/ISUS®

ESC2000

Workstation

User Guide

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

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

REACH

Complying with the REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulatory framework, we publish the chemical substances in our products at ASUS REACH website at http://green.asus.com/english/REACH.htm.

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, contact a qualified service technician or your dealer. 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 service.

- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Servicing of this product or units is to be performed by trained service personnel only.

- 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.

DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

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 the optional components and devices into the barebone server.

4. **Chapter 4: Motherboard information**

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

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

7. **Chapter 7: Driver installation**

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

8. **Chapter 8: Multiple GPU technology support**

   This chapter describes how to install and configure multiple ATI® CrossFireX™ graphics cards and NVIDIA® CUDA technology.

Conventions

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`

Where to find more information

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

1.   ASUS websites

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

2.   Optional documentation

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

Chapter 1

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

Product introduction

1.1 System package contents

Check your system package for the following items.

Model Name	ESC2000
Chassis	ASUS T50A Pedestal 5U Rackmount Chassis
Motherboard	ASUS Z8PE-D18 Server Board
Component	1 x 1100W 80+ single power supply 1 x SATA/SAS backplane with 4 x SATA cables 4 x Hot-swap HDD trays 1 x Front I/O board 2 x System fans (front: 1 x 80mm x 38mm; Rear: 1 x 120mm x 38mm)
Accessories	1 x ESC2000 User's Guide 1 x ESC2000 Support CD (including ASWM*) 1 x ASUS ASWM 2.0 User Guide 1 x Bag of Screws 1 x AC Power Cable
Optional Items	CPU Cooler DVD ROM / DVD-RW VGA Support CD ASUS T50A Rackmount Rail Kit Anti-virus Software CD

* ASUS System Web-based Management

If any of the above items is damaged or missing, contact your retailer.

1.2 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 14 characters such as xxS0xxxxxxxxxx shown as the figure below. With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.

ESC2000

xxS0xxxxxxxxxx
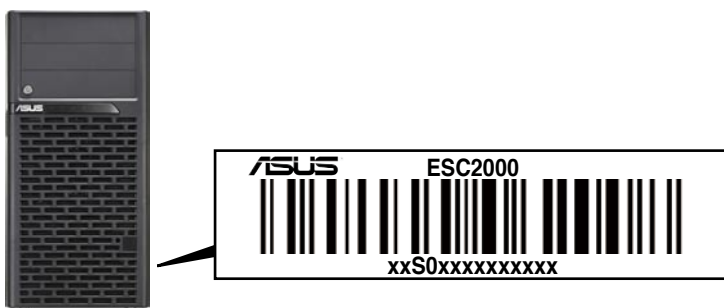
1.3   System specifications

The ASUS ESC2000 is a workstation featuring the ASUS Z8PE-D18 Server Board. The workstation supports Intel® LGA1366 Xeon™ processors, plus other latest technologies through the chipsets onboard.

Model Name		ESC2000
Processor / System Bus		2 x Socket LGA1366
		Intel® Xeon X5600 series processors (95W) Intel® Xeon E5600 series processors (80W) Intel® Xeon L5600 series processors (60W/40W) Intel® Xeon X5500 series processors (95W) Intel® Xeon E5500 series processors (80W) Intel® Xeon L5500 series processors (60W/38W)
		QPI 4.8 / 5.86 / 6.4 GT/s
Core Logic		Intel® AC5520 (36D) Intel® ICH10R I/O controller
Memory	Total Slots	18 (3-channel per CPU, 9 DIMM per CPU)
	Capacity	Maximum up to 144GB (RDIMM) Maximum up to 48GB (UDIMM)
	Memory Type	DDR3 800 / 1066 / 1333 / Reg DIMM / Unbuffered DIMM with ECC
	Memory Size	1GB, 2GB, 4GB and 8GB (RDIMM) 1GB, 2GB and 4GB (UDIMM)
Expansion Slots	Total PCI/PCI-X/ PCI-E Slots	6
	Slot Type	- Slot 1: PCI-E x8 (G1 x4 link) (Auto disabled if PIKE slot is occupied) - Slot 2: PCI 32 - Slot 3: PCI-E x16 (G2 x16 link) (Auto switch to x8 link if slot 4 is occupied) - Slot 4: PCI-E x16 (G2 x8 link) - Slot 5: PCI-E x16 (G2 x16 link) - Slot 6: PCI-E x16 (Gen2 x16 link) (Auto disabled if slot 5 is occupied, MIO supported)
	Additional Slot 1	1 x PIKE slot for storage expansion
	Additional Slot 2	1 x MIO slot for Audio
Graphics	Onboard VGA	Aspeed AST2050 8MB
	CUDA Support	Up to 2 x NVIDIA® Tesla™ C2050/C2070 or 1 x Tesla™ C1060 + 1 x Quadro™ Card
	Multi-GPU Support	Supports ATI® CrossFireX™ technology, up to Dual CrossFireX™

Storage	SATA Controller	Intel® ICH10R: - 6 x SATA2 300MB/s ports - Intel® Matrix Storage (for Windows only) - Supports software RAID 0, 1, 5 & 10 LSI® MegaRAID (for Linux / Windows): - Supports software RAID 0, 1 & 10
	SAS Controller	Optional: ASUS PIKE 1064E 4-port SAS RAID card ASUS PIKE 1068E 8-port SAS RAID card ASUS PIKE 1078 8-port SAS HW RAID card ASUS PIKE 6480 8-port SAS RAID card ASUS PIKE 2008 8-port SAS2 6G RAID card ASUS PIKE 2008/IMR 8-port SAS2 6G RAID card
HDD Bays	I = internal A or S = hot-swappable	4 x Hot-swap 3.5" HDD Bays
Networking	LAN	1 x Dual Port Intel® 82576EB (VMDq) + 1 x Mgmt LAN
Auxiliary Storage FDD / CD / DVD		3 x 5.25" media bays (Option: NO ODD / DVD-ROM / DVD-RW)
Onboard I/O		1 x External serial port 3 x RJ-45 ports (1 for ASMB4-iKVM) 4 x USB 2.0 ports (Front x 2, Rear x 2) 1 x Internal A type USB port 1 x VGA port 1 x PS/2 keyboard port 1 x PS/2 mouse port
OS Support		Windows® XP / Vista / 7 32 / 64-bit Windows® Server 2008 R2 Windows® Server 2008 Enterprise 32 / 64-bit Windows® Server 2003 R2 Enterprise 32 / 64-bit RedHat® Enterprise Linux AS5.4 / 5.5 32 / 64-bit SuSE® Linux Enterprise Server 11 32 / 64-bit (Subject to change without any notice)
Anti-virus Software		Optional anti-virus CD pack
Dimension (HH x WW x DD)		445mm x 217.5mm x 545mm
Net Weight Kg (CPU, DRAM & HDD not inclu ded)		20 Kg
Power Supply		1100W (80+ Gold) Single Power Supply
Power Rating		Input: 100-240Vac, 15-8A, 50-60Hz, Class I
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.

1.4   Front panel features

The barebone workstation displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators, optical drive, and two USB ports are located on the front panel. For future installation of 5.25-inch devices, two drive bays are available.

HDD access LED

Power LED

Optical drive

Empty 5.25-inch bays

4-bay HDD cage

USB 2.0 ports

Security lock

Power button

Reset button

Headphone output jack*
Microphone jack*
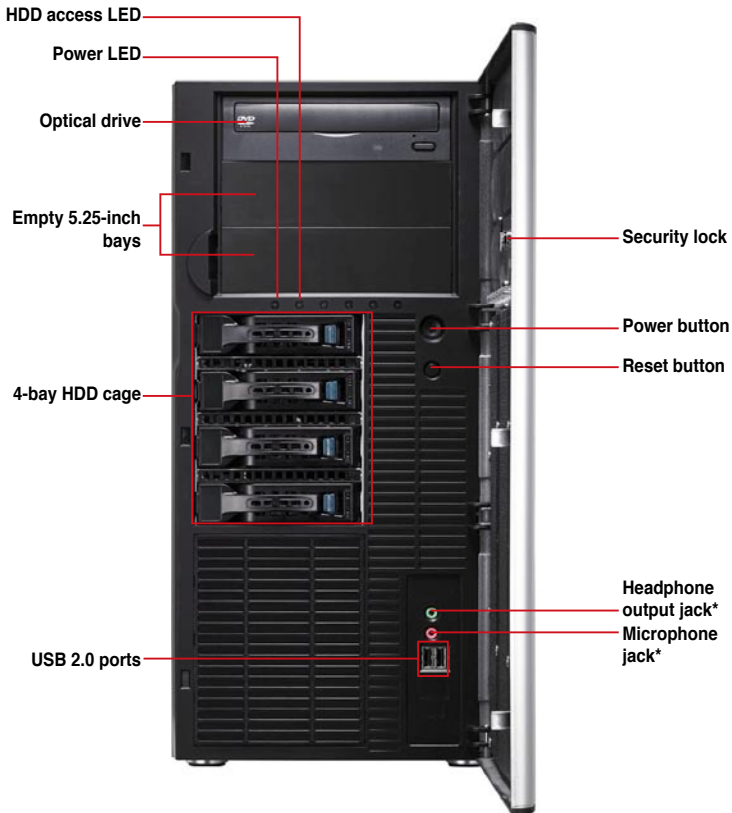
*The audio jacks function only with an optional MIO audio card.

Refer to section **1.7.1 Front panel LEDs** for the LED descriptions.

1.5   Rear panel features

The rear panel includes a slot for the motherboard rear I/O ports, expansion slots, a chassis lock and intrusion switch, a vent for the system fan, and power supply module.

Power connector

PS/2 mouse port

PS/2 keyboard port

USB 2.0 ports

Serial port

VGA port

Gigabit LAN port 1

Gigabit LAN port 2

1100W 80+Single power supply

Chassis lock

LAN port 3*

120mm x 38mm system fan

Chassis intrusion switch

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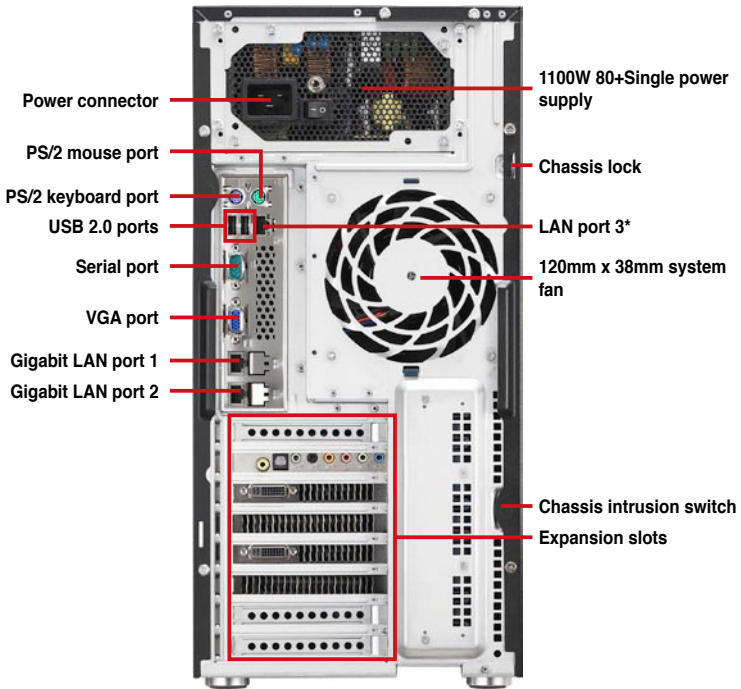
•   The ports for the PS/2 keyboard, PS/2 mouse, serial port, USB, VGA, and Gigabit LAN do not appear on the rear panel if motherboard is not present.

•   *The port is for ASUS ASMB4-iKVM controller card only.

1.6 Internal features

The barebone workstation includes the basic components as shown.
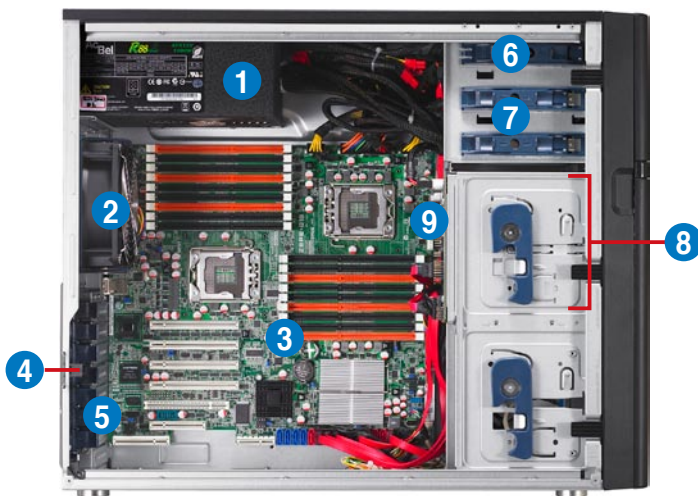
1. 1100W 80+ Single Power supply unit
2. 120mm x 38mm system fan
3. ASUS Z8PE-D18 Server Board
4. Chassis intrusion switch
5. Expansion card locks
6. Optical drive
7. 2 x 5.25-inch drive bays
8. 4-bay HDD module
9. SATA/SAS backplane board

Turn off the system power and detach the power supply before removing or replacing any system component.

The barebone workstation 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.

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*WARNING

HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

1.7 LED information

1.7.1 Front panel LEDs

HDD Access LED

Power LED
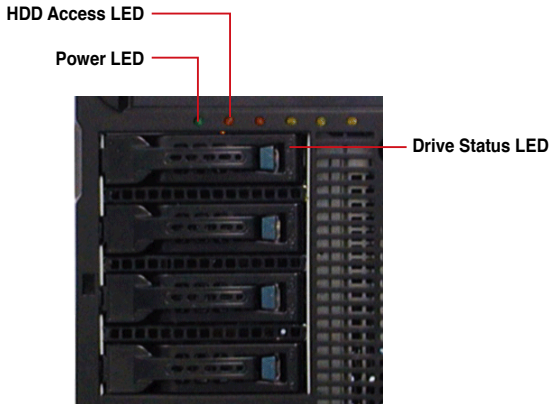
Drive Status LED

LED	Icon	Display status	Description
Power LED	☼	ON	System power ON
HDD Access LED	🖴	OFF	No activity
		Blinking	Read/write data into the HDD
Drive status LED	🗄	Green	Bridge board connected to backplane Installed HDD is in good condition
		Red	HDD failure
		Green/Red blinking	HDD rebuilding using the RAID card

> The Power and HDD Access LEDs are visible even if the system front bezel is closed.

1.7.2 Rear panel LEDs

Activity Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
ORANGE	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

ACT/LINK LED **SPEED LED**

LAN port
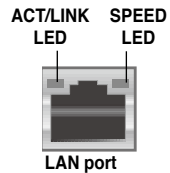
Chapter 2

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 side cover

⚠️

- • Ensure that you unplug the power cord before removing the side cover.
- • Take extra care when removing the side cover. Keep your fingers from components inside the chassis that can cause injury, such as the CPU fan, rear fan, and other sharp-edged parts.
- • The images of the workstation shown in this section are for reference purposes only and may not exactly match the model you purchase.

To remove the side cover

1.   Remove the two screws that secure the side cover.
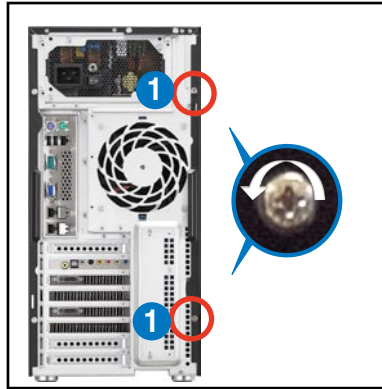
2.   Slide the side cover for about half an inch toward the rear until it is disengaged from the chassis.
3.   Carefully lift the side cover and set it aside.
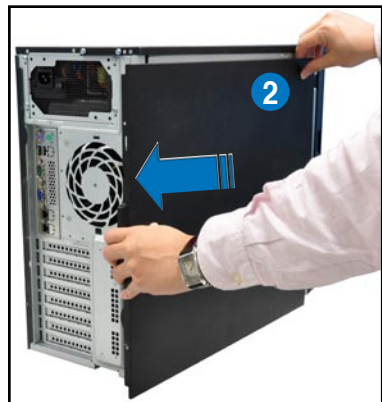
2.1.2   Reinstalling the side cover

To reinstall the side cover

1.   Match and insert the lower sliding edge of the side cover to the corresponding chassis edge.

2.   Position the side cover to the chassis.
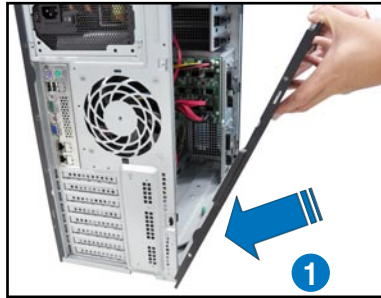
3.   Slide the side cover toward the front panel until it snaps in place.
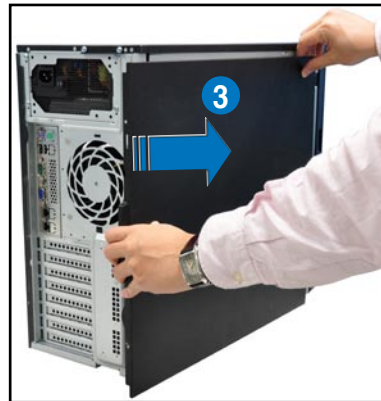
4.   Drive in the two screws you removed earlier to secure the side cover.
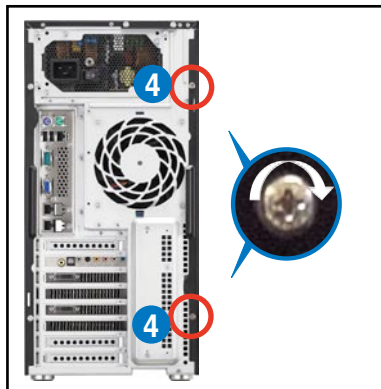
2.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1366 socket designed for the Intel® W3500 series processors.

Ensure that all power cables are unplugged before installing the CPU.

- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS shoulders the repair cost only if the damage is shipment/transit-related.

- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1366 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.
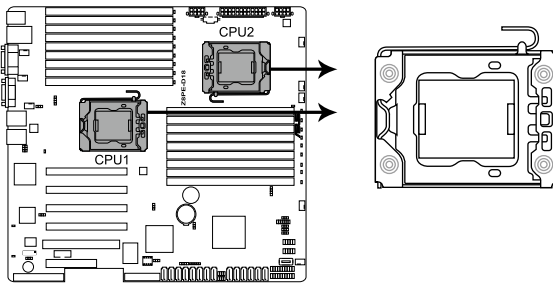
Z8PE-D18 CPU LGA1366 Socket

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

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

To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.
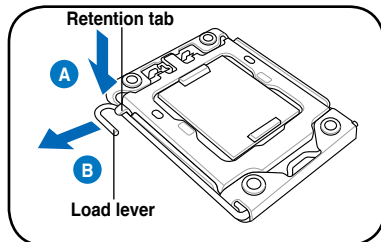
3. Lift the load lever in the direction of the arrow to a 135º angle.

4. Lift the load plate with your thumb and forefinger to a 100º angle.

Load plate
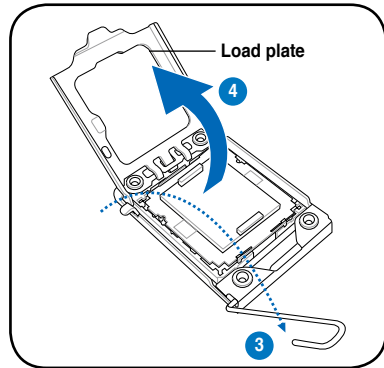
5. Remove the PnP cap from the CPU socket.

PnP cap
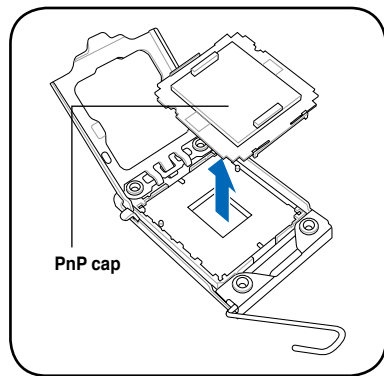
6. Position the CPU over the socket, ensuring that the gold triangle is on the bottom-left corner of the socket, and then fit the socket alignment key into the CPU notch.

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

Gold triangle mark

CPU notch

Alignment key
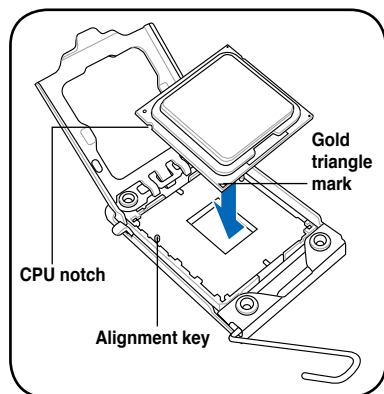
7. Apply several drops of thermal paste to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.

> Some heatsinks come with pre-applied thermal paste. If so, skip this step.

> The thermal paste is toxic and inedible. If it gets into your eyes or touches your skin, ensure to wash it off immediately and seek professional medical help.

> To prevent contaminating the paste, DO NOT spread the paste with your finger directly.
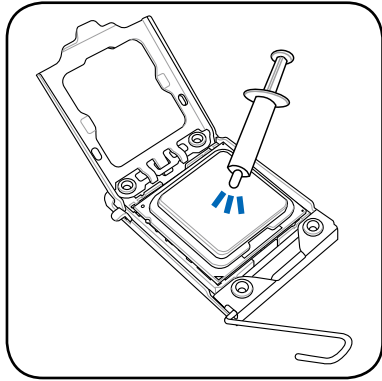
8. Close the load plate (A), and then push the load lever (B) until it snaps into the retention tab.
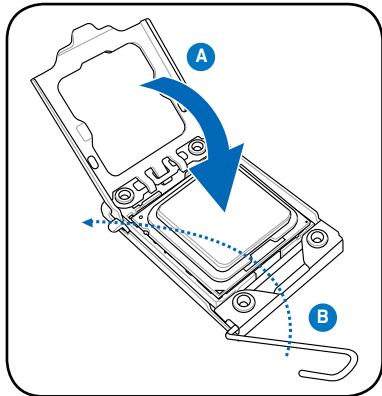
2.2.2 Installing the CPU heatsink

To install the CPU heatsink:

1. Place the heatsink on top of the installed CPU, ensuring that the four fasteners match the holes on the motherboard.
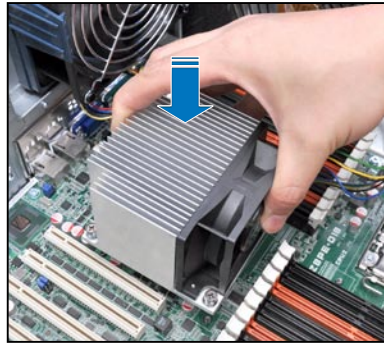
2. Twist each of the four screws with a Philips (cross) screwdriver just enough to attach the heatsink to the motherboard. When the four screws are attached, tighten them one by one to completely secure the heatsink.
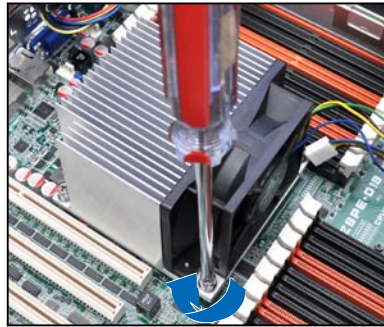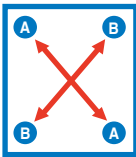
Tighten the four heatsink screws in a diagonal sequence.

3. Connect the CPU fan cable to the fan connector on the motherboard.
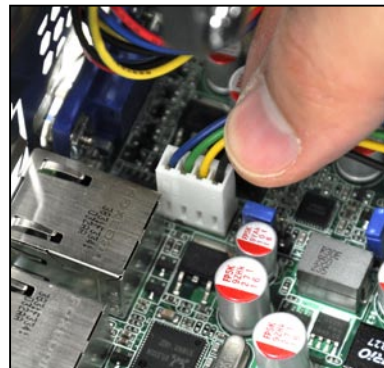
2.3 System memory

2.3.1 Overview

The motherboard comes with eighteen (18) Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR3 DIMM sockets:

Z8PE-D18 240-pin DDR3 DIMM sockets
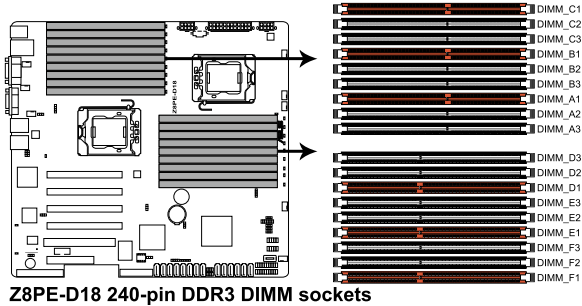
2.3.2 Memory Configurations

You may install 1 GB, 2 GB, 4 GB and 8 GB registered DDR3 DIMMs with ECC or 1GB, 2GB and 4GB unbuffered DDR3 DIMMs with ECC into the DIMM sockets using the memory configurations in this section.

- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
- For CPU1 configuraton, when installing only one DIMM, install it to the orange slots labeled DIMM_A1, DIMM_B1, or DIMM_C1.
- For CPU2 configuraton, when installing only one DIMM, install it to the orange slots labeled DIMM_D1, DIMM_E1, or DIMM_F1.

Memory population table

For UDIMM and Quad Ranks RDIMM:

CPU 1 Configuration								
	DIMM_A3	DIMM_A2	DIMM_A1	DIMM_B3	DIMM_B2	DIMM_B1	DIMM_C3	DIMM_C2	DIMM_C1
1 DIMM	--	--	●	--	--	--	--	--	--
2 DIMMs	--	--	●	--	--	●	--	--	--
3 DIMMs	--	--	●	--	--	●	--	--	●
4 DIMMs	--	●	●	--	--	●	--	--	●
5 DIMMs	--	●	●	--	●	●	--	--	●
6 DIMMs	--	●	●	--	●	●	--	●	●
CPU 2 Configuration								
	DIMM_D3	DIMM_D2	DIMM_D1	DIMM_E3	DIMM_E2	DIMM_E1	DIMM_F3	DIMM_F2	DIMM_F1
1 DIMM	--	--	●	--	--	--	--	--	--
2 DIMMs	--	--	●	--	--	●	--	--	--
3 DIMMs	--	--	●	--	--	●	--	--	●
4 DIMMs	--	●	●	--	--	●	--	--	●
5 DIMMs	--	●	●	--	●	●	--	--	●
6 DIMMs	--	●	●	--	●	●	--	●	●

For RDIMM (Single Rank, Dual Ranks):

CPU 1 Configuration								
	DIMM_A3	DIMM_A2	DIMM_A1	DIMM_B3	DIMM_B2	DIMM_B1	DIMM_C3	DIMM_C2	DIMM_C1
1 DIMM	--	--	●	--	--	--	--	--	--
2 DIMMs	--	--	●	--	--	●	--	--	--
3 DIMMs	--	--	●	--	--	●	--	--	●
4 DIMMs	--	●	●	--	--	●	--	--	●
5 DIMMs	--	●	●	--	●	●	--	--	●
6 DIMMs	--	●	●	--	●	●	--	●	●
7 DIMMs	●	●	●	--	●	●	--	●	●
8 DIMMs	●	●	●	●	●	●	--	●	●
9 DIMMs	●	●	●	●	●	●	●	●	●
CPU 2 Configuration								
	DIMM_D3	DIMM_D2	DIMM_D1	DIMM_E3	DIMM_E2	DIMM_E1	DIMM_F3	DIMM_F2	DIMM_F1
1 DIMM	--	--	●	--	--	--	--	--	--
2 DIMMs	--	--	●	--	--	●	--	--	--
3 DIMMs	--	--	●	--	--	●	--	--	●
4 DIMMs	--	●	●	--	--	●	--	--	●
5 DIMMs	--	●	●	--	●	●	--	--	●
6 DIMMs	--	●	●	--	●	●	--	●	●
7 DIMMs	●	●	●	--	●	●	--	●	●
8 DIMMs	●	●	●	●	●	●	--	●	●
9 DIMMs	●	●	●	●	●	●	●	●	●

2.3.3 Installing a DIMM

Ensure 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.

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 DIMM slot key on the socket.

DIMM notch

DIMM slot key   **Unlocked retaining clip**
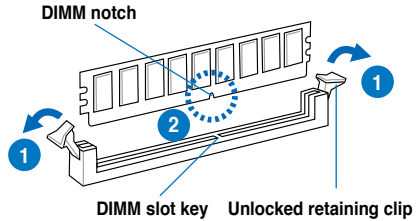
A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

3. Hold the DIMM by both of its ends, then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clips snap back into place, and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.

