P5M2 Series

Motherboard

E2776

First Edition
September 2006

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Notices

Federal Communications Commission Statement

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

• This device may not cause harmful interference, and

• This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

> The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

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

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

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

The 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.

About this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This manual contains the following parts:

- **Chapter 1: Product introduction**

  This chapter describes the features of the motherboard and the new technology it supports.

- **Chapter 2: Hardware information**

  This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the switches, jumpers, and connectors on the motherboard.

- **Chapter 3: Powering up**

  This chapter describes the power up sequence, the vocal POST messages, and ways of shutting down the system.

- **Chapter 4: BIOS setup**

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

- **Chapter 5: RAID configuration**

  Provides information on RAID configurations for this motherboard.

- **Chapter 6: Driver installation**

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

- **Appendix: Reference information**

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

Where to find more information

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

1. **ASUS websites**

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

2. **Optional documentation**

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

Conventions used in this guide

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

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

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

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

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

Typography

Bold text	Indicates a menu or an item to select.
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> +<Del>
`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`

P5M2 Series specifications summary

CPU	LGA775 socket for Intel® Core™2 Duo (E6000/E4000 Series), Pentium®D & Pentium®4 processor Supports Intel® Enhanced Memory 64 Technology (EM64T) Supports Enhanced Intel SpeedStep® Technology (EIST) Supports Intel® Hyper-Threading Technology
Chipset	NorthBridge: Intel® 3000 (Mukilteo-2) SouthBridge: Intel® ICH7R I/O bridge : Intel® 6702 PXH-V
Front Side Bus	1066/800/533 MHz
Memory	Dual-channel memory architecture 4 x 240-pin DIMM sockets support unbuffered ECC/non-ECC DDR2-533/667 memory modules Supports up to 8 GB system memory

Expansion slots	1 x PCI Express x16 slot (x8 link, PCI Express 1.0a)
	1 x PCI-X 133/100 MHz/64-bit slot
	  supports Zero-Channel RAID card, colored green on
	  the model (P5M2/SAS only)
	1 x PCI-X 133/100 MHz/64-bit slot
	1 x PCI 33 MHz/32-bit/5V slot
	1 x DDR2-SO-DIMM socket for ASUS® Server
	  Management Board Generation 3 (ASMB3)

Storage	Intel® ICH7R Southbridge supports: - 1 x IDE port supports two Ultra DMA 100/66/33 devices - 4 x Serial ATAII 300MB/s drives with RAID functionality using the Intel Matrix Storage Manager (IMSM) (RAID 0, RAID 1, RAID 10, and software RAID 5), or the LSI Logic Embedded SATA RAID controller (RAID 0, RAID 1, RAID 10) LSI1068 PCIX 8 ports SAS controller(P5M2/SAS only) supports: - 2 x Serial Attached SCSI (SAS) channels (each channel supports 4 hard disk drives) with RAID 0, RAID 1, and RAID 1E configuration - Zero-Channel RAID card (optional)
Graphics	ATI® ES1000 PCI-based VGA controller with 16MB DDR display memory
Dual LAN	Dual embedded Broadcom BCM5721 Gigabit LAN controllers that comply with PCI Express 1.0a specifications

P5M2 Series specifications summary

USB	Intel ICH7R Southbridge supports: - 4 USB 2.0 ports (two on the rear panel, 1 connector on the mid-board for 2 additional ports)
Special features	ASUS Smart Fan I/II ASUS CrashFree BIOS 2 ASUS MyLogo2
BIOS features	AMI BIOS, 8 MB Flash ROM, FWH interface, Green, PnP, DMI, SMBIOS 2.3, WfM2.0, ACPI 2.0a
Rear panel	1 x PS/2 keyboard port (purple) 1 x PS/2 mouse port (green) 2 x USB 2.0 ports 1 x Parallel port 1 x Serial port (COM1) 1 x VGA port 2 x LAN (RJ-45) ports
Internal connectors	1 x Floppy disk drive connector 1 x IDE connector 4 x Serial ATA connectors 1 x Hard disk activity LED connector 2 x LSI 1068 mini-SAS connector (P5M2/SAS only) 1 x TPM1.2 daughter board connector 2 x Front fan connectors 2 x Rear fan connectors 2 x CPU fan connectors 1 x 24-pin ATX power connector 1 x 4-pin ATX 12 V power connector 1 x Power supply SMBUS connector 1 x USB 2.0 connector for 2 additional USB 2.0 ports 1 x SMBus header for back-plane 1 x 18-1 pin SAS LSI1068 hard disk drive LED connector 1 x 20-1 pin auxiliary panel connector 1 x 20-1 pin system panel connector 1 x Serial port (COM2) connector 1 x ASUS server management board 3 (ASMB3) socket
Power Requirement	ATX power supply (with 24-pin and 4-pin 12 V plugs) ATX 12 V 2.0 compliant
Form Factor	ATX form factor: 12 in x 9.6 in (30.5 cm x 24.5 cm)
Support CD contents	Device drivers ASUS Live Update utility ASUS Server Web-based Management (ASWM)

Specifications are subject to change without notice.

This chapter describes the motherboard features and the new technologies it supports.

Product introduction

Chapter summary

1

1.1   Welcome!

Thank you for buying an ASUS® P5M2 Series motherboard!

The motherboard delivers a host of new features and latest technologies, making it another standout in the long line of ASUS quality motherboards!

Before you start installing the motherboard, and hardware devices on it, check the items in your package with the list below.

1.2   Package contents

Check your motherboard package for the following items.

Motherboard pack type	P5M2 Series Retail Pack	P5M2 Series Bulk Pack
Cables		
Serial ATA signal cables 180-180	4	-
Serial ATA power cable	2	-
SAS cable(Only available for P5M2/SAS)	2	-
3-in-1 cable set	1	-
Accessories		
I/O shield	1	1
Application CD		
ASUS motherboard support CD		
Documentation		
User guide		
Packing Quantity		
	3 pcs per carton	3 pcs per carton

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

1.3   Special features

1.3.1   Product highlights

Latest processor technology

The motherboard comes with a 775-pin surface mount Land Grid Array (LGA) socket designed for the Intel® Core™2 Duo (E6000/E4000 Series), Pentium® D and Pentium® 4 processor in the 775-land package. The motherboard supports the Intel® Pentium® 4 processor with 1066/800 MHz Front Side Bus (FSB). The motherboard also supports the Intel® Hyper-Threading Technology and is fully compatible with Intel® 05B/05A or 04B/04A processors. See page 2-6 for details.

Intel® EM64T

The motherboard supports Intel® Pentium® 4 CPUs with the Intel® EM64T (Extended Memory 64 Technology). The Intel® EM64T feature allows your computer to run on 64-bit operating systems and access larger amounts of system memory for faster and more efficient computing.

Enhanced Intel SpeedStep® Technology (EIST)

The Enhanced Intel SpeedStep® Technology (EIST) intelligently manages the CPU resources by automatically adjusting the CPU voltage and core frequency depending on the CPU loading and system speed or power requirement. See page 4-19 for details.

DDR2-533/667 memory support

The motherboard supports DDR2 memory which features data transfer rates of up to 667 MHz to meet the higher bandwidth requirements of the latest server applications. The dual-channel memory architecture doubles the bandwidth of your system memory to boost system performance, eliminating bottlenecks with peak bandwidths of up to 10.7 GB/s.

PCI Express™ interface

The motherboard fully supports PCI Express, the latest I/O interconnect technology that speeds up the PCI bus. PCI Express features point-to-point serial interconnections between devices and allows higher clockspeeds by carrying data in packets. This high speed interface is software compatible with existing PCI or PCI-X specifications. See page 2-18 for details.

Zero-Channel RAID (ZCR) card solution (P5M2/SAS only)

The motherboard comes with a PCI-X slot (the green slot on the P5M2/SAS model) that supports an optional Zero-Channel RAID card. The Zero-Channel RAID card allows you to create all types of RAID configurations for your storage devices. The ZCR capability provides a cost-effective, high-performance, and added reliability for your server system.

Gigabit LAN solution

The motherboard comes with dual Gigabit LAN controllers and ports to provide a total solution for your networking needs. The onboard Broadcom® BCM5721 Gigabit LAN controllers use the PCI Express interface and could achieve network throughput close to Gigabit bandwidth. See page 2-22 for details.

Serial ATA II technology

The motherboard supports the Serial ATA II technology through the Serial ATA interfaces controlled by the Intel® ICH7R. The SATA specification allows for thinner, more flexible cables with lower pin count, reduced voltage requirement, and up to 300 MB/s data transfer rate.

Built-in SATA RAID solution

The Intel® ICH7R allows RAID 0, RAID 1, RAID 0+1, and RAID 5 configuration for SATA hard disk drives via the Intel® Matrix Storage Manager (under Windows Operating System) or the LSI Logic Embedded SATA RAID Setup Utility (no RAID 5). See page 2-22 and Chapter 5 for details.

USB 2.0 technology

The motherboard implements the Universal Serial Bus (USB) 2.0 specification, dramatically increasing the connection speed from the 12 Mbps bandwidth on USB 1.1 to a fast 480 Mbps on USB 2.0. USB 2.0 is backward compatible with USB 1.1. See pages 2-20 and 2-25 for details.

Temperature, fan, and voltage monitoring

The CPU temperature is monitored by the ASIC (integrated in the Winbond hardware monitor) to prevent overheating and damage. The system fan rotations per minute (RPM) is monitored for timely failure detection. The ASIC monitors the voltage levels to ensure stable supply of current for critical components. See page 4-32 for details.

1.3.2 Innovative ASUS features

CrashFree BIOS 2

This feature allows you to restore the original BIOS data from the support CD in case when the BIOS codes and data are corrupted. This protection eliminates the need to buy a replacement ROM chip. See page 4-5 for details.

ASUS Smart Fan technology I/II

The motherboard supports both generations of ASUS Smart Fan technology. ASUS Smart Fan technology smartly adjusts the fan speeds according to the system loading to ensure quiet, cool, and efficient operation. See page 4-32 for details.

ASUS MyLogo2™

This new feature present in the motherboard allows you to personalize and add style to your system with customizable boot logos. See page 4-40 for details.

This chapter lists the hardware setup
procedures that you have to perform
when installing system components.
It includes description of the jumpers
and connectors on the motherboard.

Hardware information

2

Chapter summary

2

2.1 Before you proceed

Take note of the following precautions before you install motherboard components or change any motherboard settings.

• Unplug the power cord from the wall socket before touching any component.

• Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.

• Hold components by the edges to avoid touching the ICs on them.

• Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.

• **Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply.** Failure to do so may cause severe damage to the motherboard, peripherals, or components, or all of the above articles.

Onboard LED

The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard LED.

SB_PWR1

ON
Standby
Power

OFF
Powered
Off

P5M2 Onboard LED
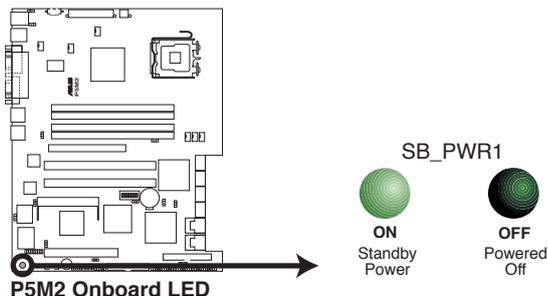
2.2 Motherboard overview

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

To optimize the motherboard features, we highly recommend that you install it in an **ATX 2.2 compliant chassis**.

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

2.2.1 Placement direction

When installing the motherboard, make sure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.2 Screw holes

Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.

Do not overtighten the screws! Doing so can damage the motherboard.

Place this side towards the rear of the chassis
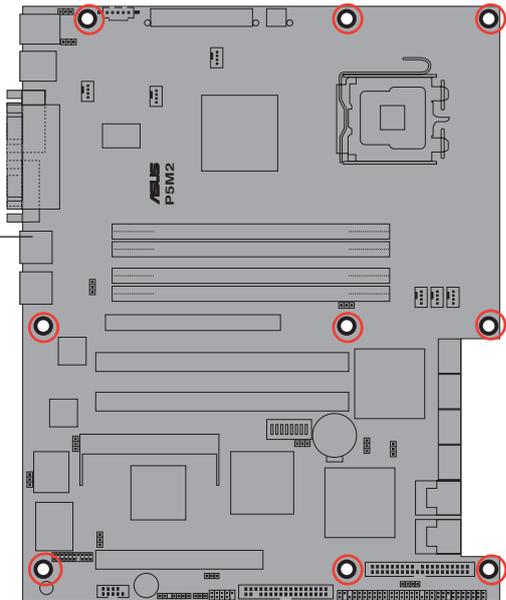
2.2.3 Motherboard layout
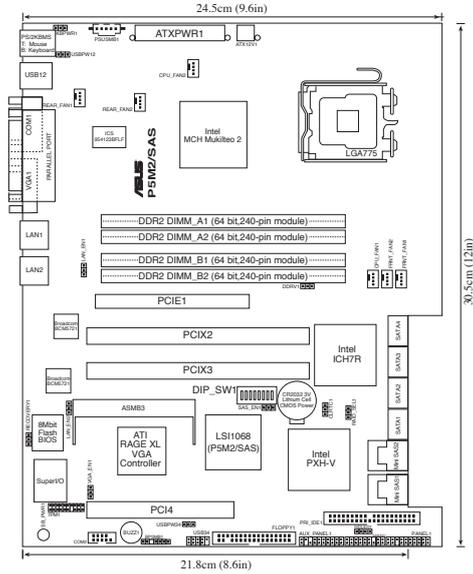
P5M2/SAS Layout
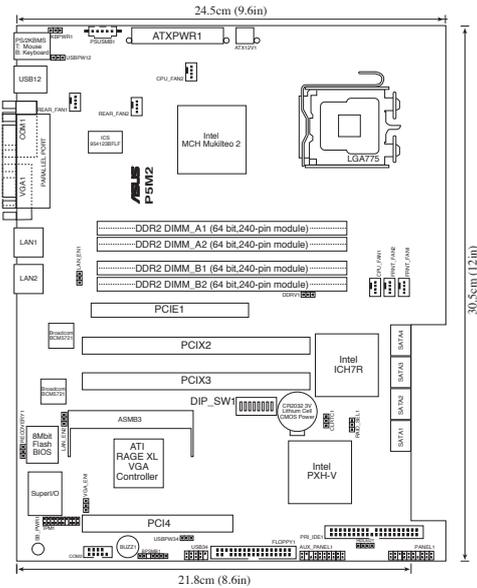
P5M2 Layout

2.2.4 Layout contents

Slots/Sockets		Page
1.	CPU socket	2-6
2.	DDR2 DIMM slots	2-13
3.	PCI/PCI-X/PCI Express x16 slots	2-18
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3.	Keyboard/Mouse power (3-pin KBPWR1)	2-21
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6.	VGA port	2-25
7.	Gigabit LAN1 (RJ-45) port	2-25
8.	Gigabit LAN2 (RJ-45) port	2-25

2.3   Central Processing Unit (CPU)

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

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

2.3.1 Installing the CPU

To install a CPU:

1.   Locate the CPU socket on the motherboard.
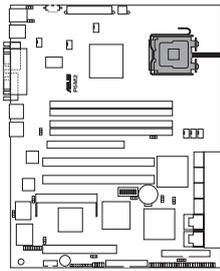
P5M2 CPU Socket 775

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

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

Retention tab

Load lever

A

B

PnP cap

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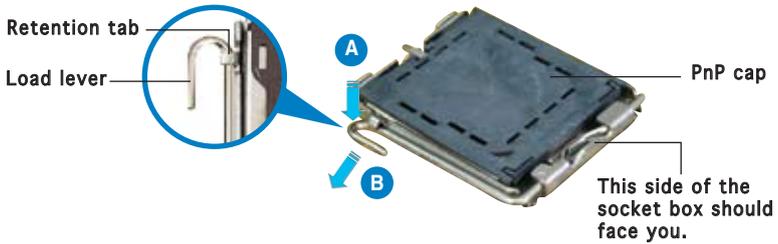
⚠	To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

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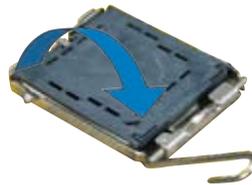
4. Lift the load plate with your thumb and forefinger to a 100º angle (A), then push the PnP cap from the load plate window to remove (B).

B

A

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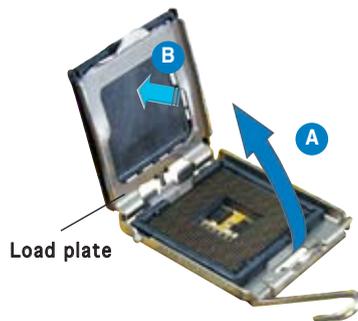
5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.

Alignment key

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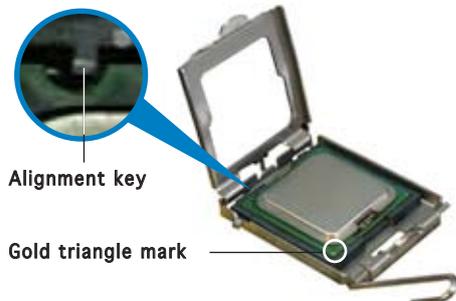
The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

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

2.3.2   Installing the CPU heatsink and fan

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

- •   When you buy a boxed Intel® Pentium® 4 processor, the package includes the CPU fan and heatsink assembly.
- •   Your Intel® Pentium® 4 LGA775 heatsink and fan assembly comes in a push-pin design and requires no tool to install.
- •   If you purchased a separate CPU heatsink and fan assembly, make sure that you have properly applied Thermal Interface Material to the CPU heatsink or CPU before you install the heatsink and fan assembly.

- •   Make sure that you use Intel®-certified multi-directional heatsink and fan only.
- •   Make sure that you have installed the motherboard to the chassis before you install the CPU fan and heatsink assembly.
- •   Do not buy a boxed Intel® processor for BTX (Balanced Technology Extend) form factor, since this Mother board does not support BTX CPU cooler.

To install the CPU heatsink and fan:

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

Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

Motherboard hole

Narrow end of the groove　　**Fastener**

Make sure to orient each fastener with the narrow end of the groove pointing outward. (The photo shows the groove shaded for emphasis.)

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.
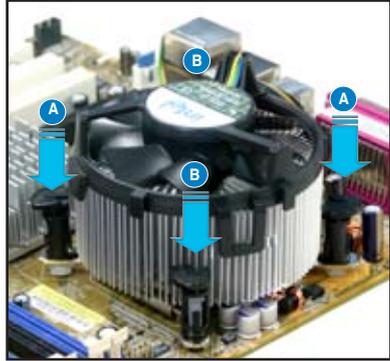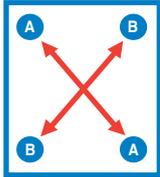
3. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN1/CPU_FAN2.

CPU_FAN2

GND
FANPWR2
Rotation
PWM

CPU_FAN1

GND
FANPWR2
Rotation
PWM

P5M2 CPU Fan Connectors
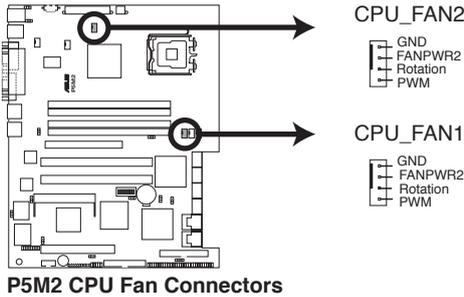
• Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

• If there is only one CPU fan cable, connect it to the connector labeled CPU_FAN1.

• Before installing the CPU heatsink, make sure that the DIP switch is properly set. Refer to **Section 2.7 Switch** for more information.

2.3.3 Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

1. Disconnect the CPU fan cable from the connector on the motherboard.
2. Rotate each fastener counterclockwise.
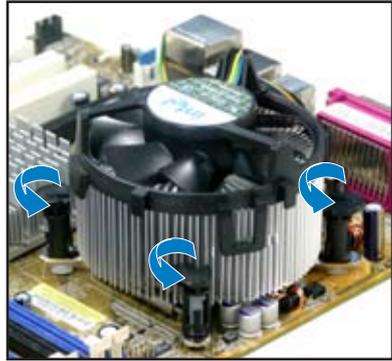
3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.
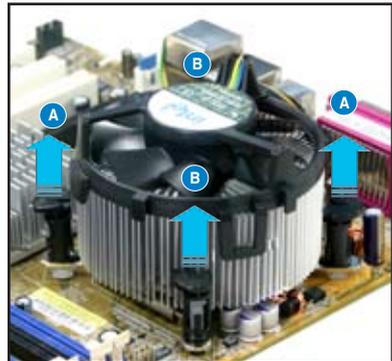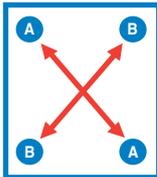
4. Carefully remove the heatsink and fan assembly from the motherboard.

