Wait for 'F1' If Error [Enabled]

When set to [Enabled], the system waits for the <F1> key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]
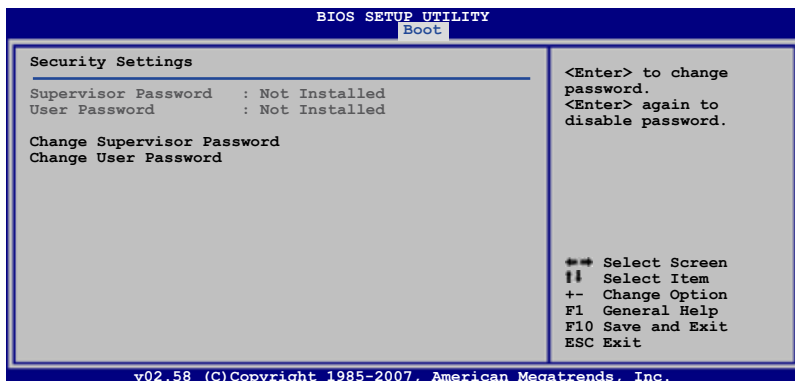
Hit 'DEL' Message Display [Enabled]

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

Interrupt 19 Capture [Disabled]

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

5.7.4   Security

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

```
                         BIOS SETUP UTILITY
                              Boot

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

   Change Supervisor Password
   Change User Password



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

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```

Change Supervisor Password

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

To set a Supervisor Password:

1.   Select the **Change Supervisor Password** item and press <Enter>.

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

3.   Confirm the password when prompted.

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

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

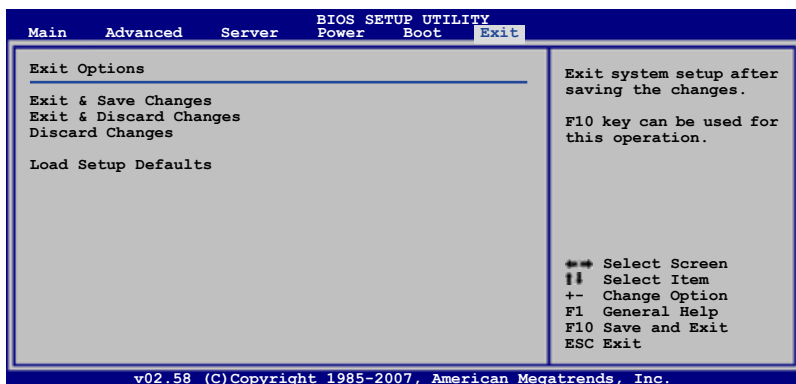To clear the supervisor password, select the **Change Supervisor Password** then press <Enter>. The message "Password Uninstalled" appears.

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

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

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

```
                        BIOS SETUP UTILITY
                          Boot

  Security Settings                              Install or Change
                                                 the password. Also,
  Supervisor Password   : Installed              the password can be
  User Password         : Not Installed          cleared just presses
                                                 "Enter" key.
  Change Supervisor Password
  User Access Level             [Full Access]
  Change User Password
  Password Check                [Setup]



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

       v02.58 (C)Copyright 1985-2007, American Megatrends, Inc.
```
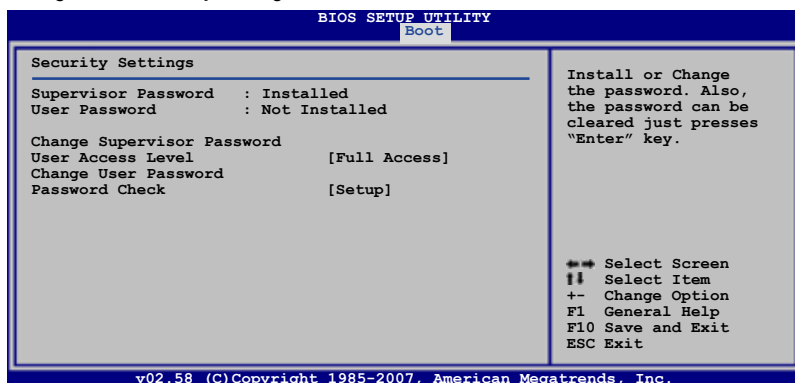
User Access Level [Full Access]

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]

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.

```
                            BIOS SETUP UTILITY
    Main     Advanced     Server    Power    Boot     Exit

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

  Load Setup Defaults




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

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```

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

Exit & Save Changes

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

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

Exit & Discard Changes

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

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

Discard Changes

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

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

Load Setup Defaults

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

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

Chapter 6

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

RAID Configuration

6.1 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 and 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

> 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.

6.1.2 Installing hard disk drives

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

To install the SATA hard disks for RAID configuration:

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

6.1.3 Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set from SATA hard disk drives attached to the SATA connectors supported by the Intel® 6321ESB Southbridge chip. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main Menu** > **IDE Configuration** > **S-ATA Configuration**, then press <Enter>.
3. Set the **SATA Controller Mode Option** item to [Enhanced], then press <Enter>.
4. Set the **SATA RAID Enable** item to [Enabled].
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 utilities

Depending on the RAID connectors that you use, you can create a RAID set using the utilities embedded in each RAID controller. For example, use the **LSI Logic Embedded SATA RAID Setup Utility** or the **Intel® Matrix Storage Manager** if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the Intel® 6321ESB Southbridge.

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

6.2   LSI Logic Embedded SATA RAID Setup Utility

The LSI Logic Embedded SATA RAID Setup Utility allows you to create RAID 0, RAID 1, or RAID 10 set(s) from SATA hard disk drives connected to the SATA connectors supported by the motherboard 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.

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

- •   The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.

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.