Locked Retaining Clip
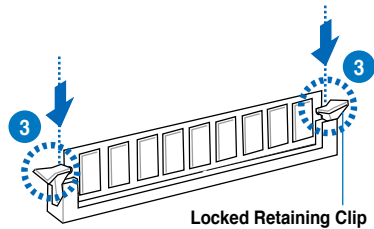
Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

2.3.4 Removing a DIMM

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

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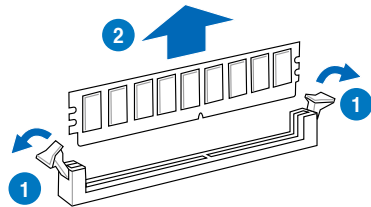
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2.4   Front panel assembly

Before you can install a 5.25-inch drive, you should first remove the front panel assembly (front bezel and front panel cover).

2.4.1   Removing the front panel assembly

To remove the front panel assembly

1.   Locate the three hooked tabs on the chassis side rail.
2.   Shift the hooked tabs and take off the front bezel.
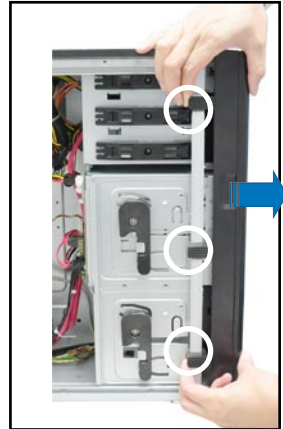
2.4.2   Reinstalling the front panel assembly

To reinstall the front panel assembly:

1.   Hook the other side of the front panel assembly to the chassis.
2.   Swing the front panel assembly and snap it back into place.

2.5   5.25-inch drives

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

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

You must remove the front panel assembly before installing a 5.25-inch drive.
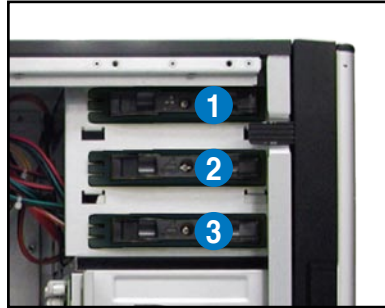
Installing a 5.25-inch drive

1. Unscrew and remove the metal cover of the bay where you want to install the 5.25-inch drive, and take off the plastic cover on the front bezel at the same position.

2. Insert the drive into the bay and slide the bay lock to the right until it clicks in place.

3. Connect the SATA cable to the SATA connector on the back of the drive.

4. Connect a power plug from the power supply to the power connector on the back of the drive.
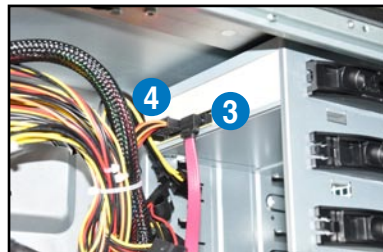
2.6 SATA hard disk drives

The hard disk drive module cage on the front panel, including externally removable trays for mounting SATA hard disk drives, allows you to access the drive trays by simply opening the front bezel.

An HDD module cage comes with a SATA backplane. Ensure of the type of HDD module cage you purchase before buying hard disks.

2.6.1 Installing the HDD module cage

1. Examine the chassis and ensure the bay space is free of wires and other obstructions.

2. Level the HDD module cage latch counterclockwise.

3. Insert the HDD module cage into the bay.
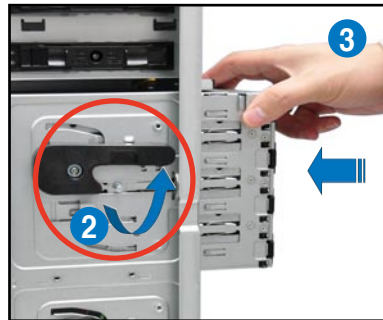
4. When the HDD module cage is completed inserted, the cage latch will be pushed back clockwise.

5. Lock the cage latch properly.

6. Connect the appropriate cables to the SATA backplane on the HDD module cage.

2.6.2   Removing the HDD module cage

1.   Disconnect the all cables from the SATA backplane on the HDD module cage.

2.   Level the HDD module cage latch counterclockwise. The HDD module cage will be pushed out of the chassis.

3.   Completely pull out the HDD module cage.

2.6.3   Installing a hot-swap SATA hard disk drive

1.   Release a drive tray by pushing the spring lock to the right, and 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, and 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.

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.
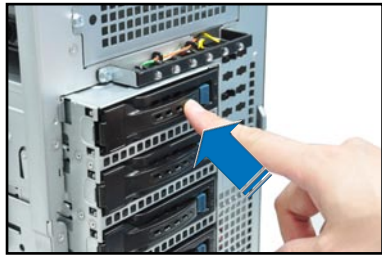
2.6.4 Removing and reinstalling the backplane

DO NOT remove the backplane unless necessary!

1. Remove all hot-swap HDD trays from the chassis.

2. Disconnect all cables from the SATA backplane.

3. Loosen the four screws on the backplane.
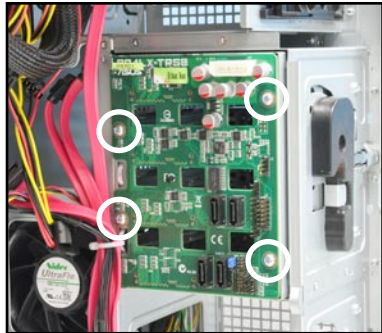
4. Firmly hold the backplane, lift it up and remove it from the module.

5. Follow the previous instructions in reverse to reinstall the backplane.
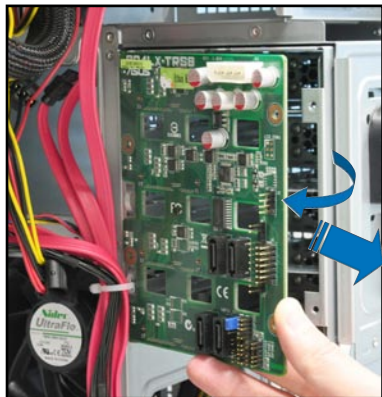
2.7 Expansion cards

The system is designed with an expansion card lock on the rear panel for you to install or remove an expansion card in less steps.

⚠️ Ensure to unplug the power cord before installing or removing expansion cards. Failure to do so may cause severe damage to the motherboard and other system components!

2.7.1 Installing an expansion card

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

2. Lay the system on its side on a flat, stable surface.

3. Push down the expansion card lock latch (step a) and lift up the expansion card lock (step b), as shown in the figures below.
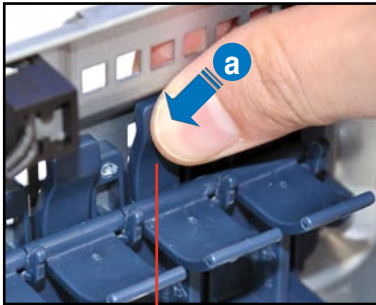
Expansion card lock latches
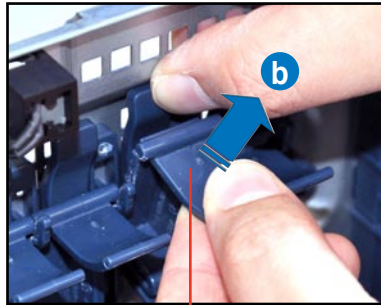
Expansion card locks

4. Remove the metal slot cover opposite the slot where you wish to install an expansion card.

5. Align the card golden fingers with the slot, and then press firmly until the card is completely seated on the slot.
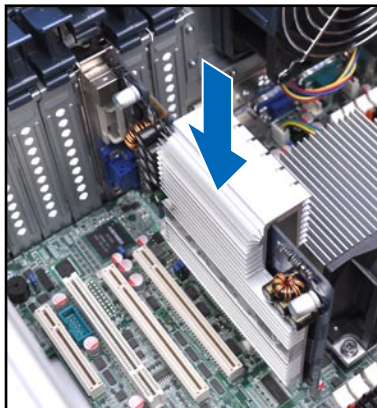
6. Restore the expansion card lock to its original position. A light click indicates that the card is locked in place.
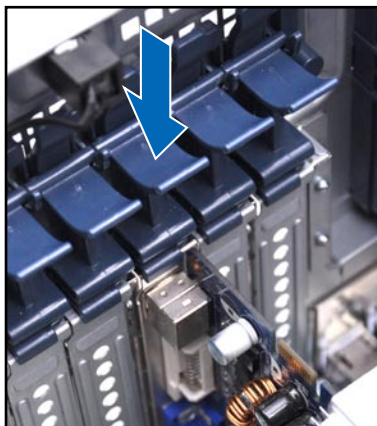
2.7.2   Configuring an expansion card

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 table.

3.   Install the software drivers for the expansion card.

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.

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.

2.7.3 PCI Express x16 slots (x16 link; x8 link)

The onboard PCI Express x16 slots provides two x16 link or one x16 link and two x8 links to Intel 5520 IOH chipset. These slots support VGA cards and various server class high performance add-on cards.

2.7.4 PCI slot

The PCI slot supports cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications.

2.7.5 PIKE slot

The PIKE slot allows you to choose and change your preferred SAS solution easily. Install an optional ASUS PIKE RAID card based on your needs.
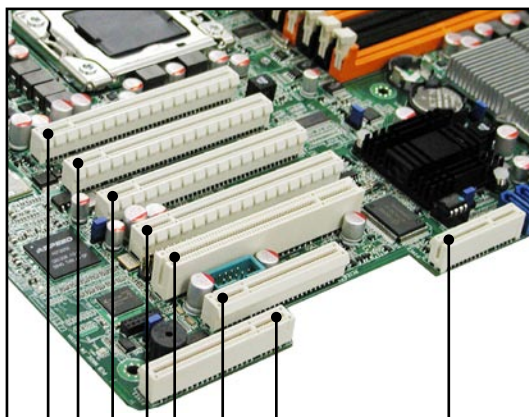
PIKE Interface

Slot 1: PCI-E x8 slot (Gen1 x4 link) (Auto disabled if PIKE slot is occupied)

Slot 2:PCI slot

Slot 3: PCI-E x16 slot (Gen2 x16 link) (Auto switch to x8 link if slot 4 is occupied)

Slot 4: PCI-E x16 slot (Gen2 x8 link)

Slot 5: PCI-E x16 slot (Gen2 x16 link)

Slot 6: PCI-E x16 slot (Gen2 x16 link) (Auto disabled if slot 5 is occupied, MIO supported)

- The PIKE Interface is for ASUS PIKE RAID card only.
- Install the optional ASUS MIO audio card to slot 6 only.
- Install the optional NVIDIA® Tesla™ computing processor cards to slot 5 and slot 3 only.

2.7.6   Installing the audio card (optional)

1.   Locate the MIO/PCIE slot (slot 6) on the motherboard.

2.   Align the card connector with the slot and press firmly until the card sits on the slot completely.
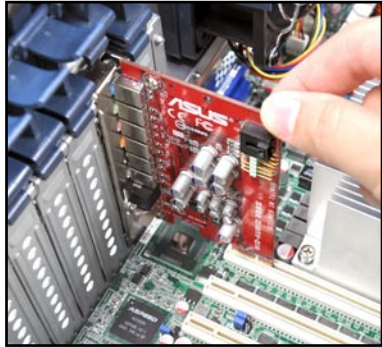
3.   Restore the expansion card lock to its original position. A light click indicates that the card is locked in place.
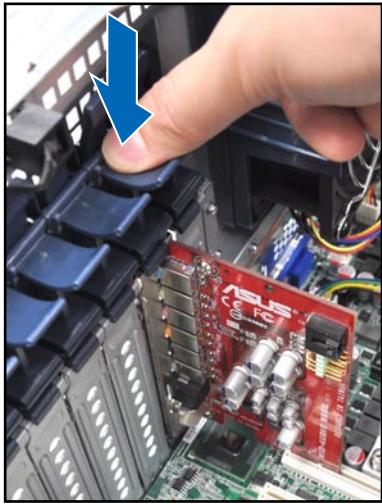
2.7.7   Installing ASUS PIKE RAID card (optional)

Follow the steps below to install an optional ASUS RAID card on your motherboard.

1.   Locate the PIKE RAID card slot on the motherboard.
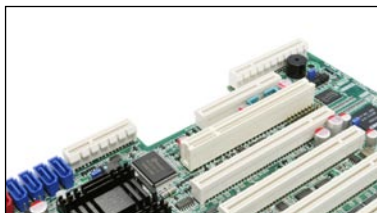
2.   Align the golden fingers of the RAID card with the PIKE RAID card slot.
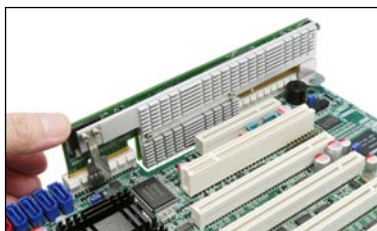
3.   Insert the RAID card into the PIKE RAID card slot. Ensure that it is completely seated on the PIKE RAID card slot.
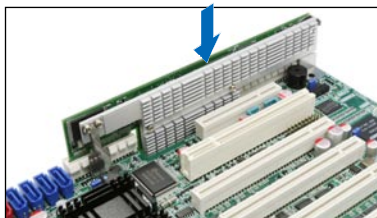
2.7.8   Installing i Button (for PIKE 1078 only)

Follow the steps below to install an optional i Button on your motherboard.

1.   Locate the I Button slot on the
      motherboard.
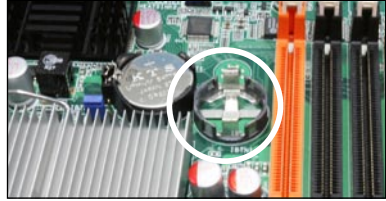
2.   Snap the I Button in place.
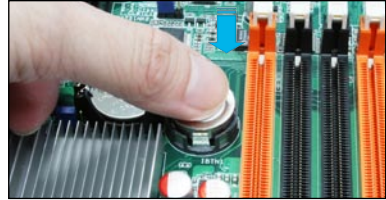
You need to install I Button before using PIKE 1078 functions.

2.8 Cable connections

- The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.
- Refer to Chapter 4 for detailed information on the connectors.

2.8.1 Motherboard connections
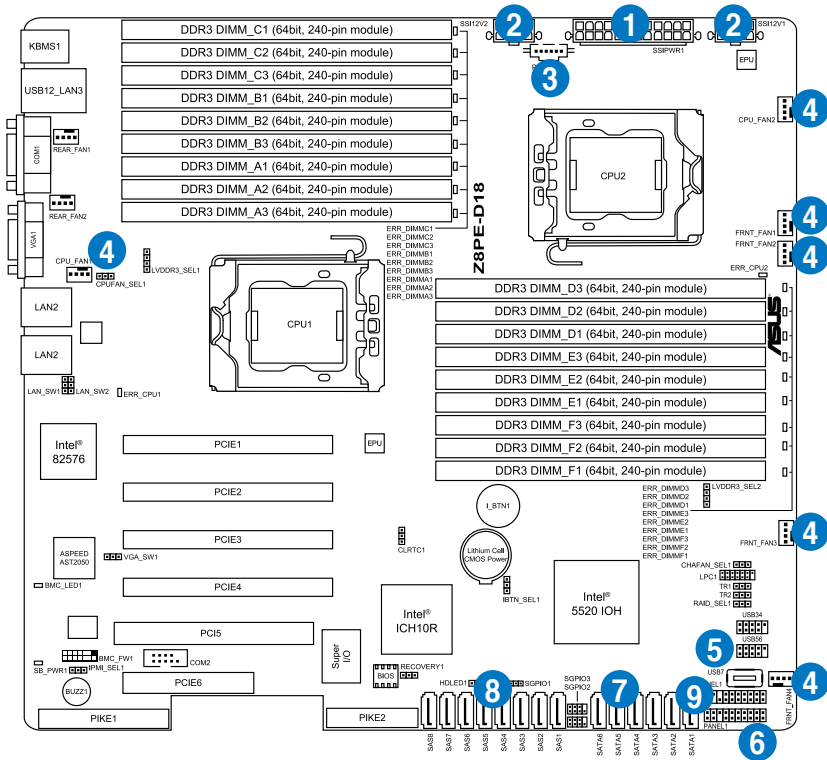
Pre-connected system cables

1. 24-pin SSI power connector (from power supply to motherboard)
2. 8-pin SSI power connector (from power supply to motherboard)
3. Power supply SMBus connector (from power supply to motherboard)
4. System fan connectors (from motherboard FRNT_FAN1, CPU_FAN1 FRNT_FAN2, FRNT_FAN3, CPU_FAN2, and FRNT_FAN4 to system fans)
5. USB connector (from motherboard to front I/O board)
6. Panel connector (from motherboard to front I/O board)
7. SATA connectors (from motherboard to SATAII/SAS backplane board)
8. SAS connectors (from motherboard to SATAII/SAS backplane board)
9. Auxiliary panel connector (from motherboard to front I/O board)

2.8.2   SATA backplane connections

An SATA backplane comes pre-installed in the ESC2000. The SATA backplane has four 22-pin SATA connectors to support Serial ATA hard disk drives. The backplane design incorporates a hot swap feature to allow easy connection or removal of SATA hard disks. The LEDs on the backplane connect to the front panel LEDs to indicate HDD status. See section **1.7 LED information** for details.

Front side

The front side of the SATA backplane faces the front panel when installed. This side includes four SATA connectors for the hot swap drive trays.
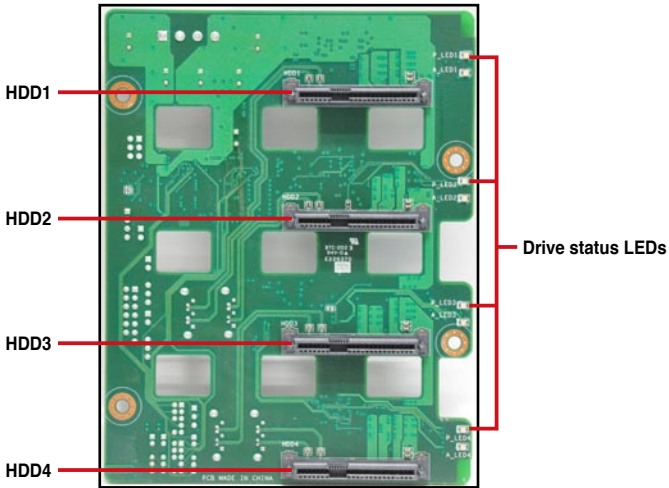
Each SATA connector is labeled (HDD1, HDD2, HDD3, HDD4) so you can easily determine their counterpart connectors at the back side of the backplane. Refer to the table for reference.

HDD Device	Front side connector	Back side connector
HDD 1	HDD1	CON1
HDD 2	HDD2	CON2
HDD 3	HDD3	CON3
HDD 4	HDD4	CON4

Back side

The back side of the SATA backplane faces the rear panel when installed. This side includes the power connectors and SATA interfaces for the motherboard Serial ATA connectors.
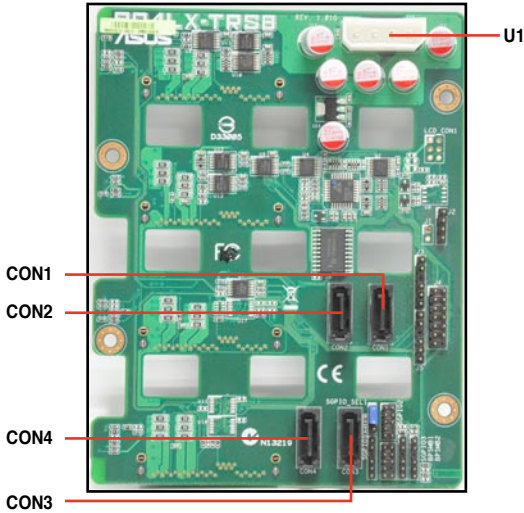
Connectors	Description
U1	Connects to 4-pin plug of the power supply
CON1/CON2/ CON3/CON4	Connects to SATA/SAS connectors on the motherboard

2.9 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. Rear system fan
2. Front system fan
3. Chassis footpads

2.9.1 Removing rear system fan

To remove the rear system fan

1. Unplug the system fan cable from the **REAR_FAN1** connector on the motherboard.

2. Shift the two hooked tabs leftward and rightward respectively.
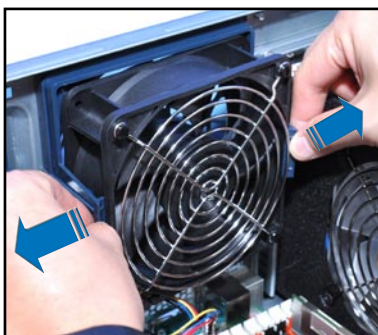
3. Carefully take off the system fan.

4. Follow the previous instructions in reverse to reinstall the rear system fan.

2.9.2 Removing front system fan

To remove the front system fan

1. Remove the two screws that secure the right side cover.
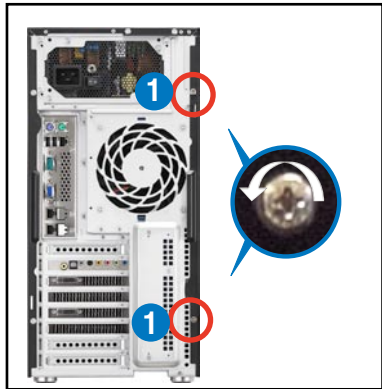
2. Locate the front system fan near the 5.25-inch drive bays.

3. Squeeze the front system fan latches (step a) and pull out the front system fan (step b), as shown in the right figure.

4. Follow the previous instructions in reverse to reinstall the front system fan.
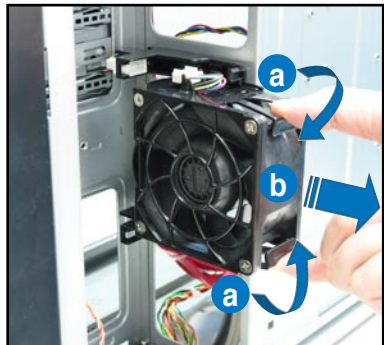
2.9.3   Removing chassis footpads

The barebone server system is shipped with four footpads attached to the bottom of the chassis for stability. You need to remove these footpads if you wish to install the system to a rack (Refer to **Chapter 3: Installation options** of this user guide, and to the "Rackmount Kit" user guide for instructions)

To remove the footpads

1. Lay the system chassis on its side.
2. Remove the footpad by rotating it counterclockwise with a Philips (cross) screwdriver.
3. Repeat step 1 and 2 to remove the other three footpads.
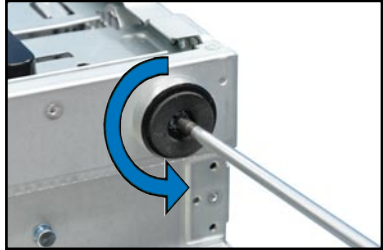
Chapter 3

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

Installation options

3.1 Preparing the system for rack mounting

> • The items required for the optional configurations described in this chapter are not included in the standard barebone system package. These items are purchased separately.
>
> • We recommend that you allot at least 1U space above the server system to ensure optimal thermal performance.

Removing the footpads

Refer to section **2.9.3 Removing chassis footpads** for instructions on removing the footpads.

Removing the top cover

Unscrew and slide the top cover toward the rear panel, and then lift it up from the chassis.

3.2 Attaching the inner rail to the server

1. Slide out the inner rail from the rackmount rail kit.
2. Align the screw holes on the inner rail and the chassis top, and then secure the inner rail to the chassis top with screws.
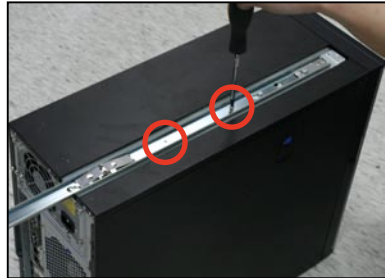
3. Repeat the previous steps to secure the other inner rail to the bottom of the chassis with screws.
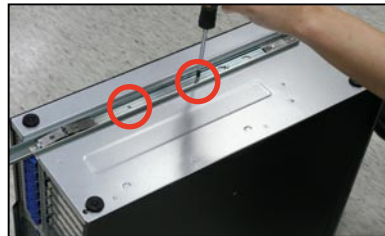
3.3   Attaching the rails to the rack

To attach the rails to the rack:

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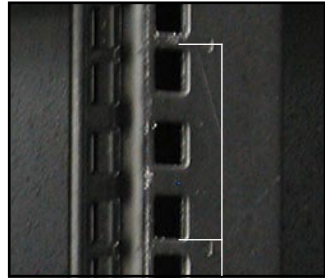
1U space

2.   Loosen the two screws on the rack rails.

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.   Drive in two screws on the outer holes to secure the rear end.

7.   From the rack front, find the corresponding 1U space for the second rail pair.

8.   Repeat steps 3–6 to attach the second rail pair.

3.4   Mounting the server to the rack

To mount the server to the rack:

1.   Align the server rails with the rack rails.

2.   Push the server all the way into the rack.

Chapter 4

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

Motherboard Info

4.1　Motherboard layout

Z8PE-D18

DDR3 DIMM_C1 (64bit, 240-pin module)
DDR3 DIMM_C2 (64bit, 240-pin module)
DDR3 DIMM_C3 (64bit, 240-pin module)
DDR3 DIMM_B1 (64bit, 240-pin module)
DDR3 DIMM_B2 (64bit, 240-pin module)
DDR3 DIMM_B3 (64bit, 240-pin module)
DDR3 DIMM_A1 (64bit, 240-pin module)
DDR3 DIMM_A2 (64bit, 240-pin module)
DDR3 DIMM_A3 (64bit, 240-pin module)

DDR3 DIMM_D3 (64bit, 240-pin module)
DDR3 DIMM_D2 (64bit, 240-pin module)
DDR3 DIMM_D1 (64bit, 240-pin module)
DDR3 DIMM_E3 (64bit, 240-pin module)
DDR3 DIMM_E2 (64bit, 240-pin module)
DDR3 DIMM_E1 (64bit, 240-pin module)
DDR3 DIMM_F3 (64bit, 240-pin module)
DDR3 DIMM_F2 (64bit, 240-pin module)
DDR3 DIMM_F1 (64bit, 240-pin module)

KBMS1
USB12_LAN3
COM1
REAR_FAN1
VGA
REAR_FAN2
CPU_FAN1
CPUFAN_SEL1
LVDDR3_SEL1
LAN2
LAN2
LAN_SW1 LAN_SW2 ERR_CPU1
Intel® 82576
ASPEED AST2050 VGA_SW1
BMC_LED1
SB_PWR1 BMC_FW1 IPMI_SEL1 COM2
BUZZ1
PIKE1

SSI12V2
PSUSMB1
SSIPWR1
EPU
CPU_FAN2
CPU2
FRNT_FAN1
FRNT_FAN2
ERR_CPU2
SSI12V1

ERR_DIMMC1
ERR_DIMMC2
ERR_DIMMC3
ERR_DIMMB1
ERR_DIMMB2
ERR_DIMMB3
ERR_DIMMA1
ERR_DIMMA2
ERR_DIMMA3

CPU1

PCIE1 EPU
PCIE2
I_BTN1
PCIE3
CLRTC1
Lithium Cell CMOS Power
PCIE4
Intel® ICH10R
IBTN_SEL1
Intel® 5520 IOH
PCI5
Super I/O
RECOVERY1
BIOS
HDLED1 SGPIO1 SGPIO3 SGPIO2
PCIE6
AUX_PANEL1
PANEL1
PIKE2

ERR_DIMMD3 LVDDR3_SEL2
ERR_DIMMD2
ERR_DIMMD1
ERR_DIMME3
ERR_DIMME2
ERR_DIMME1
ERR_DIMMF3
ERR_DIMMF2
ERR_DIMMF1
FRNT_FAN3
CHAFAN_SEL1
LPC1
TR1
TR2
RAID_SEL1
USB34
USB56
USB7
FRNT_FAN4

SAS8 SAS7 SAS6 SAS5 SAS4 SAS3 SAS2 SAS1 SATA6 SATA5 SATA4 SATA3 SATA2 SATA1

Refer to **4.3 Connectors** for more information about rear panel connectors and internal connectors.

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4.2   Jumpers

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

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

To erase the RTC RAM:

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

2.   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

Normal
(Default)   Clear CMOS

Z8PE-D18 Clear RTC RAM
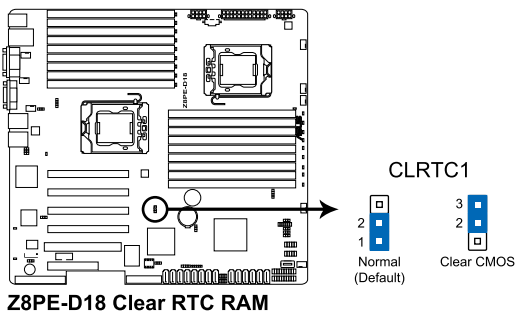
2.   **VGA controller setting (3-pin VGA_SW1)**

This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1–2 to activate the VGA feature.

VGA_SW1

Enable (Default)   Disable
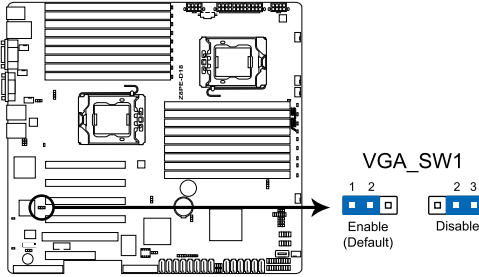
Z8PE-D18 VGA setting

3.   **CPU Fan and Chassis Fan control setting (3-pin CPUFAN_SEL1, CHAFAN_SEL1)**

These jumpers allow you to switch for fan pin selection. The CPUFAN_SEL1 jumper is for the CPU fans control and the CHAFAN_SEL1 jumper is for the front fans and rear fans control. Set to pins 1–2 when using 4-pin fans or pins 2–3 when using 3-pin fans.