5. Rotate each fastener clockwise to ensure correct orientation when reinstalling.
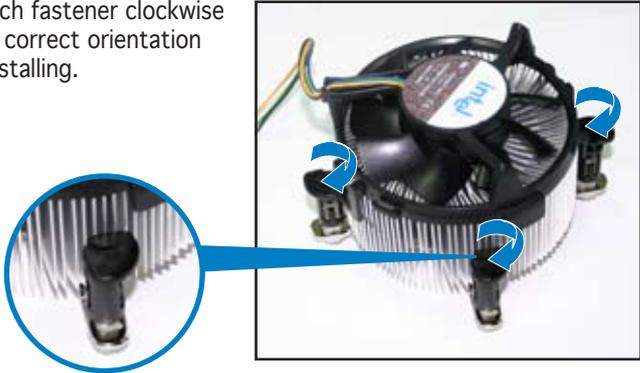
Narrow end of the groove

The narrow end of the groove should point outward after resetting. (The photo shows the groove shaded for emphasis.)
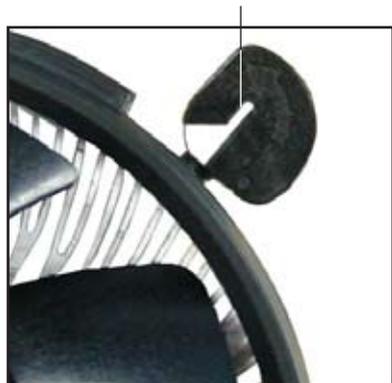
Refer to the documentation in the boxed or stand-alone CPU fan package for detailed information on CPU fan installation.

2.4 System memory

2.4.1 Overview

The motherboard comes with four Double Data Rate 2 (DDR2) Dual Inline Memory Modules (DIMM) sockets.

A DDR2 module has the same physical dimensions as a DDR DIMM but has a 240-pin footprint compared to the 184-pin DDR DIMM. DDR2 DIMMs are notched differently to prevent installation on a DDR DIMM socket.

The figure illustrates the location of the DDR2 DIMM sockets:

128 Pins   112 Pins

DIMM_A1
DIMM_A2

DIMM_B1
DIMM_B2

P5M2 240-pin DDR2 DIMM Sockets
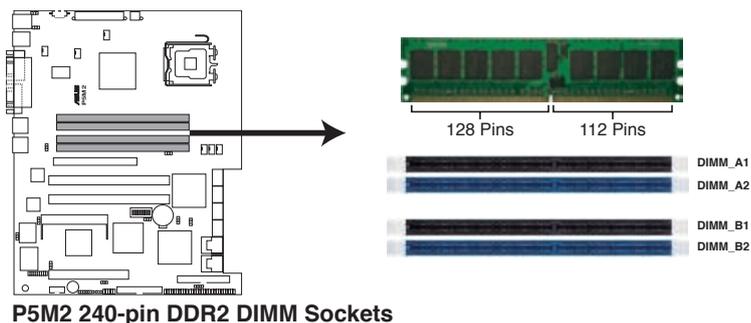
2.4.2 Memory configurations

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

- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor. Refer to the DDR2 Qualified Vendors List on the ASUS web site.

- When installing one or two DIMMs, install the DIMM(s) to the blue slots (DIMM_A2/DIMM_B2).

- Three DDR2 DIMMs installed into any three memory sockets function in dual-channel asymmetric mode.

Recommended memory configurations

Mode	Single channel mode		Dual channel interleaved mode		Dual channel asymmetic mode	
Number of memories	1	1	2	4*	3	4*
DIMM socket						
DIMM_A1				V	V	V
DIMM_A2		V	V	V	V	V
DIMM_B1				V		V
DIMM_B2	V		V	V	V	V

• When the total size of memory module(s) installed per channel is the same (A1+A2=B1+B2), the system will run in Dual Channel Interleaved mode which provides optimum performance.

• When the total size of each channel is not the same (A1+A2≠B1+B2), the system will run in Dual Channel Asymmetric mode.

2.4.3 Installing a DIMM

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

To install a DIMM:

1. Unlock a DIMM socket by pressing the retaining clips outward.

2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.

3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.
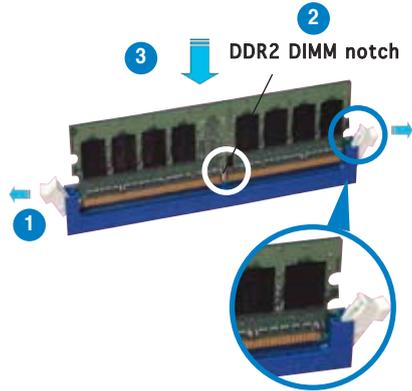
DDR2 DIMM notch

Unlocked retaining clip

✎ • A DDR2 DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

  • The DDR2 DIMM sockets do not support DDR DIMMs. DO NOT install DDR DIMMs to the DDR2 DIMM sockets.

2.4.4 Removing a DIMM

Follow these steps to remove a DIMM.

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

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

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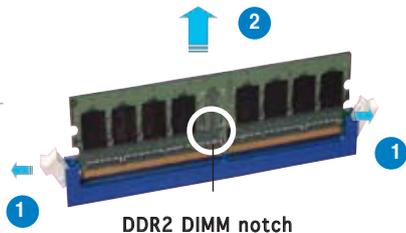
2. Remove the DIMM from the socket.

2.5 Expansion slots

In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support.

Make sure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage to the motherboard components.

2.5.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

2.5.2 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 4 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the tables on the next page.
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. Refer to the table on the next page for details.

2.5.3 Interrupt assignments

Standard interrupt assignments

IRQ	Priority	Standard Function
0	1	System Timer
1	2	Keyboard Controller
2	—	Re-direct to IRQ#9
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	IRQ holder for PCI steering
6	14	Floppy Disk Controller
7*	15	Printer Port (LPT1)
8	3	System CMOS/Real Time Clock
9*	4	IRQ holder for PCI steering
10*	5	IRQ holder for PCI steering
11*	6	IRQ holder for PCI steering
12*	7	PS/2 Compatible Mouse Port
13	8	Numeric Data Processor
14	9	Primary IDE Channel
15	10	Secondary IDE Channel

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

PCI Bus Number, IDSEL, and IRQ assignments

Description	INTA	INTB	INTC	INTD	REQ#	GNT#
PATA Controller	PIRQA#	—	—	—	—	—
SATA Controller	PIRQD#	—	—	—	—	—
SMBus Controller	PIRQB#	—	—	—	—	
USB1 UHCI Controller #1	PIRQH#	—	—	—	—	
USB1 UHCI Controller #2	PIRQD#	—	—	—	—	—
USB 2.0 EHCI Controller	PIRQH#	—	—	—	—	—
BMC5721 #1	PIRQA#	—	—	—	—	—
BMC5721 #2	PIRQB#	—	—	—	—	—
ATI ES1000	PIRQD#	—	—	—	REQ1#	GNT1#
LSI SAS 1068	PXIRQ2	—	—	—	PXREQ2	PXGNT2
PCI Express Slot 1 (x16)	PIRQA#	—	—	—	—	—
PCIX Slot 2 (64-bit)	PXIRQ0	PXIRQ1	PXIRQ2	PXIRQ3	PXREQ0	PXGNT0
PCIX Slot 3 (64-bit)	PXIRQ4	PXIRQ5	PXIRQ6	PXIRQ7	PXREQ1	PXGNT1
PCI Slot 4 (32-bit)	PIRQE#	PIRQF#	PIRQG#	PIRQH#	REQ0#	GNT0#

2.5.4 PCI/PCI-X slots

The PCI and PCI-X slots support cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI/PCI-X specifications.

32-bit PCI slot

64-bit PCI-X slot
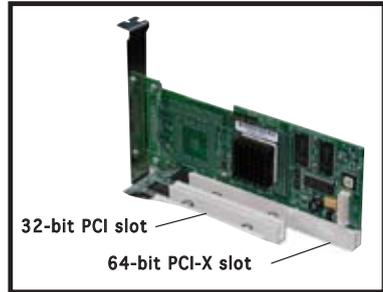
When installing an optional ZCR card for P5M2/SAS onboard LSI1068 SAS controller, install the card on PCI_X2 slot that is colored green. The model of LSI SAS ZCR is **MegaRAID SAS 8300XLP**. Refer to LSI Logic website: **www.lsilogic.com** for more information.

2.5.5 PCI Express x16 slot (x8 link)

The onboard PCI Express x16 slot provides the x8 link. It is designed for high performance add-on cards such as SCSI card, RAID card.

PCI Express x16 slot

This slot can not support PCI Express x16 graphics card due to hardware design.

2.5.6 DDR2 SO-DIMM socket

The DDR2 SO-DIMM socket on the motherboard supports an ASUS® Server Management Board 3 Series.

DDR2 SO-DIMM socket

2.6   Jumpers

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

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

    To erase the RTC RAM:
    1. Turn OFF the computer and unplug the power cord.

    2. Remove the onboard battery.

    3. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the
        cap on pins 2-3 for about 5~10 seconds, then move the cap back
        to pins 1-2.

    4. Re-install the battery.

    5. Plug the power cord and turn ON the computer.

    6. Hold down the <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!

CLRTC1

Normal
(Default)   Clear RTC

P5M2 Clear RTC RAM
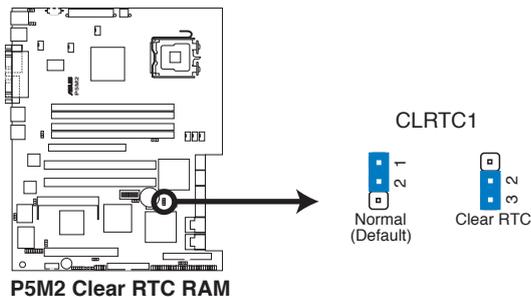
2. USB device wake-up (3-pin USBPW12, USBPW34)

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

USBPW12

1 2   2 3

+5V   +5VSB
(Default)

USBPW34

3 2   2 1

+5VSB   +5V
             (Default)

P5M2 USB Device Wake-Up
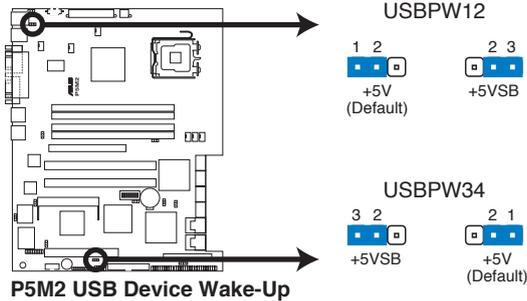
- The USB device wake-up feature requires a power supply that can provide 500mA on the +5VSB lead for each USB port; otherwise, the system would not power up.

- If you are using Windows 2000, you need to install Service Pack 4 to wake up the system from S4 sleep mode.

- The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

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

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

KBPWR1

1 2   2 3

+5V   +5VSB
(Default)
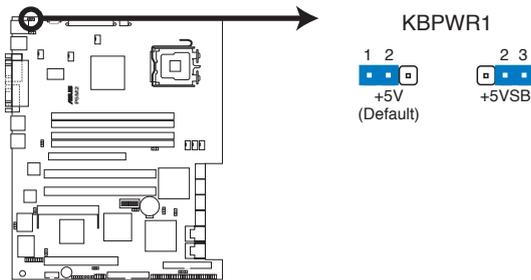
P5M2 Keyboard Power Setting

If you want to power the system on by PS/2 keyboard or mouse, set the jumper KSPWR1 to pin2-3(+5VSB) and enable the option of "Power on By PS/2 Keyboard" or "Power On By PS/2 Mouse" in the BIOS setting. Refer to **Section 4.4.9 APM Configuration**.

4. VGA controller setting (3-pin VGA_EN1)

These jumpers allow you to enable or disable the onboard ATI® ES1000 PCI VGA controller. Set to pins 1-2 to activate the VGA feature.

VGA_EN1

Enable   Disable
(Default)
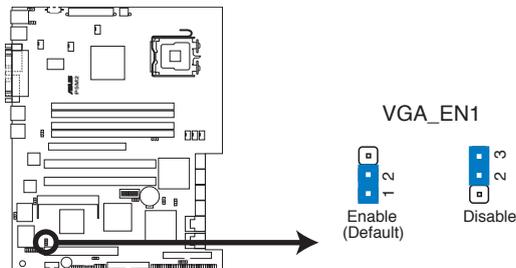
P5M2 VGA Setting

5. Gigabit LAN controller setting (3-pin LAN_EN1, LAN_EN2)

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

LAN_EN1

Enable
(Default)

Disable

P5M2 LAN_EN1 Setting

LAN_EN2

Enable
(Default)

Disable

P5M2 LAN_EN2 Setting
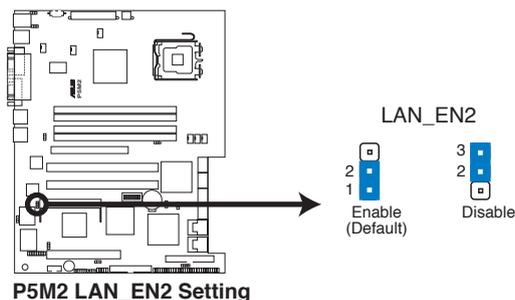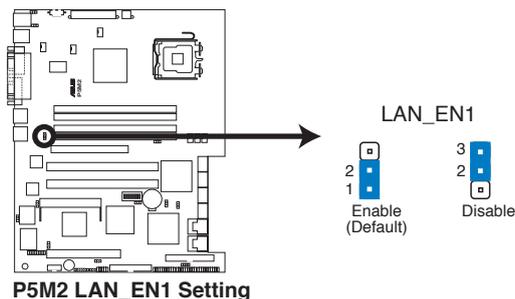
6. RAID controller selection (3-pin RAID_SEL1)

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

RAID_SEL1

LSI RAID ROM
(Default)

INTEL RAID ROM

P5M2 RAID_SEL1 Setting
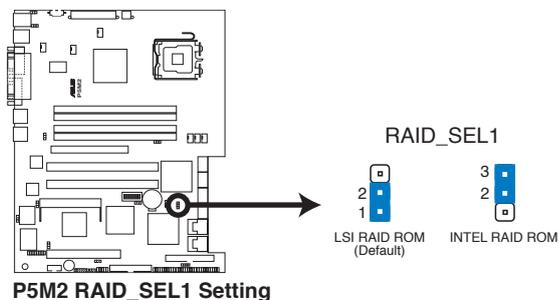
7. SAS controller setting (3-pin SAS_EN1) (For *P5M2/SAS model only*)

This jumper allows you to enable or disable the onboard LSI SAS1068 chip.

SAS_EN1

2 1   3 2

Enable   Disable
(Default)

P5M2 SAS_EN1 Setting
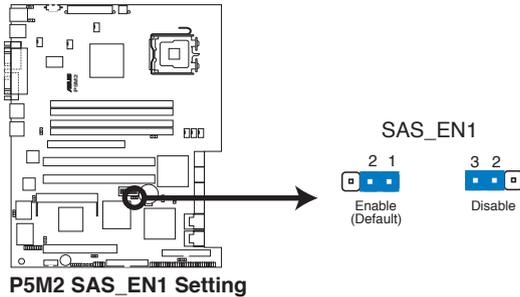
8. Force BIOS recovery setting (3-pin RECOVERY1)

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

To update the BIOS:

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

RECOVERY1

2   3
1   2

Normal   BIOS recovery
(Default)

P5M2 BIOS Recovery Setting
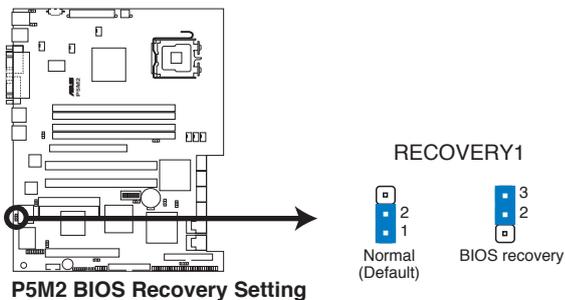
2.7 Switch

The motherboard features a DIP switch for fan pin selection.

DIP_SW1

ON
OFF
(Default)

ON:4-PIN FAN (Default)
OFF:3-PIN FAN
SW1_CPU_FAN1
SW2_CPU_FAN2
SW3_FRNT_FAN1
SW4_FRNT_FAN2
SW5_FRNT_FAN3
SW6_FRNT_FAN4
SW7_REAR_FAN1
SW8_REAR_FAN2

P5M2 DIP switches
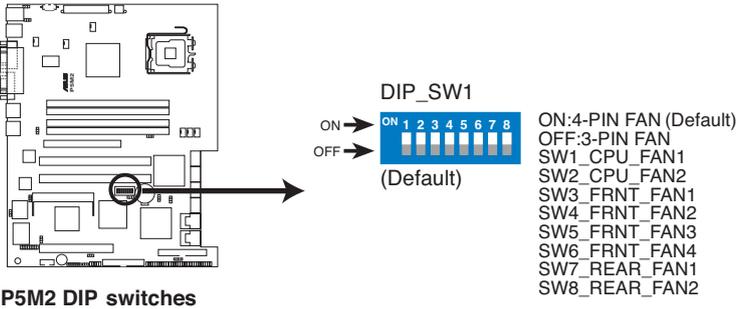
The following table shows the corresponding switch for each fan connector.

Switch	Fan connector
1	CPU_FAN1
2	CPU_FAN2
3	FRNT_FAN1
4	FRNT_FAN2
5	FRNT_FAN3
6	FRNT_FAN4
7	REAR_FAN1
8	REAR_FAN2

• If you use a 4-pin fan but set the DIP switch for a 3-pin fan, the fan you installed may not work.

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

2.8 Connectors

2.8.1 Rear panel connectors
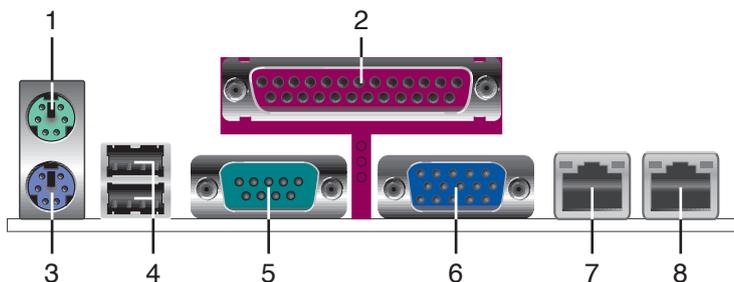
1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **Parallel port.** This 25-pin port connects a parallel printer, a scanner, or other devices.
3. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.
4. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
5. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.
6. **VGA port.** This port is for a VGA monitor or other VGA-compatible devices.
7. **Gigabit LAN1 (RJ-45) port.** This ports allow Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.
8. **Gigabit LAN2 (RJ-45) port.** This ports allow Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

LAN port LED indications

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

ACT/LINK SPEED LED   LED

LAN port
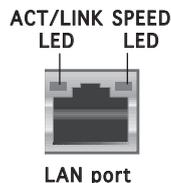
2.8.2 Internal connectors

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

This connector is for the provided Floppy Disk Drive (FDD) signal cable. Insert one end of the cable to this connector, then connect the other end to the signal connector at the back of the floppy disk drive.

Pin 5 on the connector is removed to prevent incorrect cable connection when using a FDD cable with a covered Pin 5.
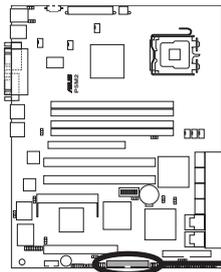
FLOPPY1

PIN 1

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

P5M2 Floppy Disk Drive Connector

2. ICH7R Primary IDE connector (40-1 pin PRI_IDE1)

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

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

- Use the 80-conductor IDE cable for Ultra DMA 100/66 IDE devices.

PRI_IDE1
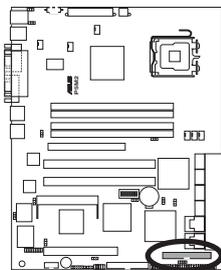
PIN 1

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

P5M2 IDE Connector

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

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

If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 0+1, and RAID 5 configuration using the Intel® Matrix Storage Technology or RAID 0, RAID 1 and RAID 0+1 configuration using the LSI MegaRAID® utility embedded in the Intel® ICH7R Southbridge.

These connectors are set **IDE** mode by default. In **IDE** mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the **Configure SATA as** item in the BIOS to [RAID]. See section "4.3.4 IDE Configuration" for details.