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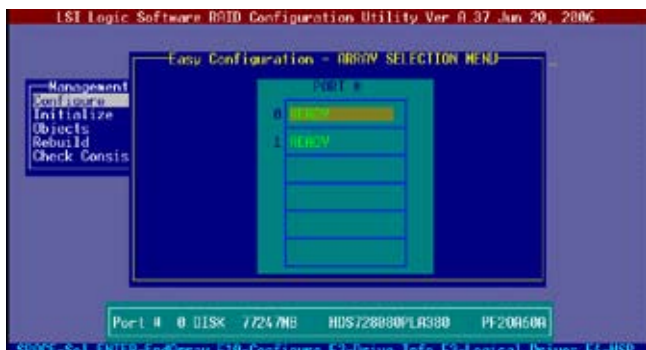
The information of the selected hard disk drive displays at the bottom of the screen.

4.	Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.
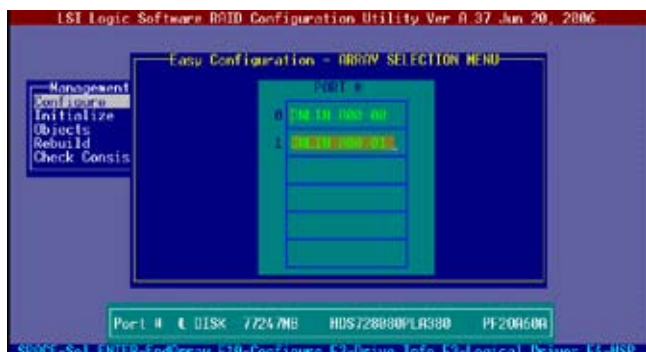
5.   Press <F10>, select the configurable array, then press <SpaceBar>.
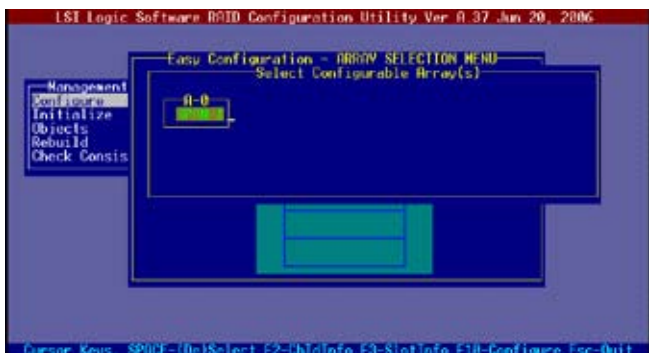
Press <F10> again, the logical drive information appears including a **Logical Drive** menu that allows you to change the logical drive parameters.

6. Select **RAID** from the **Logical Drive** menu, then press <Enter>.
7. Select the **RAID** level from the menu, then press <Enter>.
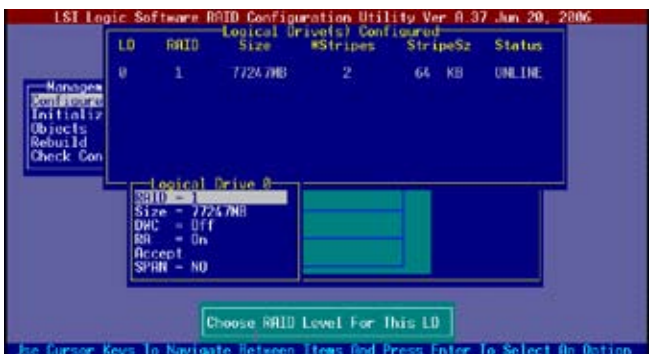
> You need at least two identical hard disk drives when creating a RAID 1 set.

8. When creating a <u>RAID 1</u> set, select **DWC** from the **Logical Drive** menu, then press <Enter>.
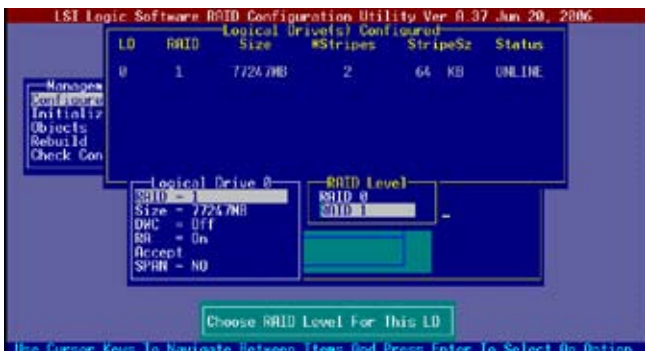
   When creating a <u>RAID 0</u> set, proceed to step 10.

9. Select **On** to enable the **Disk Write Cache** setting, then press <Enter>.
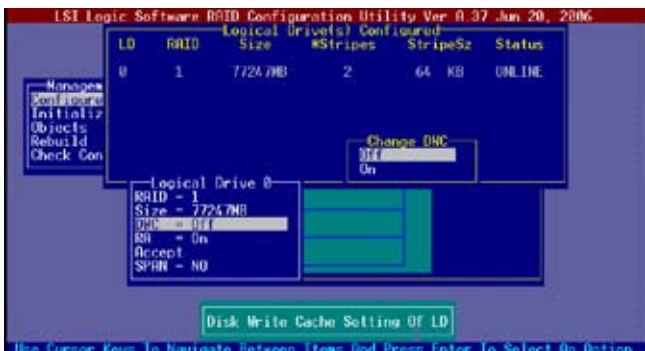
> Enabling DWC can improve the performance, but with the risk of data loss.