CPUFAN_SEL1

4-pin FAN (Default)   3-pin FAN

CHAFAN_SEL1

4-pin FAN (Default)   3-pin FAN
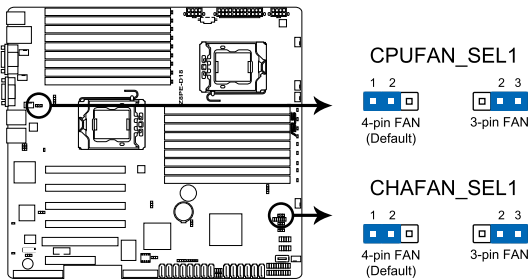
Z8PE-D18 FAN setting

- If you use a 4-pin fan but set the jumper to pin 2–3, the fan you installed may not work.

- If you use a 3-pin fan but set the jumper for a 4-pin fan, the fan control will not work and the fan you installed will always run at full speed.

4. **LAN controller setting (3-pin LAN_SW1, LAN_SW2)**

   These jumpers allow you to enable or disable the onboard Intel® 82576EB Gigabit LAN controllers. Set to pins 1–2 to activate the Gigabit LAN feature.

Z8PE-D18 LAN setting

LAN_SW1   LAN_SW2

Enable (Default)   Disable   Enable (Default)   Disable
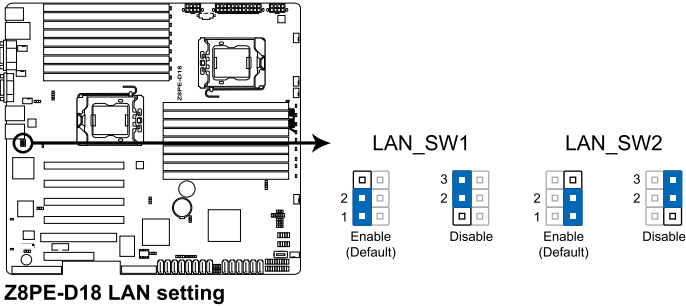
5. **DDR3 voltage control setting (4-pin LVDDR3_SEL1; LVDDR3_SEL2)**

   These jumpers allow you to adjust the DIMM voltage. Set to pins 1–2 to select 1.5V BIOS control, pins 2–3 to select 1.2V Force or 3–4 to select 1.35V Force.

Z8PE-D18 LVDDR3 setting

LVDDR3_SEL1

+1.5V (BIOS control) (Default)   Force +1.2V   Force +1.35V

LVDDR3_SEL2

+1.5V (BIOS control) (Default)   Force +1.2V   Force +1.35V
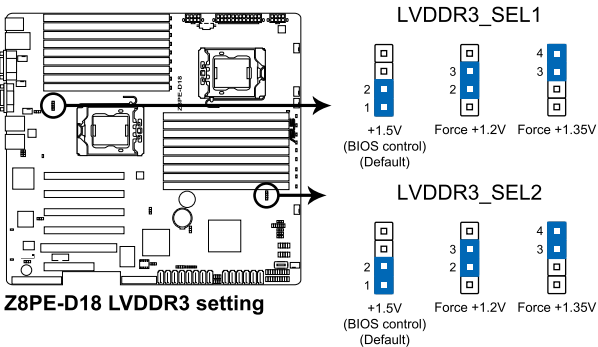
6. iBTN RAID setting (3-pin IBTN_SEL1)

This jumper allows you to select the RAID configuration utility to use when you create disk arrays. Place the jumper caps on pins 1–2 if you install a PIKE RAID card to the motherboard and want to use the LSI Logic MPT Setup Utility (default). Or you can place the jumper caps on pins 2–3 to create the LSI Mega RAID 5 supported by Intel® ICH10R SATA controller.

Z8PE-D18 IBTN setting
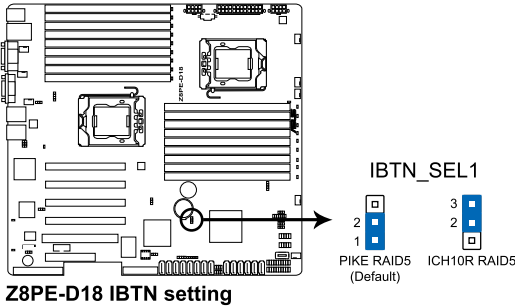
- • LSI Logic MPT Setup Utility is available only when you install a PIKE RAID card.

- • LSI Mega RAID 5 fucntion is available only when you place the iBTN to I_BTN1 slot and install an optional ASUS PIKE RAID card.

7. **Force BIOS recovery setting (3-pin RECOVERY1)**

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

To update the BIOS:

1. Prepare a USB flash disk that contains the original or latest BIOS for the motherboard (XXXXXX.ROM) and the AFUDOS.EXE utility.
2. Set the jumper to pins 2–3.
3. Insert the USB flash and turn on the system to update the BIOS.
4. Shut down the system.
5. Set the jumper back to pins 1–2.
6. Turn on the system.

RECOVERY1

1 2   2 3

Normal   BIOS Recovery
(Default)

Z8PE-D18 BIOS recovery setting
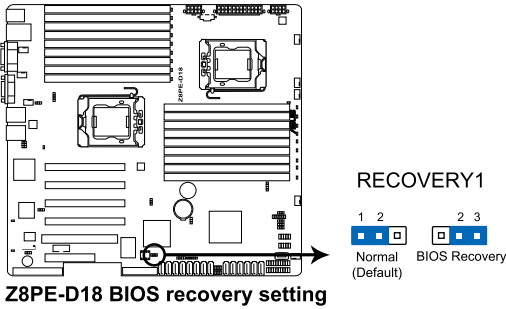
8. **RAID configuration utility selection (3-pin RAID_SEL1)**

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

RAID_SEL1

1 2   2 3

3RD   INTEL
(Default)

Z8PE-D18 RAID setting
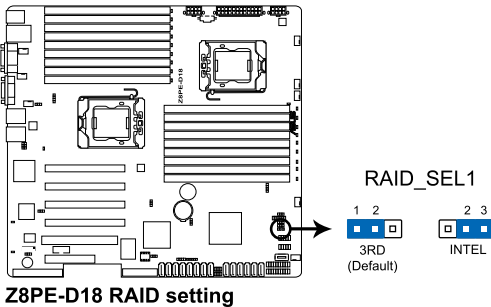
4.3 Connectors

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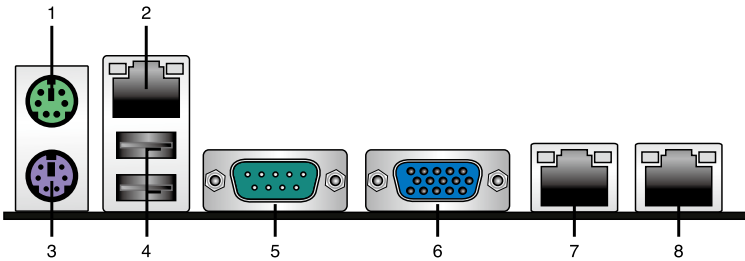
1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.

2. **RJ-45 port for iKVM.** This RJ-45 port functions only when you install ASMB4 management card.

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

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

5. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.

6. **Video Graphics Adapter port.** This port is for a VGA monitor or other VGA-compatible devices.

7. **LAN 1 (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

8. **LAN 2 (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

LAN port LED indications

Activity/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

ACT/LINK SPEED LED LED

LAN port
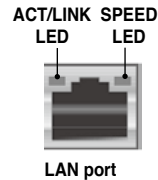
4.3.2 Internal connectors

1. **Serial ATA connectors**
   (7-pin SATA1, SATA2, SATA3, SATA4; RED)

   (7-pin SATA5, SATA6; Black)

   Supported by the Intel® ICH10R chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 3Gb/s of data transfer rate.

   If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10, or RAID 5 configuration.

Z8PE-D18 SATA connectors
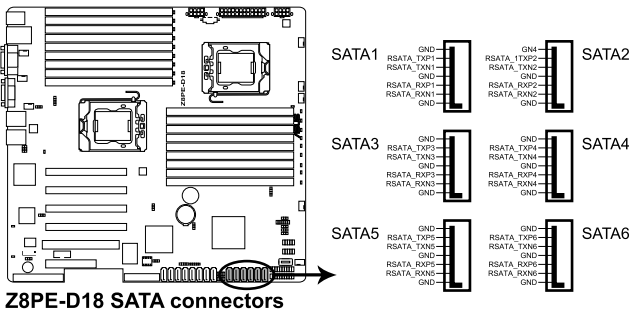
The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

2. **SAS connectors**
    (7-pin SAS1, SAS2, SAS3, SAS4; Red)
    (7-pin SAS5, SAS6, SAS7, SAS8; Blue)

    This motherboard comes with eight (8) Serial Attached SCSI (SAS) connectors, the next-generation storage technology that supports both Serial Attached SCSI (SAS) and Serial ATA (SATA). Each connector supports one device.

    - These connectors function only when you install a PIKE RAID card.
    - Connect the SAS hard disk drives to SAS connectors 1–4 (red) when installing a 4-port PIKE RAID card.

Z8PE-D18 SAS connectors
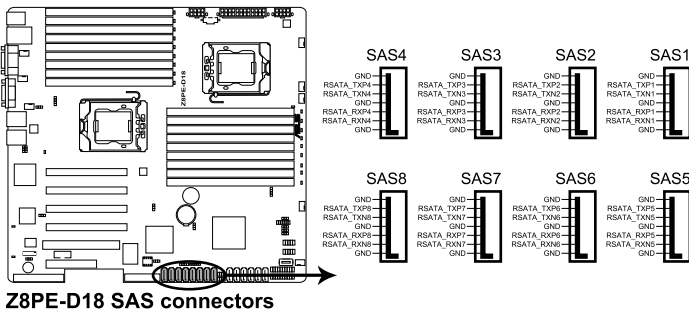
3. **Hard disk activity LED connector (4-pin HDLED1)**

    This LED connector is for the storage add-on card cable connected to the SATA or SAS add-on card. The read or write activities of any device connected to the SATA or SAS add-on card causes the front panel LED to light up.

Z8PE-D18 Storage card actisvity LED connector
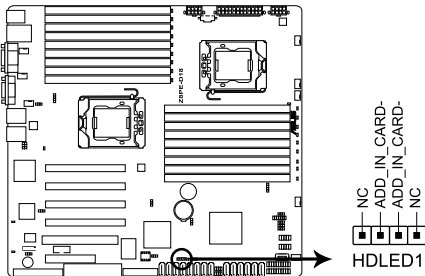
4. **USB connectors (10-1 pin USB34, USB56; A-Type USB7)**

   These connectors are for USB 2.0 ports. Connect the USB module cables to connectors USB34 and USB56, then install the modules to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.

   Z8PE-D18 USB 2.0 connectors
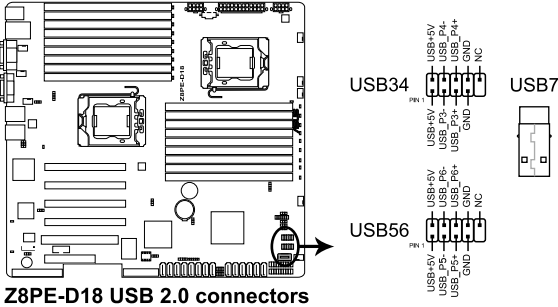
5. **Thermal sensor cable connectors (3-pin TR1, TR2)**

   These connectors are for temperature monitoring. Connect the thermal sensor cables to these connectors and place the other ends to the devices, which you want to monitor temperature.
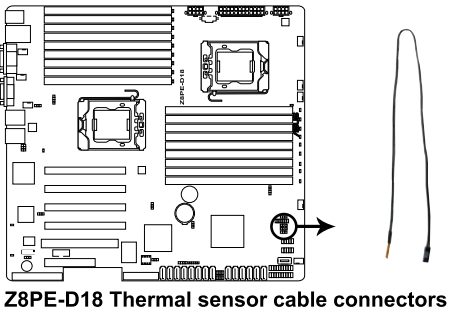
   Z8PE-D18 Thermal sensor cable connectors

6. CPU, front and rear fan connectors (4-pin CPU_FAN1, CPU_FAN2, FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, FRNT_FAN4, REAR_FAN1, REAR_FAN2)

The fan connectors support cooling fans of 350 mA–740 mA (8.88 W max.) or a total of 3.15 A–6.66 A (53.28 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.

⚠️
- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.
- These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fans feature the ASUS Smart Fan technology.

Z8PE-D18 FAN connectors
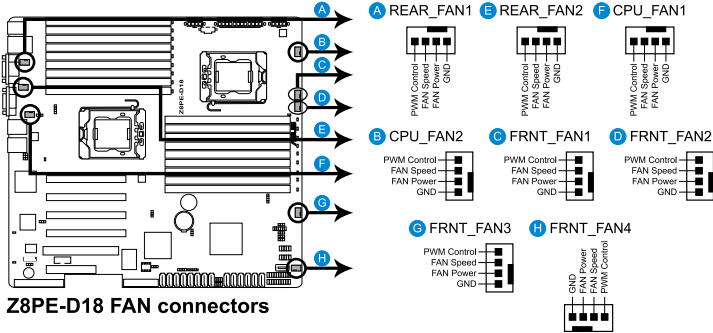
7. LPC debug card connector (14-1 pin LPC1)

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

Z8PE-D18 LPC connector
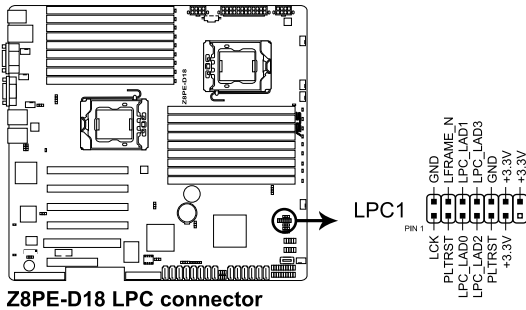
8. **Serial General Purpose Input/Output connector (6-1 pin SGPIO1)**

This connector is used for the SGPIO peripherals for the LSI MegaRAID and Intel Matrix RAID SATA LED.

Z8PE-D18 SGPIO connector

SGPIO1

SGPIO_SDATAOUT0
SGPIO_SDATAOUT1
GND
SGPIO_SLOAD
SGPIO_SCLK

PIN1
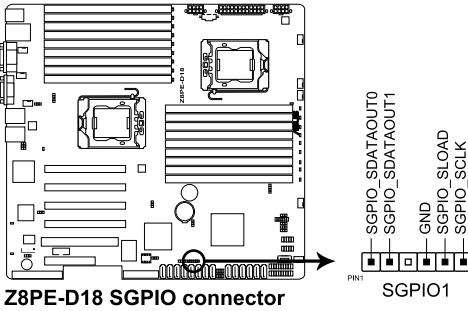
9. **Serial General Purpose Input/Output connectors (8-1 pin SGPIO2/3)**

These connector is used for the SAS chip SGPIO interface that controls the LED pattern generation, device information and general purpose data.

Z8PE-D18 SGPIO2/3 connectors

SGPIO3

SIO_DIN
SIO_DOUT
GND
GND
GND
SIO_CLK
SIO_CLK

PIN 1

SGPIO2

SIO_DIN
SIO_DOUT
GND
GND
GND
SIO_END
SIO_CLK
SIO_CLK

PIN 1
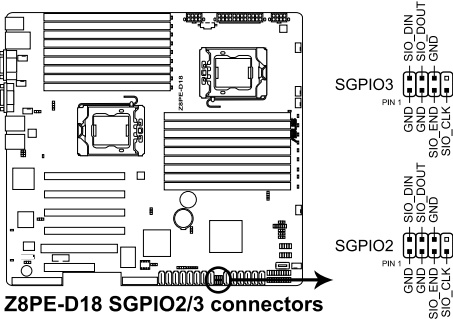
These connectors functions only when you install an ASUS PIKE SAS RAID card.

10. 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.
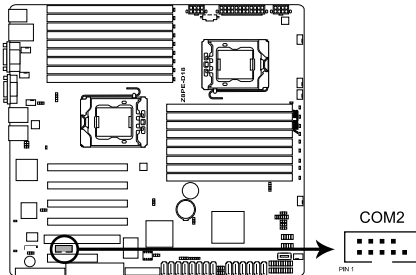
Z8PE-D18 Serial port connector

11. BMC header (BMC_FW1)

The BMC connector on the motherboard supports an ASUS® Server Management Board 4 Series (ASMB4).
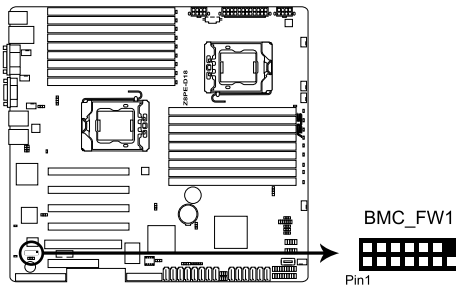
Z8PE-D18 BMC connector

12. Power Supply SMBus connector (5-pin PSUSMB1)

This connector allows you to connect SMBus (System Management Bus) to the power supply unit to read PSU information. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.
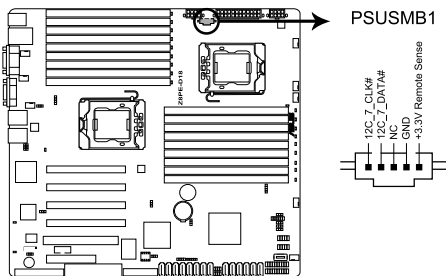
Z8PE-D18 Power supply SMBus connector

13. SSI power connectors (24-pin SSIPWR1, 8-pin SSI12V1, 8-pin SSI12V2)

These connectors are for an 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.

- DO NOT forget to connect the 24+8+8-pin power plugs; 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.

- Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system.
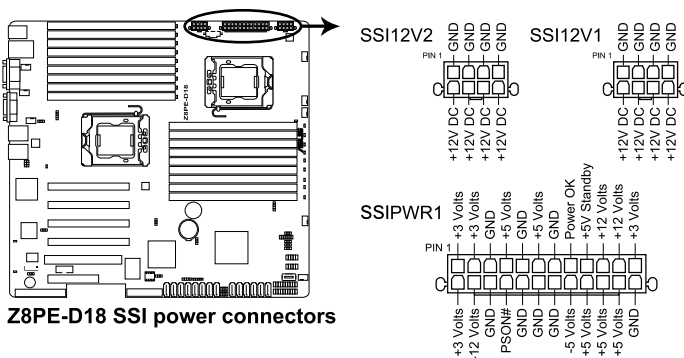
Z8PE-D18 SSI power connectors

14. **System panel connector (20-pin PANEL1)**

This connector supports several chassis-mounted functions.

Z8PE-D18 System panel connector
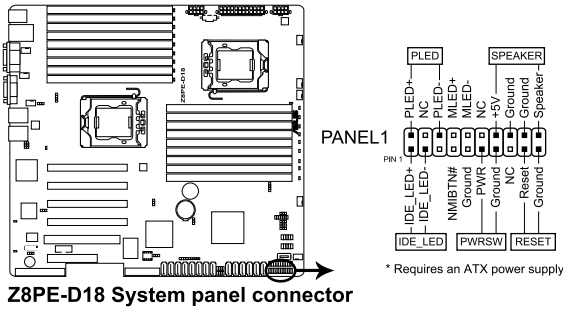
1. **System power LED (3-pin PLED)**
   This 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

2. **Message LED (2-pin MLED)**
   This 2-pin connector is for the message LED cable that connects to the front message LED. The message LED is controlled by Hardware monitor to indicate an abnormal event occurance.

3. **System warning speaker (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.

4. **Hard disk drive activity LED (2-pin HDDLED)**
   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.

5. **SSI power button/soft-off button (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.

6. **Reset button (2-pin RESET)**
   This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

15. 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.
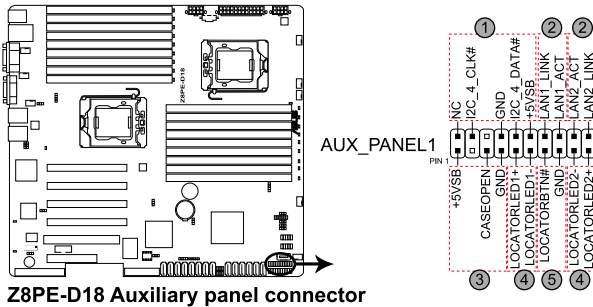
Z8PE-D18 Auxiliary panel connector

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

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

3. **Chassis intrusion (4-1 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. The default setting is short CASEOPEN and GND pin by jumper cap to disable the function.

4. **Locator LED (2-pin LOCATORLED1 and 2-pin LOCATORLED2)**
   These leads are for the locator LED1 and LED2 on the front panel. Connect the Locator LED cables to these 2-pin connector. The LEDs will light up when the Locator button is pressed.

5. **Locator Button/Swich (2-pin LOCATORBTN)**
   These leads are for the locator button on the front panel. This button queries the state of the system locator.

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. **AFUDOS utility** (Updates the BIOS in DOS mode using a bootable USB flash disk drive.)
2. **ASUS CrashFree BIOS 3** (To recover the BIOS using a bootable USB flash disk drive when the BIOS file fails or gets corrupted.)

Refer to the corresponding sections for details on these utilities.

> Save a copy of the original motherboard BIOS file to a bootable USB flash disk drive 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 AFUDOS utility

The AFUDOS utility allows you to update the BIOS file in DOS environment using a bootable USB flash disk drive 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:

> 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 USB flash disk drive 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 USB flash disk drive.

```
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 at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.

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 USB flash disk drive 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 USB flash disk drive, 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))
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   WARNING!! Do not turn off power during flash BIOS
   Reading file ....... done
   Reading flash ...... done

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

   Please restart your computer

A:\>
```

5.1.2   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 USB flash drive that contains the updated BIOS file.

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

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 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 at 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 chip.

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

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

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

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

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

5.2.1 BIOS menu screen

Menu items   Menu bar   Configuration fields   General help

```
                           BIOS SETUP UTILITY
  Main     Advanced    Server    Boot    Exit

  System Time               [09:15:30]              Use [ENTER], [TAB]
  System Date               [Wed, 06/02/2010]       or [SHIFT-TAB] to
  Legacy Diskette A         [1.44M, 3.5 in.]        select a field.

  ▶ SATA 1            :     [ST3160812AS]            Use [+] or [-] to
  ▶ SATA 2            :     [Not Detected]           configure system Date.
  ▶ SATA 3            :     [Not Detected]
  ▶ SATA 4            :     [Not Detected]
  ▶ SATA 5            :     [Not Detected]
  ▶ SATA 6            :     [Not Detected]
                                                     ←→   Select Screen
  ▶ IDE Configuration                                ↑↓   Select Item
  ▶ AHCI Configuration                               +-   Change Field
  ▶ System Information                               Tab  Select Field
                                                     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

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.

> The navigation keys differ from one screen to another.

5.2.4   Menu items

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

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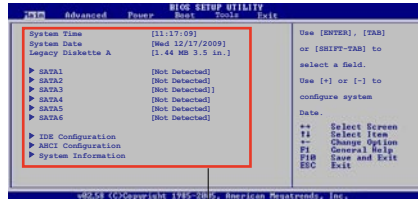
Main menu items

5.2.5   Sub-menu items

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

5.2.6   Configuration fields

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

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

5.2.7   Pop-up window

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

5.2.8   Scroll bar

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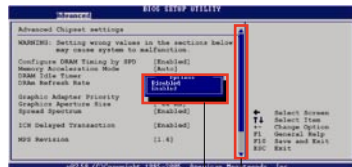
Pop-up window

Scroll bar

5.2.9   General help

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

5.3   Main menu

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

Refer to section **5.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.

```
                              BIOS SETUP UTILITY
   Main     Advanced    Server    Boot    Exit

   System Time                   [09:16:30]           Use [ENTER], [TAB]
   System Date                   [Wed 06/02/2010]     or [SHIFT-TAB] to
                                                      select a field.
 ▶ SATA 1                    :   [ST3160812AS]
 ▶ SATA 2                    :   [Not Detected]       Use [+] or [-] to
 ▶ SATA 3                    :   [Not Detected]       configure system Date.
 ▶ SATA 4                    :   [Not Detected]
 ▶ SATA 5                    :   [Not Detected]
 ▶ SATA 6                    :   [Not Detected]

 ▶ IDE Configuration                                  ←→   Select Screen
 ▶ AHCI Configuration                                 ↑↓   Select Item
 ▶ System Information                                 +-   Change Field
                                                      Tab  Select Field
                                                      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   SATA1–6

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

```
                          BIOS SETUP UTILITY
    Main

    SATA 1                                      Disabled: Disabled LBA
    Device    :Hard Disk                        Mode.
    Vendor    :xxxxxxxxx                         Auto: Enables LBA
    Size      :xx.xGB                            Mode if the device
    LBA Mode  :Supported                         supports it and the
    Block Mode:16Sectors                         device is not already
    PIO Mode  :4                                 formatted with LBA
    Async DMA :MultiWord DMA-2                   Mode disabled.
    Ultra DMA :Ultra DMA-6
    S.M.A.R.T.:Supported

    LBA/Large Mode             [Auto]            ←→    Select Screen
    Block(Multi-Sector Transfer)M[Auto]          ↑↓    Select Item
    PIO Mode                   [Auto]            +-    Change Option
    DMA Mode                   [Auto]            F1    General Help
    SMART Monitoring           [Auto]            F10   Save and Exit
    32Bit Data Transfer        [Enabled]         ESC   Exit

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```

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

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] [UDMA5]

SMART Monitoring [Auto]

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

32Bit Data Transfer [Enabled]

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

5.3.4   IDE Configuration

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

```
                           BIOS SETUP UTILITY
   Main

  IDE Configuration                                    Options

  SATA Configuration         [Enhanced]
    Configure SATA as        [IDE]             Disabled
                                               Compatible
  Hard Disk Write Protect    [Disabled]        Enhanced
  IDE Detect Time Out (Sec)  [35]




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

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```
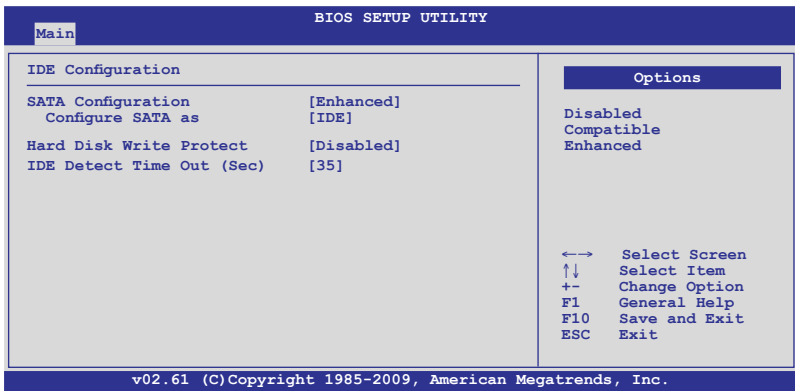
SATA Configuration [Enhanced]

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

> *Configure SATA as [IDE]*
> Sets the configuration for the Serial ATA connectors supported by the Southbridge chip. Configuration options: [IDE] [RAID] [AHCI]

- • 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 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 RAID sets with LSI MegaRAID utility, or Intel® Matrix Storage Technology from the Serial ATA hard disk drives, set this item to [RAID].

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]

5.3.5   AHCI Configuration

This menu is the section for AHCI configuration.

```
                        BIOS SETUP UTILITY
   Main

  AHCI Settings                                    Some SATA CD/DVD in
                                                   AHCI mode need to
  AHCI CD/DVD Boot Time out     [35]               wait ready longer.

  ▶ SATA Port1 [Not Detected]
  ▶ SATA Port2 [Not Detected]
  ▶ SATA Port3 [Not Detected]
  ▶ SATA Port4 [Not Detected]
  ▶ SATA Port5 [Not Detected]
  ▶ SATA Port6 [Not Detected]
```
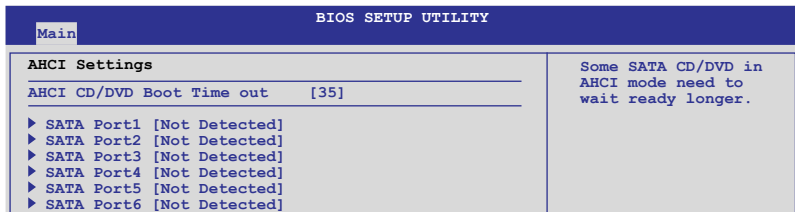
AHCI CD/DVD Boot Time out [35]

Selects the boot time out value for SATA CD/DVD devices in AHCI mode.
Congifuration options: [0] [5] [10] [15] [20] [25] [30] [35]

SATA Port1–6 [XXXX]

Displays the status of auto-detection of SATA devices.

```
                        BIOS SETUP UTILITY
   Main

  SATA Port1                                       Select the type
                                                   of device connected
  Device      :Not Detected                        to the system.

  SATA Port0                    [Auto]
  SMART Monitoring              [Enabled]
```
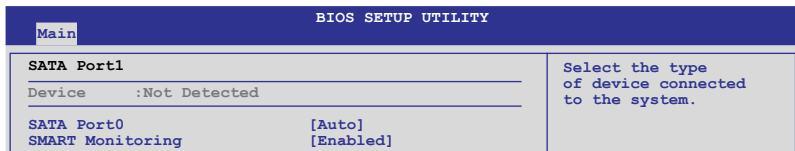
SATA Port0 [Auto]
Allows you to select the type of device connected to the system.
Configuration options: [Auto] [Not Installed]

SMART Monitoring [Enabled]
Allows you to set the Self-Monitoring, Analysis and Reporting Technology.
Configuration options: [Disabled] [Enabled]

5.3.6 System Information

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

```
                            BIOS SETUP UTILITY
    Main

   AMIBIOS
   Version      :0807
   Build Date   :04/14/10


   Processor
   Type         :Intel(R) Xeon(R) CPU X5670 @ 2.93GHz
   Speed        :2933MHZ

   System Memory
   Usable Size  : 4088MB

   Onboard LAN1 Address  : 48.5B.39.24.31.4A
   Onboard LAN2 Address  : 48.5B.39.24.31.4B
                                               ←→   Select Screen
                                               ↑↓   Select Item
   ▶  System Memory Information                Enter Go to Sub Screen
                                               F1   General Help
                                               F10  Save and Exit
                                               ESC  Exit

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```

AMIBIOS

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

Displays the auto-detected system memory.

System Memory Information

Displays system memory information.

