

P5BV(P)-E Series

P5BP-E/4L

P5BV-E/SAS

P5BV-E

ASUS[®]

Motherboard

E3378

First Edition
September 2007

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Notices

Federal Communications Commission Statement

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

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

This equipment has been tested and found to comply with the limits for a Class 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, Mercury-containing button cell battery) 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> +

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**

P5BP-E/4L specifications summary

CPU	LGA775 socket for Intel® Pentium®4/processor Compatible with Intel® PCG 06/05B/05A and 04B/04A and the latest Intel® dual-core processor Supports Intel® Enhanced Memory 64 Technology (EM64T) Supports Enhanced Intel SpeedStep® Technology (EIST) Supports Intel® Hyper-Threading Technology
Chipset	NorthBridge: Intel® Bigby-P MCH SouthBridge: Intel® ICH7R
Front Side Bus	800/1066/1333 MHz
Memory	Dual-channel memory architecture 4 x 240-pin DIMM sockets support unbuffered ECC/non-ECC DDR2-667/800 memory modules Supports up to 8 GB system memory
Expansion slots	2 x PCI-E X16 slot (x8 link) 3 x PCI 33 MHz/32-bit/5V slots (PCI 2.2 Compatible) 1 x PCI-E X8 slot (x1 link)
Storage	Intel® ICH7R Southbridge supports: <ul style="list-style-type: none"> - 1 X IDE port supports two Ultra ATA 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, and RAID 10))
Graphics	Volari® XGI Z9S PCI-based VGA controller with 32MB DDR2 display memory
LAN	Quad embedded Broadcom BCM5721 Giga PCI-E LAN Controllers that comply with PCI Express 1.0a specifications
USB	Intel ICH7R Southbridge supports: <ul style="list-style-type: none"> - 4 USB 2.0 ports (two on the rear panel, two on the board)
Special features	ASUS CrashFree BIOS 2 ASUS CrashFree BIOS 3 ASUS MyLogo2 ASUS MyLogo3 Smart Fan BIOS Recovery ASWM2.0
BIOS features	AMI BIOS, 8 MB Flash ROM, Green, PnP, DMI, SMBIOS 2.5, WfM2.0, ACPI 2.0a

(continued on the next page)

P5BP-E/4L specifications summary

Rear panel	1 x PS/2 keyboard port (purple) 1 x PS/2 mouse port (green) 2 x USB 2.0 ports 1 x Serial port (COM1) 1 x VGA port 4 x LAN (RJ-45) ports 1 x LAN (RJ-45) port for iKVM
Internal connectors	1 x Floppy disk drive connector 1 x IDE connector 4 x Black Serial ATA connectors 3 x Front fan connectors 1 x Rear fan connector 1 x CPU fan connector 1 x 24-pin ATX power connector 1 x 4-pin ATX 12 V power connector 1 x Serial port (COM2) 1 x USB connector for two additional USB1.1 and USB 2.0 ports 1 x 20-pin system panel connector 1 x 20-pin auxiliary panel connector 1 x 20-pin TPM connector
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 24.4 cm)
Support CD contents	Device drivers ASUS Live Update utility ASUS Server Web-based Management (ASWM)

**Specifications are subject to change without notice.*

P5BV-E Series specifications summary

CPU	LGA775 socket for Intel® Pentium®4/processor Compatible with Intel® PCG 06/05B/05A and 04B/04A and the latest Intel® dual-core processor Supports Intel® Enhanced Memory 64 Technology (EM64T) Supports Enhanced Intel SpeedStep® Technology (EIST) Supports Intel® Hyper-Threading Technology
Chipset	NorthBridge: Intel® Bigby-V MCH SouthBridge: Intel® ICH7R
Front Side Bus	800/1066/1333 MHz
Memory	Dual-channel memory architecture 4 x 240-pin DIMM sockets support unbuffered ECC/non-ECC DDR2-667/800 memory modules Supports up to 8 GB system memory
Expansion slots	1 x PCI-E X16 slot (x8 link) 3 x PCI 33 MHz/32-bit/5V slots (PCI 2.2 Compatible) 1 x PCI-E X8 slot (x4 link) only for P5BV-E
Storage	Intel® ICH7R Southbridge supports: <ul style="list-style-type: none"> - 1 X IDE port supports two Ultra ATA 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) <p><i>For P5BV-E /only:</i></p> <ul style="list-style-type: none"> - LSI Logic embedded SATA RAID Controller (RAID 0, RAID 1, and RAID 10) is supported. <p><i>For P5BV-E /SAS only:</i></p> <ul style="list-style-type: none"> - LSI Logic LSI1064E SAS Controller - 4 x SAS/SATA drives with Integrated RAID mode (RAID 0, RAID 1,RAID 1E)
Graphics	Volari® XGI Z9S PCI-based VGA controller with 32MB DDR2 display memory
LAN	Dual embedded Broadcom BCM 5721 Giga PCI-E LAN Controllers that comply with PCI Express 1.0a specifications
USB	Intel ICH7R Southbridge supports: <ul style="list-style-type: none"> - 4 USB 2.0 ports (two on the rear panel, two on the mid-board)

(continued on the next page)