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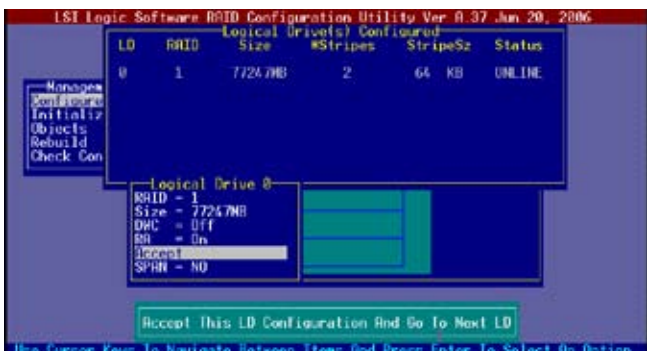
11. When finished setting the selected logical drive configuration, select **Accept** from the menu, then press <Enter>.
12. Follow steps 5 to 10 to configure additional logical drives.
13. When prompted, save the configuration, then press <Esc> to return to the **Management Menu**.

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>.

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>.

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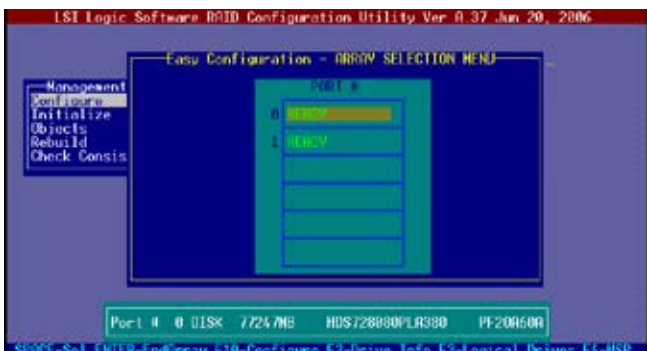
The information of the selected hard disk drive displays at the bottom of the screen.

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>.
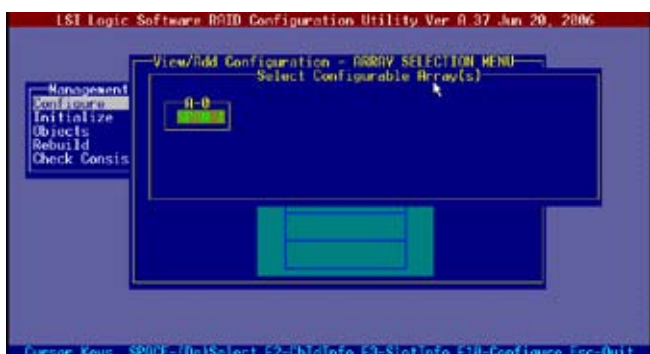
6. Press <F10> again, and select **RAID** from the **Logical Drive** menu, then
    press <Enter>.
7. Select the RAID level from the menu, then press <Enter>.

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

9. When prompted, save the configuration, then press <Esc> to return to the **Management Menu**.

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

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. Use the arrow keys to select the logical drive from the **Logical Drive** selection, then press <Enter>.
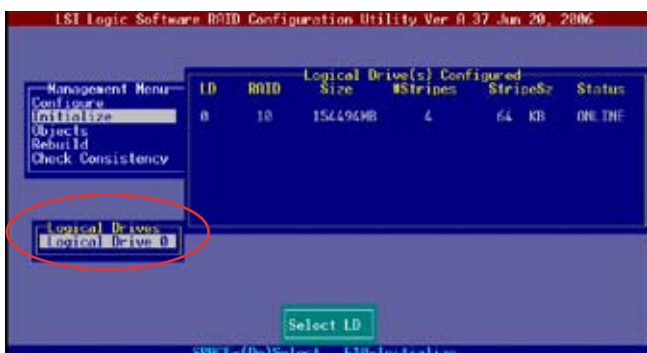
3. When prompted, press the <SpaceBar> to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.
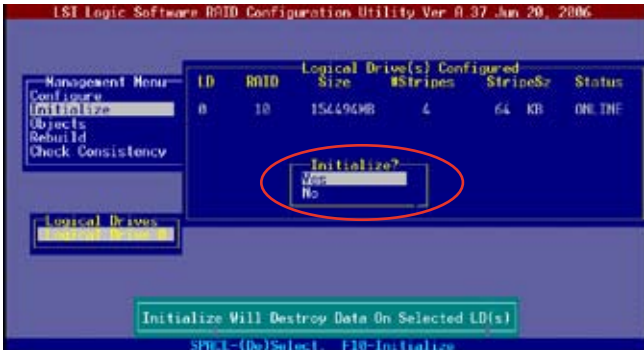
> Initializing a logical drive(s) erases all data on the drive.

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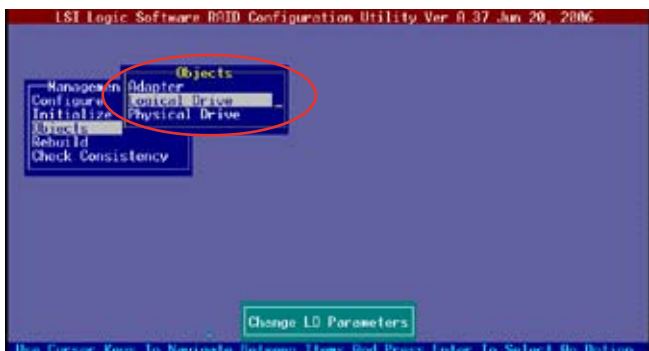
3. Select the logical drive to initialize from the **Logical Drives** sub-menu, then press <Enter>.