SATA4

GND
RSATA_TXP4
RSATA_TXN4
GND
RSATA_RXP4
RSATA_RXN4
GND

SATA3

GND
RSATA_TXP3
RSATA_TXN3
GND
RSATA_RXP3
RSATA_RXN3
GND

SATA2

GND
RSATA_TXP2
RSATA_TXN2
GND
RSATA_RXP2
RSATA_RXN2
GND

SATA1

GND
RSATA_TXP1
RSATA_TXN1
GND
RSATA_RXP1
RSATA_RXN1
GND

P5M2 SATA Connectors
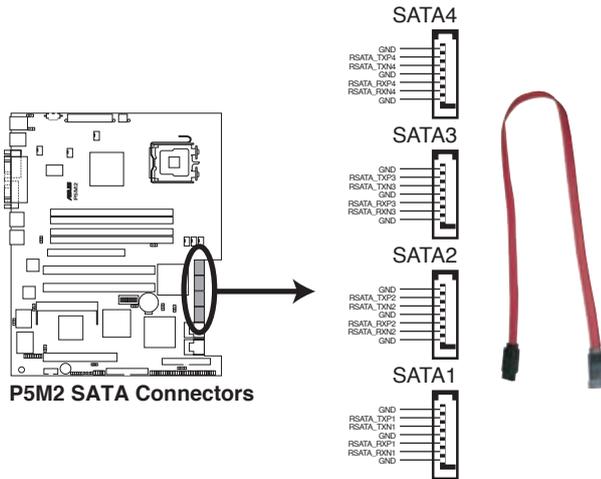
Important notes on Serial ATA

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

Serial ATA hard disk drive connection

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

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

This connector supplies power to the hard disk activity LED. Connect the external LED on the storage card like SCSI card with the onboard HDLED1to allow the access signals to got through the HDLED pin on the system panel connector.

HDLED1

ADD_IN_CARD_ACT#
ADD_IN_CARD_ACT#
NC
NC

1

P5M2 SCSI/SATA Card Activity LED Connector
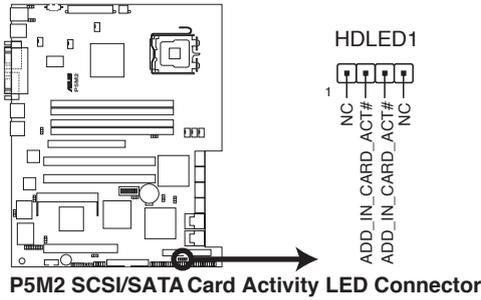
5. USB connector (10-1 pin USB34)

This connector is for USB 2.0 ports. Connect the USB module cable to this connector, then install the module to a slot opening at the back of the system chassis. This USB connector complies with USB 2.0 specification that supports up to 480 Mbps connection speed.

USB34

USB+5V
USB_P4-
USB_P4+
GND
NC

USB+5V
USB_P3+
USB_P3+
GND

P5M2 USB 2.0 Connector
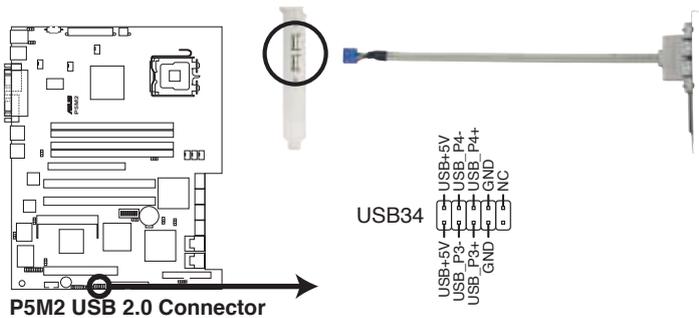
The USB port module is purchased separately.

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

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis. The serial port module is purchased separately.

COM2

PIN 1

P5M2 COM Port Connector
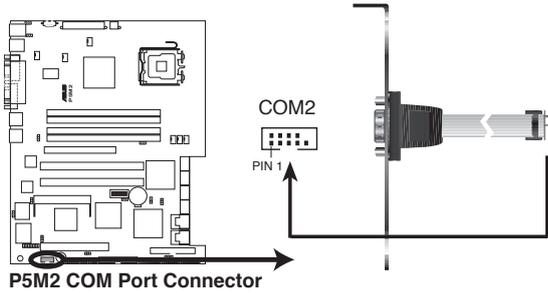
7. SAS LSI1068 ports LED connector (18-1 pin SASLED1) (*For P5M2/SAS model only*)

This connector is for SAS link state's LED. The active LOW Fault LED signals are nominally configured to indicate a SAS link fault for each respective phy. The active LOW Activity LED signals are nominally configured to indicate SAS link activity.

SASLED1

ACT_LED0
ACT_LED1
ACT_LED2
ACT_LED3
ACT_LED4
ACT_LED5
ACT_LED6
ACT_LED7

FLT_LED0
FLT_LED1
FLT_LED2
FLT_LED3
HB_LED
FLT_LED4
FLT_LED5
FLT_LED6
FLT_LED7

P5M2 SAS LED Connector
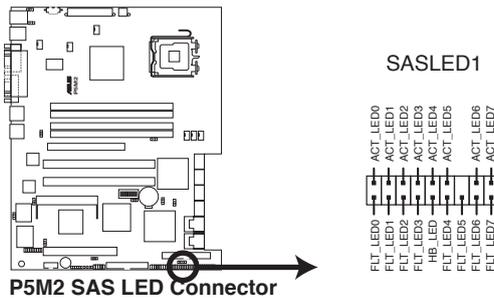
8. Mini-SAS connectors
(For P5M2/SAS model only)

This motherboard comes with two Serial Attached SCSI (SAS) connectors, the next-generation storage technology that supports both Serial Attached SCSI and Serial ATA. Each connector supports up to four (4) devices.
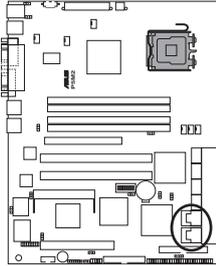
P5M2/SAS MINI SAS connectors

To connect the mini-SAS cable:

Plug in the mini-SAS cable to the mini-SAS connector until the cable lock snaps in place.
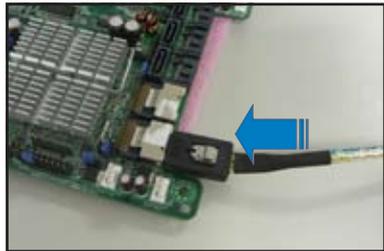
To disconnect the mini-SAS cable:

1. With your thumb, push down the cable lock to release.
2. While still keeping your thumb's grip on the cable lock, carefully pull away the cable from the connector
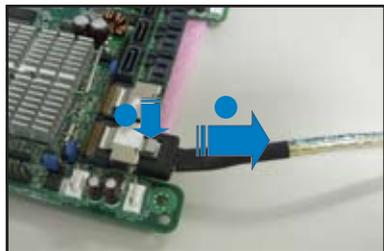
9. CPU and system fan connectors (4-pin CPU_FAN1/2, REAR_FAN1/2, FRNT_FAN1/2)

The fan connectors support 3-pin or 4-pin cooling fans of 350 mA ~ 740 mA (8.88 W max.) or a total of 2.1 A ~ 4.44 A (53.28 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.

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

> See "Section 2.7 Switch" to get detailed information about DIP switch setting for 4-pin or 3-pin fan cables.

CPU_FAN2

REAR_FAN1
REAR_FAN2

CPU_FAN1
FRNT_F AN2
FRNT_F AN1

REAR_FAN1
GND
FANPWR7
FANOUT4

REAR_FAN2
GND
FANPWR8
FANOUT4

CPU_FAN2
GND
FANPWR2
FANOUT4

CPU_FAN1
GND
FANPWR1
FANOUT4

FRNT_FAN2
GND
FANPWR4
FANOUT4

FRNT_FAN1
GND
FANPWR3
FANOUT4

P5M2 Fan Connectors
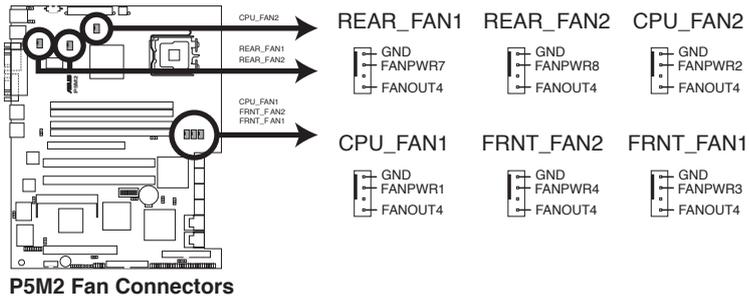
10. Backplane SMBus connector (6-1 pin BPSMB1)

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

BPSMB1

1

FAN_PWM
I2C_CLK#
GND
I2C_DATA#
+5VSB

P5M2 SMBus Connector

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

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

PSUSMB1

PSU_I2CCLK
PSU_I2CDATA
NC
GND
+3.3V Remote Sense

P5M2 Power Supply SMBus Connector

12. ATX power connectors (24-pin ATXPWR1, 4-pin ATX12V2)

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

- Use of an ATX 12 V Specification 2.02-compliant power supply unit (PSU) that provides a minimum power of 450 W is recommended for a fully-configured system.

- Do not forget to connect the 4-pin ATX +12 V power plug; otherwise, the system will not boot up.

- We recommend that you use a PSU with a higher power output when configuring a system with more power consuming devices. The system may become unstable or may not boot up if the power is inadequate.

- You must install a PSU with a higher power rating if you intend to install additional devices.

ATXPWR1

+3 Volts
+3 Volts
Ground
+5 Volts
Ground
+5 Volts
Ground
Power OK
+5V Standby
+12 Volts
+12 Volts
+3 Volts

+3 Volts
-12 Volts
Ground
PSON#
Ground
Ground
Ground
-5 Volts
+5 Volts
+5 Volts
+5 Volts
Ground

ATX12V1

GND — GND
+12V DC — +12V DC

P5M2 ATX Power Connector

13. 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.

AUX_PANEL1

P5M2 Auxiliary Panel Connector
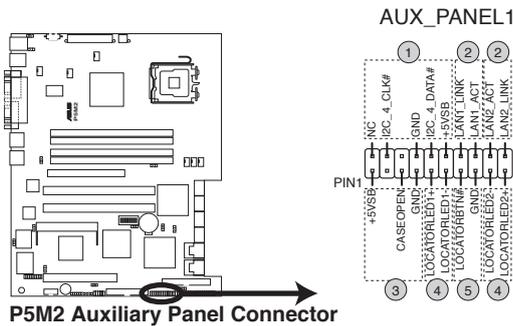
1. Front Panel SMBus (6-1 pin)
    These leads connect the front panel SMBus cable.

2. LAN link activity LED (2-pin LAN1_LINKACTLED and 2-pin LAN1_LINKACTLED)
    Both of the 2-pin connectors are for the LAN1 and LAN2 Activity LED. Connect the LAN Activity LED cable to this connector.

    This LED blinks during a network activity and is always lit when linked.

3. Chassis Intrusion connector (4-1pin CASEOPEN)
    This lead is for a chassis with an intrusion detection feature. This requires an external detection mechanism such as a chassis intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to this lead to record a chassis intrusion event. The defaults setting is to place one jumper cap over the CASEOPEN and GND leads for disabled this feature.

4. Locator LED (2-pin LOCATORLED1 and 2-pin LOCATORLED2)
    Both of the 2-pin connector is for the Locator LED 1 and LED 2. Connect the Locator LED cable to this 2-pin connector.

    This LED lights up when the Locator button is pressed.

5. Locator Button/Switch (2-pin LOCATORBTN)
    This connector is for the locator button. This button queries the state of the system locator.

14. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.

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

- **Message LED (Brown 2-pin MLED)**
  This connector is for the message LED cable that connects to the front message LED. The message LED indicates the booting status. The LED blinks when the system is in the boot process until the operating system is loaded.

- **Hard disk drive activity LED (Red 2-pin HDLED)**
  This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

- **System warning speaker (Orange 4-pin SPKEROUT)**
  This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **ATX power button/soft-off button (Light Green 2-pin POWERBTN)**
  This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

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

PANEL1

P5M2 System Panel Connector
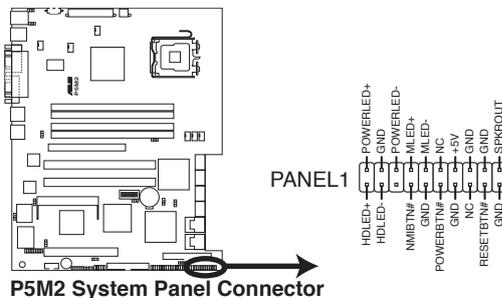
The system panel connector is color-coded for easy connection.

This chapter describes the power up
sequence, the vocal POST messages,
and ways of shutting down the
system.

Powering up

3

3.1 Starting up for the first time

1. After making all the connections, replace the system case cover.

2. Be sure that all switches are off.

3. Connect the power cord to the power connector at the back of the system chassis.

4. Connect the power cord to a power outlet that is equipped with a surge protector.

5. Turn on the devices in the following order:

   a. Monitor

   b. External storage devices (starting with the last device on the chain)

   c. System power

6. After applying power, the system power LED on the system front panel case lights up. For systems with ATX power supplies, the system LED lights up when you press the ATX power button. If your monitor complies with "green" standards or if it has a "power standby" feature, the monitor LED may light up or switch between orange and green after the system LED turns on.

   The system then runs the Power-On Self-Test (POST). While the tests are running, the BIOS beeps or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

AMI BIOS beep codes

Beep Description	Error
One beep	Refresh Time error No master drive detected
Two continuous beeps followed by four short beeps	Hardware component failure

7. At power on, hold down the <Del> key to enter the BIOS Setup. Follow the instructions in Chapter 4.

3.2 Powering off the computer

3.2.1 Using the OS shut down function

If you are using Windows® Server 2000:

1.   Click the **Start** button then click **Shut Down...**
2.   Make sure that the **Shut Down** option button is selected, then click the **OK** button to shut down the computer.
3.   The power supply should turn off after Windows® shuts down.

If you are using Windows® Server 2003:

1.   Click the **Start** button then select **Turn Off Computer**.
2.   Click the **Turn Off** button to shut down the computer.
3.   The power supply should turn off after Windows® shuts down

3.2.2 Using the dual function power switch

While the system is ON, pressing the power switch for less than four seconds puts the system to sleep mode or to soft-off mode, depending on the BIOS setting. Pressing the power switch for more than four seconds lets the system enter the soft-off mode regardless of the BIOS setting. Refer to section "4.5 Power Menu" in Chapter 4 for details

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 4

4.1 Managing and updating your BIOS

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

1. **ASUS AFUDOS** (Updates the BIOS in DOS mode using a bootable floppy disk.)
2. **ASUS CrashFree BIOS 2** (Updates the BIOS using a bootable floppy disk or the motherboard support CD when the BIOS file fails or gets corrupted.)
3. **ASUS Update** (Updates the BIOS in Windows® environment.)

Refer to the corresponding sections for details on these utilities.

Save a copy of the original motherboard BIOS file to a bootable floppy disk in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the ASUS Update or AFUDOS utilities.

4.1.1 Creating a bootable floppy disk

To create a bootable floppy disk:
DOS environment

a. Insert a 1.44MB floppy disk into the drive.

b. At the DOS prompt, type `format A:/S` then press <Enter>.

4.1.2 AFUDOS utility

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

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:

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

1. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.

2. Boot the system in DOS mode, then at the prompt type:

   afudos /o[filename]

   where the [filename] is any user-assigned filename not more than eight alphanumeric characters for the main filename and three alphanumeric characters for the extension name.

```
A:\>afudos /oOLDBIOS1.rom
```

Main filename Extension name

3. Press <Enter>. The utility copies the current BIOS file to the floppy disk.

```
A:\>afudos /oOLDBIOS1.rom
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.
    Reading flash ..... done
    Write to file...... ok
A:\>
```

The utility returns to the DOS prompt after copying the current BIOS file.

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

1. Visit the ASUS website (www.asus.com) and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable floppy disk.

> Write the BIOS filename on a piece of paper. You need to type the exact BIOS filename at the DOS prompt.

2. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.

3. Boot the system in DOS mode, then at the prompt type:

   afudos /i[filename]

   where [filename] is the latest or the original BIOS file on the bootable floppy disk.

```
A:\>afudos /iI8043A0.ROM
```

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

```
A:\>afudos /iI8043A0.ROM

=====================================================================
                      AMI Firmware Update Utility
   Copyright (C)2004 American Megatrends Inc. All Rights Reserved.  Ver.4.04
                            ASUSTEK Ver. 3.12

=====================================================================
- Bootblock chechsum ....OK
- Module checksums .......OK
- 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 /iI8043A0.ROM
========================================================================
                        AMI Firmware Update Utility
   Copyright (C)2004 American Megatrends Inc. All Rights Reserved.  Ver.4.04
                                        ASUSTEK Ver. 3.12


========================================================================

- Bootblock chechsum ....OK
- Module checksums .......OK
- Erasing flash.................done
- Writing flash .................done
- Verifying flash...............done
- Program ended normally

A:\
```

4.1.3 ASUS CrashFree BIOS 2 utility

The ASUS CrashFree BIOS 2 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using the motherboard support CD or the floppy disk that contains the updated BIOS file.

> • Prepare the motherboard support CD or the floppy disk containing the updated motherboard BIOS before using this utility.
>
> • Make sure that you rename the original or updated BIOS file in the floppy disk to I**8043A0.ROM** for P5M2 or I**8035A0.ROM** for P5M2/SAS.

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

1. Turn on the system.
2. Insert the floppy disk with the original or updated BIOS file to the floppy disk drive.
3. The utility displays the following message and automatically checks the floppy disk for the original or updated BIOS file.

```
Boot Block Compatible Version Ver.004
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
```

When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.

```
Boot Block Compatible Version Ver.004
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
Floppy found!
Reading file "I8043A0.ROM". Completed.
Start flashing...
```

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

4. Restart the system after the utility completes the updating process.

Recovering the BIOS from the support CD

To recover the BIOS from the support CD:

1.   Remove any floppy disk from the floppy disk drive, then turn on the system.
2.   Insert the support CD to the optical drive.
3.   The utility displays the following message and automatically checks the floppy disk for the original or updated BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
```

When no floppy disk is found, the utility automatically checks the optical drive for the original or updated BIOS file. The utility then updates the corrupted BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
Floppy not found!
Checking for CD-ROM...
CD-ROM found!
Reading file "I8043A0.ROM". Completed.
Start flashing...
```

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

4.   Restart the system after the utility completes the updating process.

> The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website (www.asus.com) to download the latest BIOS file.

4.1.4 ASUS Update utility

The ASUS Update is a utility that allows you to manage, save, and update the motherboard BIOS in Windows® environment. The ASUS Update utility allows you to:

- Save the current BIOS file
- Update the BIOS from an updated BIOS file
- View the BIOS version information.

This utility is available in the support CD that comes with the motherboard package.

Installing ASUS Update

To install ASUS Update:

1. Place the support CD in the optical drive. The **Drivers** menu appears.
2. Click the **Utilities** tab, then click **Install ASUS Update VX.XX.XX**.
3. The ASUS Update utility is copied to your system.

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

Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

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

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

3. Locate the BIOS file from the **Open** window, then click **Save**.

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

4.2   BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section "4.1 Managing and updating your BIOS".

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

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

The firmware hub on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Delete> 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 "4.8 Exit Menu."

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

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

4.2.1 BIOS menu screen

Menu items Menu bar Configuration fields General help

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

                                               Use [ENTER]. [TAB],
                                               or [SHIFT-TAB] to
 System Date              [Sun 01/01/2006]     select a field.
 System Time              [11:10:19]
                                               Use [+] or [-] to
 Legacy Diskette A        [1.44M, 3.5 in]      configure system time.

     IDE Configuration

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

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

Sub-menu items   Navigation keys

4.2.2 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
Security   For changing the security 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.

4.2.3 Navigation keys

At the bottom right corner of a menu screen are the navigation keys for that particular menu. Use the navigation keys to select items in the menu and change the settings.

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

4.2.4 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.
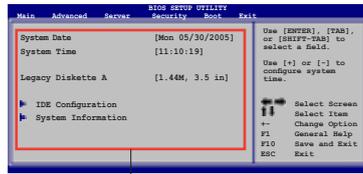
Main menu items

4.2.5 Sub-menu items

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

4.2.6 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 "4.2.7 Pop-up window."