P5BV-E Series specifications summary

Special features	ASUS CrashFree BIOS 3 ASUS CrashFree BIOS 2 ASUS MyLogo2 ASUS MyLogo3 Smart Fan BIOS Recovery ASWM2.0
BIOS features	AMI BIOS, 8 MB Flash ROM, Green, PnP, DMI, SMBIOS 2.5, 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 Serial port (COM1) 1 x VGA port 2 x LAN (RJ-45) ports 1 x LAN port for IKVM
Internal connectors	1 x Floppy disk drive connector 1 x IDE connector 4 x Black Serial ATA connectors 3 x Front fan connectors 1 x Rear fan connector 1 x CPU fan connector 1 x 24-pin ATX power connector 1 x 4-pin ATX 12 V power connector 1 x 20-1pin auxiliary panel connector 1 x Serial port (COM2) 1 x USB connector for two additional USB1.1 and USB 2.0 ports 1 x 20-pin TPM connector For P5BV-E/SAS only: 4 x Blue SAS/SATA connectors
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 24.4 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.

1 Product introduction

Chapter summary



- 1.1 Welcome! 1-1
- 1.2 Package contents..... 1-1
- 1.3 Special features 1-2

1.1 Welcome!

Thank you for buying an ASUS® P5BV-E Series and P5BP-E/4L 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.

		P5BP-E/4L	P5BV-E/SAS	P5BV-E	
			Gift Box Content	Bulk Pack Content	
Cables	Serial ATA signal cable	4	4	4	-
	Serial ATA power cable	2	2	2	-
	2-in-1 Floppy/ Ultra ATA disk drive cable	1	1	1	-
	SATA to SAS cable	-	1	-	-
Accessories	I/O shield	1	1	1	10
Application CD	Support CD	1	1	1	10
Documentation	User guide	1	1	1	10
Packing Quantity	Motherboard	1 piece per box	1 piece per box	1 piece per box	10 pieces per box



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® Pentium® 4 processor in the 775-land package. The motherboard supports the Intel® Pentium® 4, Intel® Conroe®, Intel® Xeon®, Intel® wolfdale, and Intel® yorkfield processors with 1333/1066/800 MHz Front Side Bus (FSB). The motherboard also supports the Intel® Hyper-Threading Technology and is fully compatible with Intel® O6, 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.

Intel® 3200 and Intel® ICH7R chipset

The Intel® 3200 or 3210 Memory Controller Hub (MCH) and the Intel® ICH7R (I/O controller hub) provide the vital interfaces for the motherboard.

The MCH provides the processor, dual-channel DDR2-667/800 memory, and PCI Express interfaces. The ICH7R is a new generation server class I/O controller hub that provides the interface for PCI 2.2, USB 2.0, and SATA among others.



DDR2 memory support

The motherboard supports DDR2 memory which features data transfer rates of up to 800 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 12.8 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 2-17 for details.

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 2-23 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.

Serial Attached SCSI (SAS) technology support (P5BV-E/SAS model only)

SAS is the latest storage interface for enterprise-class storage devices. Building on and improving the parallel SCSI foundation, SAS is the new industry standard that includes Serial ATA interoperability, and is projected to be the successor of the Ultra320 SCSI technology.

Dual RAID solution

Onboard RAID controllers provide the motherboard with dual-RAID functionality that allows you to select the best RAID solution using IDE or Serial ATA devices.

The Intel® ICH7R allows RAID 0, RAID 1, RAID 0+1, RAID 5 for four SATA connectors.

The LSI SAS1064E is a four-port, 3.0 Gbit/s SAS/SATA controller that is compliant with the Fusion-MPT™ architecture, and supports the Integrated RAID™ solution.

IR

The LSI Logic Integrated RAID solution provides cost benefits for the server or workstation market where the extra performance, storage capacity, and/or redundancy of a RAID configuration are required. The two components of Integrated RAID are:

- Integrated Mirroring (IM), which provides features of RAID 1 and RAID 1E (RAID 1 Enhanced). RAID 1E is also called Mirroring Enhanced (IME).
- Integrated Striping (IS), which provides features of RAID 0. By simplifying the IM and the IS configuration options and by providing firmware support in its host adapters, LSI Logic can offer the Integrated RAID solution at a lower cost than a hardware RAID implementation.

Fusion-MPT™ firmware supports IM and IS volumes. You can configure IM and IS volumes together on the same LSI Logic SAS controller.

Built-in SATA RAID solution

The Intel® ICH7R allows RAID 0, RAID 1, RAID 10, 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 2-26 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 2-23 and 2-27 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 4-30 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.

CrashFree BIOS 3

The ASUS CrashFree BIOS 3 allows users to restore corrupted BIOS data from a USB flash disk containing the BIOS file.

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 4-32 for details.

ASUS Smart Fan technology

The ASUS Smart Fan technology smartly adjusts the fan speeds according to the system loading to ensure quiet, cool, and efficient operation.

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 2 information

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2.1 Before you proceed

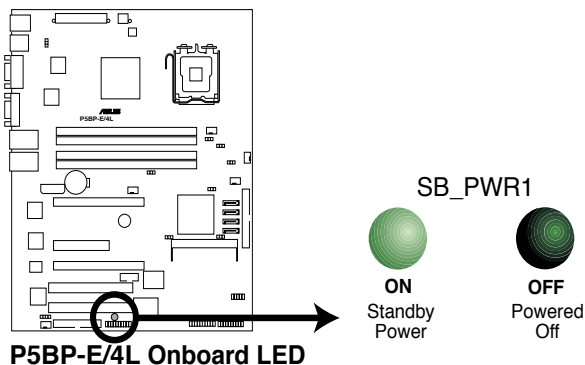
Take note of the following precautions before you install motherboard components or change any motherboard settings.