```
                            BIOS SETUP UTILITY
    Main

   System Memory Information

   ▶   CPU1 Memory Information
   ▶   CPU2 Memory Information

```
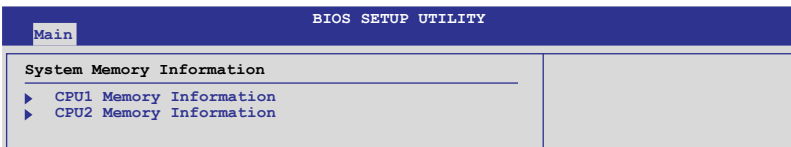
CPU1/2 Memory Configuration
Allows you to check information of installed memory (9 DIMMs per CPU).

CPU1/2 Memory Configuration
Displays the auto-detected memory specification.

```
                         BIOS SETUP UTILITY
 Main

 CPU1 Memory Configuration

 Speed    DDR3 1333

 DIMM_A1   N/A
 DIMM_A2   N/A
 DIMM_A3   N/A
 DIMM_B1   N/A
 DIMM_B2   N/A
 DIMM_B3   N/A
 DIMM_C1   4096 MB, 2R, 1333, 36.25°C/97.25°F
 DIMM_C2   N/A
 DIMM_C3   N/A
```

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    Boot    Exit

                                              Configure CPU.
 ▶  CPU Configuration
 ▶  Chipset Configuration
 ▶  Legacy Device Configuration
 ▶  USB Configuration
 ▶  PCIPnP Configuration
 ▶  APM Configuration
 ▶  Event Log Configuration
 ▶  Hardware Monitor
 ▶  I/O Virtualization
 ▶  PCI Exppress Configuration         ←→    Select Screen
 ▶  ACPI Configuration                 ↑↓    Select Item
                                       Enter Go to Sub Screen
                                       F1    General Help
                                       F10   Save and Exit
                                       ESC   Exit


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```

5.4.1 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects. Some items may not appear if your CPU does not support the related functions.

```
                                BIOS SETUP UTILITY
            Advanced

    Configure advanced CPU settings              Sets the ratio between
    Module Version:01.08                         CPU Core Clock and the
                                                 FSB Frequency.
    Manufacturer:Intel                           Note:If an invalid
    Brand String:Intel(R) Xeon(R) CPU X5670 @ 2.93GHz  ratio is set in CMOS
    Frequency    :2.93GHz                        then actual and
    BCLK Speed   :133MHz                         setpoint values may
    Cache L1     :384 KB                         differ.
    Cache L2     :1536 KB
    Cache L3     :12288 KB
    Ratio Status:Unlocked (Min:12, Max:22)
    Ratio Actual Value  :22

       Ratio CMOS Setting:          [22]
    C1E Support                     [Enabled]    ←→    Select Screen
    Hardware Prefetcher             [Enabled]    ↑↓    Select Item
    Adjacent Cache Line Prefetch    [Enabled]    +-    Change Option
    MPS and ACPI MADT ordering      [Modern ordering]  F1    General Help
    Max CPUID Value Limit           [Disabled]   F10   Save and Exit
    Intel(R) Virtualization Tech    [Enabled]    ESC   Exit

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```

Scroll down for more items.

```
                         BIOS SETUP UTILITY
            Advanced

CPU TM Function                  [Enabled]         CPU Thermal Monitor.
Execute-Disable Bit Capability  [Enabled]
Intel(R) HT Technology          [Enabled]
Active Processor Cores          [All]
A20M                            [Disabled]
Data Reuse Optimization         [Enabled]
L1 IP Prefetcher                [Enabled]
L1 Data Prefetcher              [Enabled]
Performance/Watt                [Power
Optimized]
Intel(R) SpeedStep(TM) Tech     [Enabled]
Intel(R) TurboMode tech         [Enabled]
Intel(R) C-STATE Tech           [Enabled]
C State package limit setting   [Auto]
C3 State                        [ACPI C3]          ←→   Select Screen
C6 State                        [Enabled]          ↑↓   Select Item
C State package limit setting   [Auto]             +-   Change Option
C1 Auto Demotion                [Enabled]          F1   General Help
C3 Auto Demotion                [Enabled]          F10  Save and Exit
ACPI T State                    [Enabled]          ESC  Exit

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```

Ratio CMOS Setting [22]
Allows you to adjust the ratio between CPU Core Clock and BCLK Frequency.
Use the <+> and <-> keys to adjust the value.
Configuration options: [12] [13] [14] [15] [16] [17] [18] [19] [20] [21] [22]

C1E Support [Enabled]

Allows you to enable or disable Enhanced Halt State support.
Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

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

Adjacent Cache Line Prefetch [Enabled]

Allows you to enable or disable the Adjacent Cache Line Prefetch function.
Configuration options: [Disabled] [Enabled]

MPS and ACPI MADT ordering [Modern ordering]
Allows you to select the ordering according to the operating system you install.
Select [Modern ordering] for Windows XP or later OS versions and [Legacy
ordering] for Windows 2000 or earlier OS version.
Configuration options: [Modern ordering] [Legacy ordering]

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]

Intel(R) Virtualization Tech [Enabled]

The Intel® Virtualization Technology allows a hardware platform to run multiple operating systems separately and simultaneously, 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 Capability [Enabled]

Allows you to enable or disable the No-Execution Page Protection Technology. Setting this item to [Disabled] forces the XD feature flag to always return to zero (0). Configuration options: [Disabled] [Enabled]

Intel(R) HT Technology [Disabled]

Allows you to enable or disable the Intel Hyper-Threading Technology function. When disabled, only one thread per activated core is enabled. Configuration options: [Enabled] [Disabled]

Active Processor Cores [All]

Allows you to choose the number of CPU cores to activate in each processor package.Configuration options: [All] [1] [2]

A20M [Disabled]

Legacy OSes and APs may need A20M enabled. Configuration options: [Disabled] [Enabled]

Data Reuse Optimization [Enabled]

Enables or disables data reuse performance optimization. Configuration options: [Disabled] [Enabled]

L1 IP Prefetcher [Enabled]

Enables or disables L1 IP Prefetcher. Configuration options: [Disabled] [Enabled]

L1 Data Prefetcher [Enabled]

Enables or disables L1 Data Prefetcher. Configuration options: [Disabled] [Enabled]

Performance/Watt [Power Optimized]

Allows you to set the energy efficiency of the CPU. Configuration options: [Power Optimized] [Traditional]

Intel(R) SpeedStep (TM) Tech [Enabled]

When set to [Disabled], the CPU runs at its default speed. When set to [Enabled], the CPU speed is controlled by the operating system.
Configuration options: [Disabled] [Enabled]

Intel(R) TurboMode tech [Enabled]
Turbo mode allows processor cores to run faster than marked frequency in specific condition.Configuration options: [Disabled] [Enabled]

Intel(R) C-STATE Tech [Enabled]

The Intel® C-State Technology allows the CPU to save more power under idle mode. Enable this item only when you install a C-State Technology-supported CPU. Configuration options: [Disabled] [Enabled]

> The following items appear only when you set the **Intel(R) C-STATE Tech** item to [Enabled].

C3 State [ACPI C3]

Allows you to select Nehalem C state action.
Configuratiton options: [Disabled] [ACPI C2] [ACPI C3]

C6 State [Enabled]

Allows you to select Nehalem C state action.
Configuratiton options: [Disabled] [Enabled]

C State package limit setting [Auto]

We recommend that you set this item to [Auto] for BIOS to automatically detect the C-State mode supported by your CPU.
Configuration options: [Auto] [C1] [C3] [C6] [C7]

C1 Auto Demotion [Enabled]

When this item is enabled, the CPU will conditionally demote C3/C6 requests to C1 based on the uncore auto-demote information.
Configuration options: [Disabled] [Enabled]

C3 Auto Demotion [Enabled]

When this item is enabled, the CPU will conditionally demote C6 requests to C3 based on the uncore auto-demote information.
Configuration options: [Disabled] [Enabled]

ACPI T State [Disabled]

Enables or disables processor throttling report in ACPI.
Configuration options: [Disabled] [Enabled]

5.4.2 Chipset Configuration

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

```
                        BIOS SETUP UTILITY
        Advanced
 Advanced Chipset Settings                     Configure CPU Bridge
                                               features.
 WARNING: Setting wrong values in below sections
          may cause system to malfunction.

 ▶  CPU Bridge Configuration
 ▶  North Bridge Configuration
 ▶  South Bridge Configuration
 ▶  Intel VT-d Configuration

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

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```

CPU Bridge Chipset Configuration

```
                        BIOS SETUP UTILITY
        Advanced

 CPU Bridge Chipset Configuration              ▲
 CPU Revision                :B0               To transition the CSI
 Current CSI Frequency       :6.400GT           links to full-speed
 Current Memory Frequency    :1333 Mhz          or leave them in
                                                slow-mode.
 CSI Links Speed             [Full-Speed]
 CSI Frequency               [Auto]
 CSI Isochronous             [Disabled]
 CSI L1                      [Enabled]
 CSI Power Optimization Policy [Static]
 CSI RTID                    [Default]

 Memory Frequency            [Auto]            ←→   Select Screen
 Memory Mode                 [Independent]     ↑↓   Select Item
 Memory ECC Function         [Enabled]         +-   Change Option
 Double Rate Refresh         [Auto]            F1   General Help
 Demand Scrubbing            [Enabled]         F10  Save and Exit
 Patrol Scrubbing            [Disabled]        ESC  Exit
 NUMA Aware                  [Auto]            ▼

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```

Scroll down for more items.

```
 Page Policy                 [Open]
 Adaptive Page               [Disabled]
 Data Scramble               [Enabled]
 Split Below 4GB             [Disabled]
 Channel Interleaving        [6:1]
 Rank Interleaving           [4:1]
 Memory Thermal Throttling   [Disabled]        ▼
 DDR3 Voltage Level          [Auto]
 DRAM DLL OFF Power Down      [Enabled]

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```

CSI Links Speed [Full-Speed]

Allows you to set the speed of CSI Links.
Configuration options: [Slow-Mode] [Full-Speed]

CSI Frequency [Auto]

Allows you to set the CSI frequency.
Configuration options: [Auto] [4.800GT] [5.866GT] [6.400GT]

CSI Isochronous [Disabled]

Configuration options: [Disabled] [Enabled]

CSI L1 [Enabled]

Configuration options: [Disabled] [Enabled]

CSI Power Optimization Policy [Static]

Configuration options: [Adaptive] [Static] [Bypass]

CSI RTID [Default]

Configuration options: [Default] [32_16_40]

Memory Frequency [Auto]

You may allow the system to detect DDR3 memory frequency via SPD or designate
a specific frequency.
Configuration options: [Auto] [Force DDR-800] [Force DDR-1066]
[Force DDR-1333]

Memory Mode [Independent]

Allows you to set Memory channel mode.
Configuration options: [Independent] [Channel Mirroring] [Lockstep] [Sparing]

Memory ECC Function [Enabled]

Allows you to enable or disable Memory ECC fucntion.
Configuration options: [Disabled] [Enabled]

Double Rate Refresh [Auto]

Configuration options: [Disabled] [Auto]

Demand Scrubbing [Enabled]

Enables or disables the ECC demand scrub.
Configuration options: [Disabled] [Enabled]

Patrol Scrubbing [Disabled]

Enables or disables the ECC patrol scrub.
Configuration options: [Disabled] [Enabled]

NUMA Aware [Auto]

Configuration options: [Disabled] [Auto]

Page Poilcy [Open]

Configuration options: [Open] [Closed]

Adaptive Page [Disabled]

Configuration options: [Disabled] [Enabled]

Data Scramble [Enabled]

Configuration options: [Disabled] [Enabled]

Split Below 4 GB [Disabled]

Configuation options: [Disabled] [Auto]

Channel Interleaving [6:1]

Allows you to set the channel interleaving setting.
Configuation options: [1:1] [2:1] [4:1] [6:1]

Rank Interleaving [4:1]

Allows you to set the rank interleaving setting.
Configuation options: [1:1] [2:1] [4:1]

Memory Thermal Throttling [Disabled]

[CLTT] is for closed loop thermal throttling and [OLTT] for open loop thermal throttling. Configuration options: [CLTT] [OLTT] [Disabled] [Auto]

DDR3 Voltage Level [Auto]

Set this item to [Auto] if all DIMMs are compatible to 1.35v, otherwise set to [Force to 1.50v]. Configuration options: [Auto] [Force to 1.50v]

DRAM DLL OFF Power Down [Enabled]

When set to [enabled], the system will turn off DRAM DLL during CKE power down. This applies only to memory channels with a single SR/DR DIMM installed. Configuration options: [Disabled] [Enabled]

North Bridge Configuration

The North Bridge Configuration menu shows the auto-detected Northbridge values.

```
                          BIOS SETUP UTILITY
        Advanced

  NorthBridge Chipset Configuration

  NB Revision                    :C2
  Current CSI Frequency          :5.866GT

  Crystal Beach / DMA            [Disabled]
```
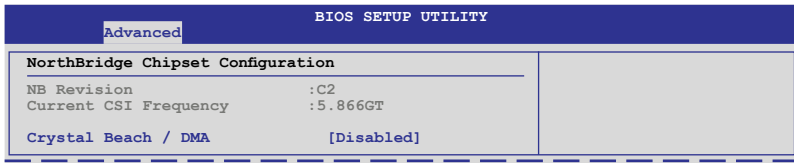
Crystal Beach / DMA [Disabled]

Configuration options: [Disabled] [Auto]

South Bridge Chipset Configuration

```
                          BIOS SETUP UTILITY
        Advanced

  South Bridge Chipset Configuration
                                                       Options
  USB Functions              [Enabled]
  USB Port Configure         [8+4 USB Ports]     Disabled
  USB 2.0 Controller         [Enabled]           Enabled
  HDA Controller             [Enabled]

  Reserved Page Route        [PCI]
  SLP_S4# Min. Assertion Width  [1 to 2 seconds]
```
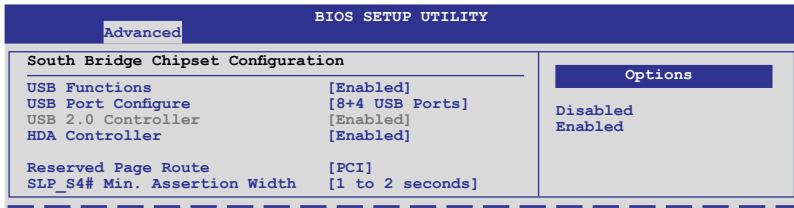
USB Functions [Enabled]

Allows you to configure the amount of USB ports to be enabled.
Configuration options: [Disabled] [Enabled]

USB Port Configure [8+4 USB Ports]

This item disappears when you set the **USB Functions** item to [Disabled].
Configuration options: [6+6 USB Ports] [8+4 USB Ports]

USB 2.0 Controller [Enabled]

Allows you to enable or disable the USB 2.0 controller. This item become
configurable if you set the **USB Functions** item to [Disabled].
Configuration options: [Enabled] [Disabled]

HDA Controller [Enabled]

Allows you to enable or disable the High Definition Audio controller.
Configuration options: [Enabled] [Disabled]

Reserved Page Route [PCI]

Configuration options: [PCI] [LPC]

SLP_S4# Min. Assertion Width [1 to 2 seconds]

Configuration options: [4 to 5 seconds] [3 to 4 seconds] [2 to 3 seconds]
[1 to 2 seconds]

Intel VT-d Configuration

```
                              BIOS SETUP UTILITY
            Advanced

                                                         Options
   Intel VT-d                     [Disabled]
                                                    Disabled
                                                    Enabled
```

Intel VT-d [Disabled]
Allows you to enable or disable the Intel Virtualization Technology for
Directed I/O.
Configuration options: [Disabled] [Enabled]

5.4.3   Legacy Device Configuration

```
                              BIOS SETUP UTILITY
            Advanced

   Legacy Device Configuration                   Allows BIOS to Enable
                                                 or Disable Floppy
   Serial Port1 Address           [3F8/IRQ4]     Controller.
   Serial Port2 Address           [2F8/IRQ3]




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

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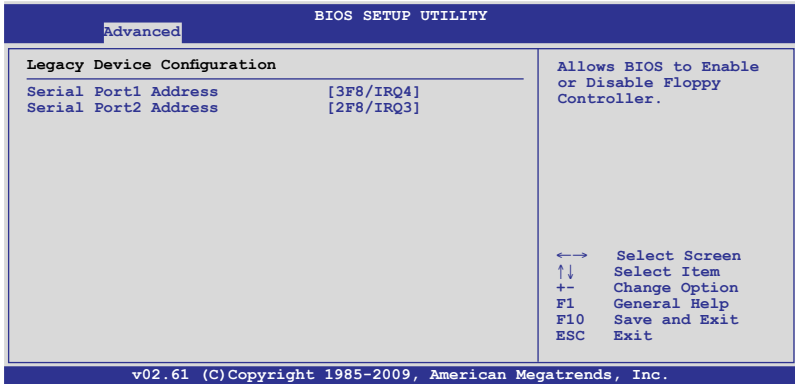
Serial Port1 Address [3F8/IRQ4]

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

Serial Port2 Address [2F8/IRQ3]

Allows you to select the Serial Port2 base address.
Configuration options: [Disabled] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

5.4.4 USB Configuration

```
                        BIOS SETUP UTILITY
        Advanced

  USB Configuration                              Enables support for
                                                 legacy USB. AUTO
  Module Version - 2.24.3-13.4                   option disables
                                                 legacy support if
  USB Devices Enabled :                          no USB devices are
          None                                   connected.

  Legacy USB Support          [Enabled]
  USB 2.0 Controller Mode     [HiSpeed]
  BIOS EHCI Hand-Off          [Enabled]
  Hotplug USB FDD Support     [Auto]
                                                 ←→    Select Screen
  ► USB Mass Storage Device Configuration        ↑↓    Select Item
                                                 +-    Change Option
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC     Exit

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```
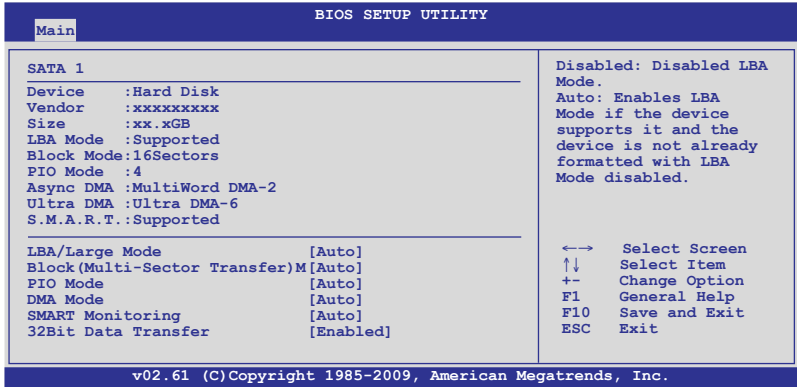
The following item appears only when you set **USB Function** to [Enabled].

Legacy USB Support [Enabled]

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

The following item appears only when you set **USB Function** to [Enabled].

USB 2.0 Controller Mode [HiSpeed]

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

BIOS EHCI Hand-Off [Enabled]

Enables or disables the BIOS EHCI hand-off support.
Configuration options: [Disabled] [Enabled]

Hotplug USB FDD Support [Auto]

Allows you to configure the Hotplug USB FDD support.
Configuration options: [Disabled] [Enabled] [Auto]

USB Mass Storage Device Configuration

```
                               BIOS SETUP UTILITY
              Advanced

   USB Mass Storage Device Configuration                    Allows BIOS to Enable
   ─────────────────────────────────────                    or Disable Floppy
   USB Mass Storage Reset Delay     [20 Sec]                 Controller.

      Device #1                 USB Hotplug FDD
      Emulation Type                   [Auto]
```

USB Mass Storage Reset Delay [20 Sec]

Allows you to set the numbers of seconds POST waits for the USB mass storage device after start unit command.
Configuration options: [10 Sec] [20 Sec] [30 Sec] [40 Sec]

> *Device #1*
> Shows automatically detected USB devices.

> *Emulation Type [Auto]*
> Configuration options: [Auto] [Floppy] [Forced FDD] [Hard Disk] [CDROM]

5.4.5   PCIPnP

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

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

```
                               BIOS SETUP UTILITY
              Advanced

   Advanced PCI/PnP Settings                                NO: lets the BIOS
   ─────────────────────────                                configure all the
   WARNING: Setting wrong values in below sections          devices in the system.
            may cause system to malfunction.                YES: lets the
                                                            operating system
                                                            configure Plug and
   Plug And Play O/S           [No]                         Play (PnP) devices not
                                                            required for boot if
   PCI Option ROM Scan Order   [Bus 0 First]                your system has a Plug
   Onboard Option ROM Priority [High]                       and Play operating
                                                            system.
      Onboard LAN1 Boot        [PXE]
      Onboard LAN2 Boot        [PXE]
```

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 Option ROM Scan Order [Bus 0 First]

Allows you to select the PCI option ROM scanning order. The scanning of the option ROM will start from the lowest bus, device, fucntion number if you set this item to [Bus 0 First]; the scanning starts from the highest bus, device, function number if you set this item to [Bus N First].
Configuration options: [Bus 0 First] [Bus N First]

Onboard Option ROM Priority [High]

Allows you to select the onboard option ROM priority.
Configuration options: [Normal] [High]

Onboard LAN1/2 Boot ROM [PXE]

Allows you to configure the onboard LAN1/2 boot mode.
Configuration: [Disabled] [PXE] [iSCSI]

5.4.6   APM Configuration

```
                          BIOS SETUP UTILITY
         Advanced

   APM Configuration                                    Options

   Restore on AC Power Loss     [Last State]
                                                   Power Off
   Resume On Ring               [Disabled]         Power On
   Resume On PME#(Wake On LAN)  [Disabled]         Last State
   Resume On RTC Alarm          [Disabled]
```
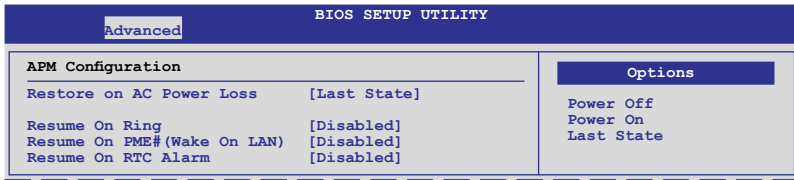
Restore on AC Power Loss [Last State]

When set to [Power Off], the system goes into off state after an AC power loss. When set to [Power On], the system will reboot after an AC power loss. When set to [Last State], the system goes into either off or on state, whatever the system state was before the AC power loss.
Configuration options: [Power Off] [Power On] [Last State]

Resume On Ring [Disabled]

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

Resume On PME# (Wake On LAN) [Disabled]

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

Resume On RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake-up event.
Configuration options: [Disabled] [Enabled]

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

RTC Alarm Date [15]
To set the alarm date, highlight this item and press the <+> or <-> key to make the selection.

System Time [12:30:30]
Use the <ENTER>, <TAB> or <SHIFT-TAB> key to select a field. Use the <+> or <-> key to configure alarm time.

5.4.7   Event Log Configuration

```
                        BIOS SETUP UTILITY
      Advanced

  Event Logging details                            View all unread events
                                                   on the Event Log.

  View Event Log
  Clear Event Log
```
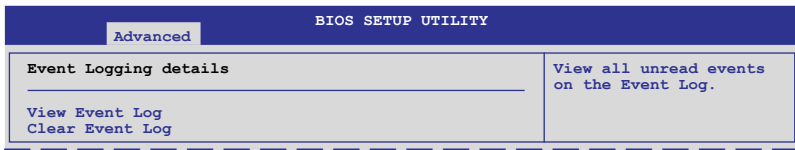
View Event Log

Press the <ENTER> key to view unread system event log.

Clear Event Log

Press the <ENTER> key to clear all system events. Select [Ok] to confirm the change.

5.4.8 Hardware Monitor

```
                          BIOS SETUP UTILITY
            Advanced

  Hardware Monitor                                  ▲    CPU1 Temperature

  CPU1 Temperature              [ 27.5°C/ 81.5°F]
  CPU2 Temperature              [ 0   °C/ 32  °F]
  TR1 Temperature               [  N/A  ]
  TR2 Temperature               [  N/A  ]
  CPU Fan1 Speed                [ 4200RPM]
  CPU Fan2 Speed                [  N/A  ]
  Front Fan1 Speed              [  N/A  ]
  Front Fan2 Speed              [  N/A  ]
  Front Fan3 Speed              [  N/A  ]
  Front Fan4 Speed              [  N/A  ]
  Rear Fan1 Speed               [  N/A  ]
  Rear Fan2 Speed               [  N/A  ]          ←→   Select Screen
  Fan Speed Control             [Generic Mode]     ↑↓   Select Item
  VCORE1 Voltage                [ 1.052 V]         +-   Change Option
  VCORE2 Voltage                [  N/A  ]          F1   General Help
  +1.5V_P1DDR3 Voltage          [ 1.508 V]         F10  Save and Exit
  +1.5V_P2DDR3 Voltage          [  N/A  ]          ESC  Exit
  +1.5V_ICH Voltage             [ 1.520 V]    ▼

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```

Scroll down for more items.

```
  P1VTT Voltage                 [ 1.022 V]
  P2VTT Voltage                 [ 1.022 V]
  +1.1V_IOH Voltage             [ 0.204 V]
  +12V Voltage                  [12.000 V]
  +5V Voltage                   [ 5.196 V]
  +3.3V Voltage                 [ 3.246 V]
  +5VSB Voltage                 [ 5.132 V]
  +3VSB Voltage                 [ 3.198 V]
  VBAT Voltage                  [ 3.126 V]    ▼

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```

CPU1/2 Temperature [xxxºC/xxxºF]
TR1/2 Temperature [xxxºC/xxxºF]

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

CPU Fan1/2; Front Fan1–4 Speed [xxxxRPM] or [Ignored] / [N/A]
Rear Fan1/2 Speed [xxxxRPM] or [Ignored] / [N/A]

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

Fan Speed Control [Generic Mode]

Allows you to configure the ASUS Smart Fan feature that smartly adjusts the fan speeds for more efficient system operation.
Configuration options: [Full Speed Mode] [Whisper Mode] [Generic Mode] [High Density Mode]

VCORE1/2 Voltage, +1.5V_P1/2DDR3 Voltage, +1.5V_ICH Voltage, P1/2VTT Voltage, +1.1V_IOH Voltage, +12V Voltage, +5V Voltage, +3.3V Voltage, +5VSB Voltage, +3VSB Voltage, VBAT Voltage

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select [Ignored] if you do not want to detect this item.