4.2.7 Pop-up window

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

4.2.8 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.
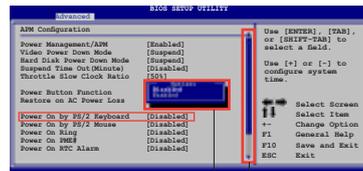
Pop-up window

Scroll bar

4.2.9 General help

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

4.3 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 "4.2.1 BIOS menu screen" for information on the menu screen items and how to navigate through them.

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

  System Date                [Sun 01/01/2006]          Use [ENTER]. [TAB],
  System Time                [11:10:19]                or [SHIFT-TAB] to
                                                       select a field.

  Legacy Diskette A          [1.44M, 3.5 in]           Use [+] or [-] to
                                                       configure system date.
  ▶   IDE Configuration

  ▶   System Information
                                                       ◄► Select Screen
                                                       ↑↓  Select Item
                                                       +-  Change field
                                                       Tab select field
                                                       F1  General Help
                                                       F10 Save and Exit
                                                       ESC Exit
```
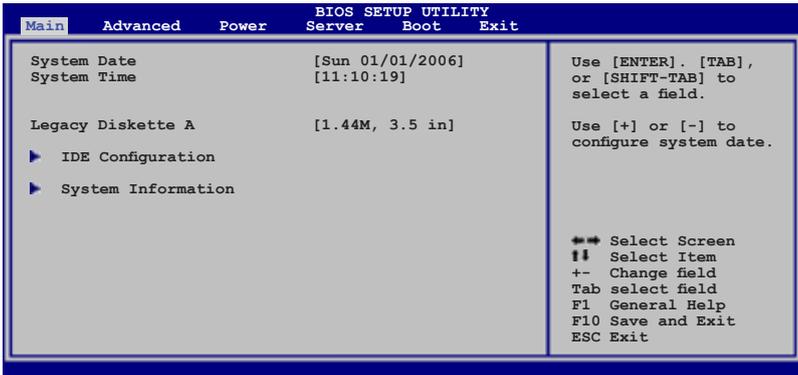
4.3.1 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

4.3.2 System Time [xx:xx:xx]

Allows you to set the system time.

4.3.3 Legacy Diskette A [1.44M, 3.5 in.]

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

4.3.4 IDE Configuration

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

```
                          BIOS SETUP UTILITY
  ┌──────┐
  │ Main │
  └──────┘
┌─────────────────────────────────────────────┬──────────────────────────┐
│  IDE Configuration                            │  Options:                │
│                                               │  Disabled                │
│  ATA/IDE Configuration        [Enhanced]      │  Compatible              │
│     Configure SATA as         [IDE]           │  Enhanced                │
│  ▶  Primary IDE Master    :   [Not Detected]  │                          │
│  ▶  Primary IDE Slave     :   [Not Detected]  │                          │
│  ▶  Tertiary IDE Master   :   [Not Detected]  │                          │
│  ▶  Tertiary IDE Slave    :   [Not Detected]  │                          │
│  ▶  Fourth IDE Master     :   [Not Detected]  │                          │
│  ▶  Fourth IDE Slave      :   [Not Detected]  │                          │
│                                               │                          │
│  IDE Detect Time Out (Sec)    [35]            │  ←→  Select Screen       │
│                                               │  ↑↓  Select Item         │
│                                               │  +-  Change Field        │
│                                               │  Tab Select field        │
│                                               │  F1  General Help        │
│                                               │  F10 Save and Exit       │
│                                               │  ESC Exit                │
├─────────────────────────────────────────────┴──────────────────────────┤
│       v02.58 (C)Copyright 1985-2004, American Megatrends, Inc.          │
└─────────────────────────────────────────────────────────────────────────┘
```

ATA/IDE Configuration [Enhanced]

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

> The items **Configure SATA as** and **Third, Fourth IDE Master/Slave** options appear only when you set the **ATA/IDE Configuration** to [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, set this item to [IDE].

Set this item to [RAID], if you want to create a RAID 0, RAID 1, RAID 0+1, or RAID 5 configurations using the Intel® Matrix Storage Manager or if you want to create a RAID 0, RAID 1, RAID 0+1 configurations using the LSI Logic Embedded SATA RAID Setup Utility.

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

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

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

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

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

Legacy IDE Channels [SATA Pri, PATA Sec]
Allows you to set Serial ATA, Parallel ATA, or both, to native mode. Configuration options: [SATA Only] [PATA Pri, SATA Sec] [SATA Pri, PATA Sec] [PATA Only]

IDE Detect Time Out (Sec) [35]

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

4.3.5 Primary, Tertiary, Fourth IDE Master/Slave

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

```
                          BIOS SETUP UTILITY
  Main

  Primary IDE Master                              Select the type of
                                                  device connected to
  Device        : Hard Disk                       the system.
  Vendor        : ST32122A
  Size          : 2.1GB
  LBA Mode      : Supported
  Block Mode    : 16 Sectors
  PIO Mode      : Supported
  Async DMA     : MultiWord DMA-2
  Ultra DMA     : Ultra DMA-5
  SMART Monitoring: Supported

  Type                          [Auto]            →← Select Screen
  LBA/Large Mode                [Auto]            ↑↓ Select Item
  Block(Multi-sector Transfer)M [Auto]            +- Change Option
  PIO Mode                      [Auto]            Tab Select field
  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 SMART monitoring). These values are not user-configurable. These items show N/A if no IDE device is installed in the system.

Type [Auto]

Selects the type of IDE drive. Setting to [Auto] allows automatic selection of the appropriate IDE device type. Select [CDROM] if you are specifically configuring a CD-ROM drive. Select [ARMD] (ATAPI Removable Media Device) if your device is either a ZIP, LS-120, or MO drive. Configuration options: [Not Installed] [Auto] [CDROM] [ARMD]

LBA/Large Mode [Auto]

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

Block (Multi-sector Transfer) [Auto]

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

PIO Mode [Auto]

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

DMA Mode [Auto]

Selects the DMA mode. Configuration options: [Auto]

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]

4.3.6 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

   System Information

   Model Name      ASUS P5M2
   Model ID        8043A0

   ASUS-BIOS
   Version      :  1001
   Date         :  09/04/2006

   Processor Information                       ←→  Select Screen
   System Memory Information                   ↑↓  Select Item
                                               +-   Change Option
                                               Tab Select field
                                               F1  General Help
                                               F10 Save and Exit
                                               ESC Exit
```
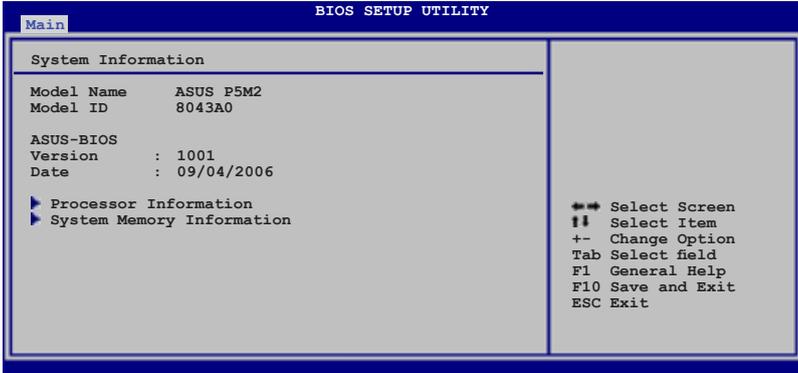
ASUS BIOS

Displays the auto-detected BIOS information.

```
                          BIOS SETUP UTILITY
  Main

   Processor Information

   *** CPU1:
   Band      Genuine Intel(R) CPU 3.80GHz
   ID/uCode  06F4h/026h
   Speed     3.80GHz
   Ratio     Actual 19 Max 19
   Cache     L1/16KB L2/2038KB

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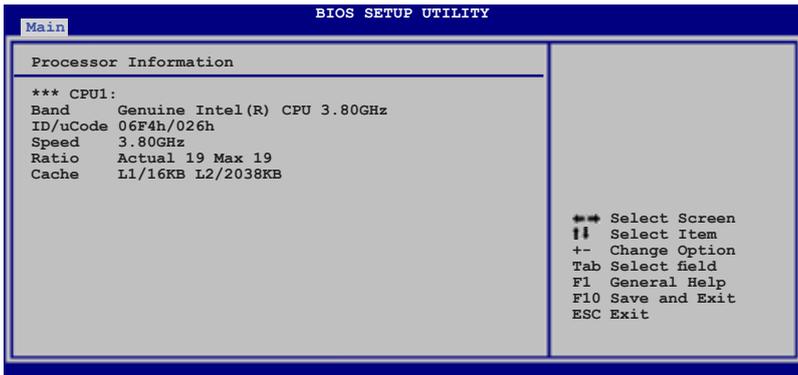
Processor

Displays the auto-detected CPU specification.

```
                        BIOS SETUP UTILITY
 Main

 System Memory Information

 Speed        DDR2 667
 Total Memory 1024MB
    DIMM_A1- None
    DIMM_A2- 1024MB
    DIMM_B1- None
    DIMM_B2- None

                                        ←→  Select Screen
                                        ↑↓  Select Item
                                        +-  Change Option
                                        Tab Select field
                                        F1  General Help
                                        F10 Save and Exit
                                        ESC Exit
```
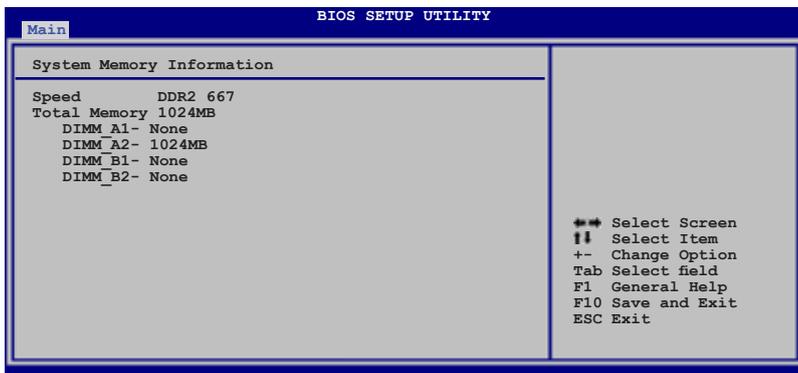
System Memory

Displays the auto-detected total system memory.

4.4   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    Security    Boot     Exit

                                                    Configure CPU
     WARNING: Setting wrong values in below sections
              may cause system to malfunction.

  ▶  CPU Configuration
  ▶  MPS Configuration

  ▶  Chipset Configuration
  ▶  PCIPnP Configuration
  ▶  USB Configuration
  ▶  Peripheral Devices Configuration
  ▶  ACPI Configuration
  ▶  APM Configuration
  ▶  Hareware Monitor
```
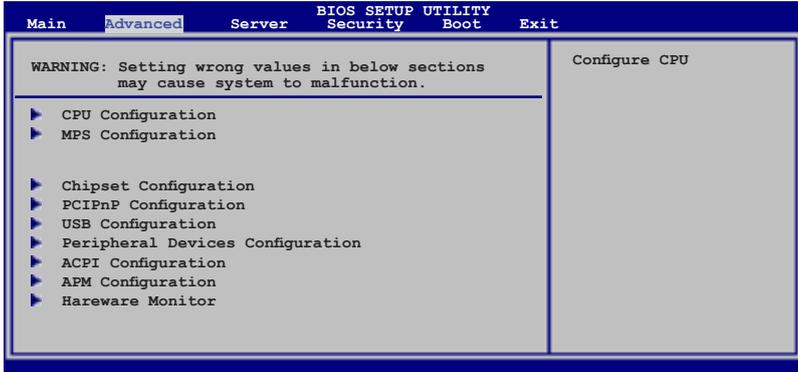
4.4.1   CPU Configuration

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

```
                             BIOS SETUP UTILITY
        Advanced

  Configure Advanced CPU settings          Disabled for
  Module Version: 3D.05                    WindowsXP

  Manufacturer: Intel
  Brand String: Genuine Intel(R) CPU 3.80GHz
  Frequency   : 3.80 GHz
  FSB Speed   : 800 MHz
  Cache L1    : 16 KB
  Cache L2    : 1024 KB
  Ratio Actual Value: 19

  Max CPUID Value Limit:       [Disabled]
  Virtualization Technology    [Enabled]       ←→  Select Screen
  Execute Disable Bit          [Enabled]       ↑↓  Select Item
  Hyper Threading Technology   [Enabled]       +-  Change Option
  Intel(R) SpeedStep(tm) tech. [Automatic]     F1  General Help
  Intel(R) C-State tech.                       F10 Save and Exit
     C1 Config.                [Enhanced]      ESC Exit
```

Max CPUID Value Limit [Disabled]

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

Execute Disable Bit [Enabled]

When set to Disabled, the XD feature flag returns to 0. Configuration options: [Disabled] [Enabled]

Virtualization Technology [Enabled]

The settings of this item can not be changed. If the CPU installed supports Virtulization Technology, the option of this item displays [Enabled] Otherwise, this item does not display.

The Hyper-Threading Technology item appears only when you install an Intel® Pentium® 4 CPU that supports the Hyper-Threading Technology.

Hyper-Threading Technology [Enabled]

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

The following item appears only when you install an Intel® Pentium® D series processor.

Single Logical Processor Mode [Disabled]

Allows you to enable or disable the single logical processor mode. Configuration options: [Disabled] [Enabled]

The following item appears only when you install an Intel® Core 2 Due (E6000, E4000) series processor.

Core Multi-Processing [Enabled]

Allows you to enable or disable one exeucation core. Configuration options: [Disabled] [Enabled]

The following item appears only when you install an CPU that supports Intel Speedstep Technology.

Intel(R) SpeedStep Technology [Automatic]

Allows you to use the Enhanced Intel SpeedStep® Technology. When set to [Automatic], you can adjust the system power settings in the operating system to use the EIST feature.

Set this item to [Disabled] if you do not want to use the EIST.

Configuration options: [Maximum Speed] [Minimum Speed] [Automatic] [Disabled]

The motherboard comes with a BIOS file that supports EIST.

The following item appears only when the CPU installed supports the
C-State technology.

Intel C-state tech.
C1 Config. [Enhanced]
When set to [Standard], it runs in the conventional C-State. When set to
[Enhanced], it runs in the enhanced C-State.
Configuration options: [Standard] [Enhanced]

4.4.2 MPS Configuration

```
                              BIOS SETUP UTILITY
    Advanced

  MPS Configuration                              Select MPS Revision.

  MPS Table Revision            [1.4]



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

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```
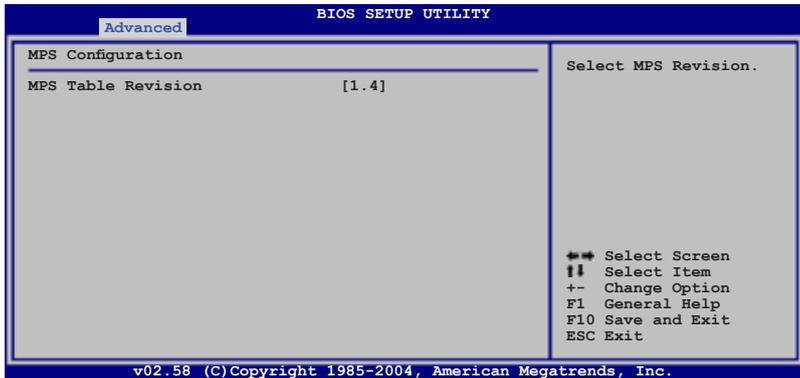
MPS Table Revision [1.4]

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

4.4.3 Chipset Configuration

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

```
                              BIOS SETUP UTILITY
    Advanced

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

  ▶ North Bridge Configuration
  ▶ South Bridge Configuration
  ▶ Intel PCI-X Hub Configuration

  Onboard PCIE LAN Boot ROM      [Enabled]

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

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```

Onboard PCIE LAN Boot ROM [Enabled]

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

NorthBridge Configuration

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

```
                         BIOS SETUP UTILITY
  Advanced

  North Bridge Chipset Configuration                ENABLE: Allow
                                                    remapping of
  Memory Remap Feature          [Enabled]           overlapped PCI memory
  DRAM Frequency                [Auto]              above the total
  Configure DRAM Timing by SPD  [Enabled]           physical memory.

  Boots Graphics Adapter Priority[PEG/PCI]           DISABLE: Do not allow
                                                    remapping of memory.
  PEG Port Configuration
     PEG Port                   [Auto]
     PEG Force x1               [Disabled]

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

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```

Memory Remap Feature [Enabled]

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

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

DRAM Frequency [Auto]

When Configure DRAM Timing by SPD is enabled, you are not allowed change the setting of this item. The motherboard automatically sets the DDR operating frequency according to the DRAM SPD. When Configure DRAM Timing by SPD is disabled, this items allows you to set the DDR operating frequency manually. Configuration options: [Auto] [533 MHz] [667 MHz]

Configure DRAM Timing by SPD [Enabled]

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

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

DRAM RAS# to CAS# Delay [6 DRAM Clocks]
Controls the latency between the DDR SDRAM active command and
the read/write command. Configuration options: [2 DRAM Clocks]
[3 DRAM Clocks] [4 DRAM Clocks] [5 DRAM Clocks] [6 DRAM Clocks]

DRAM RAS# Precharge [6 DRAM Clocks]
Controls the idle clocks after issuing a precharge command to the DDR
SDRAM. Configuration options: [2 DRAM Clocks] [3 DRAM Clocks]
[4 DRAM Clocks] [5 DRAM Clocks] [6 DRAM Clocks]

DRAM RAS# Activate to Precharge Delay [15 DRAM Clocks]
Configuration options: [4 DRAM Clocks] [5 DRAM Clocks] ~
[15 DRAM Clocks]

Boot Graphic Adapter Priority [PCI/PEG]
Allows selection of the graphics controller to use as primary boot device.
Configuration options: [PCI/PEG] [PEG/PCI]

PEG Port Configuration

PEG Port [Auto]
Allows you to set or disable the PCI Express Graphic port.
Configuration options: [Auto] [Disabled]

PEG Force x1 [Disabled]
Allows you to enable or disable the PEG Force x1.Configuration
options: [Enabled] [Disabled]

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

```
                         BIOS SETUP UTILITY
       Advanced                                    Options:
                                                  Disabled
    South Bridge Chipset Configuration             2 USB Ports
                                                   4 USB Ports
    USB Functions              [4 USB Ports]       6 USB Ports


    PCIE Ports Configuration
      PCI Express Port 0       [Auto]
      PCI Express Port 4       [Auto]
      PCI Express Port 5       [Auto]
                                                  ←→  Select Screen
                                                  ↑↓  Select Item
                                                  +-  Change Option
                                                  F1  General Help
                                                  F10 Save and Exit
                                                  ESC Exit


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```

4.4.4 PCI/PnP Configuration

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

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

```
                          BIOS SETUP UTILITY
  Advanced

PCI/PnP Configuration                          Clear NVRAM during
                                               system boot.
Reset ESCD Data              [No]
Plug And Play O/S            [No]
Palette Snooping            [Disabled]




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

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```

Reset ESCD [No]

Clears NVRAM during system boot. Configuration options: [No] [Yes]

Plug And Play O/S [No]

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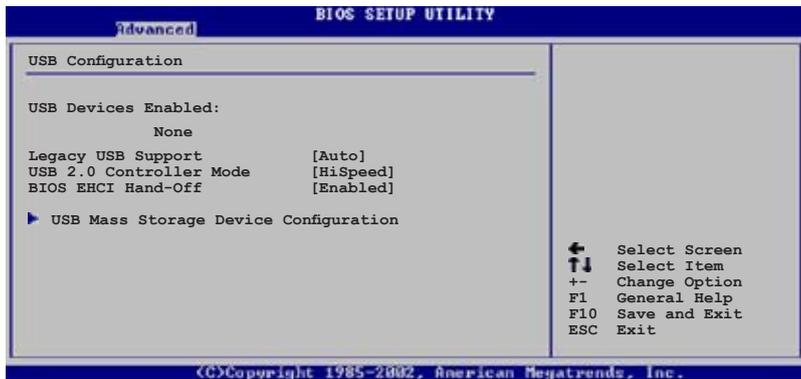
Palette Snooping [Disabled]