- 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.



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

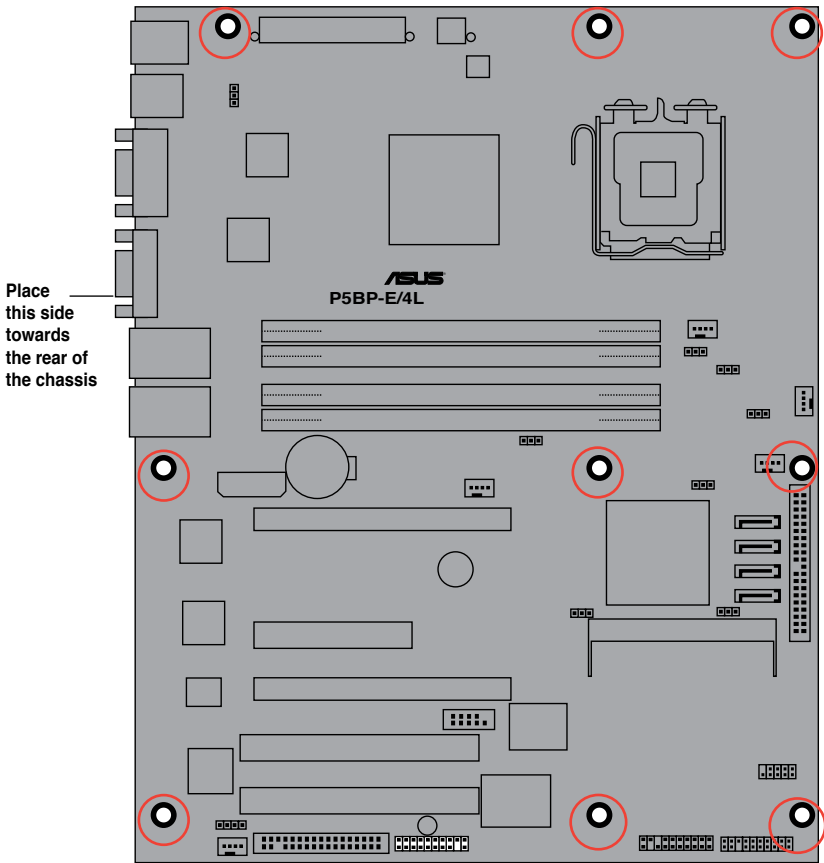
When installing the motherboard, make sure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.2 Screw holes

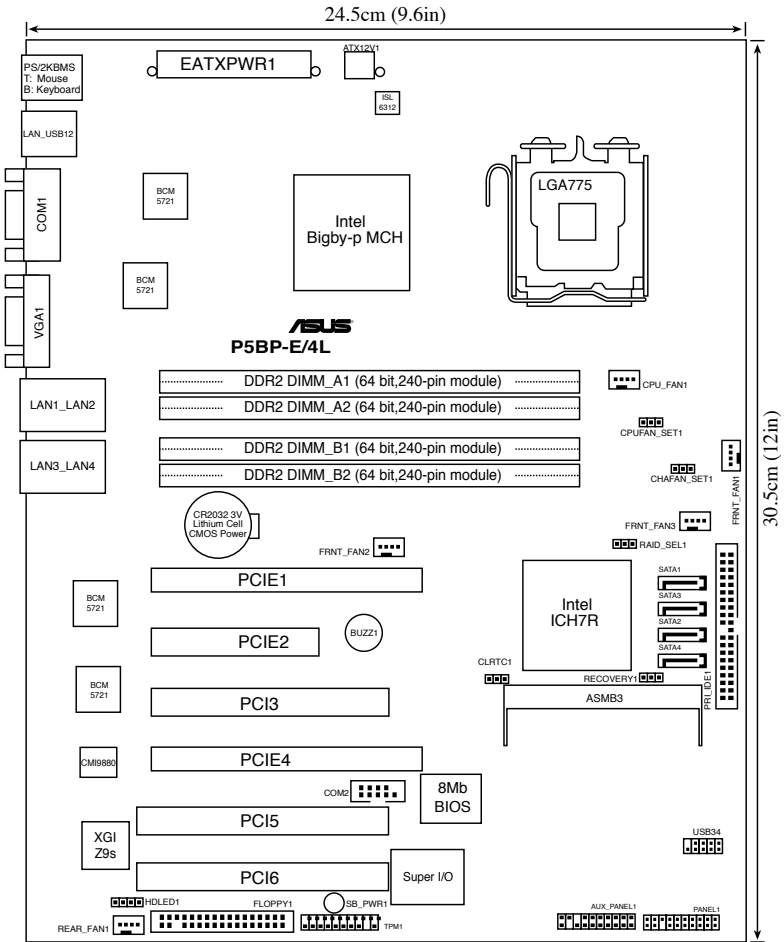
Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.