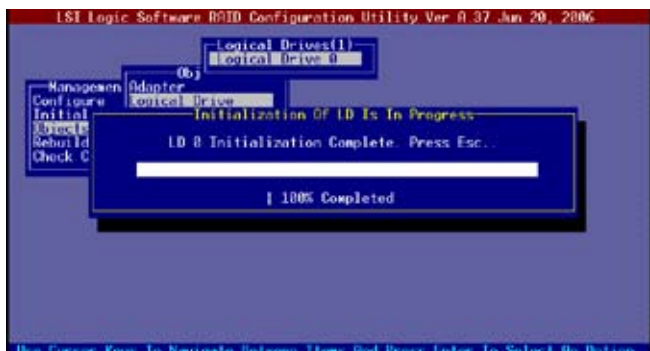4. Select **Initialize** from the pop-up menu, then press <Enter> to start initialization.
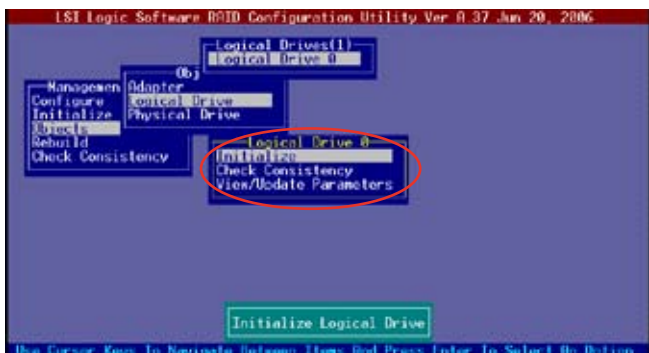
5.   When prompted, press the <SpaceBar> to select **Yes** from the **Initialize?** dialog box, then press <Enter>.
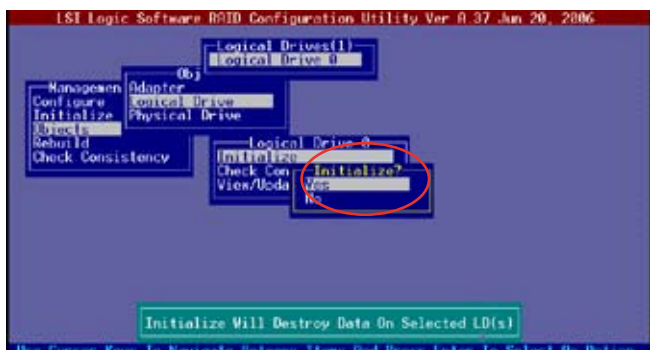
6.   A progress bar appears on screen. If desired, press <Esc> to abort initialization.

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.
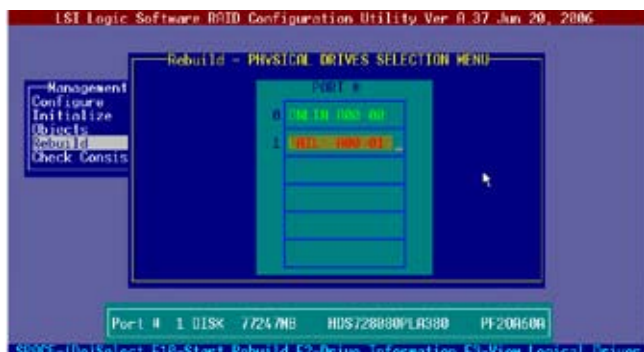
To rebuild a failed hard disk drive:

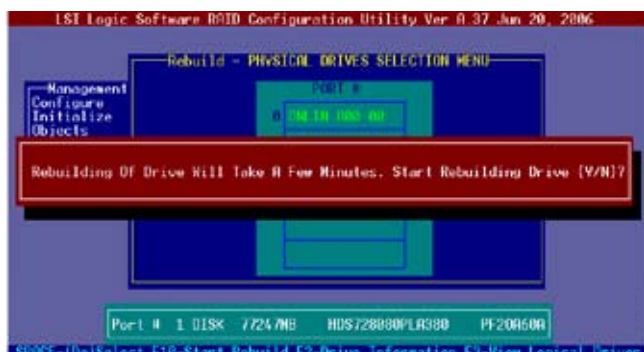1. From the **Management Menu**, highlight **Rebuild**, then press <Enter>.

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>.

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

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

5. 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.
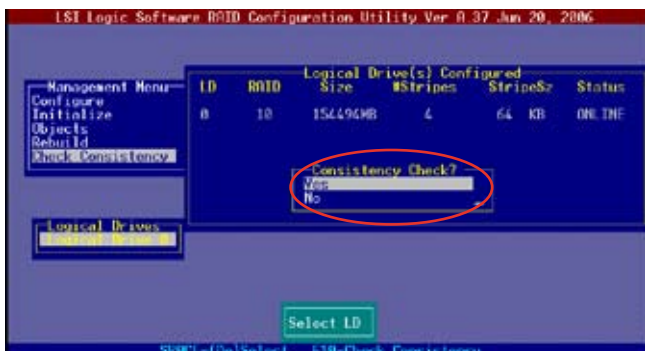
A progress bar appears on screen.

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 percentage completed rather than from zero percent.

- **Continue** - Continues the consistency check.

- **Abort** - Aborts the consistency check. When you restart checking, it continues from zero percent.

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 and 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.

```
Intel(R) Matrix Storage Manager Option ROM v5.6.2.1002 ESB2 wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
================================[ MAIN MENU ]================================
                         1. Create RAID Volume
                         2. Delete RAID Volume
                         3. Reset Disks to Non-RAID
                         4. Exit

========================[ DISK/VOLUME INFORMATION ]=========================
RAID Volumes:
None defined.

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


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

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

The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.

The utility supports maxium four hard disk drives for RAID configurration.

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 v5.6.2.1002 ESB2 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              XX.XGB   Non-RAID Disk
     1     XXXXXX  XXXXXX              XX.XGB   Non-RAID Disk
     2     XXXXXX  XXXXXX              XX.XGB   Non-RAID Disk
     3     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 <Spacebar>
    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.

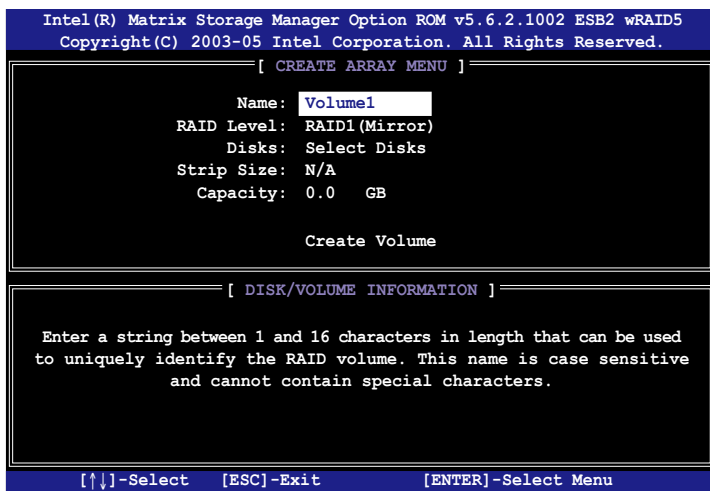8. When the **Create Volume** item is highlighted, press <Enter>. A warning message appears.