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

4.4.5 USB Configuration

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

```
                    BIOS SETUP UTILITY
  Advanced

  USB Configuration


  USB Devices Enabled:
              None
  Legacy USB Support          [Auto]
  USB 2.0 Controller Mode     [HiSpeed]
  BIOS EHCI Hand-Off          [Enabled]

  ▶ USB Mass Storage Device Configuration

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

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```
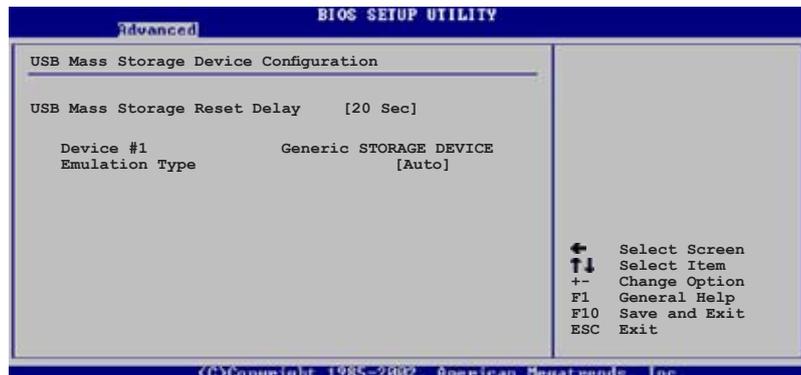
Legacy USB Support [Auto]

Allows you to enable or disable support for USB devices on legacy
operating systems (OS). Setting to Auto allows the system to detect the
presence of USB devices at startup. If detected, the USB controller legacy
mode is enabled. If no USB device is detected, the legacy USB support is
disabled. Configuration options: [Disabled] [Enabled] [Auto]
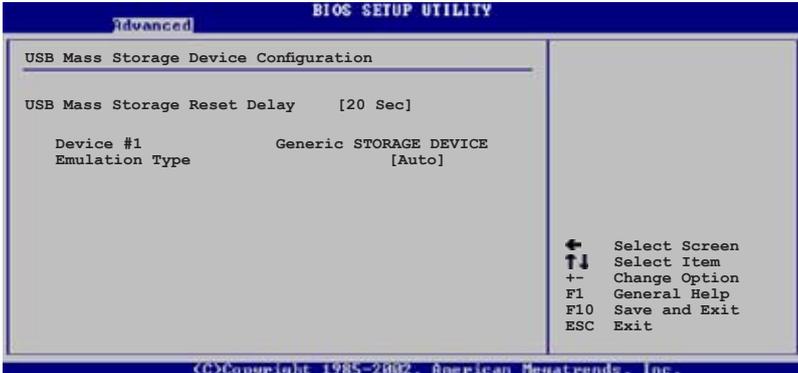
USB 2.0 Controller Mode [HiSpeed]

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

BIOS EHCI Hand-Off [Enabled]

Allows you to enable or disable the BIOS EHCI hand-off support.
Configuration options: [Disabled] [Enabled]
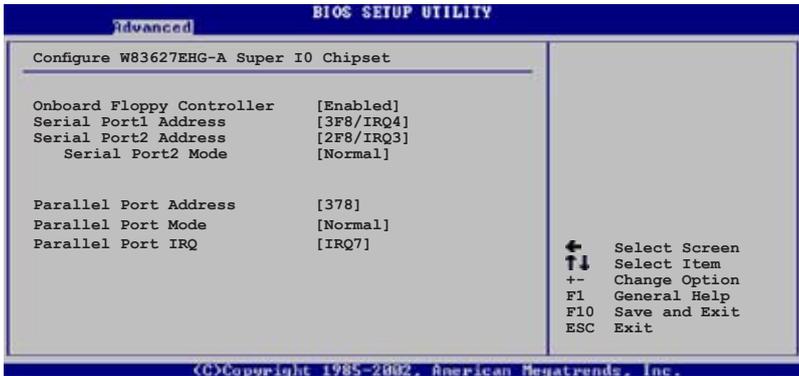
```
                    BIOS SETUP UTILITY
  Advanced

  USB Mass Storage Device Configuration


  USB Mass Storage Reset Delay     [20 Sec]

    Device #1              Generic STORAGE DEVICE
    Emulation Type                  [Auto]




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

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```

USB Mass Storage Device Configuration

```
                         BIOS SETUP UTILITY
    Advanced

    USB Mass Storage Device Configuration

    USB Mass Storage Reset Delay      [20 Sec]

        Device #1                Generic STORAGE DEVICE
        Emulation Type                    [Auto]


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

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```

USB Mass Storage Reset Delay [20 Sec]

Allows you to set the time that POST waits for the USB mass storage device after starting unit command. Configuration options: [10 Sec] [20 Sec] [30 Sec] [40 Sec]

Emulation Type [Auto]

Allows you to select device emulation type. If set to Auto, the part of less than 530MB of USB devices is emulated as floppy disk, and the rest part is emulated as hard disk. Configuration options: [Auto] [Floppy] [Forced FDD] [Hard Disk] [CDROM]

4.4.6 Peripheral Device Configuration

```
                      BIOS SETUP UTILITY
 Advanced

 Configure W83627EHG-A Super I0 Chipset

 Onboard Floppy Controller      [Enabled]
 Serial Port1 Address           [3F8/IRQ4]
 Serial Port2 Address           [2F8/IRQ3]
    Serial Port2 Mode           [Normal]


 Parallel Port Address          [378]
 Parallel Port Mode             [Normal]
 Parallel Port IRQ              [IRQ7]              ←    Select Screen
                                                    ↑↓   Select Item
                                                    +-   Change Option
                                                    F1   General Help
                                                    F10  Save and Exit
                                                    ESC  Exit



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```

Onboard Floppy Controller [Enabled]

Enables or disables the onboard floppy controller.
Configuration options: [Disabled] [Enabled]

Serial Port1 Address [3F8/IRQ4]

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

Serial Port2 Address [2F8/IRQ3]

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

> *Serial Port2 Mode [Normal]*
> Allows you to select the Serial Port2 mode. This item appears only
> when the Serial Port1 item is not Disabled.
> Configuration options: [Normal] [IrDA] [ASK IR]

Parallel Port Address[378]

Allows you to disable or select parallel port base addresses.
Configuration options: [Disabled] [378] [278] [3BC]

Parallel Port Mode [Normal]

Allows you to set the parallel port mode.
Configuration options: [Normal] [Bl-Directional] [ECP] [EPP] [ECP&EPP]

Parallel Port IRQ [IRQ7l]

Allows you to set the parallel port IRQ.
Configuration options: [IRQ5] [IRQ7]

4.4.7 ACPI Configuration

The ACPI Configuration menu items allow you to change the settings for the ACPI features. Select an item then press <Enter> to display the configuration options.

```
                    BIOS SETUP UTILITY
  Advanced

  ACPI Configuration

  ACPI 2.0 Support          [Yes]
  Headless Mode             [Disabled]
  ACPI EMS Support          [Disabled]
  ACPI MCFG Support         [Enabled]



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

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```

ACPI 2.0 Support [Yes]

Allows you to add additional tables as per Advanced Configuration and Power Interface (ACPI) 2.0 specifications. Configuration options: [No] [Yes]

Headless Mode [Disabled]

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

ACPI EMS Support [Disabled]

Allows you to enable or disable ACPI EMS support. [Disabled] [Enabled]

ACPI MCFG Support [Enabled]

Allows you to enable or disable ACPI MCFG support. [Disabled] [Enabled]

4.4.8 APM Configuration


```
                              BIOS SETUP UTILITY
    Advanced

    APM Configuration

    Power Management/APM            [Enabled]
    Video Power Down Mode           [Suspend]
    Hard Disk Power Down Mode       [Suspend]
    Suspend Time Out(Minutes)       [Disabled]
    Throttle Slow Clock Ratio       [50%]

    Power Button Function           [On/Off]
    Restore on AC Power Loss        [Last State]

    Resume By Ring                  [Disabled]
    Resume On LAN                   [Disabled]         ←    Select Screen
    Resume By PME#                  [Disabled]         ↑↓   Select Item
    Resume On By PS/2 Keyboard      [Disabled]         +-   Change Option
    Resume On By PS/2 Mouse         [Disabled]         F1   General Help
    Resume By RTC Alarm             [Disabled]         F10  Save and Exit
                                                       ESC  Exit

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```

Power Management/APM [Enabled]

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

> The following items appear only when the Power Management/APM feature is Enabled.

Video Power Down Mode [Suspend]

Allows you to disable the Video Power Down Mode or set it to Suspend or Standby mode. Configuration options: [Disabled] [Standby] [Suspend]

Hard Disk Power Down Mode [Suspend]

Allows you to disable the Hard Disk Power Down Mode or set it to Suspend or Standby mode. Configuration options: [Disabled] [Standby] [Suspend]

Suspend Time Out [Disabled]

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

Throttle Slow Clock Ratio [50%]

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

Power Button Function [On/Off]

Allows you to select the power button function. Configuration options: [On/Off] [Suspend]

Restore On AC Power Loss [Last State]

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

Resume By Ring [Disabled]

This allows either settings of [Enabled] or [Disabled] for powering up the computer when the external modem receives a call while the computer is in Soft-off mode. Configuration options: [Disabled] [Enabled]

> The computer cannot receive or transmit data until the computer and applications are fully running. Thus, connection cannot be made on the first try. Turning an external modem off and then back on while the computer is off causes an initialization string that turns the system power on.

Resume On LAN [Disabled]

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

Resume By PME# [Disabled]

When set to [Enabled], this parameter allows you to turn on the system through a PME# device. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.
Configuration options: [Disabled] [Enabled]

Power On By PS/2 Keyboard [Disabled]

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

Power On By PS/2 Mouse [Disabled]

When set to [Enabled], this parameter allows you to use the PS/2 mouse to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Enabled]

Resume On By RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake event. When this item is set to [Enabled], the items RTC Alarm Date, RTC Alarm Hour, RTC Alarm Minute, and RTC Alarm Second appear with set values. Configuration options: [Disabled] [Enabled]

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

RTC Alarm Date (Days) [15]

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

System Time [12:30:30]

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

4.4.9 Hardware Monitor

```
                        BIOS SETUP UTILITY
          Advanced

  Hardware Monitor                              This value stands
                                                for the offset
  CPU1 Throttle Temp. Margin[49°C/120°F]        temperature to CPU1
  System1 Temperature       [42°C/107.5°F]      defined TControl
  System2 Temperature       [46°C/114.5°F]
  CPU Fan1 Speed            [3884RPM]
  CPU Fan2 Speed            [N/A]
  Front Fan1 Speed          [N/A]
  Front Fan2 Speed          [N/A]
  Rear Fan1 Speed           [N/A]
  Rear Fan2 Speed           [N/A]

  Smart Fan Control         [Smart Fan II]
  Offset to CPU1 TControl   [0]              ←→   Select Screen
  System1 Target Temperature[39]            ↑↓   Select Item
                                            +-   Change Option
  VCORE1 Voltage            [ 1.320V]       F1   General Help
  VTT Voltage               [ 1.258V]       F10  Save and Exit
  1.5V Voltage              [ 1.424V]       ESC  Exit
  1.8V Voltage              [ 1.776V]

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```

Use the arrow down key to display additional items.

```
  - - - - - - - - - - - - - - - - - - - -   +-   Change Option
  3V Voltage                [ 3.345V]       F1   General Help
  5V Voltage                [ 5.094V]       F10  Save and Exit
  5VSB Voltage              [ 4.980V]       ESC  Exit
  VBAT Voltage              [ 3.120V]

        vMM.mm (C)Copyright 1985-2002, American Megatrends, Inc.
```
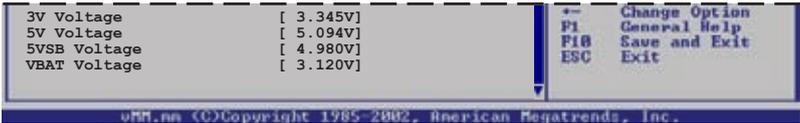
> When the Intel® Pentium® 4 and Pentium® D Series CPU, **CPU1 Temperature** item appears showing the CPU temperature currently detected; when the Intel® Core 2 Due Series CPU is installed, **CPU1 Throttle Temp Margin** appears.

CPU1 Throttle Temperature [xxxºC/xxxºF]
System Temperature [xxxºC/xxxºF]

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

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

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

Smart Fan Control [Smart Fan II]

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

When the Intel® Pentium® 4 and Pentium® D Series CPU, **CPU1 Temperature** item appears; when the Intel® Core 2 Due Series CPU is installed, **Offset To CPU1 TControl** item appears.

CPU1 Temperature [XXX]
System1 Temperature [XXX]

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

Offset To CPU1 TControl [0]

This value bases on the offset temperature to CPU defined TControl. It allows you to set the threshold temperature(Threshold temperature = TControl + User defined value), when the Smart Fan Control is enabled. Configuration options: [0] ~ [-25].

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

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

4.5   Server menu

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

```
                        BIOS SETUP UTILITY
    Main    Advanced   Sever   Security    Boot    Exit
  ┌─────────────────────────────────────────┬──────────────────────────┐
  │ Server Features                           │                          │
  │                                           │ Configure Remote         │
  │ ▶  Remote Access Configuration            │ Access.                  │
  │                                           │                          │
  │                                           │                          │
  │                                           │                          │
  │                                           │                          │
  │                                           │                          │
  │                                           │ ⇔  Select Screen         │
  │                                           │ ↕↑  Select Item          │
  │                                           │ +-  Change Option        │
  │                                           │ F1  General Help         │
  │                                           │ F10 Save and Exit        │
  │                                           │ ESC Exit                 │
  └─────────────────────────────────────────┴──────────────────────────┘
       v02.58 (C)Copyright 1985-2004, American Megatrends, Inc.
```
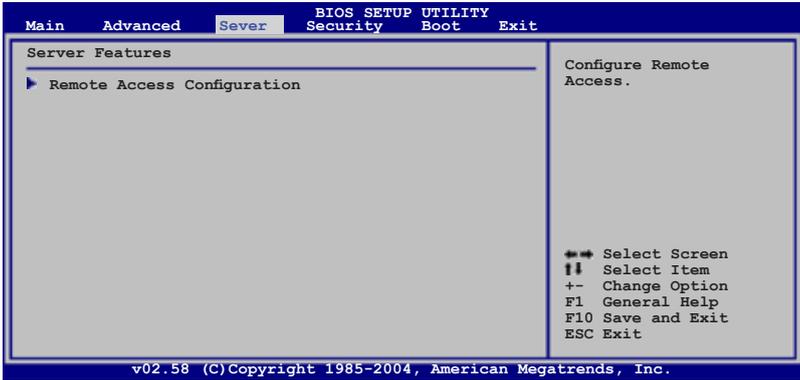
Remote Access Configuration

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     │
  │ Remote Access           [Enabled]         │ type.                    │
  │                                           │                          │
  │ Serial port number      [COM1]            │                          │
  │ Baudrate                [19200]           │                          │
  │ Flow Control            [None]            │                          │
  │ Redirection After BIOS POST  [Always]     │                          │
  │                                           │                          │
  │ Terminal Type           [ANSI]            │                          │
  │ VT-UTFB Combo Key Support   [Disabled]    │                          │
  │                                           │ ⇔  Select Screen         │
  │                                           │ ↕↑  Select Item          │
  │                                           │ +-  Change Option        │
  │                                           │ F1  General Help         │
  │                                           │ F10 Save and Exit        │
  │                                           │ ESC Exit                 │
  └─────────────────────────────────────────┴──────────────────────────┘
       v02.58 (C)Copyright 1985-2004, American Megatrends, Inc.
```
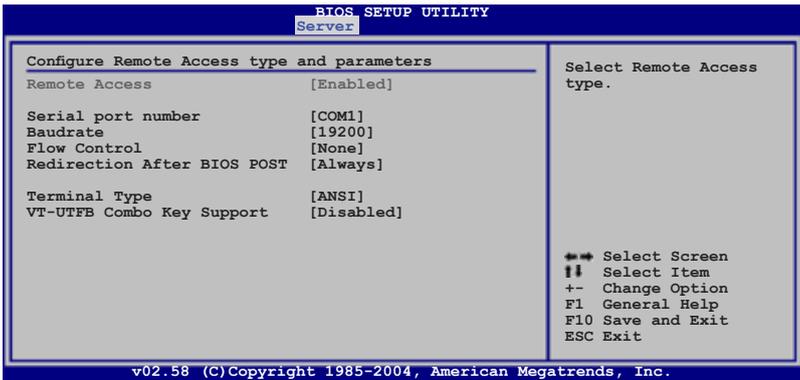
Remote Access [Disabled]

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

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

Serial port number [COM1]

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

Baudrate [19200]

Selects the Baudrate for the Serial port.
Configuration options: [115200] [57600] [38400] [19200] [9600]

Flow Control [None]

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

Redirection After BIOS POST [Always]

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

Terminal Type [ANSI]

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

VT-UTF8 Combo Key Support [Disabled]

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

4.6   Security menu

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

```
                        BIOS SETUP UTILITY
                       Security

  Security Settings                              Install or change
                                                 the password. Also,
  Supervisor Password   : Not Installed          the password can be
  User Password         : Not Installed          cleared just presses
                                                 "Enter" key.
  Change Supervisor Password
  Change User Password

  Flash Write                    [Enabled]



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

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```
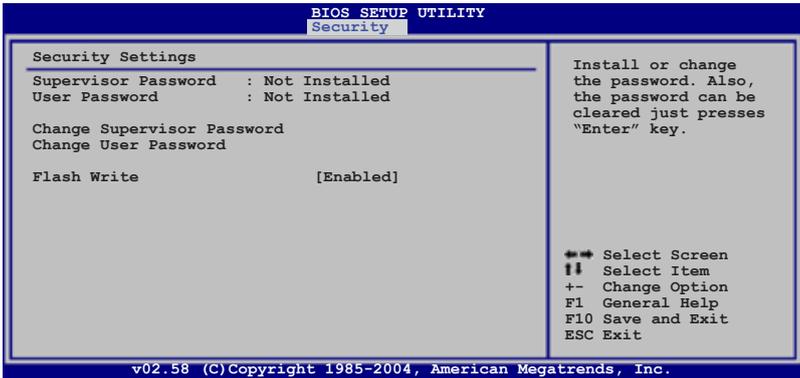
Change Supervisor Password

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

To set a Supervisor Password:

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

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

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

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

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

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

```
                        BIOS SETUP UTILITY
              Security

  Security Settings                              <Enter> to change
  Supervisor Password   : Installed             password.
  User Password         : Not Installed         <Enter> again to
                                                 disable password.
  Change Supervisor Password
  User Access Level            [Limited]
  Change User Password
  Clear User Password
  Password Check               [Setup]
  Password Lock Mode           [Disabled]
  Removable Device Boot        [Enabled]
  Flash Write                  [Enabled]        ◄►  Select Screen
                                                 ↑↓  Select Item
                                                 +-  Change Option
                                                 F1  General Help
                                                 F10 Save and Exit
                                                 ESC Exit

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```

User Access Level [Full Access]

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

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

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

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

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

Clear User Password

Select this item to clear the user password.

Password Check [Setup]

This field requires you to enter the password before entering the BIOS setup or the system. Select [Setup] to require the password before entering the BIOS Setup. Select [System] to require the password before entering the system. Configuration options: [Setup] [System]

Password Lock Mode [Enabled]

When set to [Enabled], the keyboard is locked and the user has no privilege to launch the BIOS setup utility when installing adapter cards during option ROM initialization. Configuration options: [Disabled] [Enabled]

Removable Device Boot [Enabled]

Allows you to enable or disable booting from a legacy floppy, USB floppy, or IDE optical drive. Configuration options: [Disabled] [Enabled]

Flash Write [Enabled]

Set this item to [Disabled] to write-protect the BIOS flash memory. Configuration options: [Disabled] [Enabled]

4.7 Boot menu

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

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

    Boot Settings                              Specifies the Boot
  ─────────────────────────────────────       Device Priority
    ▶  Boot Device Priority                    sequence.

    ▶  Boot Settings Configuration             A virtual floppy disk
                                               drive (Floppy Drive
                                               B:) may appear when
                                               you set the CD-ROM
                                               drive as the first boot
                                               device.

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

4.7.1   Boot Device Priority

```
                            BIOS SETUP UTILITY
                                Boot

    Boot Device Priority                       Specifies the boot
  ─────────────────────────────────────       sequence from the
    1st Boot Device          [1st FLOPPY DRIVE]  available devices.
    2nd Boot Device          [Network: MBA v7.7.5]
    3rd Boot Device          [Network: MBA v7.7.5]  A device enclosed
                                               in parenthesis has
                                               been disabled in the
                                               corresponding menu.


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

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```

1st Boot Device [1st FLOPPY DRIVE]
2nd Boot Device [Network: MBA v7.7.5]
3rd Boot Device [Network: MBA v7.7.5]

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

4.7.2 Boot Settings Configuration

```
                    BIOS SETUP UTILITY
                         Boot

    Boot Settings Configuration                   Allows BIOS to skip
                                                  certain tests while
    Quick Boot              [Enabled]             booting. This will
    Full Logo Display       [Enabled]             decrease the time
    Bootup Num-Lock         [On]                  needed to boot the
    PS/2 Mouse Support      [Auto]                system.
    POST Errors             [Enabled]
    Setup Prompt            [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 Logo Display [Enabled]

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

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

Bootup Num-Lock [On]

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

PS/2 Mouse Support [Auto]

Allows you to enable or disable support for PS/2 mouse.
Configuration options: [Disabled] [Enabled] [Auto]

POST Errors [Enabled]

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

Setup Prompt [Enabled]

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

Interrupt 19 Capture [Enabled]

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

4.8   Exit menu

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

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

   Exit & Save Changes                         Exit system setup
   Exit & Discard Changes                      after saving the
   Discard Changes                             changes.