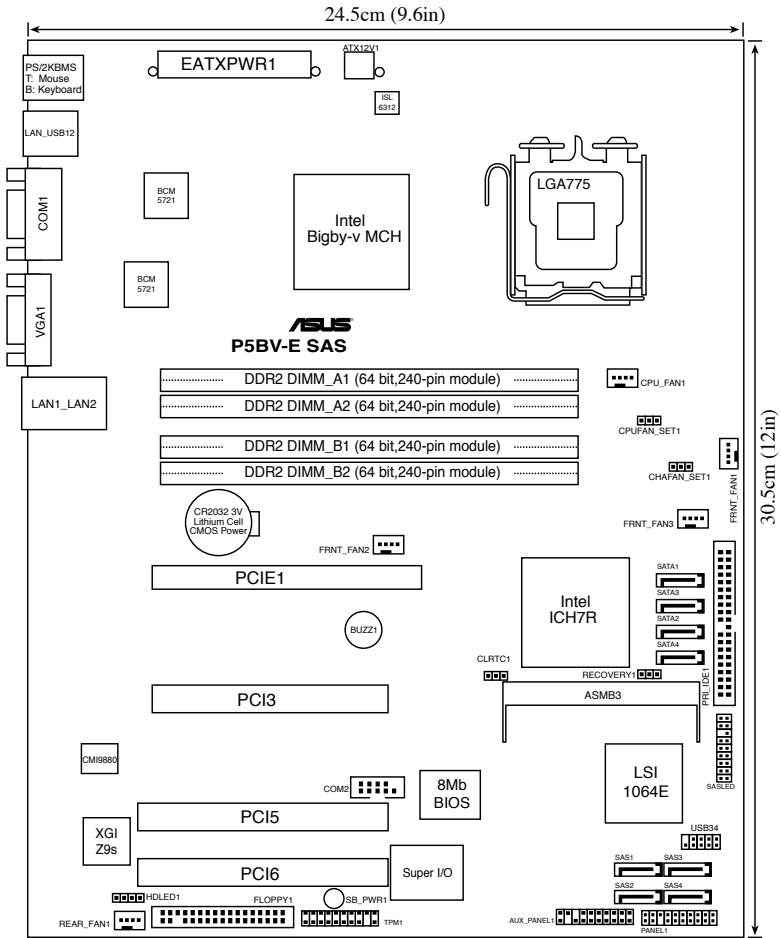
Do not overtighten the screws! Doing so can damage the motherboard.



2.2.3 Motherboard layout



P5BP-E/4L Layout



P5BV-E/SAS Layout

2.2.4 Layout contents

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8.	Hard disk activity LED connector (4-pin HDLED1)	2-32
9.	ATX power connectors (24-pin EATXPWR1, 4-pin ATX12V1)	2-33
10.	System panel connector (20-pin PANEL1)	2-34
11.	CPU, Rear, and Front fan connectors (CPU_FAN1, 4-pin FRNT_FAN1/FRNT_FAN2/ FRNT_FAN3, 4-pin REAR_FAN1)	2-35
12.	Auxiliary Panel connector (20-pin AUX_Panel1)	2-36
13.	SAS LSI1064E ports LED connector (18-1pin SAS LED) (For P5BV-E/SAS model only)	2-37
14.	TPM connector (20-pin TPM)	2-37

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.

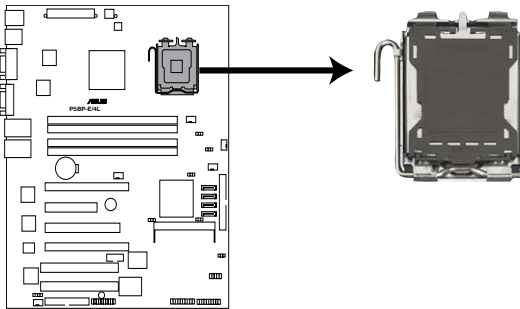


- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS shoulders the repair cost only if the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

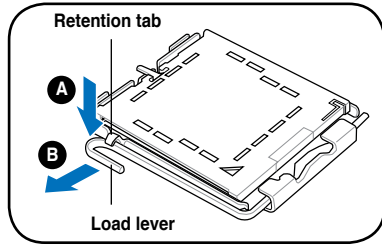


P5BP-E/4L CPU Socket 775



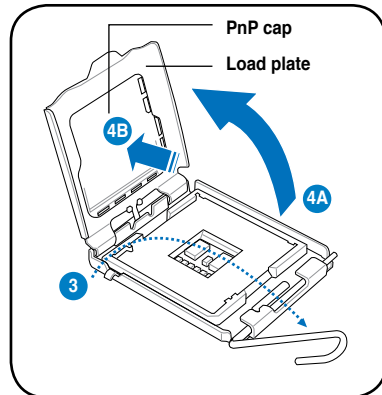
Before installing the CPU, make sure that the cam box is facing towards you and the load lever is on your left.

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



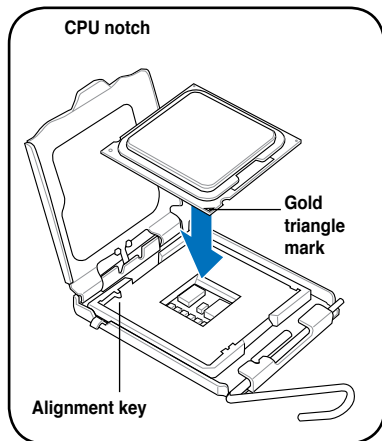
To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

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



4. Lift the load plate with your thumb and forefinger to a 100° angle (A), then push the PnP cap from the load plate window to remove (B).