5.4.9 I/O Virtualization

```
                        BIOS SETUP UTILITY
      Advanced

  Configure I/O Virtualization Parameters              Options

  SR-IOV Supported            [Disabled]        Disabled
                                                Enabled
```

SR-IOV Supported [Disabled]

Enables or disables the SR-IOV support. Configuration options: [Disabled] [Enabled]

5.4.10 PCI Express Configuration

```
                        BIOS SETUP UTILITY
      Advanced

  PCI Express Configuration                     Enable/Disable
                                                PCI Express L0s and
  Active State Power-Management  [Disabled]     L1 link power
  Auto allocate Payload size     [Enabled]      states.
  ▶   Auto allocate Payload size setting
```

Active State Power-Management [Disabled]

Enables or disables the PCI Express L0s and L1 link power states.
Configuration options: [Disabled] [Enabled]

Auto allocate Payload size [Enabled]

Enables or disables auto allocate payload size improve PCIE data transfer performance. Configuration options: [Disabled] [Enabled]

Auto allocate Payload size setting

```
                        BIOS SETUP UTILITY
      Advanced

  Auto allocate Payload size setting            Multiple bus
                                                PCIE device support
  Multiple bus PCIE device [Enabled]
  Multiple device PCIE device [Enabled]
  Multiple function PCIE device [Enabled]
```

Multiple bus/device/function PCIE device [Enabled]

Enables or disables multiple bus/device/function PCIE device support. If some PCIE cards act abnormally, set this item to [Disabled] to let payload size return to the default value. Configuration options: [Disabled] [Enabled]

5.4.11 ACPI Configuration

```
                         BIOS SETUP UTILITY
          Advanced

   ACPI Settings                              Advanced ACPI
                                              Configuration
   ▶  Advanced ACPI Configuration            settings.
   ▶  Chipset ACPI Configuration
   ▶  General WHEA Configuration              Use this section to
                                              configure additional
                                              ACPI options.
```

Advanced ACPI Configuration

```
                         BIOS SETUP UTILITY
          Advanced

   Advanced ACPI Configuration
                                              Add additional tables
   ACPI 2.0 Support          [Enabled]        as per ACPI 2.0
   ACPI APIC support         [Enabled]        specifications.
   BIOS-->AML ACPI table     [Enabled]
   Headless mode             [Disabled]
```

ACPI 2.0 Support [Enabled]

Specifies the Advanced Configuration and Power Interface (ACPI) version
supported. Configuration options: [Disabled] [Enabled]

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]

BIOS-->AML ACPI table [Enabled]

Allows you to include the BIOS-->AML exchange table pointer to (X)RSDT pointer
list. Configuration options: [Disabled] [Enabled]

Headless mode [Disabled]

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

Chipset ACPI Configuration

```
                         BIOS SETUP UTILITY
          Advanced

   South Bridge ACPI Configuration
                                              Enabled/Disable
   APIC ACPI SCI IRQ              [Disabled]  APIC ACPI SCI IRQ.
   USB Device Wakeup From S3/S4   [Disabled]
   High Performance Event Timer   [Enabled]
   HPET Memory Address            [FED00000h]
```

APIC ACPI SCI IRQ [Disabled]

Allows you to enable or disable the APIC ACPI SCI IRQ feature.
Configuration options: [Disabled] [Enabled]

USB Device Wakeup From S3/S4 [Disabled]

Allows you to enable or disable the USB device wakeup from S3/S4 feature.
Configuration options: [Disabled] [Enabled]

High Performance Event Timer [Enabled]

Allows you to enable or disable the High Performance Event Timer feature.
Configuration options: [Disabled] [Enabled]

HPET Memory Address [FED00000h]

Configuration options: [FED00000h] [FED01000h] [FED02000h] [FED03000h]

General WHEA Configuration

```
                          BIOS SETUP UTILITY
            Advanced

    General WHEA Configuration                    Enable or disable
                                                  Windows Hardware
    WHEA Support                  [Enabled]       Error Architecture.
```
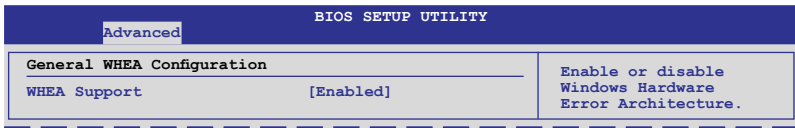
WHEA Support [Enabled]

Allows you to enable or disable the Windows Hardware Error Architecture (WHEA)
support. Configuration options: [Disabled] [Enabled]

5.5 Server menu

```
                         BIOS SETUP UTILITY
   Main    Advanced    Server    Boot    Exit
 ┌─────────────────────────────────────────┬───────────────────────────┐
 │                                          │ Configure Remote          │
 │ ▶  Remote Access Configuration           │ Access.                   │
 │                                          │                           │
 │                                          │                           │
 │                                          │                           │
 │                                          │                           │
 │                                          │ ←→   Select Screen        │
 │                                          │ ↑↓   Select Item          │
 │                                          │ +-   Change Option        │
 │                                          │ F1   General Help         │
 │                                          │ F10  Save and Exit        │
 │                                          │ ESC  Exit                 │
 └─────────────────────────────────────────┴───────────────────────────┘
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```
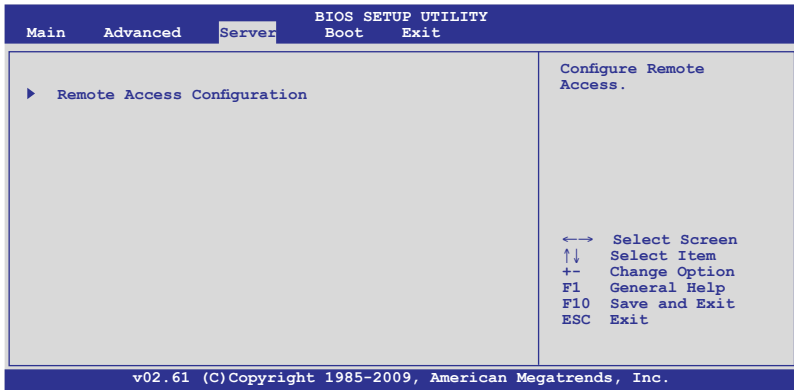
5.5.1 Remote Access Configuration

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

```
                         BIOS SETUP UTILITY
                  Server
 ┌─────────────────────────────────────────┬───────────────────────────┐
 │ Configure Remote Access type and parameters │ Select Remote Access   │
 │ ─────────────────────────────────────   │ type.                     │
 │ Remote Access             [Enabled]      │                           │
 │                                          │                           │
 │ Serial port number        [COM2]         │                           │
 │    Base Address, IRQ      [2F8h, 3]      │                           │
 │ Serial Port Mode          [57600 8,n,1]  │                           │
 │ Flow Control              [Hardware]     │                           │
 │ Redirection After BIOS POST  [Disabled]  │                           │
 │ Terminal Type             [VT-UTF8]      │                           │
 │                                          │ ←→   Select Screen        │
 │                                          │ ↑↓   Select Item          │
 │                                          │ +-   Change Option        │
 │                                          │ F1   General Help         │
 │                                          │ F10  Save and Exit        │
 │                                          │ ESC  Exit                 │
 └─────────────────────────────────────────┴───────────────────────────┘
        v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```
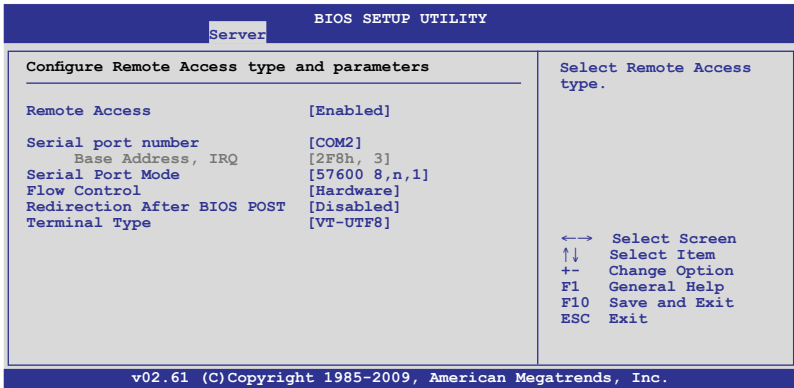
Remote Access [Enabled]

Enables or disables the remote access feature.
Configuration options: [Disabled] [Enabled]

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

Serial port number [COM2]

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

> *Base Address. IRQ [2F8h, 3]*
> This item is not user-configurable and changes with the configuration of Serial
> port number.

Serial Port Mode [57600 8,n,1]

Sets the Serial port mode.
Configuration options: [115200 8,n,1] [57600 8,n,1] [38400 8,n,1] [19200 8,n,1]
[09600 8,n,1]

Flow Control [Hardware]

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

Redirection After BIOS POST [Disabled]

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 [VT-UTF8]

Allows you to select the target terminal type.
Configuration options: [ANSI] [VT100] [VT-UTF8]

5.6 Boot menu

The Boot menu items allow you to change the system boot options. Select an item then press <Enter> to display the sub-menu.

```
                              BIOS SETUP UTILITY
   Main     Advanced    Server    Boot    Exit
  ─────────────────────────────────────────────────────────────────────────
   Boot Settings                                    Specifies the Boot
  ─────────────────────────────────────────        Device Priority
   ▶  Boot Device Priority                          sequence.
   ▶  Hard Disk Drives
   ▶  Removable Drives                              A virtual floppy disk
   ▶  CDROM Drives                                  drive (Floppy Drive B:
                                                    ) may appear when you
   ▶  Boot Settings Configuration                   set the CD-ROM drive
   ▶  Security                                      as the first boot
                                                    device.


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

  ─────────────────────────────────────────────────────────────────────────
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```

5.6.1 Boot Device Priority

```
                              BIOS SETUP UTILITY
                                 Boot
  ─────────────────────────────────────────────────────────────────────────
   Boot Device Priority                             Specifies the Boot
  ─────────────────────────────────────────        Device Priority
   1st Boot Device         [CDROM:3M-ASUS DVD-]     sequence.
   2nd Boot Device         [SATA:PM-Hitachi HD]
   3rd Boot Device         [Disabled]               A device enclosed
                                                    in parenthesis has
                                                    been disabled in the
                                                    corresponding type
                                                    menu.



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

  ─────────────────────────────────────────────────────────────────────────
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```

1st ~ xxth Boot Device [XXXXXXX]

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

5.6.2 Hard Disk / Removable / CDROM Drives

```
                    BIOS SETUP UTILITY
                    Boot

  Removable Drives                                 Specifies the boot
                                                   sequence from the
  1st Device              [USB:USB Hotplug FD]     available devices.




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

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```
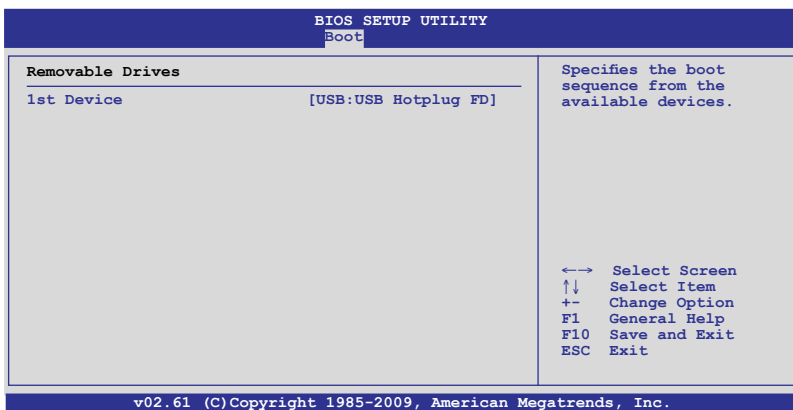
1st Device [XXXXXXX]

Allows you to specifies the boot sequence from the available devices.
Configuration options: [xxxxx DRIVE] [Disabled]

5.6.3 Boot Settings Configuration

```
                    BIOS SETUP UTILITY
                    Boot

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

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

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

AddOn ROM Display Mode [Force BIOS]

Allows you to set the display mode for Options 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 [Enabled]

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

5.6.4   Security

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

```
                         BIOS SETUP UTILITY
                      Boot

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

    Change Supervisor Password
    Change User Password

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

         v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```
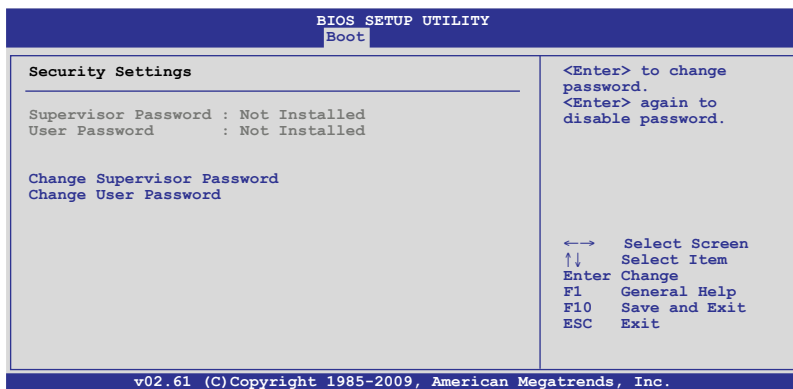
Change Supervisor Password

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

To set a Supervisor Password:

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

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

3.   Confirm the password when prompted.

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

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

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

> If you forget your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section **4.2 Jumpers** for information on how to erase the RTC RAM.

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

```
                        BIOS SETUP UTILITY
                            Boot

  Supervisor Password : Installed                    <Enter> to change
  User Password       : Not Installed                password.
                                                     <Enter> again to
  Change Supervisor Password                         disable password.
  User Access Level              [Full Access]
  Change User Password
  Password Check                 [Setup]
```
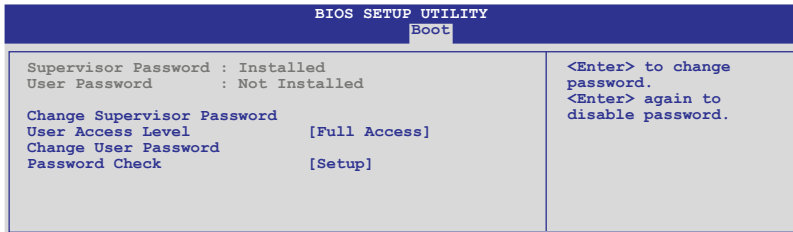
User Access Level [Full Access]

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

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

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

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

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

Password Check [Setup]

When set to [Setup], BIOS checks for user password when accessing the Setup utility. When set to [Always], BIOS checks for user password both when accessing Setup and booting the system. Configuration options: [Setup] [Always]

5.7 Exit menu

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

```
                              BIOS SETUP UTILITY
   Main    Advanced    Server    Boot    Exit

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

   Load Setup Defaults



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

        v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```

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

Exit & Save Changes

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

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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

Chapter 6

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

RAID configuration

6.1 Setting up RAID

The motherboard comes with the following RAID solutions:

The motherboard comes with the Intel® ICH10R southbridge controller that supports the following SATA RAID solutions:

*   **LSI MegaRAID Software RAID Configuration Utility** (default) with RAID 0, RAID 1, and RAID 10 support (for both Linux and Windows OS).
*   **Intel Matrix Storage Manager** with RAID 0, RAID 1, RAID 10, and RAID 5 support (for Windows OS only).

6.1.1 RAID definitions

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

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

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

---

*   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.

*   Please refer to page 4-9 for how to select the RAID configuration utility. Move the jumper to choose between LSI MegaRAID and Intel® Matrix RAID.

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 Intel® ICH10R chipset. To do this:

1.   Enter the BIOS Setup during POST.
2.   Go to the **Main Menu** > **IDE Configuration**, then press <Enter>.
3.   Set **Configure SATA as** to [RAID]
4.   Press <F10> to save your changes and 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 MegaRAID Software 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® ICH10R chipset.

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

6.2 LSI Software RAID Configuration Utility

The LSI MegaRAID software RAID configuration 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 MegaRAID software RAID configuration utility

1. Turn on the system after installing all the SATA hard disk drives.

2. During POST, the LSI MegaRAID software RAID configuration utility automatically detects the installed SATA hard disk drives and displays any existing RAID set(s). Press <Ctrl> + <M> to enter the utility.

```
LSI MegaRAID Software RAID BIOS Version A.08 09161344R
LSI SATA RAID Found at PCI Bus No: Dev No:1F
Device present at Port 0      ST3160812AS      152114MB
Device present at Port 1      ST3160812AS      152114MB
Device present at Port 2      ST3160812AS      152114MB
Device present at Port 3      ST3160812AS      152114MB
Press Ctrl-M or Enter to run LSI Software RAID Setup Utility.
```

> • The LSI MegaRAID software RAID configuration utility automatically 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.
>
> • When you create RAID sets with the LSI MegaRAID software RAID configuration utility, the boot priority of the SATA optical drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

3. The utility main window appears. Use the arrow keys to select an option from the **Management Menu** and 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.

```
          LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                     BIOS Version   A.08.09161344R


      ┌─Management Menu─┐
      │Configure        │
      │Initialize       │
      │Objects          │
      │Rebuild          │
      │Check Consistency│
      └─────────────────┘




                        ┌Configure VD(s)┐
                        └───────────────┘
 Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```

Menu	Description
Configure	Allows you to create RAID 0, RAID 1 or RAID 10 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 virtual drives of a created RAID set
Objects	Allows you to initialize virtual drives or change the virtual drive parameters
Rebuild	Allows you to rebuild failed drives
Check Consistency	Allows you to check the data consistency of the virtual drives of a created RAID set

6.2.1   Creating a RAID set

The LSI Software RAID Configuration Utility allows you to create a RAID 0, RAID 1, or RAID 10 set using two types of configurations: **Easy** and **New**.

In **Easy Configuration**, the virtual drive parameters are set automatically.

In **New Configuration**, you manually set the virtual drive parameters.

Using Easy Configuration

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

1.   From the **Management Menu**, select **Configure > Easy Configuration**, and then press <Enter>.
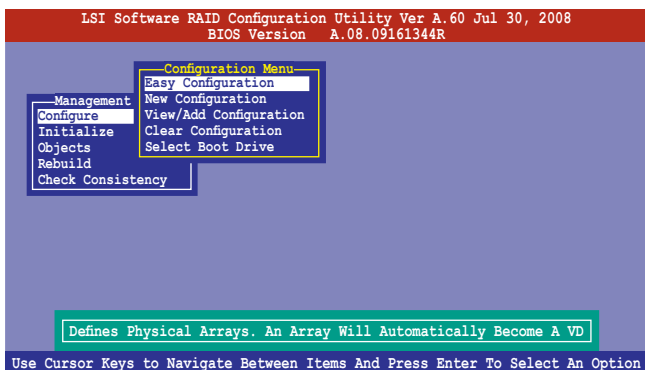
2. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Use the up/down arrow key to select the drives you want to include in the RAID set, and then press <Space>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

```
        LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                       BIOS Version   A.08.09161344R

                   ─Easy Configuration - ARRAY SELECTION MENU─
                                   PORT #
   ──Management──
   Configure           0  ONLIN A00-00
   Initialize
   Objects             1  ONLIN A00-01
   Rebuild
   Check Consist       2  READY

                       3  READY



    ┌─────────────────────────────────────────────────────┐
    │ Port # 1 DISK   77247MB   HDS728080PLA380   PF20A60A │
    └─────────────────────────────────────────────────────┘
   SPACE-Sel,ENTER-EndArray,F10-Configure,F2-Drive Info,F3-Virtual Drives,F4-HSP
```
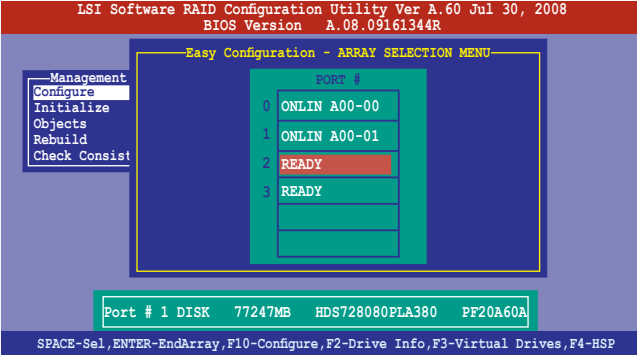
> • The information of the selected hard disk drive displays at the bottom of the screen.
>
> • You need at least two identical hard disk drives when creating a RAID 1 set.
>
> • You need at least four identical hard disk drives when creating a RAID 10 set.

3. Select all the drives required for the RAID set, and then press <F10> to configure array setting.

4. Press <Space> to select the configurable array.

```
        LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                       BIOS Version   A.08.09161344R

                   ─Easy Configuration - ARRAY SELECTION MENU─
                           ─Select Configurable Array(s)─
   ──Management──
   Configure         ┌─A-0─┐
   Initialize        │SPAN-1│
   Objects           └─────┘
   Rebuild
   Check Consist




    Cursor Keys, SPACE-(De)Select F2-ChIdInfo F3-SlotInfo F10-Configure Esc-Quit
```
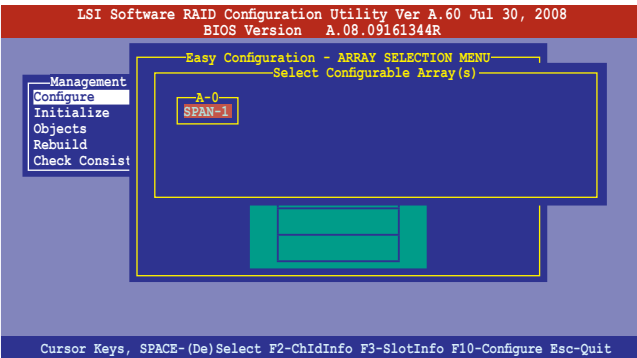
5. Press <F10> again, the virtual drive information appears including a **Virtual Drive** menu that allows you to change the virtual drive parameters.

```
            LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                            Virtual Drive(s) Configured
            LD     RAID    Size      #Stripes     StripSz    Status
            0      1       77247MB   2            64 KB      ONLINE
        Manager
    Configure
    Initializ
    Objects
    Rebuild
    Check Cor
                    Virgual Drive 0
            RAID = 1
            Size = 77247MB
            DWC  = Off
            RA   = On
            Accept
            SPAN = NO

                    Choose RAID Level For This VD

        Cursor Keys, SPACE-(De)Select F2-ChIdInfo F3-SlotInfo F10-Configure Esc-Quit
```
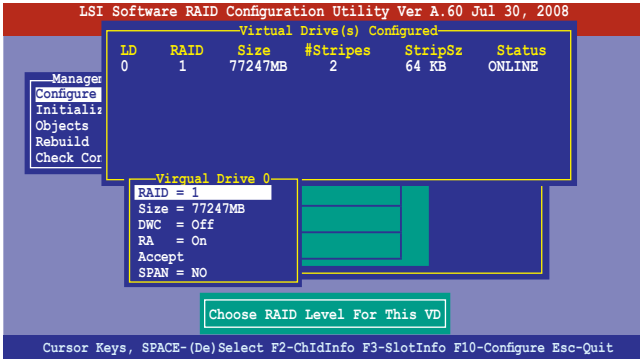
6. Select **RAID** from the **Virtual Drive** sub-menu, and then press <Enter>.

7. Select the **RAID** level from the menu, and then press <Enter>.

```
            LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                            Virtual Drive(s) Configured
            LD     RAID    Size      #Stripes     StripSz    Status
            0      1       77247MB   2            64 KB      ONLINE
        Manager
    Configure
    Initializ
    Objects
    Rebuild
    Check Cor
                    Virtual Drive 0          RAID Level
            RAID = 1                  RAID 0
            Size = 77247MB            RAID 1
            DWC  = Off
            RA   = On
            Accept
            SPAN = NO

                    Choose RAID Level For This VD

        Cursor Keys, SPACE-(De)Select F2-ChIdInfo F3-SlotInfo F10-Configure Esc-Quit
```

8.   When creating a **RAID 1** or a **RAID 10** set, select **DWC** from the **Virtual Drive** menu, and then press <Enter>.

When creating a **RAID 0** set, proceed to step 10.

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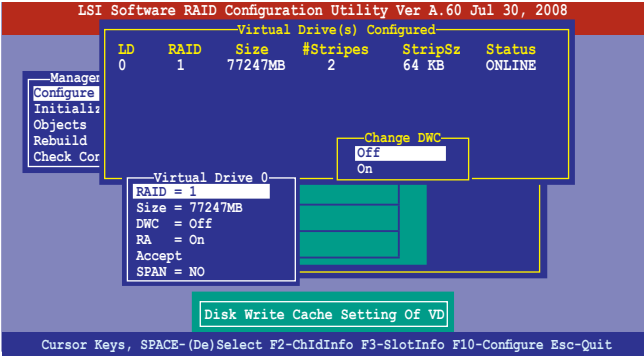
Enabling DWC can improve the performance, but with the risk of data loss.

10.   When finished setting the selected virtual drive configuration, select **Accept** from the menu, and then press <Enter>.
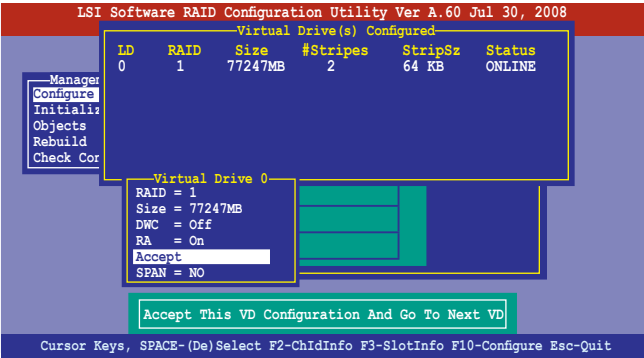
11. Follow step 2 to 10 to configure additional virtual drives.

12. Press <Esc> to finish RAID configuration. When prompted to save configuration, select **Yes** from the menu, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                      BIOS Version   A.08.09161344R
               ┌─────Configuration Menu─────┐
               │Easy Configuration          │    ┌──Save Configuration?──┐
               │New Configuration           │    │Yes                    │
    ┌──Management─┤View/Add Configuration    │    │No                     │
    │Configure    │                          │    └───────────────────────┘
    │Initializ ┌──────Virtual Drive(s) Configured──────┐
    │Objects   │                                        │
    │Rebuild   │LD   RAID   Size     #Stripes  StripSz  Status
    │Check Con │0    1      77247MB   2         64 KB    ONLINE
    │          │                                        │
    │          │                                        │
    │          │                                        │
    │          │                                        │
    │          │                                        │
    │          │         ┌──────────────────┐          │
    │          │         │ Select Yes Or No │          │
    │          │         └──────────────────┘          │
    └──────────┴────────────────────────────────────────┘
   Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```

Using New Configuration

> When a RAID set already exists, 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 **Management Menu**, select **Configure > New Configuration,** and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                      BIOS Version   A.08.09161344R
               ┌─────Configuration Menu─────┐
               │Easy Configuration          │
    ┌──Management─┤New Configuration         │
    │Configure    │View/Add Configuration    │
    │Initialize   │Clear Configuration       │
    │Objects      │Select Boot Drive         │
    │Rebuild      └──────────────────────────┘
    │Check Consistency │
    └──────────────────┘



               ┌──────────────────────────────────────────────────┐
               │ Clear Existing Configuration And Start A New Configuration │
               └──────────────────────────────────────────────────┘
   Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```

2. Follow step 2 to 7 of the previous section: **Using Easy Configuration**.

3. Select **Size** from the **Virtual Drive** menu, and then press <Enter>.

4. Key-in the desired virtual drive size, and then press <Enter>.


```
              LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                            Virtual Drive(s) Configured
                    LD     RAID    Size     #Stripes    StripSz    Status
                    0      1       77247MB  2           64 KB      ONLINE
        Manager
       Configure
       Initializ
       Objects
       Rebuild
       Check C
               Enter VD Size (MB): 77247

                    RAID = 1
                    Size = 77247MB
                    DWC  = Off
                    RA   = On
                    Accept
                    SPAN = NO

                           Enter VD Size (MB):

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

5. Follow step 8 to 12 of the previous section: **Using Easy Configuration** 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**, select **Configure > View/Add Configuration**, and then press <Enter>.
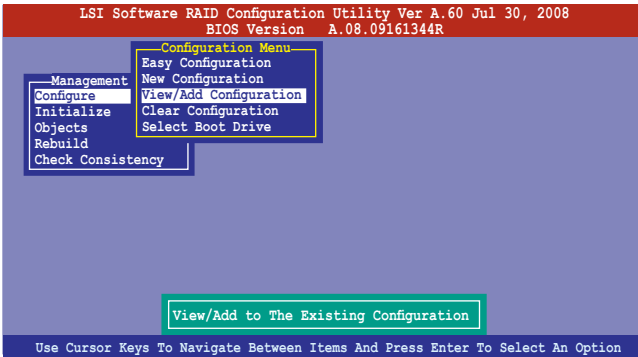
```
    LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                        BIOS Version    A.08.09161344R
                   ┌─Configuration Menu─┐
                   │ Easy Configuration │
      ┌─Management─┤ New Configuration  │
      │ Configure  │ View/Add Configuration │
      │ Initialize │ Clear Configuration │
      │ Objects    │ Select Boot Drive  │
      │ Rebuild    └────────────────────┘
      │ Check Consistency │
      └────────────────┘



              ┌─────────────────────────────────────┐
              │ View/Add to The Existing Configuration │
              └─────────────────────────────────────┘
    Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

2.   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 <Space>. 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.