   Load Setup Defaults                         F10 key can be used
                                               for this operation.



                                               →← Select Screen
                                               ↑↓  Select Item
                                               +-  Change Option
                                               F1  General Help
                                               F10 Save and Exit
                                               ESC Exit
```
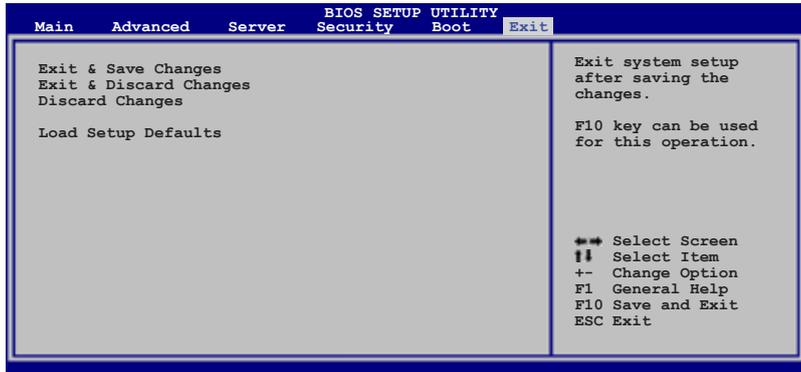
> If you made changes to any of the settings in the menus, pressing <Esc> does not immediately exit this menu. A confirmation window appears and prompts you to either save your changes or cancel the command. Select one of the options from this menu to exit.

Exit & Save Changes

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

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

Exit & Discard Changes

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

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

Discard Changes

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

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

Load Setup Defaults

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

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

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

RAID
configuration
5

Chapter summary

5

5.1 Setting up RAID

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

5.1.1 RAID definitions

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

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

If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support CD to a floppy disk before you install an operating system to the selected hard disk drive. Refer to Chapter 7 for details.

5.1.2   Installing hard disk drives

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

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

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

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

5.1.3   Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set from SATA hard disk drives attached to the SATA connectors supported by the Intel® ICH7R Southbridge chip. To do this:

1.   Enter the BIOS Setup during POST.

2.   Go to the **Main Menu**, select **IDE Configuration**, then press <Enter>.

3.   Set the **ATA/IDE Configuration** item to [Enhanced Mode], then press <Enter>.

4.   Set the **Configure SATA As** item to [RAID].

5.   Save your changes, then exit the BIOS Setup.

> Refer to Chapter 5 for details on entering and navigating through the BIOS Setup.

5.1.4   RAID configuration utility

Depending on the RAID_SEL1 jumper setting and the operating system, you can select a utility to create a RAID set. Refer to section 4.2 Jumpers for details on the RAID_SEL1 jumper settings.

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

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

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

5.2 LSI Logic Embedded SATA RAID Setup Utility

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

To enter the LSI Logic Embedded SATA RAID Setup Utility:

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

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

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

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

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

5.2.1   Creating a RAID 0 or RAID 1 set

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

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

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

Using Easy Configuration

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

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

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

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

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

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

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

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

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

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

8.   When creating a **RAID 1** set, select **Stripe Size** from the **Logical Drive** menu, then press <Enter>.

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

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

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

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

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

12. Follow steps 5 to 10 to configure additional logical drives.

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

Using New Configuration

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

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

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

3.   Follow steps 3 to 7 of the previous section.
4.   Select **Size** from the **Logical Drive** menu, then press <Enter>.
5.   Key-in the desired logical drive size, then press <Enter>.

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

5.2.2 Adding or viewing a RAID configuration

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

Adding a new RAID configuration

To add a new RAID configuration:

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

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

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

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

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

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

6. Follow steps 6 to 7 of the **Creating a RAID set: Using Easy Configuration** section.

7. Select **Size** from the **Logical Drive** menu, then press <Enter>.

8. Key-in the desired logical drive size, then press <Enter>.

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

5.2.3   Initializing the logical drives

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

Using the Initialize command

To initialize the logical drive using the Initialize command:

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

2.   The screen displays the available RAID set(s) and prompts you to select the logical drive to initialize. Press the <Spacebar> to select the logical drive from the **Logical Drive** selection, then press <F10>.
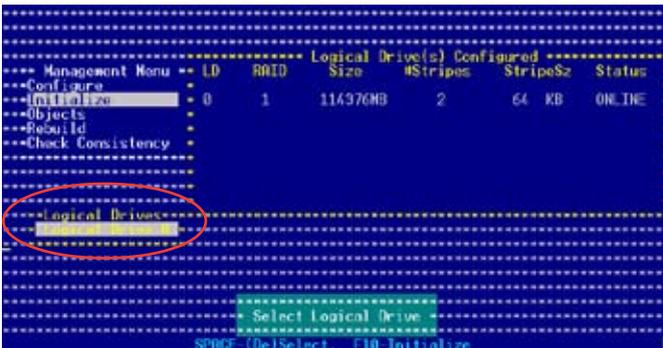
3. When prompted, use the arrow keys to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.
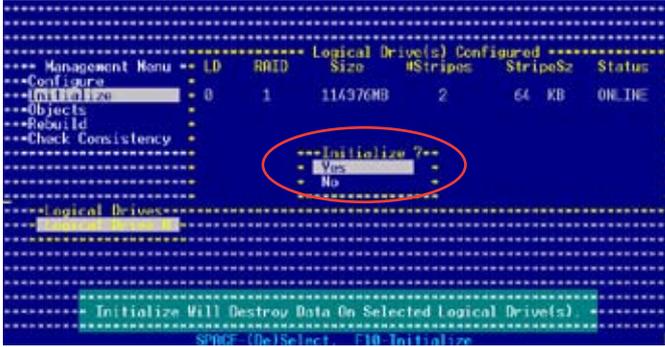
Initializing a logical drive(s) erases all data on the drive.

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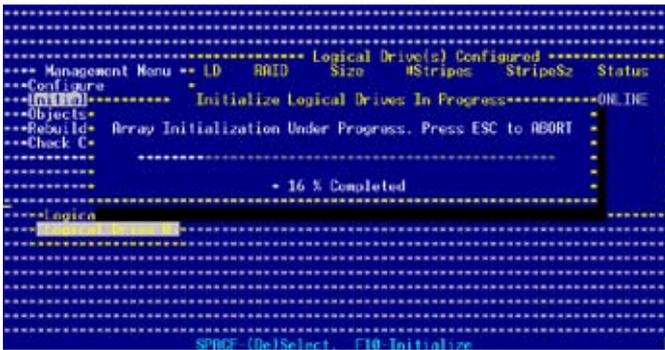
5.   When initialization is completed, press <Esc>.
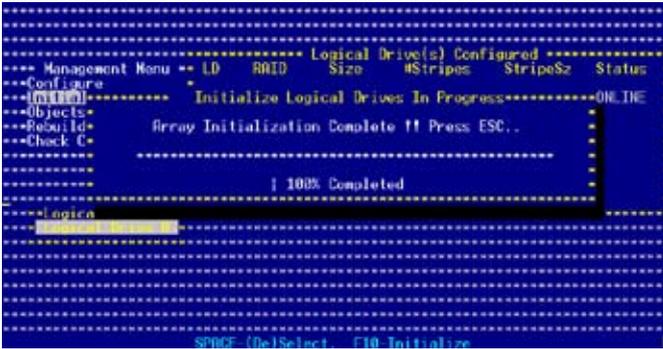
Using the Objects command

To initialize the logical drives using the Objects command:

1.   From the **Management Menu**, highlight **Objects**, then press <Enter>.
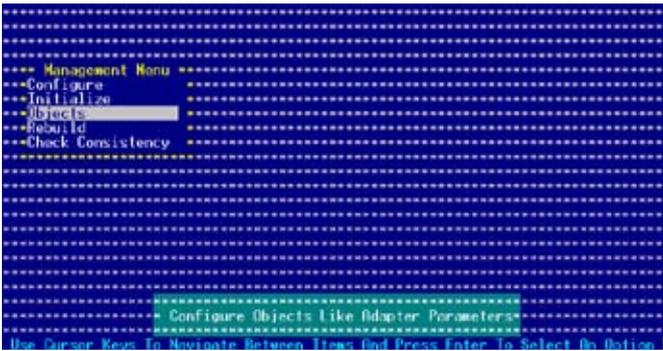
2. Select **Logical Drive** from the **Objects** sub-menu, then press <Enter>.
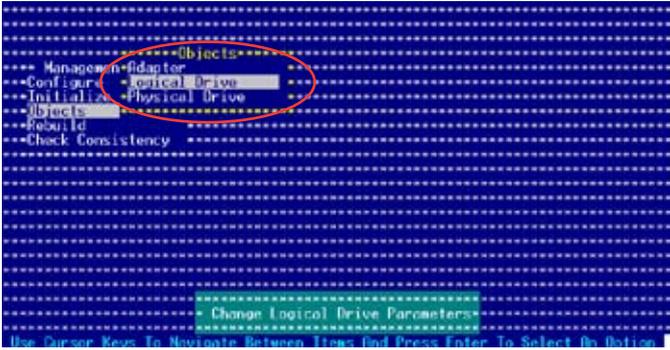
3. Select the logical drive to initialize from the **Logical Drives** sub-menu, then press <Enter>.

4. Select **Initialize** from the pop-up menu, then press <Enter> to start initialization.
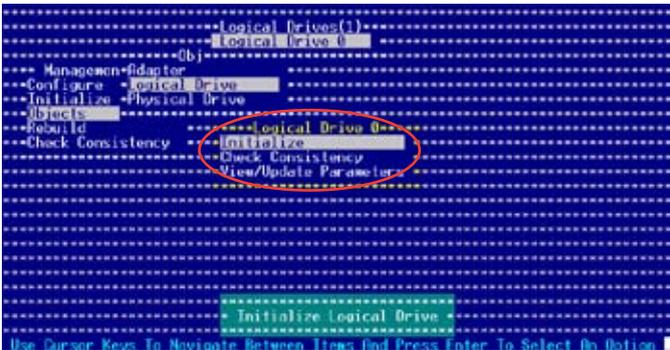
5. When prompted, use the arrow keys to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.
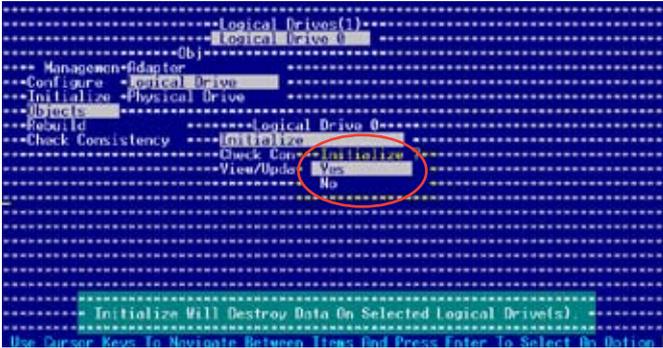
6. A progress bar appears on screen. If desired, press <Esc> to abort initialization.
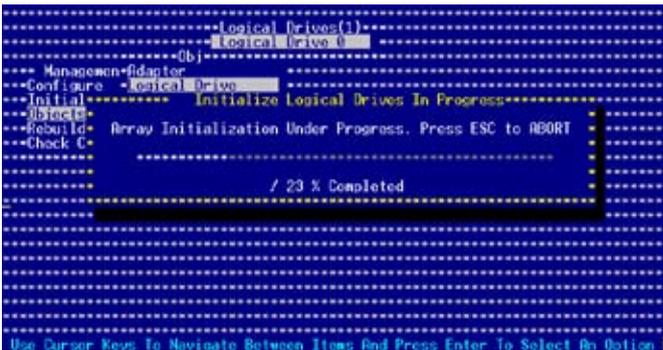
7. When initialization is completed, press <Esc>.
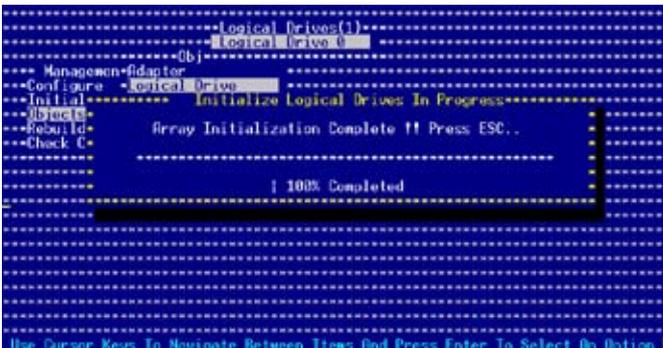
5.2.4 Rebuilding failed drives

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

To rebuild a failed hard disk drive:

1. From the **Management Menu**, highlight **Rebuild**, then press <Enter>.
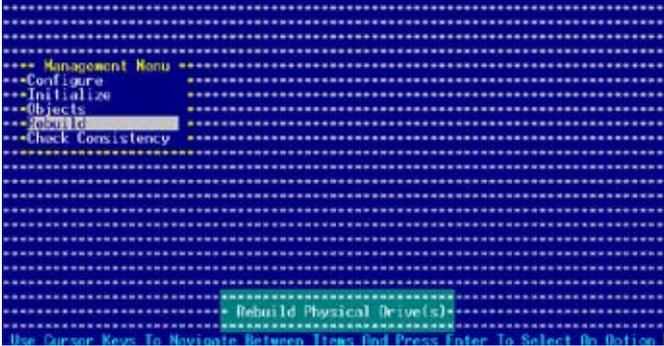
2. The **PHYSICAL DRIVES SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive you want to rebuild, then press <SpaceBar>.

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

4. When prompted, press <Y> to to rebuild the drive.
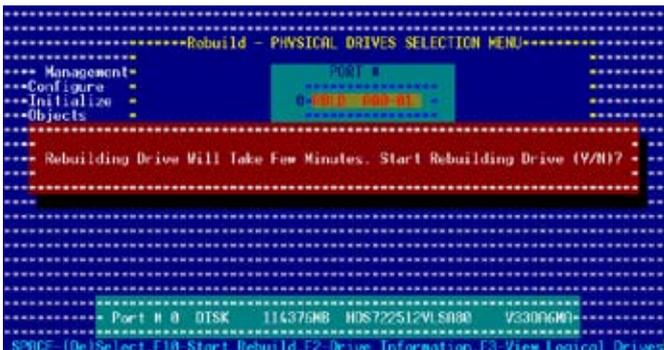
5. When rebuild is complete, press any key to continue.

5.2.5 Checking the drives for data consistency

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

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

Using the Check Consistency

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

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

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

3.   When prompted, use the arrow keys to select **Yes** from the **Consistency Check** dialog box, then press <Enter>. You may also press <F10> to check the drive consistency.
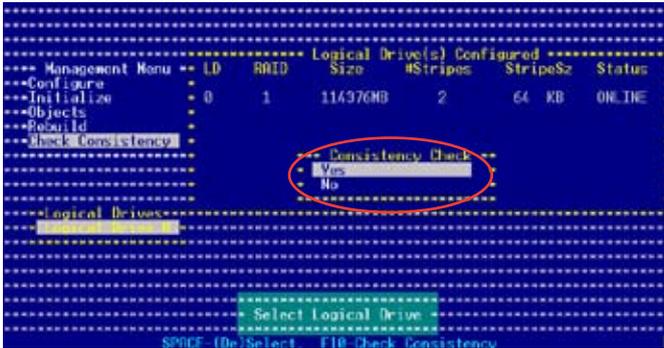
A progress bar appears on screen.
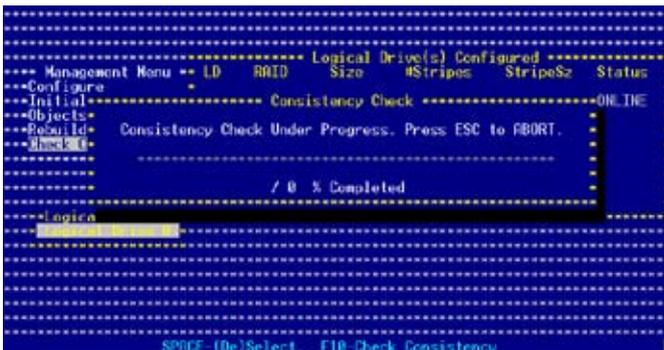
4.   While checking the disk consistency, press <Esc> to display the following options.

•   **Stop** - Stops the consistency check. The utility stores the percentage of disk checked, When you restart checking, it continues from the last percentage completed rather than from zero percent.

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

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

5.   When checking is complete, press any key to continue.

Using the Objects command

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

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

5.2.6 Deleting a RAID configuration

To delete a RAID configuration:

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

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

The utility clears the current array.

3. Press any key to continue.

5.2.7   Selecting the boot drive from a RAID set

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

To select the boot drive from a RAID set:

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

2.   When prompted, use the arrow keys to select the bootable logical drive from the list, then press <Enter>.
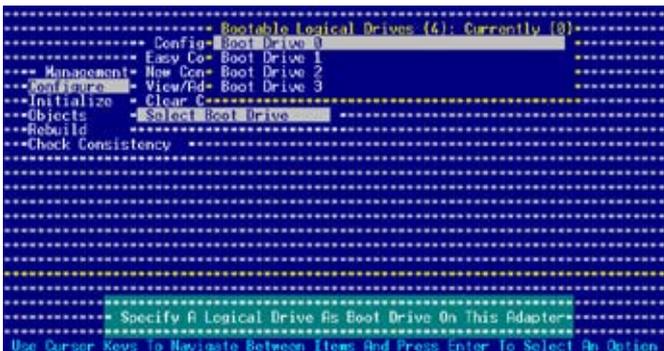
3.   The logical drive is selected as boot drive. Press any key to continue.

5.2.8 Enabling the WriteCache

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

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

To enable WriteCache:

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

2. Select **WriteCache**, then press <Enter> to turn the option **On** (enabled).

3. When finished, press any key to continue.

5.3 Intel® Matrix Storage Manager Option ROM Utility

The Intel® Matrix Storage Manager Option ROM utility allows you to create RAID 0, RAID 1, RAID 0+1, and RAID 5 set(s) from Serial ATA hard disk drives.

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

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

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

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


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

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




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

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

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

5.3.1   Creating a RAID 0 set (Stripe)

To create a RAID 0 set:

1.   From the utility main menu, select **1. Create RAID Volume**, then press
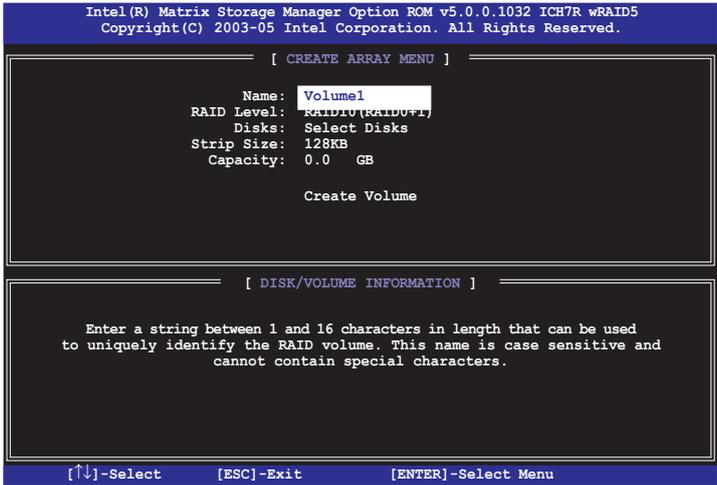   <Enter>. This screen appears.
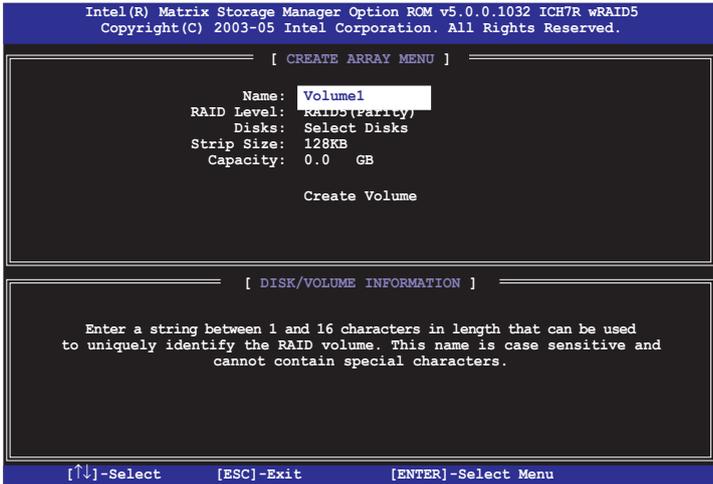
```
        Intel(R) Matrix Storage Manager Option ROM v5.0.0.1032 ICH7R wRAID5
             Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

                          ═══ [ CREATE ARRAY MENU ] ═══

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

                                  Create Volume

                      ═══ [ DISK/VOLUME INFORMATION ] ═══

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

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

2.   Enter a name for the RAID 0 set, then press <Enter>.

3.   Highlight **RAID Level**, press the up/down arrow key to select
       RAID 0 (Stripe), then press <Enter>.

4.   Highlight the **Disks** item, then press <Enter> to select the hard disk drives
       you want to include in the RAID set. The **SELECT DISKS** screen appears.

```
                          ═══ [ SELECT DISKS ] ═══

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

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


        [↑↓]-Previous/Next  [SPACE]-Selects  [ENTER]-Selection Complete
```
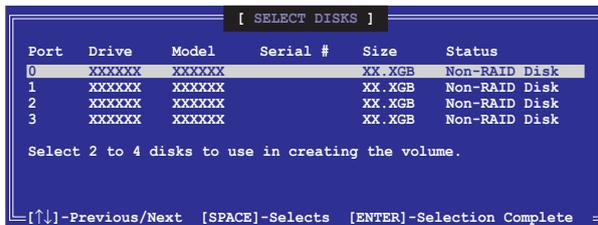
5.   Use the up/down arrow key to highlight a drive, then press <Space> to
       select. A small triangle marks the selected drive. Press <Enter> after
       completing your selection.