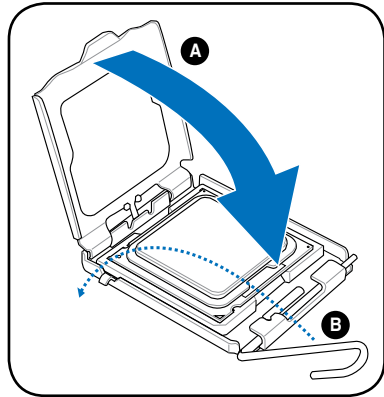
5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.





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

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



The motherboard supports Intel® Pentium® 4 LGA775 processors with the Intel® Enhanced Memory 64 Technology (EM64T), Enhanced Intel SpeedStep® Technology (EIST), and Hyper-Threading Technology. Refer to the Appendix for more information on these CPU features.

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.
-

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.

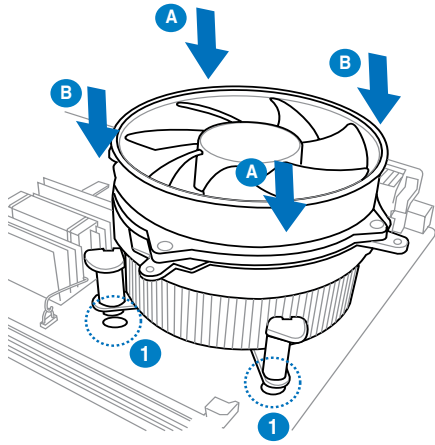
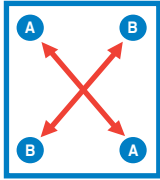


Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

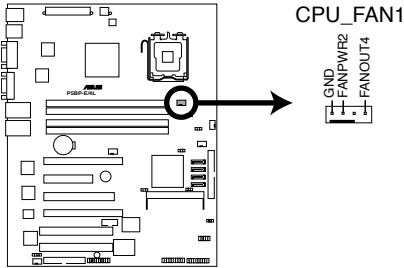


Make sure to orient each fastener with the narrow end of the groove pointing outward.

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.



P5BP-E/4L CPU Fan Connector

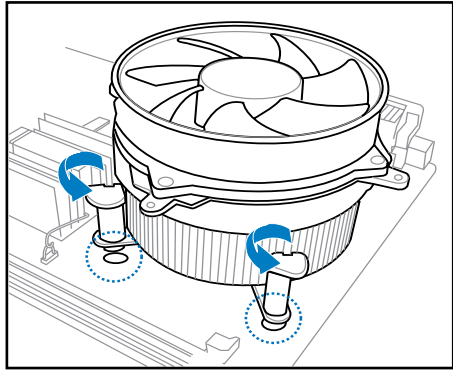


- Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.
- If there is only one CPU fan cable, connect it to the connector labeled CPU FAN1. Failure to do so may cause hardware monitoring errors. Set the CPU fan pin selection jumper to use a 3-pin or 4-pin fan cable plug. Refer to “2.6 Jumpers” for details.

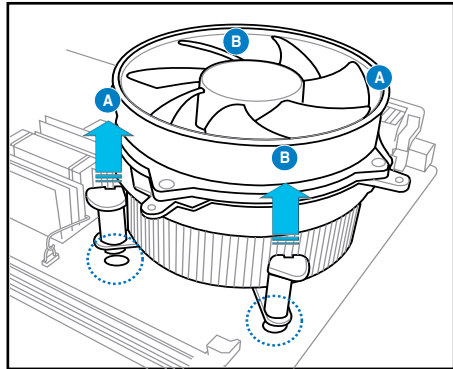
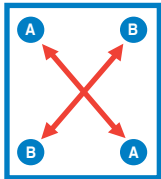
2.3.3 Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

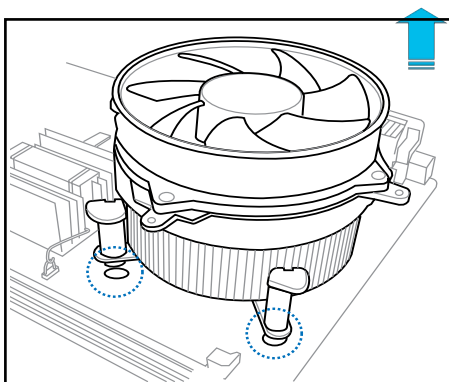
1. Disconnect the CPU fan cable from the connector on the motherboard.
2. Rotate each fastener counterclockwise.



3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.



- Carefully remove the heatsink and fan assembly from the motherboard.



Refer to the documentation in the boxed or stand-alone CPU fan package for detailed information on CPU fan installation.

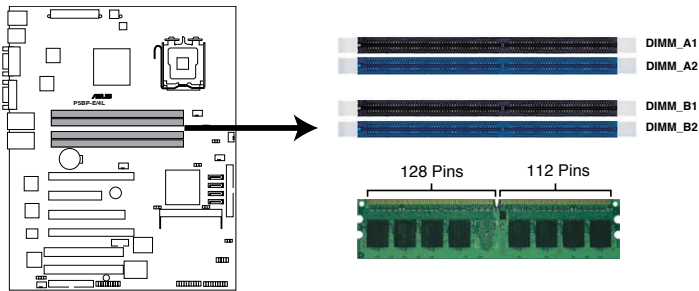
2.4 System memory

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:



P5BP-E/4L 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 DDR2-667/800 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 will function in dual-channel Asymmetric mode.