```
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.

```
    Intel(R) Matrix Storage Manager Option ROM v5.6.2.1002 ESB2 wRAID5
      Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
    ══════════════════[ CREATE ARRAY MENU ]══════════════════

                         Name:  Volume1
                   RAID Level:  RAID1(Mirror)
                        Disks:  Select Disks
                   Strip Size:  N/A
                     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 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.
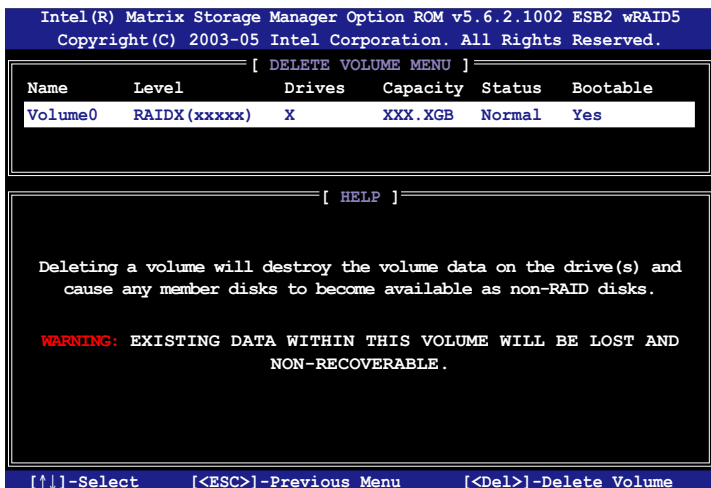
6.3.3   Deleting a RAID set

⚠️ 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.

```
    Intel(R) Matrix Storage Manager Option ROM v5.6.2.1002 ESB2 wRAID5
       Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
    ══════════════════════[ DELETE VOLUME MENU ]══════════════════════
    Name        Level         Drives    Capacity  Status    Bootable
    Volume0     RAIDX(xxxxx)  X         XXX.XGB   Normal    Yes


    ═════════════════════════════[ HELP ]═════════════════════════════


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

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



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

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

```
                  [ DELETE VOLUME VERIFICATION ]

                 ALL DATA IN THE VOLUME WILL BE LOST!
      Are you sure you want to delete volume "VolumeX"? (Y/N):
```

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

6.3.4   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.

```
                          [ RESET RAID DATA ]
     Resetting RAID data will remove internal RAID structures
     from the selected RAID disks. By removing these structures,
     the drive will revert back to a non-RAID disk.

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

     Port  Drive Model     Serial #       Size    Status
     0     XXXXXXXXXXXX    XXXXXXXX       XX.XGB  Member Disk
     1     XXXXXXXXXXXX    XXXXXXXX       XX.XGB  Member Disk
                 Select the disks that should be reset.
      [↑↓]-Previous/Next  [SPACE]-Selects  [ENTER]-Selection Complete
```

2.   Use the up/down arrow key to highlight the RAID set drive you want to reset,
       then press <Spacebar> 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.

5.3.5   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.

```
                          [ CONFIRM EXIT ]
                Are you sure you want to exit? (Y/N):
```
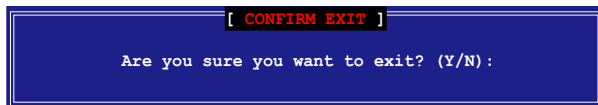
2.   Press <Y> to exit or press <N> to return to the utility main menu.

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.

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

Driver installation

7.1 RAID driver installation

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

7.1.1 Creating a RAID driver disk

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

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

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.

```
Create Driver Diskette Menu
ICH7R INTEL RAID Driver
ICH7R LSI RAID Driver
Write DMI
Broadcom ASF Firmware Update
FreeDOS command prompt
```
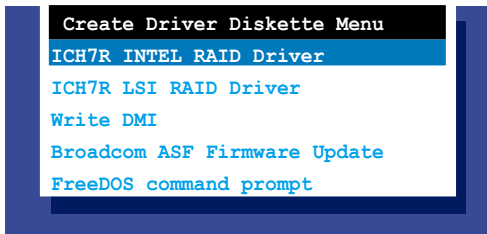
6. Use the arrow keys to select the type of RAID driver disk you want to ceate and press <Enter> to enter the sub-menu.