```
    LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                        BIOS Version    A.08.09161344R
              ┌─View/Add Configuration - ARRAY SELECTION MENU─┐
      ┌─Management─┐  │            PORT #             │
      │ Configure  │  │                              │
      │ Initialize │  │   0  ONLIN A00-00            │
      │ Objects    │  │                              │
      │ Rebuild    │  │   1  ONLIN A00-01            │
      │ Check Consist │                              │
      └────────────┘  │   2  READY                   │
                      │                              │
                      │   3  READY                   │
                      │                              │
                      │                              │
                      └──────────────────────────────┘
              ┌─────────────────────────────────────────────┐
              │ Port # 2 DISK   77247MB   HDS728080PLA380   PF20A60A │
              └─────────────────────────────────────────────┘
    SPACE-Sel,ENTER-EndArray,F10-Configure,F2-Drive Info,F3-Virtual Drives,F4-HSP
```
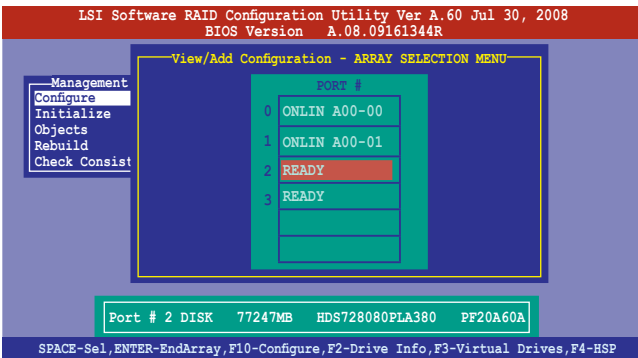
> The information of the selected hard disk drive displays at the bottom of the screen.

3.   Follow step 3 to 12 of section **6.2.1 Creating a RAID set: Using Easy Configuration** to add a new RAID set.

6.2.3 Initializing the virtual drives

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

Using the Initialize command

To initialize the virtual drive using the Initialize command

1.	From the **Management Menu**, select **Initialize**, and then press <Enter>.
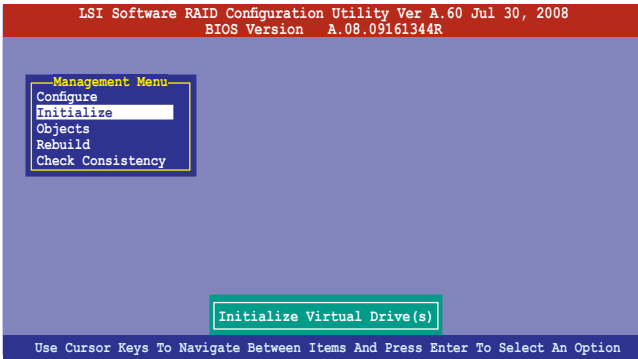
2.	The screen displays the available RAID set(s) and prompts you to select the virtual drive to initialize. Use the arrow keys to select the virtual drive from the **Virtual Drive** selection, and then press <Space>.
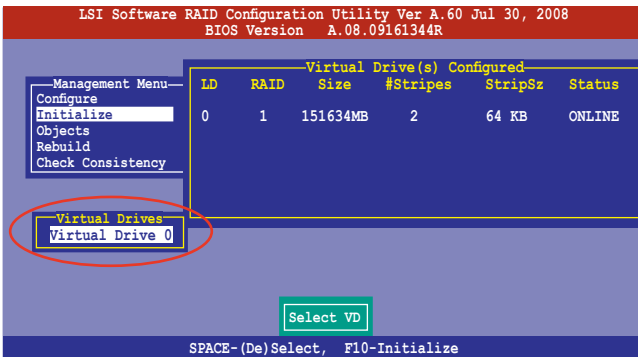
3.   Press <F10> to start initialization. When prompted, select **Yes** from the
     Initialize? dialog box, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                       BIOS Version   A.08.09161344R

                            ┌─Virtual Drive(s) Configured─┐
        ┌─Management Menu─┐ │ LD    RAID    Size   #Stripes    StripSz   Status │
        │Configure        │ │ 0     10    154494MB    4          64 KB    ONLINE │
        │Initialize       │ │                                                   │
        │Objects          │ │                                                   │
        │Rebuild          │ │         ┌──────Initialize?──────┐                 │
        │Check Consistency│ │         │Yes                    │                 │
        └─────────────────┘ │         │No                     │                 │
                            │         └───────────────────────┘                 │
                            └──────────────────────────────────────────────────┘
        ┌──Virtual Drives──┐
        │ Virtual Drive 0  │
        └──────────────────┘

              ┌─────────────────────────────────────────────────┐
              │    Init Will Destroy Data On Selected VD(s)      │
              └─────────────────────────────────────────────────┘
                      SPACE-(De)Select,  F10-Initialize
```
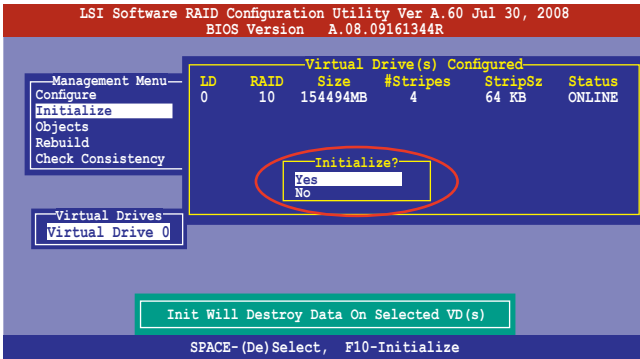
⚠ Initializing a virtual drive erases all data on the drive.

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

```
        LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                       BIOS Version   A.08.09161344R

                            ┌─Virtual Drive(s) Configured─┐
        ┌─Management Menu─┐ │ LD    RAID    Size   #Stripes    StripSz   Status │
        │Configure        │ │ 0     10    154494MB    4          64 KB    ONLINE │
        │Initiali┌────────Init Of VD Is In Process────────┐               │
        │Objects │                                        │               │
        │Rebuild │    VD 0 Initialization Complete. Press Esc.. │         │
        │Check Co│    ┌────────────────────────────────┐  │               │
        └────────│    └────────────────────────────────┘  │──────────────┘
        ┌──Virtua│           ┊ 100% Completed              │
        │ Virtual│                                         │
        └────────└─────────────────────────────────────────┘


                      SPACE-(De)Select,  F10-Initialize
```
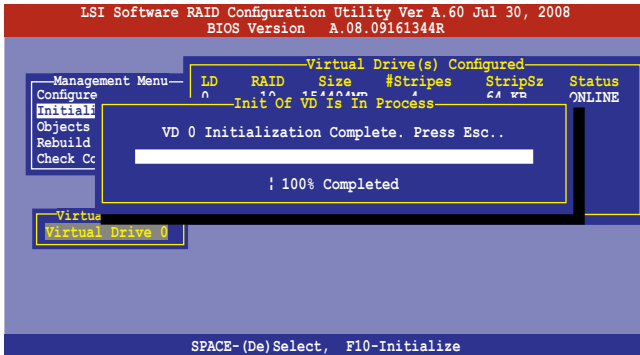
Using the Objects command

To initialize the virtual drives using the **Objects** command

1.   From the **Management Menu**, select **Objects > Virtual Drive**, and then press <Enter>.
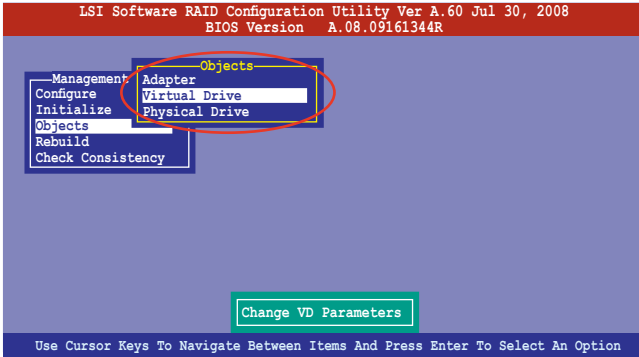
2.   Select the virtual drive to initialize from the **Virtual Drives** sub-menu, and then press <Enter>.
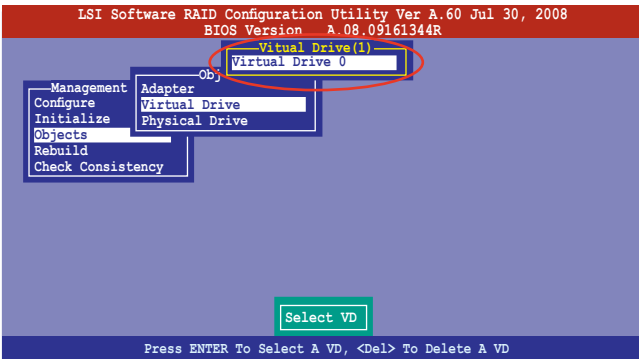
3. Select **Initialize** from the pop-up menu, and then press <Enter> to start initialization.
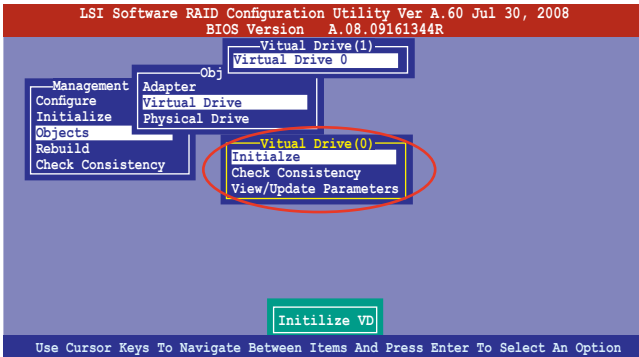
4. When prompted, press the <Space> to select **Yes** from the **Initialize?** dialog box, and then press <Enter>.
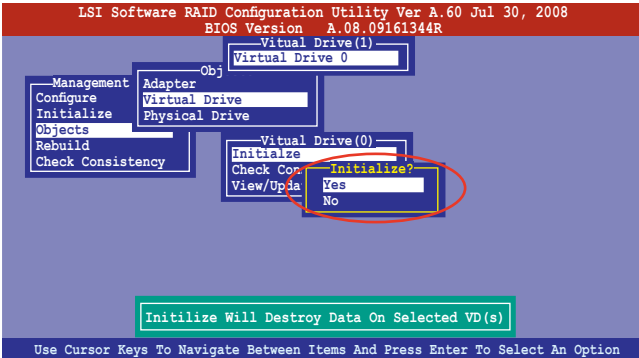
5. A progress bar appears on screen. If desired, press <Esc> to abort initialization. When initialization is completed, press <Esc>.

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**, select **Rebuild**, and then press <Enter>.

```
         LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                       BIOS Version   A.08.09161344R


     ┌──Management Menu──┐
     │ Configure         │
     │ Initialize        │
     │ Objects           │
     │ Rebuild           │
     │ Check Consistency │
     └───────────────────┘






                              ┌─────────────────┐
                              │  Rebuild PD(s)  │
                              └─────────────────┘
     Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```
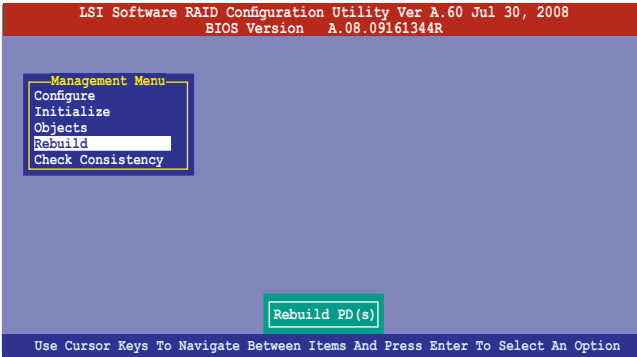
2. The **PHYSICAL DRIVES SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive you want to rebuild, and then press <Space>.

```
         LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                       BIOS Version   A.08.09161344R

                ┌───REBUILD - PHYSICAL DRIVES SELECTION MENU───┐
     ┌──Management┤                    PORT #                  │
     │ Configure  │                                            │
     │ Initialize │        0   ONLIN A00-00                    │
     │ Objects    │                                            │
     │ Rebuild    │        1   FAIL  A00-01                    │
     │ Check Consist                                           │
                  │                                            │
                  │                                            │
                  │                                            │
                  │                                            │
                  │                                            │
                  └────────────────────────────────────────────┘

          ┌──────────────────────────────────────────────────┐
          │ Port # 1 DISK   77247MB   HDS728080PLA380   PF20A60A │
          └──────────────────────────────────────────────────┘
     SPACE-(De)Select,F10-Start Rebuild,F2-Drive Information,F3-View Virtual Drives
```
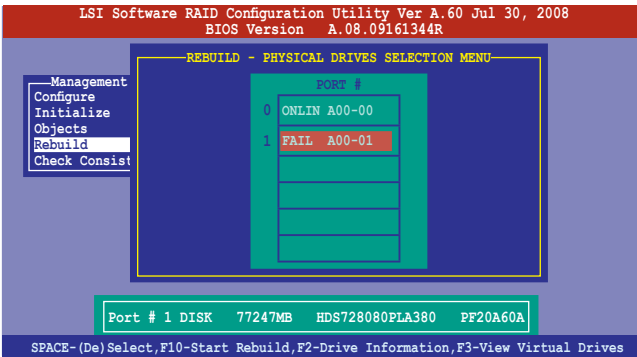
3. After selecting the drive to rebuild, press <F10>. When prompted, press <Y> to rebuild the drive.

```
        LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                    BIOS Version   A.08.09161344R

               ┌─REBUILD - PHYSICAL DRIVES SELECTION MENU─┐
    Management │              PORT #                      │
    Configure  │                                          │
    Initialize │   0 │ ONLIN A00-00 │                     │
    Objects
 ┌──────────────────────────────────────────────────────────────┐
 │ Rebuilding Of Drive Will Take A Few Minutes. Start Rebuilding Drive (Y/N)? │
 └──────────────────────────────────────────────────────────────┘




                    │                          │
                    │                          │

              │ Port # 1 DISK   77247MB   HDS728080PLA380   PF20A60A │

    SPACE-(De)Select,F10-Start Rebuild,F2-Drive Information,F3-View Virtual Drives
```

4. 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 virtual 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 virtual drives included in a RAID 1 or RAID 10 set.

Using the Check Consistency Command

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

1. From the **Management Menu**, select **Check Consistency**, and then press <Enter>.
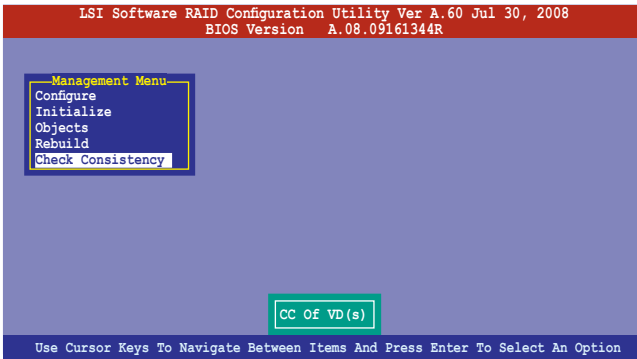
```
         LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                      BIOS Version   A.08.09161344R


         ┌─Management Menu─┐
         │Configure        │
         │Initialize       │
         │Objects          │
         │Rebuild          │
         │Check Consistency│
         └─────────────────┘









                              ┌──────────┐
                              │CC Of VD(s)│
                              └──────────┘
         Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

2. The screen displays the available RAID set(s) and prompts you to select the virtual drive to check. Press <Space> to select the virtual drive from the **Virtual Drive** sub-menu, and then press <F10>.

```
         LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                      BIOS Version   A.08.09161344R

                         ┌─────Virtual Drive(s) Configured─────┐
         ┌─Management Menu─┐ LD    RAID    Size    #Stripes    StripSz    Status
         │Configure        │ 0     10    154494MB    4         64 KB      ONLINE
         │Initialize       │
         │Objects          │
         │Rebuild          │
         │Check Consistency│
         └─────────────────┘


         ┌─Virtual Drives─┐
         │Virtual Drive 0 │
         └────────────────┘



                              ┌─────────┐
                              │Select VD│
                              └─────────┘
                   SPACE-(De)Select,   F10-Check Consistency
```
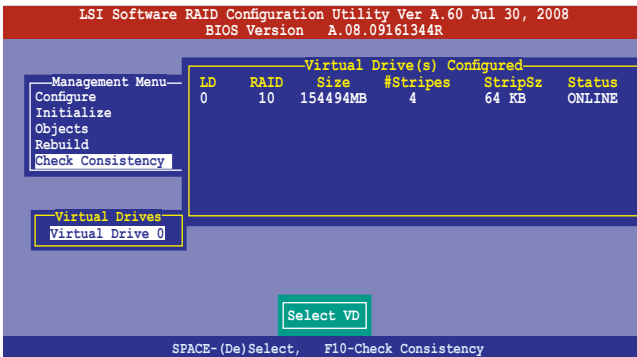
3. When prompted, use the arrow keys to select **Yes** from the **Consistency Check?** dialog box, and then press <Enter>.

```
          LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                          BIOS Version   A.08.09161344R

                             ┌─────Virtual Drive(s) Configured─────┐
  ┌──Management Menu──┐       │ LD    RAID    Size    #Stripes    StripSz    Status │
  │ Configure         │       │ 0     10     154494MB    4        64 KB     ONLINE  │
  │ Initialize        │       │                                            │
  │ Objects           │       │                                            │
  │ Rebuild           │       │         ┌──────Consistency Check?──────┐    │
  │ Check Consistency │       │         │ Yes                          │    │
  └───────────────────┘       │         │ No                           │    │
                              └─────────────────────────────────────────────┘
  ┌──Virtual Drives──┐
  │ Virtual Drive 0  │
  └──────────────────┘

                              ┌─────────────┐
                              │  Select VD  │
                              └─────────────┘
              SPACE-(De)Select,    F10-Check Consistency
```

A progress bar appears on screen.

```
          LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                          BIOS Version   A.08.09161344R

                             ┌─────Virtual Drive(s) Configured─────┐
  ┌──Management Menu──┐       │ LD    RAID    Size    #Stripes    StripSz    Status │
  │ Configure         │       │ 0     10    154494MB    4         64 KB     ONLINE  │
  │ Initializ─────────┼───CC Under Process──────────────────┐ │
  │ Objects           │                                     │ │
  │ Rebuild           │   VD 0 Consistency Check. Press Esc to Abort. │
  │ Check Co          │                                     │ │
  └───────────┤       │  ┌───────────────────────────────┐  │ │
              │       │  │                               │  │
  ┌──Virtua───┘       │       ┊ 85 % Completed            │
  │ Virtual Drive 0  │  └─────────────────────────────────────┘
  └──────────────────┘

                 ┌──────────────────────────────────────────────────┐
                 │ The Data On The Drives Is Inconsistency. Repair Done! │
                 └──────────────────────────────────────────────────┘
              SPACE-(De)Select,    F10-Check Consistency
```

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, and 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**, and then select **Virtual Drive** from the sub-menu.
2.   Use the arrow keys to select the virtual drive you want to check, and then press <Enter>.
3.   Select **Check Consistency** from the pop-up menu, and 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**, and then press <Enter>.

```
         LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                       BIOS Version   A.08.09161344R
                     ┌─Configuration Menu─┐
                     │ Easy Configuration │
        ┌Management┐ │ New Configuration  │
        │Configure │ │ View/Add Configuration
        │Initialize│ │ Clear Configuration│
        │Objects   │ │ Select Boot Drive  │
        │Rebuild   │ └────────────────────┘
        │Check Consistency│




                      ┌──────────────────────────────┐
                      │ Clear Existing Configuration  │
                      └──────────────────────────────┘
         Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```
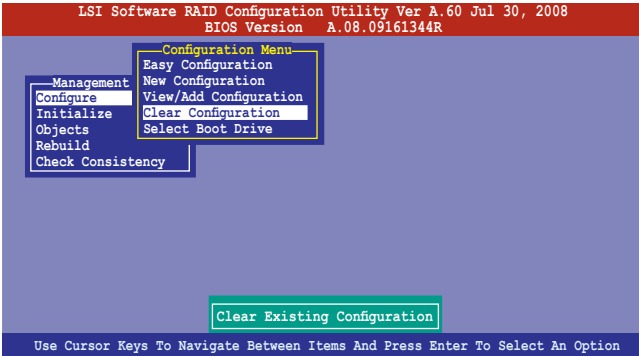
2.   When prompted, use the arrow keys to select **Yes** from the **Clear Configuration?** dialog box, and then press <Enter>.

```
         LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                       BIOS Version   A.08.09161344R
                     ┌─Configuration Menu─┐
                     │ Easy Configuration │
        ┌Management┐ │ New Configuration  │
        │Configure │ │ View/A ┌─Clear Configuration?─┐
        │Initialize│ │ Clear  │ Yes                  │
        │Objects   │ │ Select │ No                   │
        │Rebuild   │ └────────└──────────────────────┘
        │Check Consistency│




                      ┌──────────────────────────────┐
                      │ Clear Existing Configuration  │
                      └──────────────────────────────┘
         Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

The utility clears all the current array(s).

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. See section **6.2.1 Creating a RAID set: Using New Configuration** for details.

To select the boot drive from a RAID set

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

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

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

6.2.8 Enabling WriteCache

You may manually enable the RAID controller's WriteCache option after creating a RAID set 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.

> ✏️ The WriteCache function is recommended for RAID 1 and RAID 10 sets.

To enable WriteCache

1. From the **Management Menu**, select **Objects** > **Adapter**, and then press <Enter> to display the adapter properties.

2. Select **Disk WC**, and then press <Enter> to turn on the option.

```
          LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                         BIOS Version   A.08.09161344R
                                       ─Adapter 0─
                            Obje    Rebuild Rate     = 30
                                    Chk Const Rate   = 30
        ─Management─    ─Adapter    FGI Rate         = 30
        Configure      Virtual Driv  BGI Rate        = 30
        Initialize     Physical Dri  Disk WC         = Off
        Objects                      Read Ahead      = On
        Rebuild                      Bios State      = Enable
        Check Consistency            Stop On Error   = No
                                     Fast Init       = Enable
                                     Auto Rebuild    = On
                                     Auto Resume     = Enable
                                     Disk Coercion   = 1GB
                                     Factory Default


            Disk Write Cache - Off(Write Through) or On(Write Back)

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

3. From the **Management Menu**, select **Objects** > **Virtual Drive**, and then press <Enter> to display the adapter properties.

4. Select **Disk WC**, and then press <Enter> to turn on the option.

```
          LSI Software RAID Configuration Utility Ver A.60 Jul 30, 2008
                         BIOS Version   A.08.09161344R
                                     ─Virtual Drive─
                            O   RAID          = 0
                                Size          = 1428604MB
        ─Management─    ─Adapter   Stripe Size   = 64KB
        Configure      Virtual D  #Stripes      = 2
        Initialize     Physical   State         = OPTIMAL
        Objects                    Spans         = 1
        Rebuild                    Disk WC       = On
        Check Consistency          Read Ahead    = On




            Disk Write Cache - Off(Write Through) or On(Write Back)

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

5. When finished, press any key to continue.

6.3 Intel® Matrix Storage Manager Option ROM Utility

The Intel® Matrix Storage Manager Option ROM utility allows you to create RAID 0, RAID 1, RAID 10 (RAID 0+1), and RAID 5 set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

To enter the Intel® Matrix Storage Manager option ROM utility:

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

```
        Intel(R) Matrix Storage Manager option ROM v8.5.0.1030 ICH10R/DO wRAID5
              Copyright(C) 2003-08 Intel Corporation.  All Rights Reserved.
    ═══════════════════════════════[ MAIN MENU ]═══════════════════════════════
            1. Create RAID Volume                3. Reset Disks to Non-RAID
            2. Delete RAID Volume                4. Recovery Volume Options
                                   5. Exit

    ════════════════════════════[ DISK/VOLUME INFORMATION ]════════════════════
        RAID Volumes:                               * = Data is Encrypted
        None defined.

        Physical Disks:
        Port Drive Model     Serial #          Size      Type/Status(Vol ID)
        0    ST3160812AS     9LS0HJA4          149.0GB   Non-RAID Disk
        1    ST3160812AS     9LS0F4HL          149.0GB   Non-RAID Disk
        2    ST3160812AS     3LS0JYL8          149.0GB   Non-RAID Disk
        3    ST3160812AS     9LS0BJ5H          149.0GB   Non-RAID Disk



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

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

> The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.
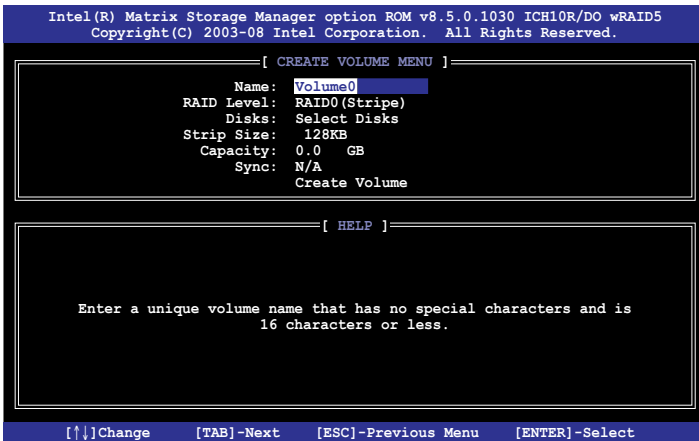
> The utility supports maximum four hard disk drives for RAID configuration.
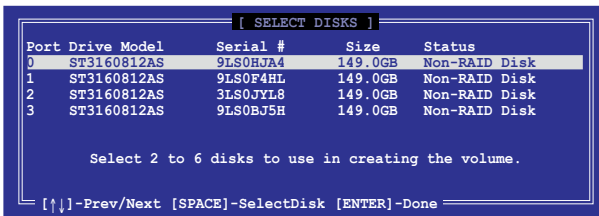
6.3.1   Creating a RAID set

To create a RAID set

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

```
   Intel(R) Matrix Storage Manager option ROM v8.5.0.1030 ICH10R/DO wRAID5
           Copyright(C) 2003-08 Intel Corporation.  All Rights Reserved.
   ════════════════════════[ CREATE VOLUME MENU ]════════════════════════

                       Name:   Volume0
                 RAID Level:   RAID0(Stripe)
                      Disks:   Select Disks
                 Strip Size:   128KB
                   Capacity:   0.0   GB
                       Sync:   N/A
                              Create Volume

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



              Enter a unique volume name that has no special characters and is
                             16 characters or less.




   [↑↓]Change       [TAB]-Next     [ESC]-Previous Menu     [ENTER]-Select
```

2. Enter a name for the RAID set and press <Enter>.

3. When the **RAID Level** item is selected, press the up/down arrow key to select
    a RAID level to create, and then press <Enter>.

4. When the **Disks** item is selected, 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    ST3160812AS       9LS0HJA4       149.0GB    Non-RAID Disk
      1    ST3160812AS       9LS0F4HL       149.0GB    Non-RAID Disk
      2    ST3160812AS       3LS0JYL8       149.0GB    Non-RAID Disk
      3    ST3160812AS       9LS0BJ5H       149.0GB    Non-RAID Disk


            Select 2 to 6 disks to use in creating the volume.

      [↑↓]-Prev/Next [SPACE]-SelectDisk [ENTER]-Done
```

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

6. Use the up/down arrow key to select the stripe size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
RAID 0: 128KB
RAID 10: 64KB
RAID 5: 64KB

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

7. When the **Capacity** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.

8. When the **Create Volume** item is selected, press <Enter>. The following 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 VOLUME** menu.

6.3.2   Creating a Recovery set

To create a recovery set

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

```
    Intel(R) Matrix Storage Manager option ROM v8.5.0.1030 ICH10R/DO wRAID5
         Copyright(C) 2003-08 Intel Corporation.  All Rights Reserved.
    ━━━━━━━━━━━━━━━━━━━━━━━━[ CREATE VOLUME MENU ]━━━━━━━━━━━━━━━━━━━━━
                      Name:   Volume0
                RAID Level:   RAID0(Stripe)
                     Disks:   Select Disks
                Strip Size:    128KB
                  Capacity:   0.0    GB
                      Sync:   N/A
                              Create Volume

    ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━[ HELP ]━━━━━━━━━━━━━━━━━━━━━━━━━━━

          Enter a unique volume name that has no special characters and is
                            16 characters or less.




    [↑↓]Change      [TAB]-Next     [ESC]-Previous Menu     [ENTER]-Select
```

2. Enter a name for the recovery set and press <Enter>.

3. When the **RAID Level** item is selected, press the up/down arrow key to select **Recovery**, and then press <Enter>.

4. When the **Disks** item is selected, press <Enter> to select the hard disk drives you want to include in the recovery set. The **SELECT DISKS** screen appears.

```
┌──────────────────────[ SELECT DISKS ]──────────────────────┐
│Port Drive Model      Serial #      Size      Status         │
│0    ST3160812AS      9LS0HJA4      149.0GB   Non-RAID Disk   │
│1    ST3160812AS      9LS0F4HL      149.0GB   Non-RAID Disk   │
│2    ST3160812AS      3LS0JYL8      149.0GB   Non-RAID Disk   │
│3    ST3160812AS      9LS0BJ5H      149.0GB   Non-RAID Disk   │
│                                                             │
│                                                             │
│      Select 1 Master and 1 Recovery disk to create volume.  │
│                                                             │
│                                                             │
└──[↑↓]-Prev/Next [TAB]-(M)aster [SPACE]-(R)ecovery [ENTER]-Done──┘
```

5. Use the up/down arrow key to select a drive, press <TAB> to select a Master disk, and then press <SPACE> to select a Recovery disk. A small triangle marks the selected drive. Press <Enter> after completing your selection.

6. When the **Sync** item is selected, use the up/down arrow key to select a sync option that you want and press <Enter>.