Recommended memory configurations

Mode	Single channel mode		Dual channel interleaved mode		Dual channel asymmetric 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 ($A1+A2 \neq B1+B2$), the system will run in Dual Channel Asymmetric mode.
-

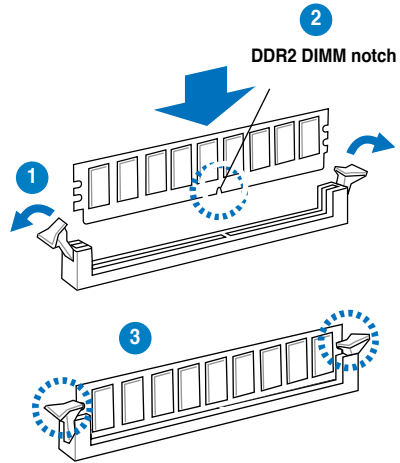
2.4.3 Installing a DIMM



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.



- A DDR2 DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.
- The DDR2 DIMM sockets do not support DDR DIMMs. DO NOT install DDR DIMMs to the DDR2 DIMM sockets.

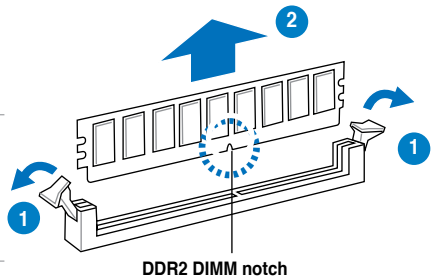
2.4.4 Removing a DIMM

Follow these steps to remove a DIMM.

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



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



2. Remove the DIMM from the socket.

2.5 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	-	System Timer
1 Keyboard	-	Standard 101/102-Key or Microsoft Natural PS/2
3	-	Communications Port (COM2)
4	-	Communications Port (COM1)
6	-	Standard Floppy Disk Controller
8	-	System CMOS/Real Time Clock
9	-	Microsoft ACPI-Compliant System
12	-	Microsoft PS/2 Mouse
13	-	Numeric Data Processor
14	-	Primary IDE Channel
15	-	Secondary IDE Channel
16	-	Intel® 82801GR/GH/GHM (ICH7 Family) PCI Express Root Port - 27E0
16	-	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D0
18	-	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27CA
23	-	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27C8
23	-	Intel® 82801G (ICH7 Family) USB Enhanced Host Controller - 27CC
19	-	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27C9
17	-	Intel® 82801GR/GH/GHM (ICH7 Family) PCI Express Root Port - 27E2
18	-	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D4
19	-	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D6
19	-	Intel® 82801GB/GR/GH (ICH7 Family) Serial ATA Storage Controller - 27C0
16	-	Broadcom NetXtreme Gigabit Ethernet
17	-	Broadcom NetXtreme Gigabit Ethernet
18	-	Broadcom NetXtreme Gigabit Ethernet
19	-	Broadcom NetXtreme Gigabit Ethernet

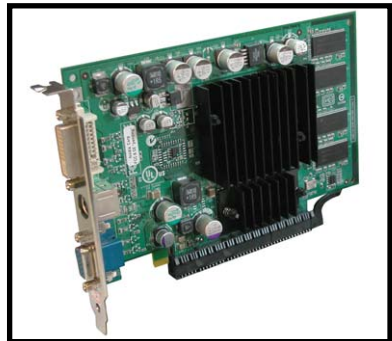
* These IRQs are usually available for ISA or PCI devices.

PCI Bus Number, IDSEL, and IRQ assignments

Description	INTA	INTB	INTC	INTD	REQ#	GNT#
PCI-E1						
PCI-E2						
PCI-E4						
PCI3	PIRQF#	PIRQG#	PIRQH#	PIRQE#	REQ0	GNT0
PCI5	PIRQG#	PIRQH#	PIRQE#	PIRQF#	REQ1	GNT1
PCI6	PIRQH#	PIRQE#	PIRQF#	PIRQG#	REQ2	GNT2
Onboard USB Controller1	PIRQH#					
Onboard USB Controller2		PIRQD#				
Onboard USB Controller3			PIRQC#			
Onboard USB2.0 Controller	PIRQH#					
Onboard LAN1	PIRQA#					
Onboard LAN2		PIRQB#				
Onboard LAN3		PIRQB#				
Onboard LAN4		PIRQB#				
Onboard VGA	PIRQF#					

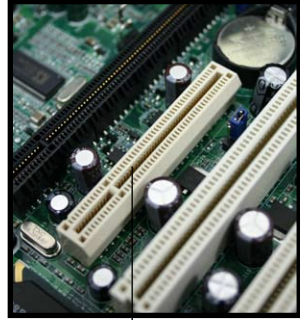
2.5.4 PCI Express x16 slot (x8 link)

This motherboard supports PCI Express x16 graphics cards that comply with the PCI Express specifications, and PCI Express x8, x4, x1 SATA/SAS RAID card. The following figure shows a graphics card installed on the PCI Express x16



2.5.5 PCI Express x8 slot (x1 link for P5BP-E/4L and x4 link for P5BV-E)

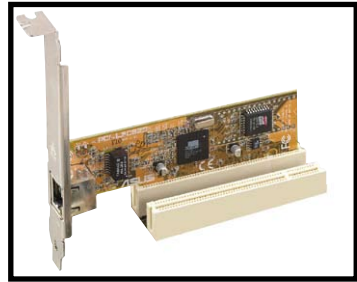
This motherboard supports PCI Express x8 network cards, SCSI cards, and other cards that comply with PCI Express 1.0a specifications.