ICH7R Intel RAID Driver

```
 ICH7R INTEL RAID Driver
Windows 32 bit
Windows 64 bit
Back
Exit
```

ICH7R LSI RAID Driver

```
 ICH7R LSI RAID Driver
Windows Server 2003 32 bit
Windows Server 2003 64 bit
RHEL AS3 UP8 32/64 bit
RHEL AS4 UP4 32/64 bit
SLES 9.0 SP3 32 bit
SLES 9.0 SP3 64 bit
SLES 10 32 bit
SLES 10 64 bit
Back
Exit
```
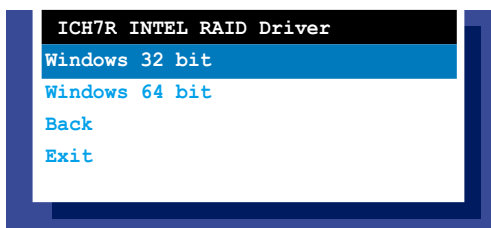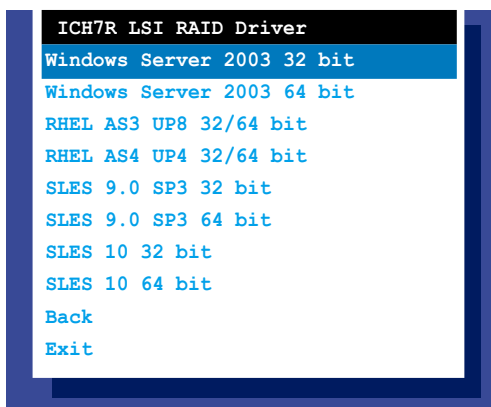
7. Locate the RAID driver and place a blank, high-density floppy disk to the floppy disk drive.

8. Press <Enter>.

9. Follow screen instructions to create the driver disk.

7.1.2   Installing the RAID controller driver

Windows® Server

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

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


```
Windows 2000 Setup




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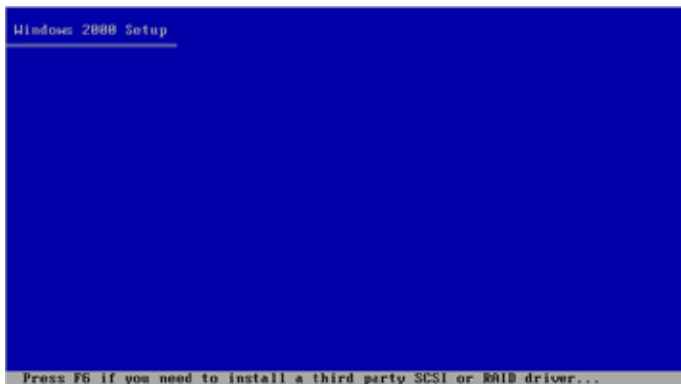
2.   Press <F6> when the message "Press F6 if you need to install a third party
      SCSI or RAID driver..." appears at the bottom of the screen.
3.   When prompted, press <S> to specify an additional device.


```
Windows 2000 Setup

Setup could not determine the type of one or more mass storage devices
installed in your system, or you have chosen to manually specify an adapter.
Currently, Setup will load support for the following mass storage devices(s):

   <none>

 * To specify additional SCSI adapters, CD-ROM drives, or special
   disk controllers for use with Windows 2000, including those for
   which you have a device support disk from a mass storage device
   manufacturer, press S.

 * If you do not have any device support disks from a mass storage
   device manufacturer, or do not want to specify additional
   mass storage devices for use with Windows 2000, press ENTER.