6. Use the up/down arrow key to select the stripe size for the RAID 0 array, then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The default stripe size is 128 KB.

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

7. Highlight the **Capacity** item, enter the desired RAID volume capacity, then press <Enter>. The default value indicates the maximum allowed capacity.

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

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

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

5.3.2 Creating a RAID 1 set (Mirror)

To create a RAID 1 set:

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

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

    ═══════════════════════ [ CREATE ARRAY MENU ] ═══════════════════════

                          Name:  Volume1
                    RAID Level:  RAID1(Mirror)
                         Disks:  Select Disks
                    Strip Size:  N/A
                      Capacity:  0.0   GB

                                 Create Volume


    ═══════════════════ [ DISK/VOLUME INFORMATION ] ═══════════════════

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




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

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

5.3.3 Creating a RAID 10 set (Stripe + Mirror)

To create a RAID 10 set:

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

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

                         Name:   Volume1
                   RAID Level:   RAID10(RAID0+1)
                        Disks:   Select Disks
                   Strip Size:   128KB
                     Capacity:   0.0   GB

                                 Create Volume


    ════════════════════════ [ DISK/VOLUME INFORMATION ] ════════════════════════

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




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

2. Enter a name for the RAID 10 set, then press <Enter>.
3. Highlight RAID Level, press the up/down arrow key to select IRAID 10 (RAID0+1), then press <Enter>.
4. Follow steps 4 to 9 of section "5.3.1 Creating a RAID 0 set (striped)" to create the RAID 10 set.

5.3.4   Creating a RAID 5 set (Parity)

To create a RAID 5 set:

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

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

    ═══════════════════════[ CREATE ARRAY MENU ]═══════════════════════

                        Name:  Volume1
                 RAID Level:  RAID5(Parity)
                      Disks:  Select Disks
                 Strip Size:  128KB
                   Capacity:  0.0   GB

                                Create Volume


    ═══════════════════════[ DISK/VOLUME INFORMATION ]═══════════════════════

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



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

2.   Enter a name for the RAID 10 set, then press <Enter>.

3.   Highlight RAID Level, press the up/down arrow key to select
     lRAID 10 (RAID0+1), then press <Enter>.

4.   Follow steps 4 to 9 of section "5.3.1 Creating a RAID 0 set (striped)" to create
     the RAID 5 set.

5.3.5   Deleting a RAID set

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

To delete a RAID set:

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

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

                         ═════════ [ DELETE VOLUME MENU ] ═════════
   Name          Level           Drives     Capacity     Status      Bootable
   Volume0       RAIDX(xxxxx)    X          XXX.XGB      Normal      Yes




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


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

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




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

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

```
                      ▛▀▀▀▀▀[ DELETE VOLUME VERIFICATION ]▀▀▀▀▀▜

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

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

5.3.6 Resetting disks to Non-RAID

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

To reset a RAID set hard disk drive:

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

```
================[ RESET RAID DATA ]================

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

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

Port   Drive Model      Serial #         Size     Status
0      XXXXXXXXXXXX     XXXXXXXX         XX.XGB   Member Disk
1      XXXXXXXXXXXX     XXXXXXXX         XX.XGB   Member Disk
              Select the disks that should be reset.




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

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

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

4. Press <Y> to reset the drive or press <N> to return to the utility main menu.

5. Follow steps 2 to 4 to select and reset other RAID set drives.

5.3.7 Exiting the Intel® Matrix Storage Manager

To exit the utility:

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

```
=========[ CONFIRM EXIT ]=========

   Are you sure you want to exit? (Y/N):
```

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

5.4 Global Array Manager

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

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

5.5 LSI Logic MPT Setup Utility
(For P5M2/SAS model only)

The LSI Logic MPT Setup Utility is an integrated RAID solution that allows you to allows you to create the following RAID set(s) from SAS hard disk drives supported by the LSI1068 PCI-X SAS controller:

- RAID 1 (Integrated Mirroring)
- RAID 1E (Integrated Mirroring Enhanced)
- RAID 0 (Integrated Striping)

5.5.1 Integrated Mirroring

Overview

The Integrated Mirroring (IM) feature supports simultaneous mirrored volumes with two disks (IM). Integrated Mirroring Enhanced (IME) supports three to eight disks, or seven mirrored disks plus a hot spare disk.

The IM feature supports hot swap capability, so when a disk in an IM volume failes, you can easily restore the volume, and the swapped disk is automatically re-mirrored.

Creating Integrated Mirroring volumes

- You may use disks of different sized in IM and IME volumes; however, the size of the smallest disk determines the "logical" size of each member disk.

- Do not combine Serial ATA and SAS disks in one volume.

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

To create an IM volume:

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

2. During POST, press <Ctrl+C> to enter the SAS configuration utility.

```
LSI Logic Corp. MPT SAS BIOS
MPTBIOS-6.05.06.00 (2005.01.16)
Copyright 2000-2005 LSI Logic Corp.
*** RELEASE VERSION ***


Press Ctrl-C to start LSI Logic Configuration Utility...
```

3. The Adapter Properties screen appears.
    Use the arrow keys to select RAID Properties, then press <Enter>.

4. The Select New Array Type screen apprears.
    Use the arrow keys to select Create IM Volume, then press <Enter>.

5. The Create New Array screen shows the disks you can add to make up the IM volume. Use the arrow key to select a disk, then move the cursor to the RAID Disk column. To include this disk in the array, press <+>, <->, or <Space>.

   You may also specify the Hot Spare disk here. Select the disk, then move the cursor to the Hot Spr column, then press <+>, <->, or <Space>.

```
LSI Logic MPT Setup Utility          v6.05.06.00 (2006.01.16)
Create New Array -- SAS1068
   Array Type:                       IM
   Array Size(MB):                   --------

Slot  Device Identifier             RAID  Hot   Drive         Pred  Size
Num                                 Disk  Spr   Status        Fail  (MB)
   4  SAS    HDS722580VLSA80 A63A   [No]  [No]  ----------    ----  78533
   5  FUJITSU MAX3147RC      0104   [No]  [No]  ----------    ----  140272
   6  SAS    HDS722580VLSA80 A63A   [No]  [No]  ----------    ----  78533
   7  SAS    HDS722580VLSA80 A63A   [No]  [No]  ----------    ----  78533




Esc = Exit Menu      F1/Shift+1 = Help
Space/+/- = Select Disk for array or hot spare   C = Create Array
```
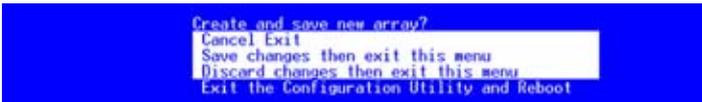

By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID array.

- The disk is not large enough to mirror existing data on the primary drive.

- The disk has been selected as the Hot Spare for the RAID array.

- The disk is already part of another array.

---

6. A confirmation screen appears.

   Press <M> to keep existing data on the first disk. If you choose this option, data on the first disk will be mirrored on the second disk that you will add to the volume later. Make sure the data you want to mirror is on the first disk.

   Press <D> to overwrite any data and create the new IM array.

7.   Repeat steps 5 and 6 to add the second disk to the volume.

8.   When done, press <C> to create the array, then select Save changes then exit this menu.

9.   The utility creates the array.

To create an IME volume:

1. The Adapter Properties screen appears.
    Use the arrow keys to select RAID Properties, then press <Enter>.

2. The Select New Array Type screen apprears.
    Use the arrow keys to select Create IM Volume, then press <Enter>.

3. The Create New Array screen shows the disks you can add to make up the IME volume.

    Integrated Mirroring Enhanced (IME) supports three to eight disks, or seven mirrored disks plus a hot spare disk. Use the arrow key to select a disk, then move the cursor to the RAID Disk column. To include this disk in the array, press <+>, <->, or <Space>.

    You may also specify the Hot Spare disk here. Select the disk, then move the cursor to the Hot Spr column, then press <+>, <->, or <Space>.

By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID array.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk has been selected as the Hot Spare for the RAID array.
- The disk is already part of another array.

4.   Repeat step 5 to add the other disks to the volume.

5.   When done, press <C> to create the array, then select Save changes then exit this menu.

6.   The utility creates the array.

5.5.2 Integrated Striping (IS) volume

Overview

The Integrated Striping (IS) feature provides RAID 0 functionality, supporting volumes with two to eight disks. You may combine an IS volume with an IM or IME volume.

Creating Integrated Striping volumes

Do not combine Serial ATA and SAS disks in one volume.

To create an IS volume:

1. Turn on the system after installing all SAS hard disk drives.
2. During POST, press <Ctrl+C> to enter the SAS configuration utility.

```
LSI Logic Corp. MPT SAS BIOS
MPTBIOS-6.05.06.00 (2005.01.16)
Copyright 2000-2005 LSI Logic Corp.
*** RELEASE VERSION ***


Press Ctrl-C to start LSI Logic Configuration Utility...
```

3. The Adapter Properties screen appears.
   Use the arrow keys to select RAID Properties, then press <Enter>.

4. The Select New Array Type screen apprears.
   Use the arrow keys to select Create IM Volume, then press <Enter>.

```
LSI Logic MPT Setup Utility        v6.05.06.00 (2006.01.16)
Select New Array Type -- SAS1068


     Create IM Volume          Create Integrated Mirror Array of 2
                               disks plus an optional hot spare. Data
                               on the primary disk may be migrated.

     Create IME Volume         Create Integrated Mirrored Enhanced
                               Array of 3 to 8 disks including an
                               optional hot spare.
                               ALL DATA on array disks will be DELETED!

    Create IS Volume           Create Integrated Striping array of
                               2 to 8 disks.
                               ALL DATA on array disks will be DELETED!


Esc = Exit Menu      F1/Shift-1 = Help
Enter = Choose array type to create
```

5. The Create New Array screen shows the disks you can add to make up
   the IS volume. Use the arrow key to select a disk, then move the cursor to
   the RAID Disk column. To include this disk in the array, press <+>, <->, or
   <Space>.

```
LSI Logic MPT Setup Utility        v6.05.06.00 (2006.01.16)
Create New Array -- SAS1068
   Array Type:                   IS
   Array Size(MB):               234603

Slot  Device Identifier         RAID    Hot   Drive      Pred  Size
Num                             Disk    Spr   Status      Fail  (MB)
  4   SAS    HDS722580VLSA80 A63A  [Yes]  [No]  ----------  ---  78533
  5   FUJITSU MAX3147RC      0104  [No]   [No]  ----------  ---  140272
  6   SAS    HDS722580VLSA80 A63A  [Yes]  [No]  ----------  ---  78533
  7   SAS    HDS722580VLSA80 A63A  [Yes]  [No]  ----------  ---  78533




Esc = Exit Menu      F1/Shift+1 = Help
Space/+/- = Select Disk for array or hot spare   C = Create Array
```

By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID array.

- The disk is not large enough to mirror existing data on the primary drive.

- The disk has been selected as the Hot Spare for the RAID array.

- The disk is already part of another array.

6. Repeat step 5 to add the other disks to the volume.

7. When done, press <C> to create the array, then select Save changes then exit this menu.

```
Create and save new array?
Cancel Exit
Save changes then exit this menu
Discard changes then exit this menu
Exit the Configuration Utility and Reboot
```

9. The utility creates the array.

```
LSI Logic MPT Setup Utility          v6.05.06.00 (2006.01.16)

Processing...may take up to 1 minute
Creating RAID Array...
```

5.5.3   Managing Arrays

The LSI Logic MPT Setup Utility allows you to perform other tasks related to configuring and maintaining IM and IME volumes.

Refer to this section to view volume properties, manage the hot spare disk, synchronize the array, activate the array, and delete the array.

Viewing volume properties

To view volume properties:

1.   On the main menu, select RAID Properties.

2.   On the next screen that appears, select View Array.

3. The View Array screen appears. Here you can view properties of the RAID array(s) created. If you have configured a hot spare, it will also be listed. if you created more than one array, you may view the next array by pressing <Alt+N>.

```
LSI Logic MPT Setup Utility        v6.05.06.00 (2006.01.16)
View Array -- SAS1068
      Array                  1 of 1
      Identifier             LSILOGICLogical Volume 3000
      Type                   IME
      Scan Order             4
      Size (MB)              117301
      Status                 Optimal

      Manage Array

Slot  Device Identifier           RAID  Hot  Drive   Pred  Size
Num                               Disk  Spr  Status  Fail  (MB)
  4   SAS    HDS722580VLSA80 A63A  Yes  No   Ok      No    78200
  5   SAS    HDS722580VLSA80 A63A  Yes  No   Ok      No    78200
  7   SAS    HDS722580VLSA80 A63A  Yes  No   Ok      No    78200




Esc = Exit Menu             F1/Shift+1 = Help
Alt+D = Device Properties   Alt+N = Next Array   Alt+M = More Keys
```

Managing hot spares

You may configure one disk as a global hot spare to protect critical data on the IM/IME volume(s). You may create the hot spare disk at the same time you create the IM/IME volume. Refer to this section when adding a hot spare disk on an existing volume.

> If a disk on an IM/IME volume fails, the utility automatically rebuilds the failed disk data on the hot spare. When the failed disk is replaced, the utility assigns the replacement as the new hot spare.

To create a hot spare:

1. Follow steps 1 ~ 3 of the section "Viewing volume properties."
2. From the View Array screen, select Manage Array, then press <Enter>.

3. From the Manage Array screen select Manage Hot Spare, then press <Enter>.

4. Use the arrow key to select the disk you would like to configure as hot spare, then move the cursor to the Hot Spr column. Press <+>, <->, or <Space>. The Drive Status column field now shows Hot Spare.

    Press <C> to commit the changes.

Synchronizing the array

Synchronizing the array allows the utility to resynchronize data on the mirrored disk in the array. This procedure is seldom required because data synchronization is automatically done during normal operation.

To synchronize the array:

1. Follow steps 1 ~ 3 of the section "Viewing volume properties" and step 2 of the section "Managing hot spares."

2. From the Manage Array screen select Synchronize Spare, then press <Enter>.

3. Press <Y> to begin the synchronization, or <N> to cancel.

Activating an array

If an array is removed from one controller/computer or moved to another, the array is considered inactive. When you add the array back to the system, you may reactivate the array.

To activate the array:

1.   From the Manage Array screen, select Activate Array, then press <Enter>.
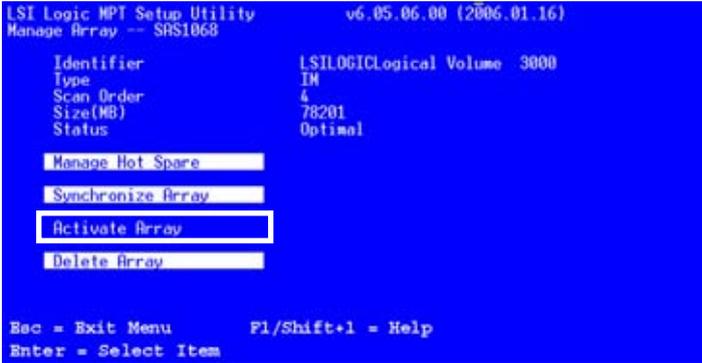
2.   Press <Y> to activate, or <N> to cancel.

Deleting an array

⚠️ • You cannot recover lost data if you delete an array. Make sure you back up important data before deleting an array.

• If you delete an IM (RAID 1) volume, the data is preserved on the primary disk.

To delete an array:

1. From the Manage Array screen, select Delete Array, then press <Enter>.

```
LSI Logic MPT Setup Utility       v6.05.06.00 (2006.01.16)
Manage Array -- SAS1068

        Identifier           LSILOGICLogical Volume  3000
        Type                 IM
        Scan Order           4
        Size(MB)             78201
        Status               Optimal

        Manage Hot Spare

        Synchronize Array

        Activate Array

        Delete Array


Esc = Exit Menu        F1/Shift+1 = Help
Enter = Select Item
```

2. Press <Y> to delete, or <N> to cancel.

Viewing SAS topology

1. From the Adapter Properties screen, select SAS Topology.

```
LSI Logic MPT Setup Utility        v6.05.06.00 (2006.01.16)
Adapter Properties -- SAS1068

         Adapter                      SAS1068
         PCI Slot                     00
         PCI Address(Bus/Dev/Func)    07:03:00
         MPT Firmware Revision        0.07.01.00-IR
         SAS Address                  00000001:00000008
         Status                       Enabled
         Boot Order                   0
         Boot Support                 [Enabled BIOS only]

           RAID Properties

           SAS Topology

           Advanced Adapter Properties


 Esc = Exit Menu                F1/Shift+1 = Help
 Alt+D = Device Properties      Alt+M = More Keys
```

Press <Alt+D> to display device properties, or <Alt+M> to display more keys.

```
More keys for the SAS Topology display:

C = Clear Device Mappings for Non-Present Devices
R = Refresh SAS Topology
Enter = On a SAS Enclosure or Expander - Expand or Collapse Item
Enter = On a Disk Drive - Turn on the Locate LED (next key press turns off)
```

2. Information about the volume and its member-disks are then displayed.

```
LSI Logic MPT Setup Utility        v6.05.06.00 (2006.01.16)
SAS Topology -- SAS1068
                      Device Identifier          Device
SAS1068(07:03:00)                                Info
+ Controller          Direct Attach Devices      Controller
| Phy  4              RAID Physical Disk         SATA
| Phy  5              FUJITSU MAX3147RC    0104  SAS
| Phy  6              RAID Physical Disk         SATA
+ Phy  7              RAID Physical Disk         SATA
+ IS VOL              LSILOGICLogical Volume 3000




                                            <:           >

 Esc = Exit Menu                F1/Shift+1 = Help
 Alt+D = Device Properties      Alt+M = More Keys
```

5.5.4   Selecting a boot disk

You can select a boot disk in the SAS Topology screen. This disk is then moved to scan ID 0 on the next boot, and remains at this position. This makes it easier to set BIOS boot device options and to keep the boot device constant during device additions and removals. There can be only one boot disk.

Follow these steps to select a boot disk:

1.   In the SAS BIOS CU, select an adapter from the Adapter List.
2.   Select the SAS Topology option.

      The current topology is displayed. If the selection of a boot device is supported, the bottom of the screen lists the Alt+B option. This is the key for toggling the boot device. If a device is currently configured as the boot device, the Device Info column on the SAS Topology screen will show the word "Boot."

3.   To select a boot disk, move the cursor to the disk and press Alt+B.
4.   To remove the boot designator, move the cursor to the disk and press Alt+B. This controller will no longer have a disk designated as boot.
5.   To change the boot disk, move the cursor to the new boot disk and press Alt+B. The boot designator will move to this disk.