PCI Express x8 slot

2.5.6 PCI slots

The PCI slots support cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI 2.2 specifications. The figure shows a LAN card installed on a 32-bit PCI slot.



2.6 Jumpers

1. Clear RTC RAM (CLRTC1)

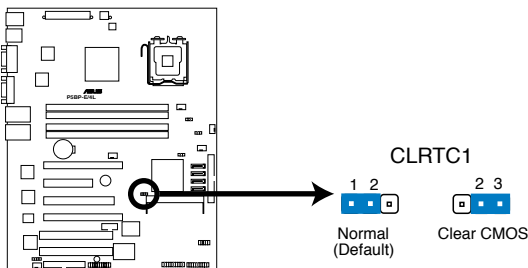
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

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 key during the boot process and enter BIOS setup to re-enter data.



Except when clearing the RTC RAM, never remove the cap on CLRTC1 jumper default position. Removing the cap will cause system boot failure!

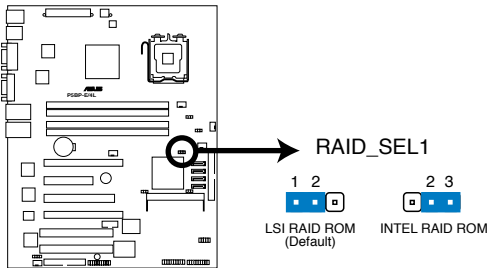


P5BP-E/4L Clear RTC RAM

2. RAID controller selection (3-pin RAID_SEL1)

(For P5BP-E/4L and P5BV-E only)

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.



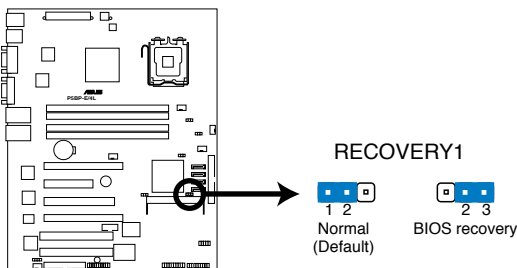
P5BP-E/4L RAID_SEL1 Setting

3. 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:

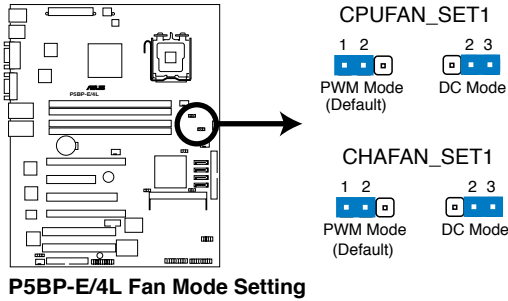
1. Prepare a floppy disk that contains the latest BIOS for the motherboard (xxx-xxx.ROM) and the AFUDOS.EXE utility.
2. Set the jumper to pins 2-3.
3. Insert the floppy disk then turn on the system to update the BIOS.
4. Shut down the system.
5. Set the jumper back to pins 1-2.
6. Turn on the system.



P5BP-E/4L BIOS Recovery Setting

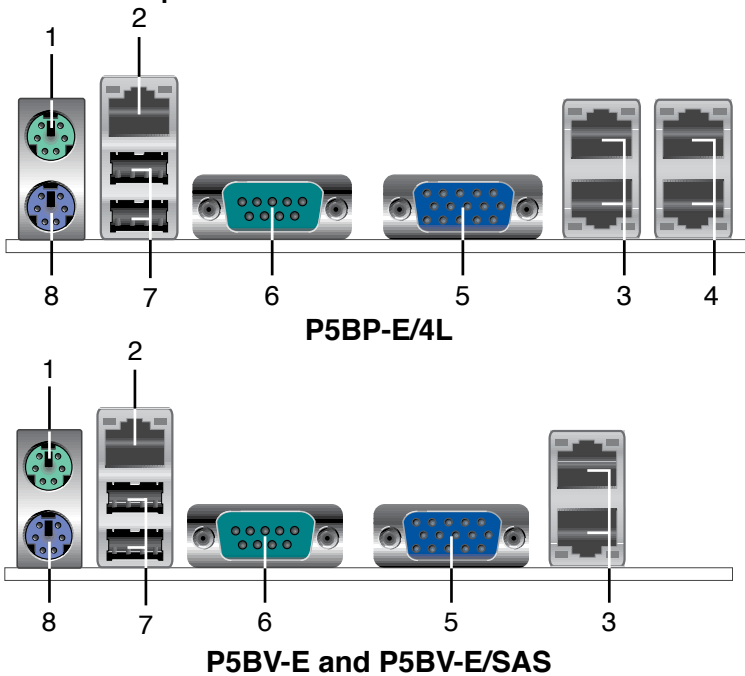
4. Fan mode setting (3-pin CPUFAN_SET1 and CHAFAN_SET1)

These jumpers allow you to connect either a 3-pin or a 4-pin fan cable plug to the CPU fan or Chasis fan connectors. Set these jumpers to pins 1-2 Short PWM mode if you are using a 4-pin fan cable plug, or to pins 2-3 Short DC mode if you are using a 3-pin plug.