    S=Specify Additional Device   ENTER=Continue   F3=Exit
```

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

5. Select the RAID controller driver from the list, then press <Enter>.
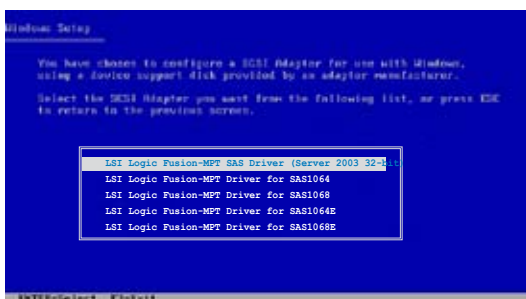
•   **Intel® 6321ESB Intel® MATRIX STORAGE** driver:

    - If SATA RAID mode is to enabled, select **Intel ESB2 SATA RAID Controller (Server ESB2)**.

    - If SATA AHCI mode is enabled, select **Intel ESB2 SATA AHCI Controller (Server ESB2)**.

- **Intel® 6321ESB LSI Logic Embedded SATA RAID** driver:

  - For Windows Server, select **LSI MegaRAID Software RAID (Windows 2000 SP4)**.

  - For Windows Server, select **LSI MegaRAID Software RAID (Windows XP/2003)**.

6. The Windows® Server 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® Server

To install the RAID controller driver on an existing Windows® Server:

1. Restart the computer, then log in with **Administrator** privileges.

2. Windows® automatically detects the RAID controller and displays a **New Hardware Found** window. Click **Cancel**.

3. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.

4. Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.
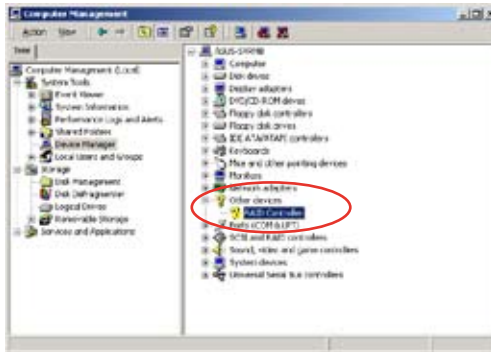
5.   Right-click the **RAID controller** item, then select **Properties**.

6.   Click the **Driver** tab, then click the **Update Driver** button.

7.   The **Upgrade Device Driver Wizard** window appears. Click **Next**.

8.   Insert the RAID driver disk you created earlier to the floppy disk drive.

9.   Select the option **Search for a suitable driver for my device (recommended)**, then click **Next**.

10.   The wizard searches the RAID controller drivers. When found, click **Next** to install the drivers.

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

To verify the RAID controller driver installation:

1.   Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.

2.   Click the **Hardware** tab, then click the **Device Manager** button.

3.   Click the "+" sign before the item **SCSI and RAID controllers**, then the LSI Adapter, SAS 3000 series, 8-port with 1068-StorPort item should appear.
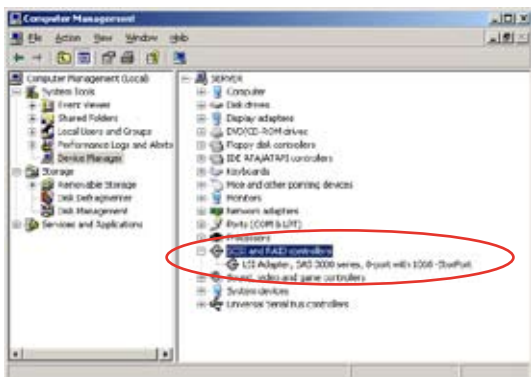
The screen differs based on the controller.

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

To install the Intel® 6321ESB LSI Logic Embedded SATA RAID controller driver when installing Red Hat® Enterprise OS:

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

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

When installing a Red Hat 2.4 kernel with a Driver Update Disk (DUD) to a disk drive attached to a LSI HBA, use the command below at the install prompt:
linux dd updates.

3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>
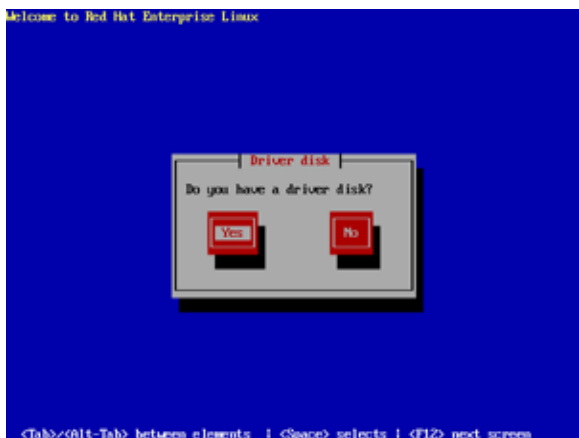
4. Select **fd0** using the <Tab> key when asked to select the driver disk source. Press <Tab> to move the cursor to **OK**, then press <Enter>.
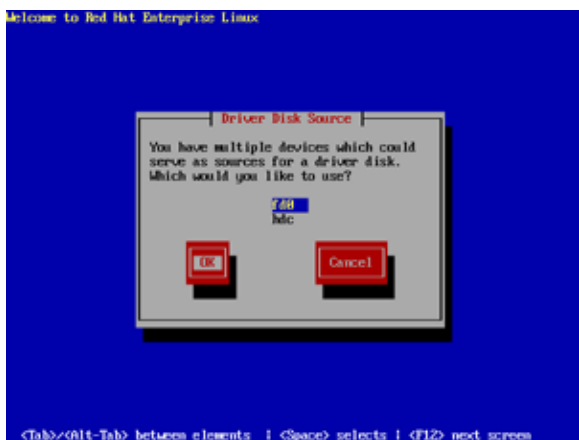
5.   When prompted, insert the Red Hat® Enterprise RAID driver disk to the floppy
     disk drive, select **OK**, then press <Enter>.
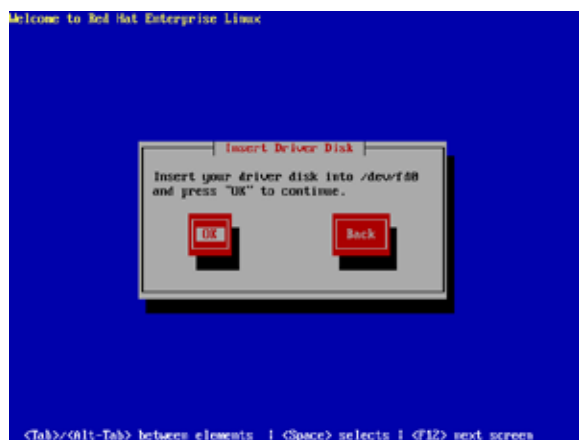