7. When the **Create Volume** item is selected, press <Enter>. The following warning message appears.

```
┌─────────────────────────────────────────────────────────────┐
│                                                             │
│         WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.    │
│      Are you sure you want to create this volume? (Y/N):     │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```

8. Press <Y> to create the recovery set and return to the main menu, or <N> to go back to the **CREATE VOLUME** menu.

> If a recovery set is created, you cannot add more RAID sets even when you have more non-RAID disks installed in your system.

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** and press <Enter>. The following screen appears.

```
        Intel(R) Matrix Storage Manager option ROM v8.5.0.1030 ICH10R/DO wRAID5
             Copyright(C) 2003-08 Intel Corporation.  All Rights Reserved.
══════════════════════════[ DELETE VOLUME MENU ]══════════════════════════
   Name        Level          Drives      Capacity      Status      Bootable
   Volume0     RAID0(Stripe)      2        298.0GB       Normal        Yes




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

            Deleting a volume will reset the disks to non-RAID.

                    WARNING: ALL DISK DATA WILL BE DELETED.
                    (This does not apply to Recovery volumes)




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

2. Use the up/down arrow key to select the RAID set you want to delete, and then press <Del>. The following warning message appears.

```
═══════════════════[ DELETE VOLUME VERIFICATION ]═══════════════════
                 ALL DATA IN THE VOLUME WILL BE LOST!
              (This does not apply to Recovery volumes)

         Are you sure you want to delete volume "Volume0"? (Y/N):
```

3. Press <Y> to delete the RAID set and return to the utility main menu, or 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** and press <Enter>. The following screen appears.

```
                           [ RESET RAID DATA ]
          Resetting RAID disk will remove its RAID structures
          and revert it to a non-RAID disk.

    WARNING: Resetting a disk causes all data on the disk to be lost.
    (This does not apply to Recovery volumes)

    Port Drive Model      Serial #      Size     Status
    0    ST3160812AS      9LS0HJA4      149.0GB   Member Disk
    1    ST3160812AS      9LS0F4HL      149.0GB   Member Disk

                Select the disks that should be reset.

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

2. Use the up/down arrow key to select the RAID set drive(s) you want to reset, and then press <Space> to select.

3. Press <Enter> to reset the RAID set drive(s). A confirmation message appears.

4. Press <Y> to reset the drive(s) or press <N> to return to the utility main menu.
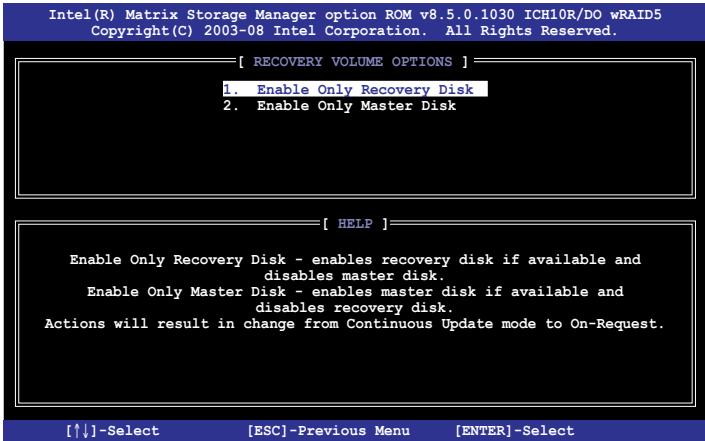
6.3.5   Recovery Volume Options

If you have created a recovery set, you can configure more recovery set options
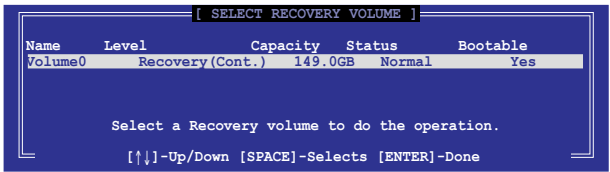following the descriptions in the section.

See section **6.3.2 Creating a Recovery set** to create a recovery set before
continue.

To configure a recovery set

1.   From the utility main menu, select **4. Recovery Volume Options** and press
     <Enter>. The following screen appears.

```
      Intel(R) Matrix Storage Manager option ROM v8.5.0.1030 ICH10R/DO wRAID5
          Copyright(C) 2003-08 Intel Corporation.  All Rights Reserved.
      ═══════════════════════[ RECOVERY VOLUME OPTIONS ]═══════════════════════
                         1.  Enable Only Recovery Disk
                         2.  Enable Only Master Disk




      ══════════════════════════════[ HELP ]══════════════════════════════
          Enable Only Recovery Disk - enables recovery disk if available and
                              disables master disk.
           Enable Only Master Disk - enables master disk if available and
                              disables recovery disk.
          Actions will result in change from Continuous Update mode to On-Request.



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

2.   Use the up/down arrow key to select the option you want, and then press
     <ENTER>. The **SELECT RECOVERY VOLUME** screeen appears.

```
           ═══════════════[ SELECT RECOVERY VOLUME ]═══════════════
      Name      Level            Capacity    Status      Bootable
      Volume0       Recovery(Cont.)   149.0GB    Normal          Yes



           Select a Recovery volume to do the operation.
               [↑↓]-Up/Down [SPACE]-Selects [ENTER]-Done
```

3.   Use the up/down arrow key to select a drive, and then press <Space>
     to select. A small triangle marks the selected drive. Press <Enter> after
     completing your selection and return to the utility main menu.

6.3.6   Exiting the Intel® Matrix Storage Manager

To exit the utility

1.   From the utility main menu, select **5. Exit**, and then press <Enter>. The
      following warning message 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.

6.3.7   Rebuilding the RAID

This option is only for the RAID 1 set.

Rebuilding the RAID with other non-RAID disk

If any of the SATA hard disk drives included in the RAID 1 array failed, the system
displays the status of the RAID volume as "**Degraded**" during POST. You can
rebuild the RAID array with other installed non-RAID disks.

To rebuild the RAID with other non-RAID disk:

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

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

   Select the port of destination disk for rebuilding (ESC to exit):
   Port Drive Model      Serial #        Size
   X    XXXXXXXXXXX      XXXXXXXX        XX.XGB




        ═[↑↓]-Previous/Next   [ENTER]-Select   [ESC]-Exit═
```
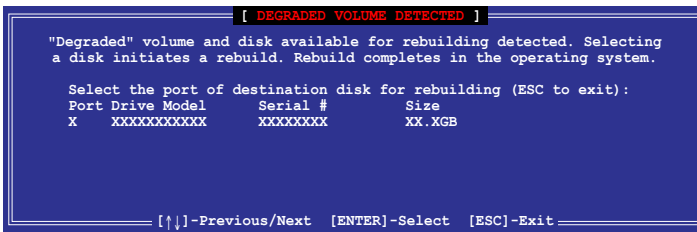
Select a destination disk with the same size as the original hard disk.

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

```
   Intel(R) Matrix Storage Manager option ROM v8.5.0.1030 ICH10R/DO wRAID5
         Copyright(C) 2003-08 Intel Corporation.  All Rights Reserved.
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━[ MAIN MENU ]━━━━━━━━━━━━━━━━━━━━━━━━━━━
       1. Create RAID Volume              3. Reset Disks to Non-RAID
       2. Delete RAID Volume              4. Recovery Volume Options
                            5. Exit

   ━━━━━━━━━━━━━━━━━━━━━[ DISK/VOLUME INFORMATION ]━━━━━━━━━━━━━━━━━━━━
     RAID Volumes:                                * = Data is Encrypted
     ID   Name      Level         Strip  Size     Status    Bootable
     0    Volume0   RAID1(Mirror) N/A    149.0GB  Rebuild   Yes


     Physical Disks:
     Port Drive Model    Serial #            Size      Type/Status(Vol ID)
     1    ST3160812AS    9LS0F4HL            149.0GB   Member Disk(0)
     2    ST3160812AS    3LS0JYL8            149.0GB   Member Disk(0)



    Volumes with "Rebuild" status will be rebuilt within the operating system.

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

4. Exit Intel Matrix Storage Manager and reboot the system.

5. Select **Start > Programs > Intel Matrix Storage > Intel Matrix Storage Console** or click the **Intel Matrix Storage Manager** tray icon to load the Intel Matrix Stroage Manager utility.

6. From the **View** menu, select **Advanced Mode** to display the details of the Intel Matrix Storage Console.

7. From the **Volumes view** option, select **RAID volume** to view the rebuilding status. When finished, the status is changed to "**Normal**".

Rebuilding the RAID with a new hard disk

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

To rebuild the RAID with a new hard disk:

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

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

2. Reboot the system and then follow the steps in section **Rebuilding the RAID with other non-RAID disk** on page 6-31.

6.3.8 Setting the Boot array in the BIOS Setup Utility

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

To set the boot array in the BIOS:

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

1.   Reboot the system and press <Del> to enter the BIOS setup utility during POST.
2.   Go to the **Boot** menu and select the option **Boot Device Priority**.
3.   Use up/down arrow keys to select the boot priority and press <Enter>. See section **5.6.1 Boot Device Priority** for details.
4.   From the **Exit** menu, select **Exit & Save Changes**, then press <Enter>.
5.   When the confirmation window appears, select **OK**, then press <Enter>.

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

The system does not include a floppy drive. You have to use a USB floppy drive when creating a SATA RAID driver disk.

If you have created RAID sets with the LSI Software RAID configuration utility, the boot priority of the SATA optical disk drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

A floppy disk with the RAID driver is required when installing Windows® or Red Hat® Enterprise 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 DVD).

To create a RAID driver disk in DOS environment

1. Place the motherboard support DVD in the optical drive.
2. Restart the computer, and then enter the BIOS Setup.
3. Select the optical drive as the first boot priority to boot from the support DVD. Save your changes, and then exit the BIOS Setup.
4. Restart the computer. The Makedisk menu appears.

```
Create Driver Diskette Menu
ICH10R INTEL RAID Driver
ICH10R LSI RAID Driver
ITE IT8213F Linux Driver
Write DMI
FreeDOS command prompt
```
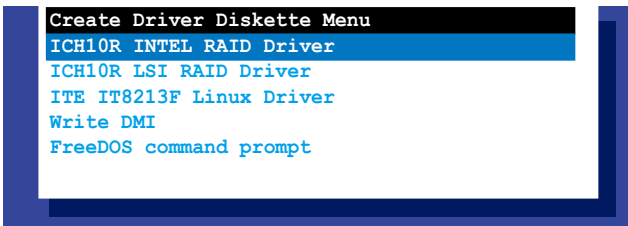
5. Use the arrow keys to select the type of RAID driver disk you want to create and press <Enter> to enter the sub-menu.

ICH10R INTEL RAID Driver

```
ICH10R INTEL RAID Driver
Windows 32 bit
Windows 64 bit
Back
Exit
```

ICH10R LSI RAID Driver

```
     PXH LSI RAID Driver
Windows XP 32 bit
Windows XP 64 bit
Windows Server 2003 32 bit
Windows Server 2008 64 bit
Windows Vista 32 bit
Windows Vista 64 bit
Windows Server 2008 32 bit
Windows Server 2008 64 bit
Windows 7 32 bit
Windows 7 64 bit
Windows Server 2008 R2 64 bit
RHEL AS4 UP7 32/64 bit
RHEL AS4 UP8 32/64 bit
RHEL 5 UP3 32/64 bit
RHEL 5 UP4 32/64 bit
SLES 9 SP3 32 bit
SLES 9 SP3 64 bit
SLES 9 SP4 32 bit
SLES 9 SP4 64 bit
SLES 10 32 bit
SLES 10 64 bit
SLES 10 SP1 32 bit
▼
```

ITE IT8213F Linux Driver

```
ITE IT8213F Linux Driver
RHEL 4 UP7 32/64 bit
RHEL 4 UP8 32/64 bit
RHEL 5 UP3 32/64 bit
RHEL 5 UP4 32/64 bit
SLES 9 SP3 32 bit
SLES 9 SP3 64 bit
SLES 10 32 bit
SLES 10 64 bit
FreeBSD 7 32/64 bit
Back
Exit
```

6.   Locate the RAID driver and place a blank, high-density floppy disk to the floppy disk drive.

7.   Press <Enter>.

8.   Follow screen instructions to create the driver disk.

To create a RAID driver disk in Windows® environment

1.   Start Windows®.

2.   Place the motherboard support DVD into the optical drive.

3.   Go to the **Make Disk** menu, and then select the type of RAID driver disk you want to create.

4.   Insert a floppy disk into the floppy disk drive.

5.   Follow succeeding screen instructions to complete the process.

> Write-protect the floppy disk to avoid computer virus infection.

To create a RAID driver disk in Red Hat® Enterprise Linux server environment

1.   Insert a blank formatted high-density floppy disk to the floppy disk drive.
2.   Type `dd if=XXX.img of=/dev/fd0` to decompress the file into the floppy disk from the following path in the support DVD:

    For LSI MegaRAID Driver

        \Drivers\ICH10R LSI RAID\Driver\makedisk\Linux
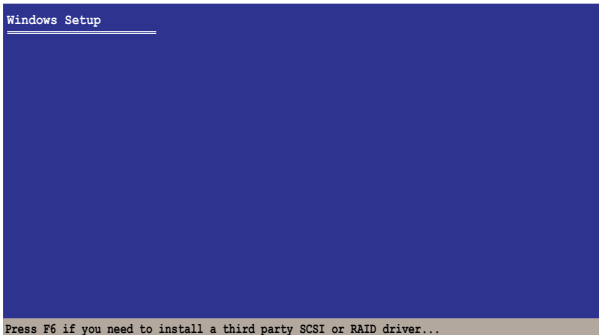
3.   Eject the floppy disk.

7.1.2　Installing the RAID controller driver
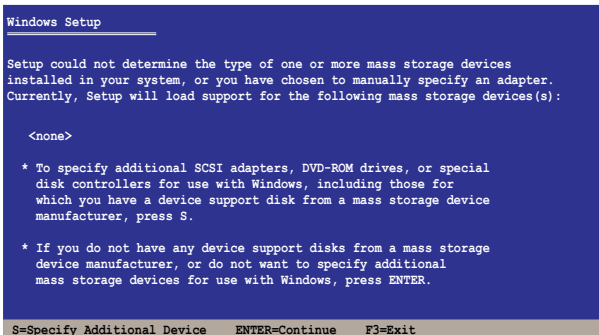
Windows® Server OS

During Windows® Server OS installation

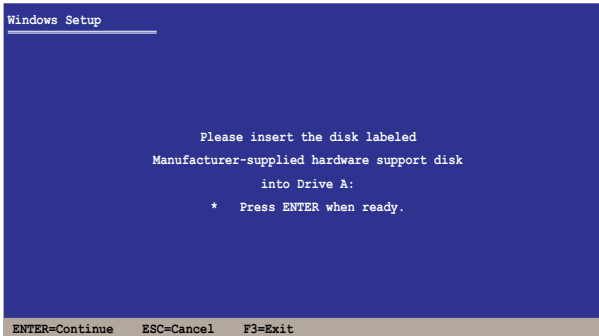To install the RAID controller driver when installing Windows® Server OS:

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

```
Windows 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 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, DVD-ROM drives, or special
   disk controllers for use with Windows, 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, 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>.

```
Windows Setup


                         Please insert the disk labeled
                Manufacturer-supplied hardware support disk
                              into Drive A:
                       *   Press ENTER when ready.




 ENTER=Continue     ESC=Cancel     F3=Exit
```

5. Select the RAID controller driver you need from the list, then press <Enter>.
6. The Windows® 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® OS

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

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

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

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

4. Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.

5. Right-click the **RAID controller** item, then select **Properties**.

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

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

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

9. Select the option **Search for a suitable driver for my device (recommended)**, then click **Next**.
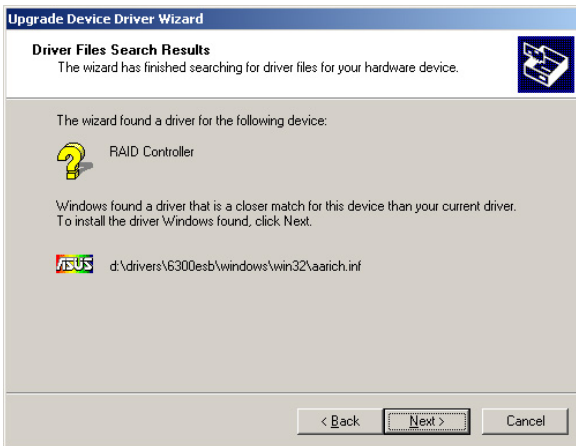
10. The wizard searches the RAID controller drivers. When found, click **Next** to install the drivers.

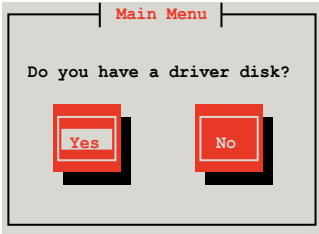11. Click **Finish** after the driver installation is done.

Red Hat® Enterprise Linux OS 4.7/4.8

To install the RAID controller driver when installing Red Hat® Enterprise OS:
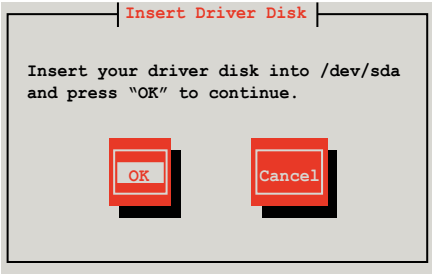
1.   Boot the system from the Red Hat® OS installation CD.

2.   At the `boot:`, type `linux dd nostorage`.

3.   Press <Enter>.

```
-  To install or upgrade in graphical mode, press the <ENTER> key.
-  To install or upgrade in text mode, type: linux text <ENTER>.
-  Use the function keys listed below for more information.
[F1-Main] [F2-Options] [F3-General] [F4-Kernel] [F5-Rescue]
boot: linux dd nostorage
```
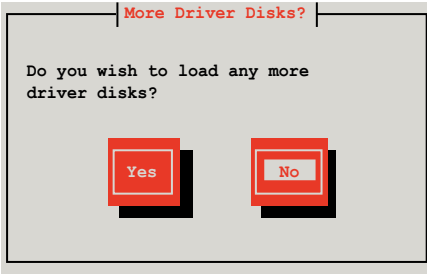
4.   Select **Yes** using the <Tab> key when asked if you have the driver disk, then
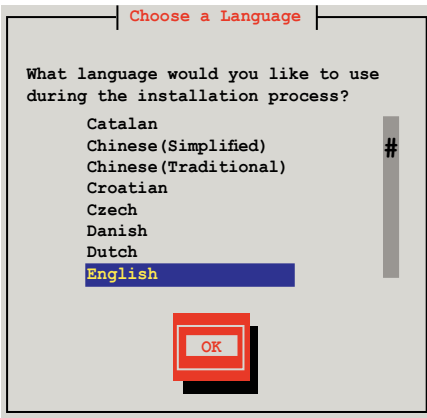   press <Enter>.

```
            ┤ Main Menu ├

    Do you have a driver disk?


        Yes              No
```

5.   Press <Enter> to continue.

```
            ┤ Insert Driver Disk ├

    Insert your driver disk into /dev/sda
    and press "OK" to continue.


        OK              Cancel
```

6.   Select **No** and press <Enter> to continue.

```
┌───────────────┤ More Driver Disks? ├───────────────┐
│                                                     │
│  Do you wish to load any more                       │
│  driver disks?                                      │
│                                                     │
│                                                     │
│           ┌─────────┐         ┌─────────┐           │
│           │   Yes   │         │   No    │           │
│           └─────────┘         └─────────┘           │
│                                                     │
│                                                     │
└─────────────────────────────────────────────────────┘
```

7.   Select your desired language and press <Enter> to continue.

```
┌────────────────┤ Choose a Language ├────────────────┐
│                                                     │
│  What language would you like to use                │
│  during the installation process?                   │
│          Catalan                                    │
│          Chinese(Simplified)                     #  │
│          Chinese(Traditional)                       │
│          Croatian                                   │
│          Czech                                      │
│          Danish                                     │
│          Dutch                                      │
│          English                                    │
│                                                     │
│                                                     │
│                ┌─────────┐                          │
│                │   OK    │                          │
│                └─────────┘                          │
│                                                     │
└─────────────────────────────────────────────────────┘
```

8.   Select your keyboard type and press <Enter> to continue.
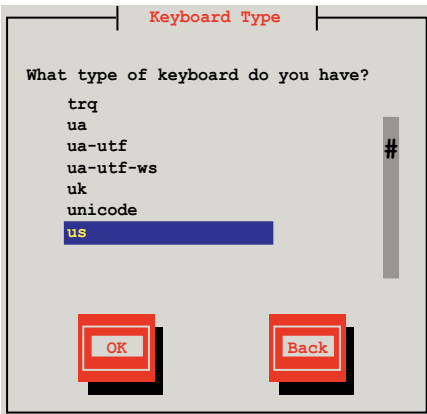
```
┌─────────────────┤ Keyboard Type ├──────────────────┐
│                                                     │
│  What type of keyboard do you have?                 │
│        trq                                          │
│        ua                                           │
│        ua-utf                                    #  │
│        ua-utf-ws                                    │
│        uk                                           │
│        unicode                                      │
│        us                                           │
│                                                     │
│                                                     │
│                                                     │
│      ┌─────────┐         ┌─────────┐                │
│      │   OK    │         │  Back   │                │
│      └─────────┘         └─────────┘                │
│                                                     │
└─────────────────────────────────────────────────────┘
```

9. Select the media and press <tab> to select **OK**. Press<Enter> to continue.

```
┌──────────────┤ Installation Method ├──────────────┐
│                                                    │
│  What type of media contains the                   │
│  packages to be installed?                         │
│                   Local CDROM                       │
│                   Hard drive                        │
│                   NFS image                         │
│                   FTP                               │
│                   HTTP                              │
│                                                    │
│                                                    │
│        ┌────────┐              ┌────────┐          │
│        │   OK   │              │  Back  │          │
│        └────────┘              └────────┘          │
│                                                    │
└────────────────────────────────────────────────────┘
```

10. Select the media and press <tab> to select **OK**. Press <Enter> to continue.

```
┌───────────────────┤ No driver found ├───────────────────┐
│                                                          │
│      Unable to find any devices of the type              │
│      needed for this installation type.                  │
│                                                          │
│      Would you like to manually select your              │
│      driver or use a driver disk?                        │
│                                                          │
│  ┌───────────────┐  ┌───────────────────┐  ┌────────┐   │
│  │ Select driver │  │ Use a driver disk │  │  Back  │   │
│  └───────────────┘  └───────────────────┘  └────────┘   │
│                                                          │
└──────────────────────────────────────────────────────────┘
```
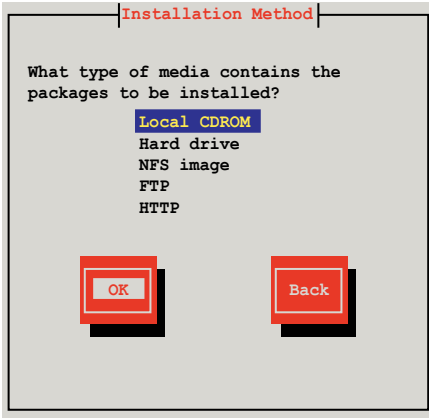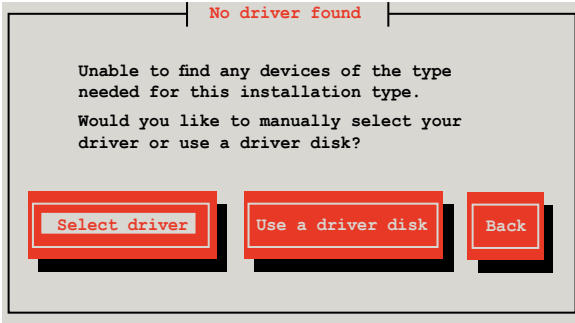
11. Scroll down to locate the driver and press <Enter> to continue.

```
┌─────────────────┤ Select Device Driver to Load ├─────────────────┐
│                                                                   │
│  Please select the driver below which you wish to load. If        │
│  it does not appear and you have a driver disk, press F2.         │
│                                                                   │
│   LSI Logic Fusion MPT SPI Driver (mptspi)                        │
│   LSI MegaRAID Controllers (megaraid_mbox)                        │
│   LSI MegaRAID Controllers (megaraid_sas)                         │
│   LSI megasr Driver ver 13.10.0708.2009 (megasr)                  │
│   Marvell SATA controllers (sata_mv)                              │
│   Mylex DAC960 RAID Controller (DAC960)                           │
│             [] Specify optional module arguments                  │
│                                                                   │
│                                                                   │
│         OK                              Back                       │
│                                                                   │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

The driver version may vary with time and model. Select LSI Mega Software RAID driver (**LSI megasr Driver**) all the time.

12. Select **Skip** and press <Enter> to continue.

```
┌──────────┤ CD Found ├──────────┐
│                                │
│  To begin testing the CD media before │
│  installation press OK.        │
│                                │
│  Choose Skip to skip the media test │
│  and start the installation.   │
│                                │
│                                │
│      OK          Skip          │
│                                │
│                                │
└────────────────────────────────┘
```
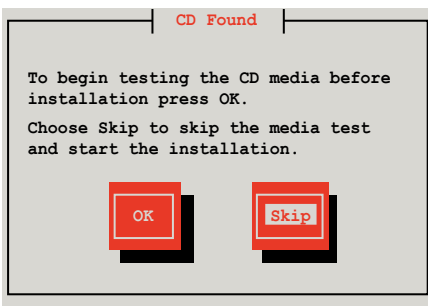
13. Select **Done** and press <Enter> to continue.

```
┌─────────────────────────┤ Devices ├─────────────────────────┐
│                                                             │
│   The following devices have been found on your system.     │
│      Intel Pro/1000 (e1000e)                                │
│      LSI megasr Driver ver 13.10.0708.2009 (megasr)         │
│      USB Mass Storage driver for Linux (usb-storage)        │
│                                                             │
│                                                             │
│           ┌──────┐              ┌────────────┐              │
│           │ Done │              │ Add Device │              │
│           └──────┘              └────────────┘              │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```
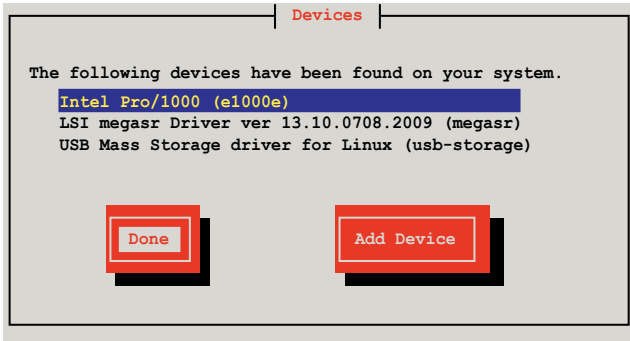
The displayed devices may vary with models and systems.

14. Follow the onscreen instructions to finish installing the RedHat operating system.

Red Hat® Enterprise Linux OS 5.0

To install the RAID controller driver when installing Red Hat® Enterprise OS:

1. Boot the system from the Red Hat® OS installation CD.
2. At the `boot:`, type `linux dd noprobe=ata[n]`. The number of ata varies with the hard disk drive number you have when building a RAID set. For example, if you want to build a RAID set with 6 hard disk drives, type command line: linux dd noprobe=ata1 noprobe=ata2 noprobe=ata3 noprobe=ata4 noprobe=ata5 noprobe=ata6.
3. Press <Enter>.

```
- To install or upgrade in graphical mode, press the <ENTER> key.
- To install or upgrade in text mode, type: linux text <ENTER>.
- Use the function keys listed below for more information.
[F1-Main] [F2-Options] [F3-General] [F4-Kernel] [F5-Rescue]
boot: linux dd noprobe=ata[n]
```

4. Select **Yes** using the <Tab> key when asked if you have the driver disk, then press <Enter>.

```
                    Main Menu

        Do you have a driver disk?


           Yes              No
```
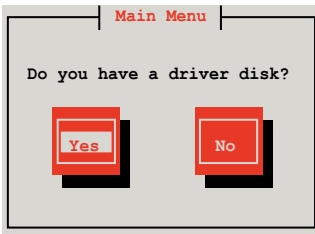
5. Select **fd0** using the <Tab> key when asked to select the driver disk source. Press <Tab> to move the cursor to **OK**, then press <Enter>.

```
                  Driver Disk Source

      You have multiple devices which could
      serve as sources for a driver disk.
      Which would you like to use?

                    fd0
                    scd0

          OK              Cancel
```
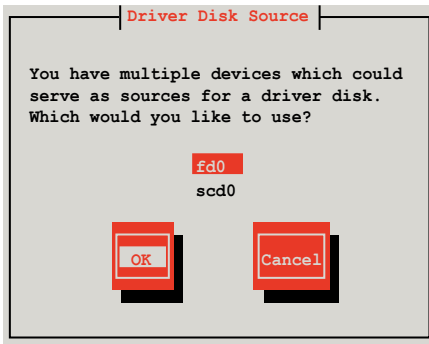
6.   Insert the Red Hat® Enterprise RAID driver disk to the floppy disk drive, select
      OK, then press <Enter>.