The firmware must be configured correctly in order for the Alt+B feature to work.

5.5.5   Global_Properties

From the Setup Utility screen, press <Ctrl+C> to enter LSI Logic Configuration, then select Global Properties. The Global Properties menu allows you to change related settings.

Pause When Boot Alert Displayed

Sets whether to pause when the boot alert displays.
Configuration options: [Yes] [No]
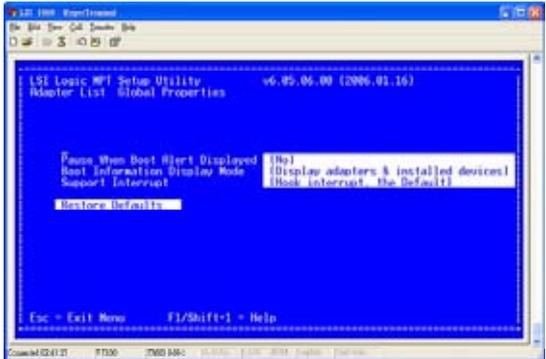
Boot Information Display Mode

Sets the disk infomation display mode.
Configuration options: [Display adapters & installed devices] [Display adapters only]
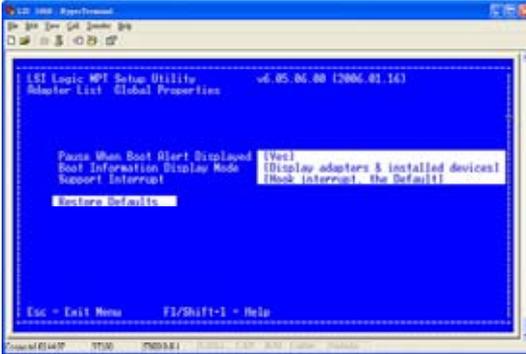
Support Interrupt

Configuration options: [Hook interrupt, the Default] [Bypass interrupt hook]
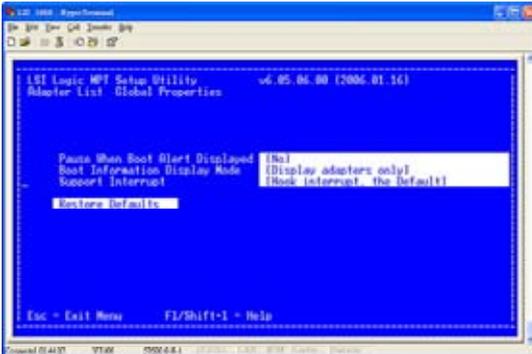
Restore Defaults

This option allows you to discard the selections you made and restore the system defaults.
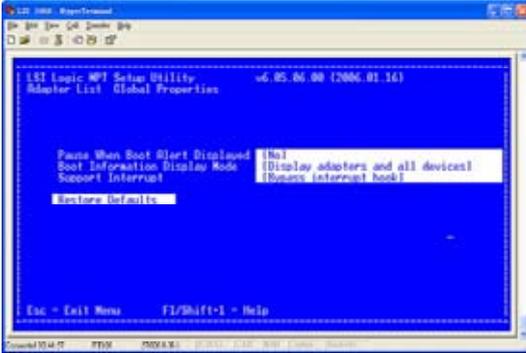
This chapter provides instructions for installing the necessary drivers for different system components.

Driver installation

6

6.1 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.

6.1.1 Creating a RAID driver disk

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

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

Boot from CD-ROM (DOS)

To create a RAID driver disk in DOS environment:

1. Place the motherboard support CD in the optical drive.
2. Restart the computer, then enter the BIOS Setup.
3. Select the optical drive as the first boot priority to boot from the support CD. Save your changes, then exit the BIOS Setup.
4. Restart the computer.
5. Press any key when prompted to boot from CD.

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

The Makedisk menu appears.

```
A)   FreeDOS command prompt
B)   Create LSI 1068 SAS for Windows 2000/2003 32 bit Driver Disk
C)   Create LSI 1068 SAS for RHEL4 UP2 64 bit Driver Disk
D)   Create LSI 1068 SAS for RHEL4 UP2 32 bit Driver Disk
E)   Create LSI 1068 SAS for RHEL3 UP6 64 bit Driver Disk
F)   Create LSI 1068 SAS for RHEL3 UP6 32 bit Driver Disk
G)   Create Intel Matrix Storage Manager for Windows 32 bit Driver Disk
H)   Create Intel Matrix Storage Manager for Windows 64 bit Driver Disk
I)   Create LSI MegaRAID for Windows 32/64 bit Driver Disk
J)   Create LSI MegaRAID for RHEL4 UP2 32/64 bit Driver Disk
K)   Create LSI MegaRAID for RHEL3 UP6 32/64 bit Driver Disk
L)   Broadcom ASF Firmware Update
M)   Flash AMI BIOS for P5M2/SAS
N)   Flash AMI BIOS for P5M2
Please choose A To N:
```

6. Place a blank, high-density floppy disk to the floppy disk drive, then select the type of RAID driver disk you want to create by typing the number before the option

7. Press <Enter>.

8. Follow screen instructions to create the driver disk.

Windows® 2000/2003 Server

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

1. Restart the system from the hard disk drive, then place the system/motherboard support CD in the optical drive.

2. Browse the contents of the support CD to locate the driver disk utility. The Windows 32-bit OS RAID driver disk for the Intel® Matrix Storage Manager is located in:

    \Drivers\ICH7R Intel RAID\Driver\win32\F6flpy32.exe

    The Windows 2003 64-bit OS RAID driver disk for the Intel® Matrix Storage Manager is located in:

    \Drivers\ICH7R Intel RAID\Driver\win64\F6flpy64.exe

    The Windows 32-bit and 64-bit OS RAID driver disk for the LSI Logic Embedded SATA RAID is located in:

    \Drivers\ICH7R LSI RAID\Driver\makedisk\win32_64.exe

The Windows 32-bit OS RAID driver disk for the LSI1068 SAS is located in:

    \Drivers\LSI 1068\Driver\makedisk\2k_2k3.exe

The Windows 2003 64-bit OS RAID driver disk for the LSI1068 SAS controller is located in:

    \Drivers\LSI 1068\Driver\makedisk\2k364.exe

3. Insert a formatted high-density floppy disk to the floppy disk drive.

4. Follow screen instructions to complete the process.

5. After creating a RAID driver disk, eject the floppy disk, then write-protect it to prevent computer virus infection.

Red Hat® Enterprise Linux/SUSE Linux Enterprise Server:

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

1. Insert a blank formatted high-density floppy disk to the floppy disk drive.
2. Decompress the file into the floppy disk from the following path in the support CD:

   For LSI Logic Embedded SATA RAID Driver:

   \Drivers\ICH7R LSI RAID\Driver\Makedisk

   For LSI1068 SAS RAID RAID Driver:

   \Drivers\ICH7R LSI 1068\Driver\Makedisk

3. Eject the floppy disk.

> For systems with other Lunix versions that are not listed in the Makedisk menu, explore the support CD and copy the driver file from the following path: For LSI Logic Embedded SATA RAID Driver:\Drivers\ICH7R LSI RAID\ Driver\Linux\; For LSI1068 SAS RAID Driver:\Drivers\LSI 1068\Drivers\ Linux\

6.1.2 Installing the RAID controller driver

Windows® 2000/2003 Server OS

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

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

2. Press <F6> when the message "**Press F6 if you need to install a third
   party SAS or RAID driver**..." appears at the bottom of the screen.

3. When prompted, press **<S>** to specify an additional device.

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

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

•   **LSI Logic Embedded SATA RAID:**

     Select **"LSI Logic Embedded SATA RAID"** for Windows 2000 or 32bit

     Windows 2003 Server OS from the list, then press <Enter>.

     For 64bit Windows 2003 Server OS, select **"LSI Logic**
     Embedded SATA RAID (Intel IA32E)" item and then press <Enter>.
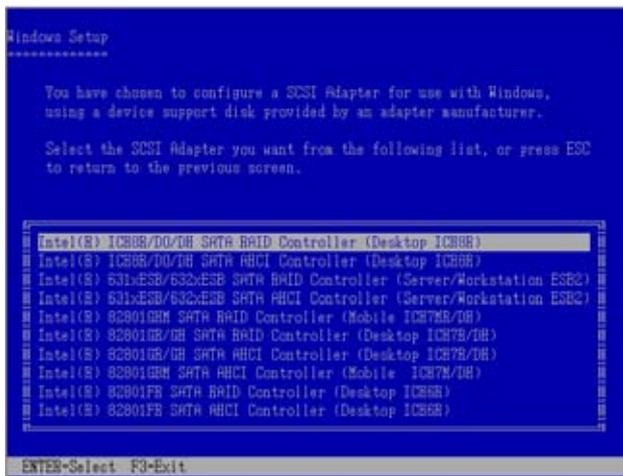
- **Intel Matrix Storage Manager:**

  Select "**Intel(R) 82801GR/GH SATA RAID Controller (Desktop ICH7RDH)**"

  for Intel Matrix Storage RAID mode from the list, then press <Enter>.

- **Intel ICH7R ACHI Mode:**

  If you select **SATA as AHCI** in the BIOS setup utility of IDE Configuration, install the Intel SATA AHCI Driver during windows setup. Then, select the "**Intel(R) 82801GR/GH SATA AHCI Controller (Desktop ICH7RDH)**" from the list. Refer to section "6.1.1 Creating a RAID driver disk" to create the Intel Matrix Storage Manager driver disk for Intel ICH7R ACHI Driver.

- **LSI1068 PCI-X SAS controller Driver (for P5M2/SAS Only):**

  For Windows 2000, select "**LSI Logic Fusion-MPT Drivers for SAS 1068 (Windows 2000)**".

  For 32bit Windows 2003 , select "**LSI Logic Fusion-MPT Drivers for SAS 1068 (Windows 2003 32-bit)**".

  For 64bit Windows 2003 , select "**LSI Logic Fusion-MPT Drivers for SAS 1068 (Windows 2003 x64)**"

6. The Windows® 2000/2003 Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.

7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

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

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

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

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

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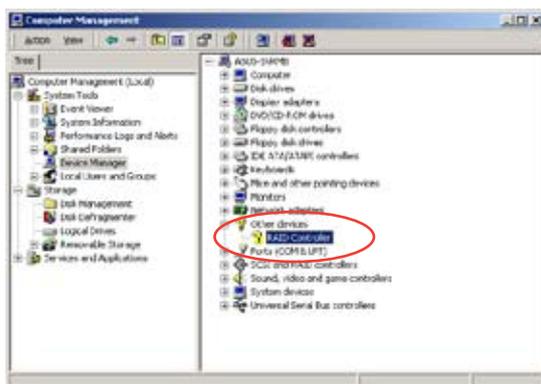
5. Right-click the **RAID controller** item, then select **Properties**.

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

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

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

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

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

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

To verify the RAID controller driver installation:

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

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

3.   Click the "+" sign before the item **SAS and RAID controllers**. For example the **LSI Logic Embedded SATA RAID** or **LSI SAS1068 SAS Driver** items should appear.
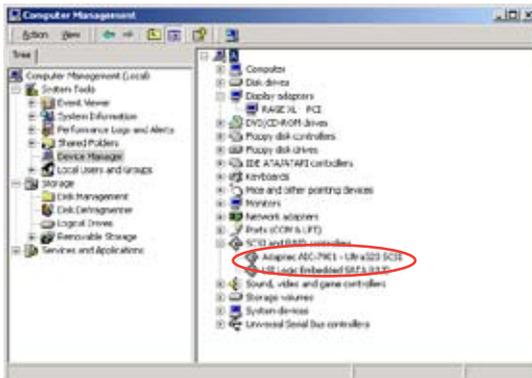
4.   Right-click the **RAID controller driver** item, then select **Properties** from the menu.

5.   Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.

6.   Click **OK** when finished.

Red Hat® Enterprise ver. 3.0

To install the Intel® LSI Logic Embedded SATA RAID controller driver or LSI1068 SAS controller driver when installing Red Hat® Enterprise ver. 3.0 operating system:
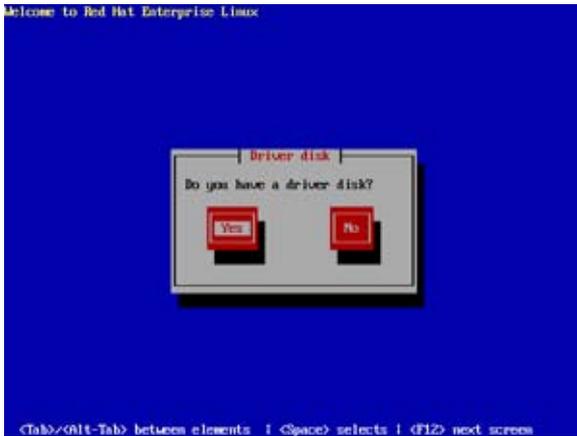
1.   Boot the system from the Red Hat® Installation CD.

2.   At the `boot:`, type `linux dd` , then press <Enter>.
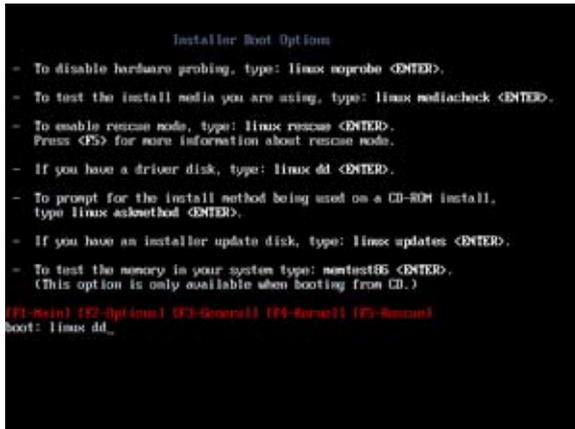
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>

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

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

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

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

7.   Follow screen instructions to continue the OS installation.

SuSE Linux

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

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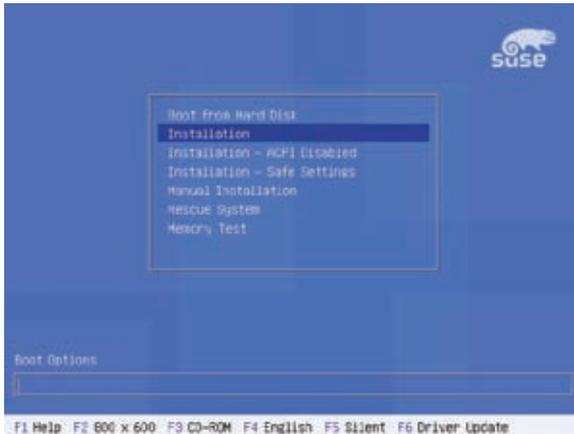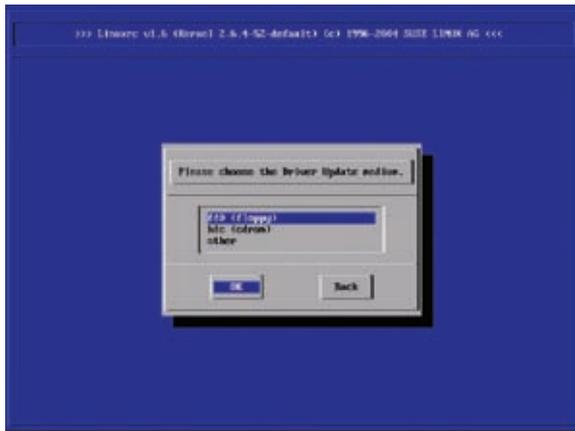

3. A message instructs you to prepare the RAID driver disk. Press <F6>.
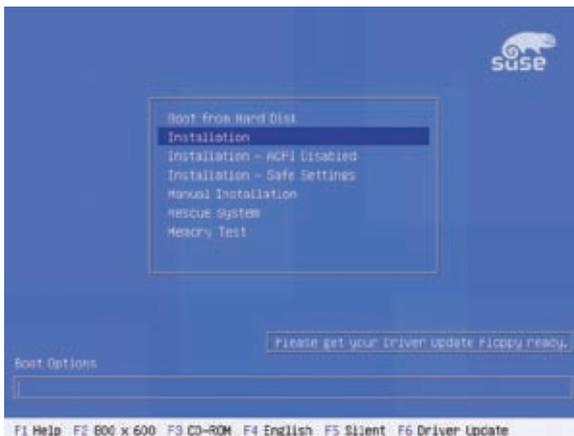
4.   When prompted, insert the RAID driver disk to the floppy disk drive, then press <Enter>.
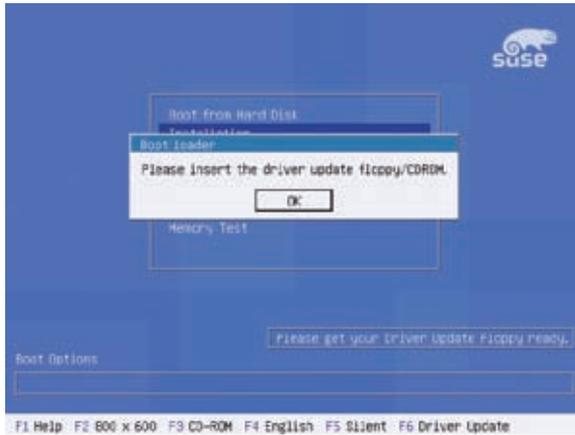
5.   When prompted, select the floppy disk drive (fd0) as the driver update medium, select **OK**, then press <Enter>.

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

6.2 LAN driver installation

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

6.2.1 Windows® 2000/2003 Server

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

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

2. Insert the motherboard/system support CD to the optical drive. The CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

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

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

4. Click **Next** when the InstallShield Wizard window appears. Follow screen instructions to continue installation.
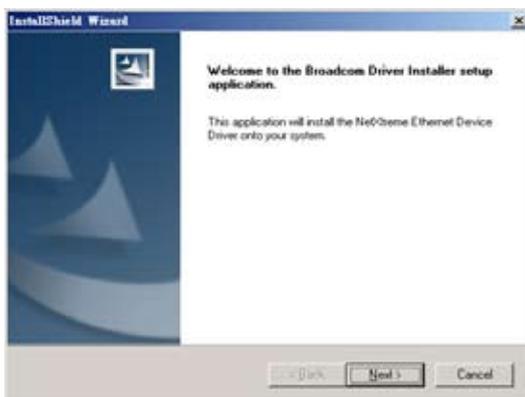
6.2.2 Red Hat® Enterprise Linux

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

Building the driver from the TAR file

Install first the Kernel Development tools before building the driver from the TAR file:

To install the kernel development application:

1. Insert the Linux OS installation CD disk1 to the optical drive.
2. Double click **Application > System setting > Add/Remove application**.
3. Select **Kernel Development** from the development tools.
4. Follow the instructions on the screen to finish installation.

To build the driver from the TAR file:

1. Create a directory and extract the TAR files:
   `tar xvzf tq3-<version>.tar.gz`
2. Build the driver bcm5700.o as a loadable module for the running kernel:
   `cd tg3-<version>/src`
   `make`
3. Test the driver by loading it:
   `insmod tg3.o or (on 2.6 x Kernels)insmod tg3.ko`
4. Install the driver and man page:
   `make install`
5. Refer to Red Hat distribution documentation to configure the network protocol and address.

> The Broadcom LAN driver for Linux OS is located in: \Drivers\BCM5721 LAN\B57BCMCD_SV_943\Linux\Driver.

6.3 VGA driver installation

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

6.3.1 Windows 2000/Server 2003

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

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

The Drivers menu if Autorun is enabled in your computer.

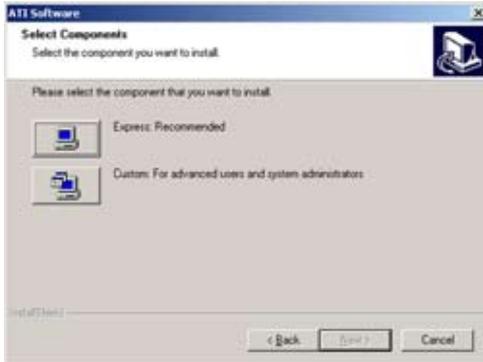3. Click the item ATI ES1000 from the menu.

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

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

6. Press the [button icon] button to activate quick installation.

7. After completing the installation, restart the computer.

6.4 Management applications and utilities installation

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

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

6.4.1 Running the support CD

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

If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the **ASSETUP.EXE** to run the CD.

6.4.2 Drivers menu

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

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

6.4.3 Management Software menu

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

6.4.4 Utilities menu

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

6.4.5 Contact information

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