     The drivers for the RAID controller are installed to the system.

6.   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>.
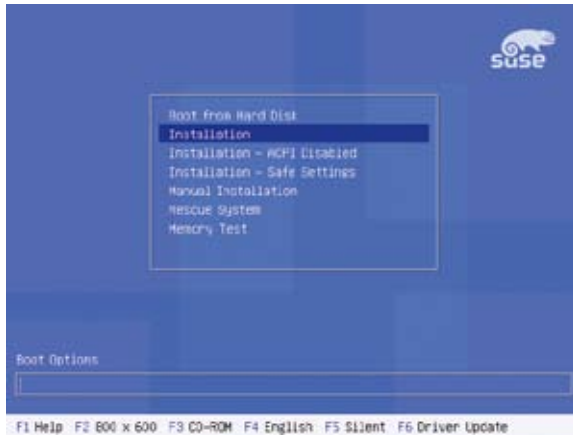
3. A message instructs you to prepare the RAID driver disk. Press <F6>.
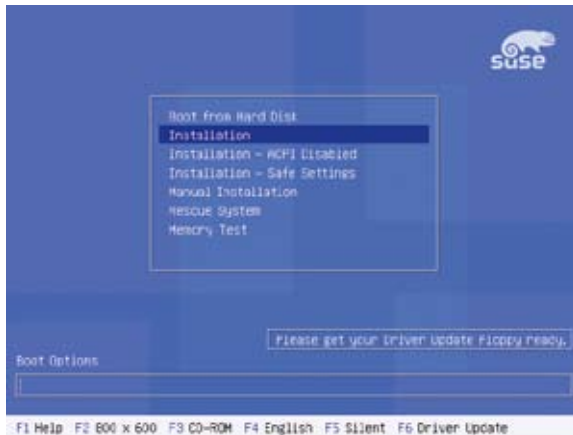
4. When prompted, insert the RAID driver disk to the floppy disk drive, then press <Enter>.

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 Intel® chipset software installation

This section provides instructions on how to install the Plug and Play components for the Intel® chipset on the system.

You need to manually install the Intel® chipset software on a Windows 2000 / Server 2003 operating system. To install the Intel® chipset software:

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.
3. Click the item **Intel(R) Chipset Software Installation Utility** from the menu.

4.   The **Intel(R) Chipset Software Installation Utility** window appears. Follow
the screen instructions to complete installation.
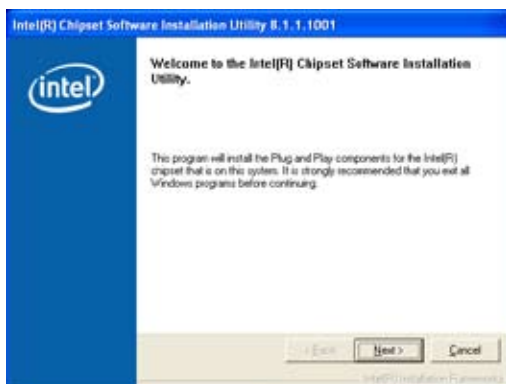
5.   Select **Yes** to accept the terms of the **License Agreement** and continue the
process.

6. Read the **Readme File Information** and press **Next** to activate the installation.

7. After completing the installation, click **Finish** to restart the computer.

7.3   LAN driver installation

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

To install the LAN controller drivers:

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.

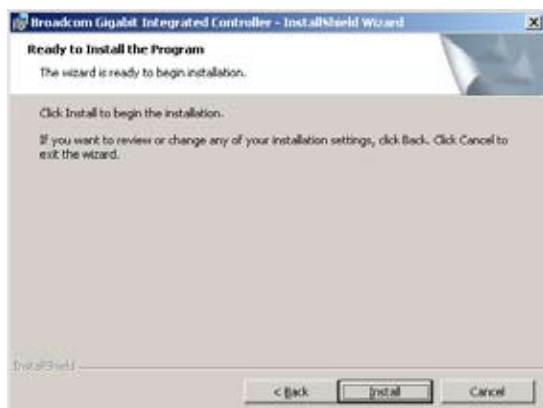3.   Click the **Broadcom 5721 Driver** to begin installation.

4.	Click **Next** when the InstallShield Wizard window appears.

5.	Toggle **I accept the terms in the license agreement** and click **Next** to continue.
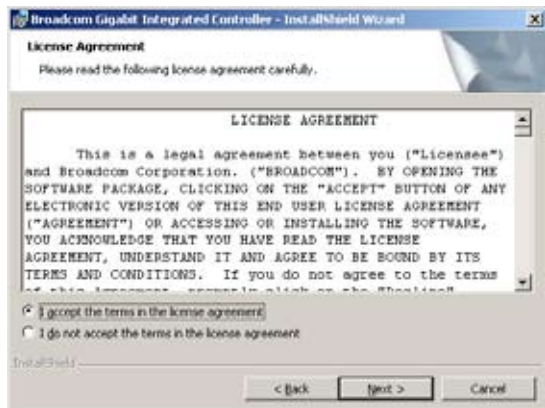
6. Click **Install** to start the installation.

7. Click **Finish** to exit the wizard when the installation is completed.
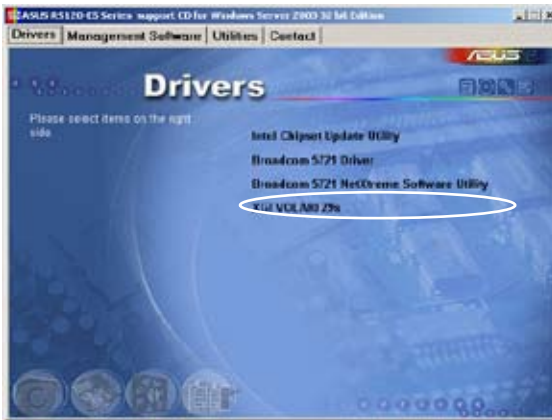
7.4 VGA driver installation

This section provides instructions on how to install the XGI Volari Z9s Video Graphics Adapter (VGA) driver.

7.4.1 Windows® Server

You need to manually install the XGI Volari Z9s VGA driver on a Windows® Server operating system. To install the XGI Volari Z9s 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.
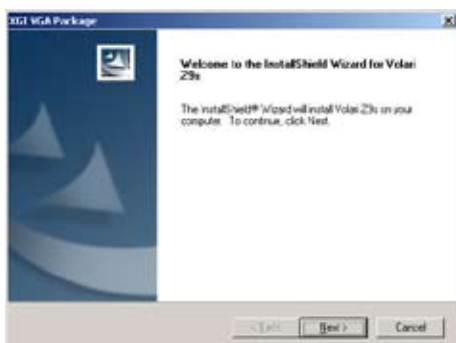
The **Drivers** menu if Autorun is enabled in your computer.

4. The **XGI VGA Package** window appears, preparing the setup.
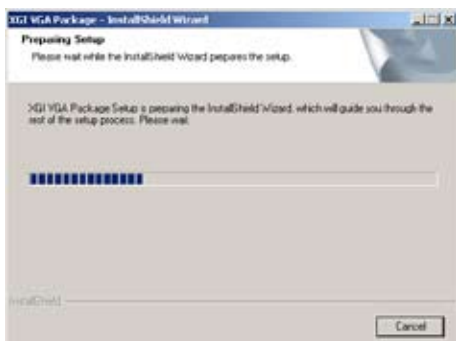
5. Click **Next** to start the installation.

6. The system will update the VGA driver.
7. When the installation completes, click **Finish** to restart your computer before using the program.

7.5 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.

7.5.1 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.

7.5.2 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.

7.5.3   Management Software menu

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

7.5.4   Utilities menu

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

7.5.5   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.