```
┌─────────────┤ Insert Driver Disk ├─────────────┐
│                                                 │
│   Insert your driver disk into /dev/fd0         │
│   and press "OK" to continue.                   │
│                                                 │
│                                                 │
│      ┌────────┐              ┌────────┐         │
│      │   OK   │              │  Back  │         │
│      └────────┘              └────────┘         │
│                                                 │
└─────────────────────────────────────────────────┘
```
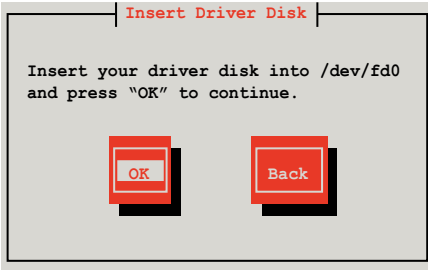
      The drivers for the RAID card are installed to the system.

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

```
┌───────┤ More Driver Disks? ├───────┐
│                                     │
│   Do you wish to load any more      │
│   driver disks?                     │
│                                     │
│                                     │
│    ┌────────┐        ┌────────┐     │
│    │  Yes   │        │   No   │     │
│    └────────┘        └────────┘     │
│                                     │
└─────────────────────────────────────┘
```
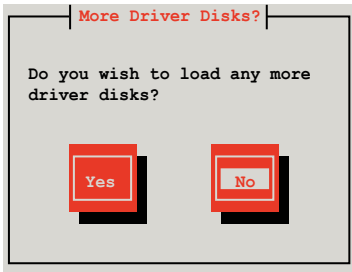
8.   Follow the onscreen instructions to finish the OS installation.

9.   If you install RHEL AS5, when the installation is completed, DO NOT click
      Reboot. Press <Ctrl> + <Alt> + <F2> to switch to the command-line interface
      from graphic user interface.

10.   Type the following commands when using a USB floppy.

      `cat /proc/partitions`

      Write down the **Major** and **Minor** number before **sdb** for later use.

      ```
      mknod /dev/sdb b [major number] [minor number]
      mkdir /mnt/driver
      mount /dev/sdb /mnt/driver
      cd /mnt/driver
      sh replace_ahci.sh
      reboot
      ```

SUSE Linux OS

To install the RAID controller driver when installing SUSE Linux Enterprise Server OS

1.   Boot the system from the SUSE OS installation CD.

2.   Use the arrow keys to select **Installation** from the **Boot Options** menu.

```
              Boot from Hard Disk
              Installation
              Installation--ACPI Disabled
              Installation--Local APIC Disabled
              Installation--Safe Settings
              Rescue System
              Memory Test



        Boot Options |


 F1 Help  F2 Language  F3 1280 x 1024  F4 DVD  F5 Driver
```
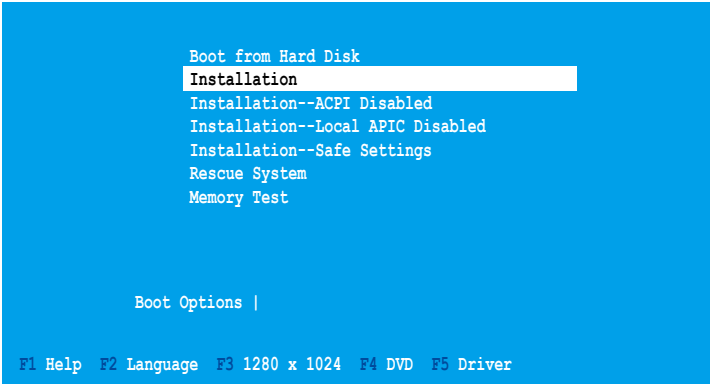
3.   Press <F5>, then select **Yes** from the menu. Press <Enter>.

```
              Boot from Hard Disk
              Installation
              Installation--ACPI Disabled
              Installation--Local APIC Disabled
              Installation--Safe Settings
              Rescue System
              Memory Test



        Boot Options |                    Yes
                                          No
                                          File
 F1 Help  F2 Language  F3 1280 x 1024  F4 DVD  F5 Driver
```
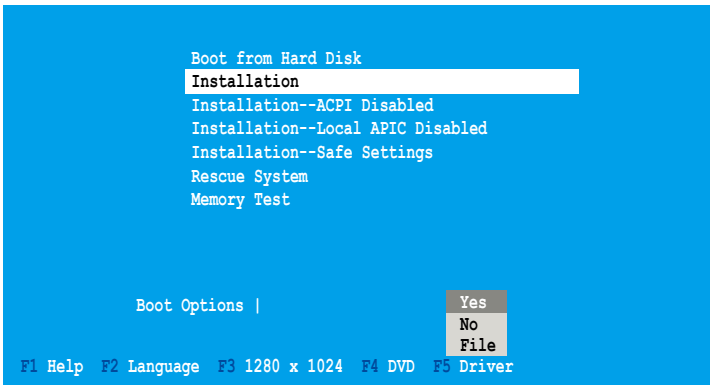
4.   Insert the RAID driver disk to the floppy disk drive. Make sure that **Installation**
      from the **Boot Options** menu is selected, then press <Enter>.

```
              Boot from Hard Disk
              Installation
              Installation--ACPI Disabled
              Installation--Local APIC Disabled
              Installation--Safe Settings
              Rescue System
              Memory Test



         Boot Options |


 F1 Help  F2 Language  F3 1280 x 1024  F4 DVD  F5 Driver
```
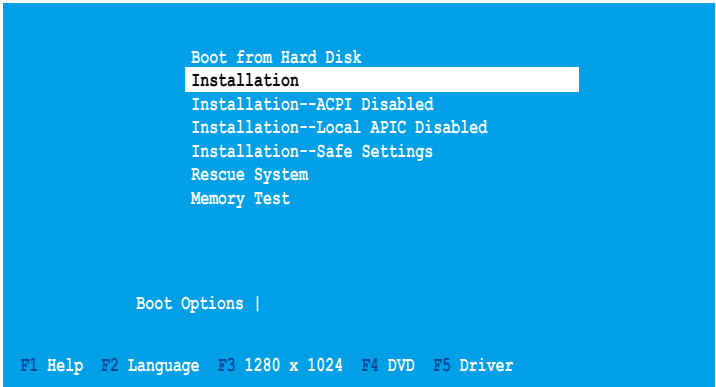
If you install SLES 10, type `brokenmodules=ahci` after **Boot Options** and
press **Enter** to continue.

5.   When below screen appears, select the floppy disk drive (fd0) as the driver
      update medium. Select **OK**, then press <Enter>.

```
    Please choose the Driver Update medium.

    fd0: Floppy
    sr0: CD-ROM, TEAC DV-516E
    sda: Disk, SEAGATE ST336754SS
    sdb: Disk, SEAGATE ST336754SS
    Other device


         OK              Back
```
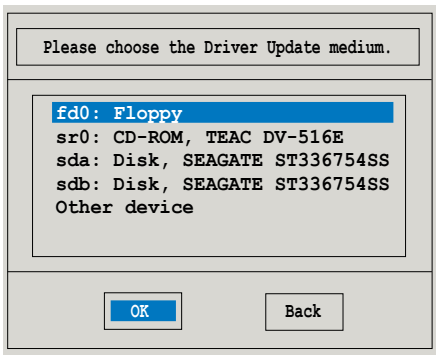
The drivers for the RAID controller are installed to the system.

7.2 Intel chipset device 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® XP / 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 Device Software** window appears. Click **Next** to start
      the installation.

5.   Select **Yes** to accept the terms of the **License Agreement** and continue the
      process.
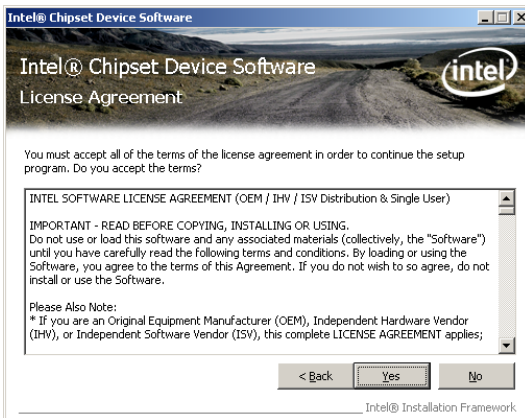
6. Read the **Readme File Information** and click **Next** to activate the installation.
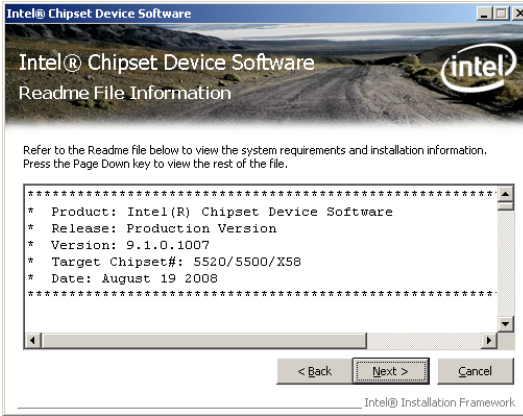
7. After completing the installation, click **Next** to continue.
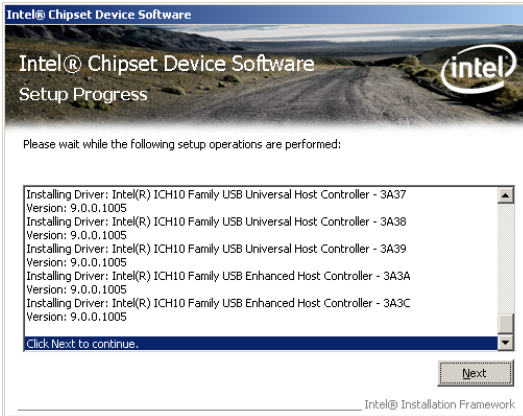
8. Click **Yes, I want to restart this computer now** and click **Finish** to restart the computer.

7.3 LAN driver installation

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

Windows XP/Server 2003

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

1. Restart the computer, and 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 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 **AUTORUN.EXE** from the **\Drivers\Intel 82576** folder. Double-click the **AUTORUN.EXE** and follow step 4 to run the installation.

3. Click the **Intel® PRO/1000 EB Network Connection** option.

4. When the **Intel® PRO Network Connections – InstallShield Wizard** window appears, click **Next** to start the installation.
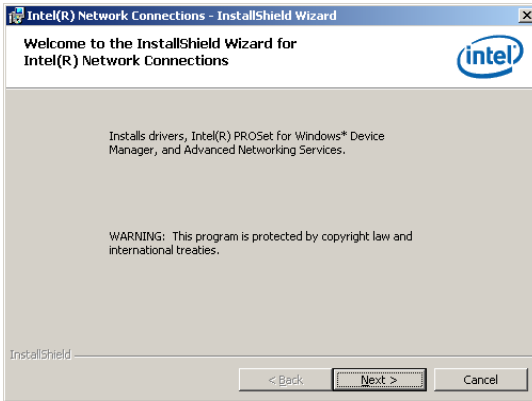
5. Click **I accept the terms in the license agreement** and then click **Next** to continue.

6. Select the programs you want to install and click **Next** to continue.
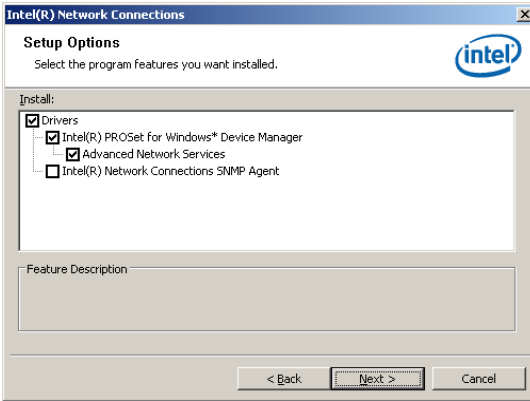
7. Click **Install** to start the installation.
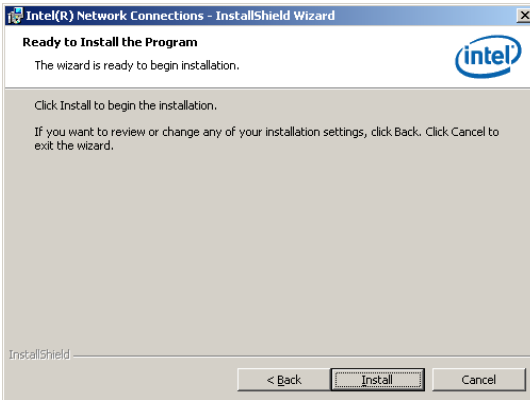
8.   The programs you select are being installed.
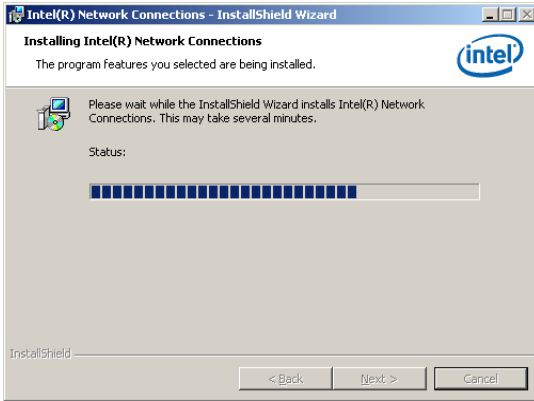
9.   Click **Finish** to finish the installation.
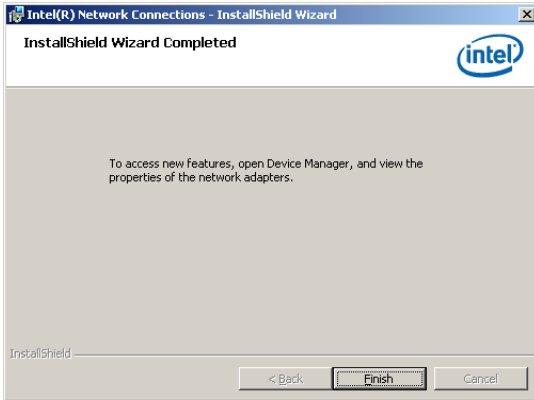
7.4 Display driver installation

This section provides instructions on how to install the ASPEED display driver.

Windows® Server 2003

You need to manually install the ASPEED display driver on a Windows® Server 2003 operating system.

To install the ASPEED display driver

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

   The **Drivers** menu if Autorun is enabled in your computer.
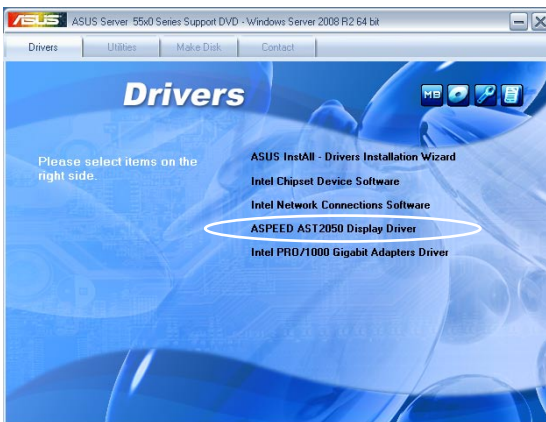
3. When the **ASPEED InstallShield Wizard** window appears, click **Next** to continue.

4. Click **Install** to start the installation.
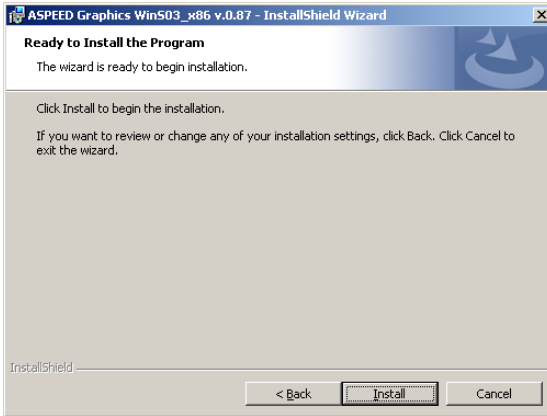
5. The system installs the driver automatically.
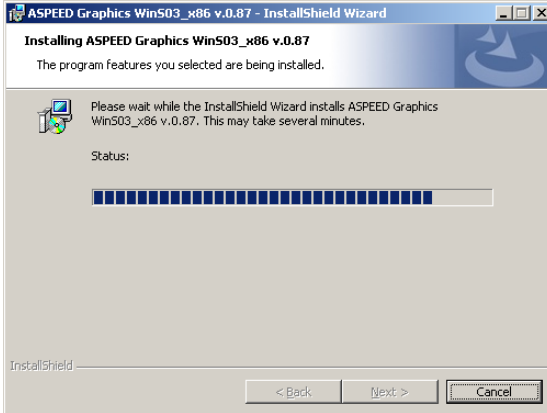
6. When the installation completes, click **Finish** to exit the wizard.

7. Click **Yes** to restart the computer.
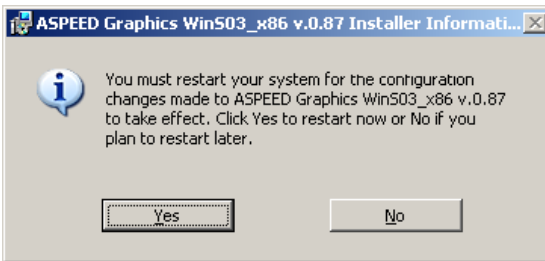
7.5 Management applications and utilities installation

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.
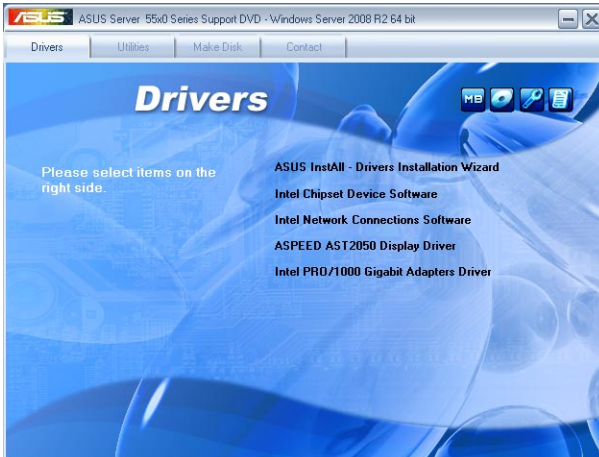
7.5.3   Utilities menu

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

7.5.4   Make disk menu

The Make disk menu contains
items to create the Intel Matrix
Storage Manager and LSI
Embedded MegaRAID driver
disk.
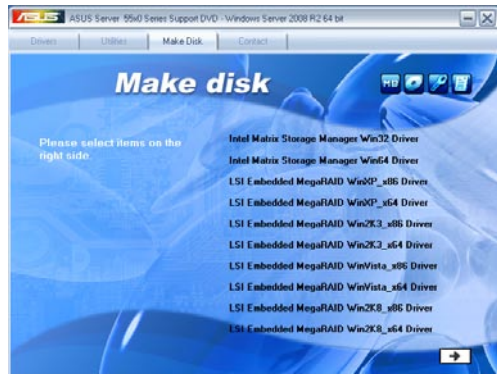
7.5.5   Contact information

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.
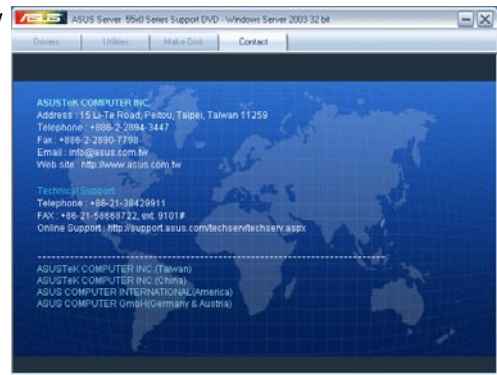
Chapter 8

This chapter describes how to install and configure multiple ATI® CrossFireX™ graphics cards and NVIDIA® CUDA technology.

Multiple GPU tech. support

8.1 ATI® CrossFireX™ technology

The motherboard supports the ATI® CrossFireX™ technology that allows you to install multi-graphics processing units (GPU) graphics cards. Follow the installation procedures in this section.

8.1.1 Requirements

- In CrossFireX mode, you should have two identical CrossFireX-ready graphics cards or one CrossFireX-ready dual-GPU graphics card that are ATI® certified.
- Ensure that your graphics card driver supports the ATI CrossFireX technology. Download the latest driver from the AMD website (www.amd.com).

> - We recommend that you install additional chassis fans for better thermal environment.
> - Visit the ATI Game website at http://game.amd.com for the latest certified graphics card and the supported 3D application list.

8.1.2 Before you begin

For ATI CrossFireX to work properly, you have to uninstall all existing graphics card drivers before installing ATI CrossFireX graphics cards to your system.

To uninstall existing graphics card drivers

1. Close all current applications.
2. For Windows XP, go to **Control Panel > Add/Remove Programs**.
   For Windows Vista/7, go to **Control Panel > Programs and Features**.
3. Select your current graphics card driver/s.
4. For Windows XP, select **Add/Remove**.
   For Windows Vista/7, select **Uninstall**.
5. Turn off your computer.

8.1.3 Installing CrossFireX graphics cards

The following pictures are for reference only. The graphics cards and the motherboard layout may vary with models, but the installation steps remain the same.

1. Prepare two CrossFireX-ready graphics cards.

2. Insert the two graphics card into **slot 3** and **slot 5**.

3. Ensure that the cards are properly seated on the slots.
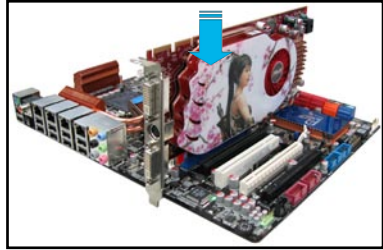
4. Align and firmly insert the CrossFireX bridge connector to the goldfingers on each graphics card. Ensure that the connector is firmly in place.
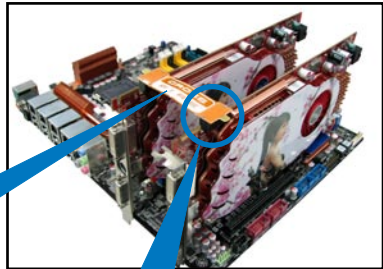
CrossFireX bridge (bundled with graphics cards)
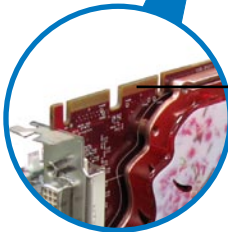
Goldfingers

5. Connect two independent auxiliary power sources from the power supply to the two graphics cards separately.

6. Connect a VGA or a DVI cable to the graphics card.
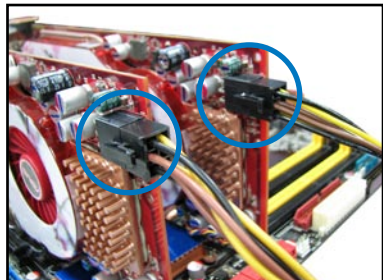
8.1.4 Installing the device drivers

Refer to the documentation that came with your graphics card package to install the device drivers.

Ensure that your PCI Express graphics card driver supports the ATI® CrossFireX™ technology. Download the latest driver from the AMD website at www.amd.com.

8.1.5 Enabling the ATI® CrossFireX™ technology

After installing your graphics cards and the device drivers, enable the CrossFireX™ feature through the ATI Catalyst™ Control Center in Windows environment.

Launching the ATI Catalyst Control Center

To launch the ATI Catalyst Control Center

1. Right-click on the Windows® desktop and select **Catalyst(TM) Control Center**. You can also right-click the ATI icon in the Windows notification area and select **Cayalist Control Center**.
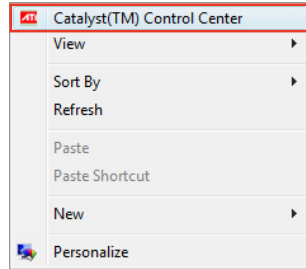
2. The **Catalyst Control Center Setup Assistant** appears when the system detects the existance of multi-graphics cards. Click **Go** to continue to the **Catalyst Control Center Advanced View** window.
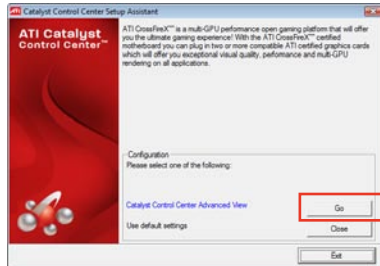
Enabling Dual CrossFireX settings

1. In the Catalyst Control Center window, click **Graphics Settings > CrossFireX > Configure**.

2. From the Graphics Adapter list, select the graphics card to act as the display GPU.

3. Select **Enable CrossFireX**.

4. Click **Apply**, and then click **OK** to exit the window.

8.2 NVIDIA® CUDA™ technology

The motherboard supports the NVIDIA® CUDA™ technology with 2 NVIDIA® Tesla™ C2050/C2070 cards or one Tesla™ C1060 + one NVIDIA® Quadro™ cards, providing the optimum multi purpose computing performance. Follow the installation procedures in this section.

8.2.1 Requirements

- 32 / 64-bit Microsoft® Windows XP / Vista / 7 OS
- A minimum of 1GB RAM

> - We recommend that you install additional chassis fans for better thermal environment.
>
> - Visit the NVIDIA CUDA Zone website at http://www.nvidia.com/object/cuda_home.html for the latest driver, list of CUDA-certified graphics card and supported 3D application list.

8.2.2 Installing CUDA-ready graphics cards

> The following pictures are for reference only. The graphics cards and the motherboard layout may vary with models, but the installation steps remain the same.
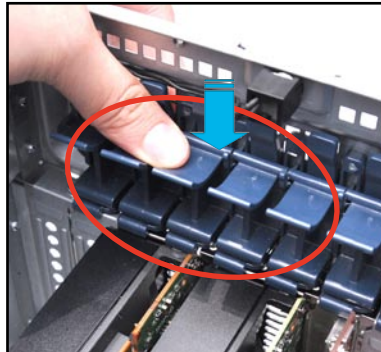
1. Insert the Quadro or Tesla card into **Slot 5** on the server board. Ensure that the card is properly seated on the slot.
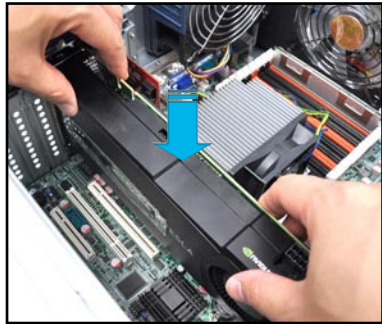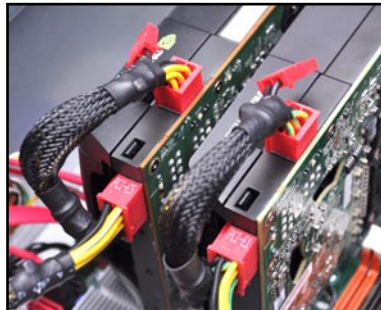
2. Insert the second Tesla card into **Slot 3** on the server board. Ensure that the card is properly seated on the slot.
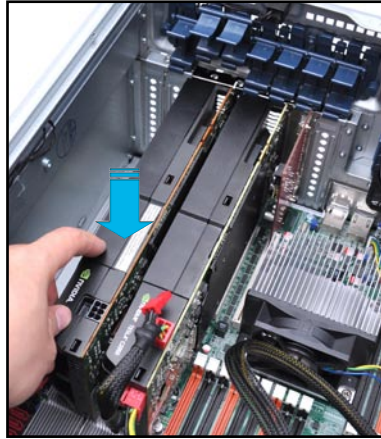
3. Restore the expansion card lock to its original position. A light click indicates that the card is locked in place.


4. Connect the 8-pin and 6-pin power connectors from the power supply to the Tesla cards.

5.	Refer to the documentation that came with your graphics card package to install the device drivers.

6.	To verify graphics card driver installation, right-click **My Computer** and select **Properties** from the menu. Click the **Hardware** tab, and then click **Device Manager**. Click the "+" sign before **Display adapters**, and the installed graphics card and computing processor card(s) should appear.

The screen differs based on the components you installed.
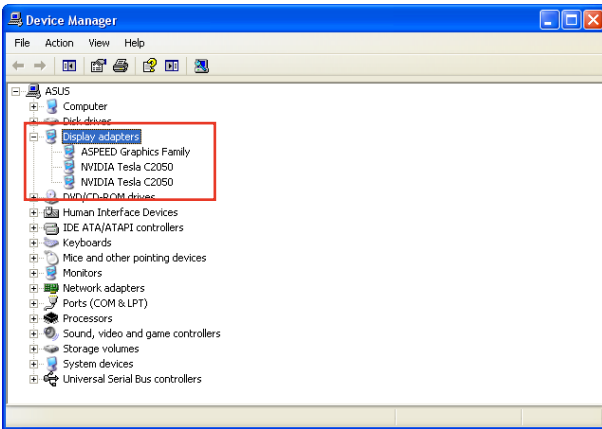
ASUS contact information

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Web site	http://www.asus.com.tw

Technical Support

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Online Support	http://support.asus.com/techserv/techserv.aspx

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Technical Support

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Technical Support

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Online Support	http://support.asus.com/techserv/techserv.aspx

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Technical Support

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General Support   +1-812-282-2787
Online support   http://support.asus.com/techserv/techserv.aspx

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Online support   http://support.asus.com/techserv/techserv.aspx

* EUR 0.14/minute from a German fixed landline; EUR 0.42/minute from a mobile phone.