2.7 Connectors

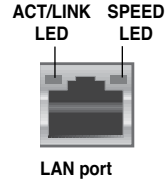
2.7.1 Rear panel connectors



1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **Lan port for ASMB3 iKVM.**
3. **Dual integrated Gigabit Ethernet connections LAN1_LAN2.** These ports allow Gigabit connection to a Local Area Network (LAN) through a network hub. (The bottom one is **LAN1**.)
4. **Dual integrated Gigabit Ethernet connections LAN3_LAN4.** These ports allow Gigabit connection to a Local Area Network (LAN) through a network hub. (The bottom one is **LAN3**.)
5. **VGA port.** This port is for a VGA monitor or other VGA-compatible devices.
6. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.
7. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
8. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

LAN port LED indications

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



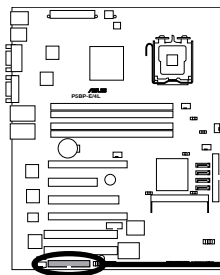
2.7.2 Internal connectors

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.



P5BP-E/4L Floppy Disk Drive Connector

FLOPPY

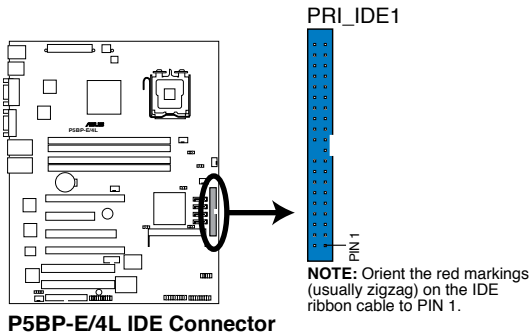


PIN1

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

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

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



P5BP-E/4L IDE Connector



- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra DMA 100/66 IDE devices.

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

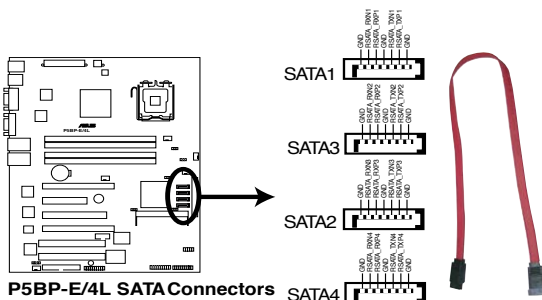
These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives.

If you installed Serial ATA hard disk drives, you can create a RAID 0, 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.

Only P5BP-E/4L and P5BV-E support LSI MegaRAID.

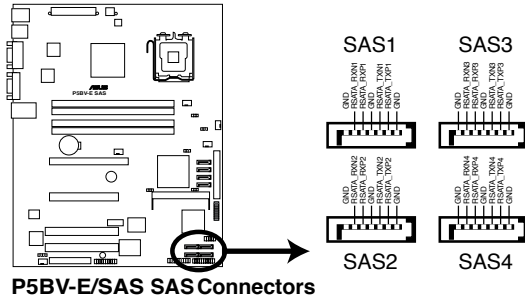


Important notes on Serial ATA

- Use only two Serial ATA RAID connectors for each RAID 0 or RAID 1 set.

4. SAS connector (blue, 7-pin SAS1, SAS2, SAS3, SAS4)
(For P5BV-E/SAS model only)

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



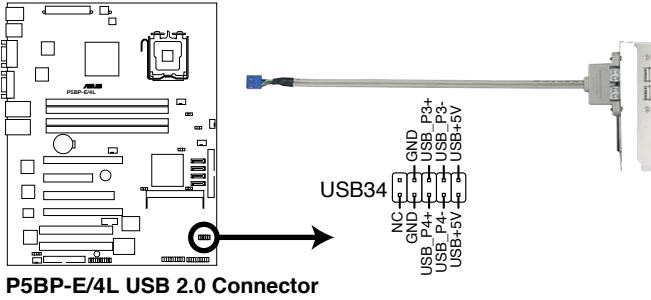
To connect the SAS cable:

Plug in the SAS cable to the SAS1-4 connector until the cable snaps in place

You must use 4 PORT SATA to SAS cable (4 to 4) if you use SAS hard drives. Else, you can use SATA cable if you use SATA hard drives.

5. USB connector (10-1 pin USB34)

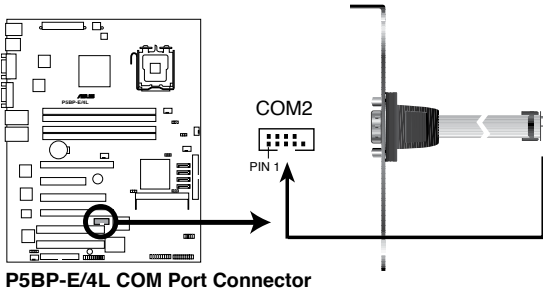
This connector is for USB 2.0 ports. Connect the USB module cable to this connector, then install the module to a slot opening at the back of the system chassis. This USB connector complies with USB 2.0 specification that supports up to 480 Mbps connection speed.



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.



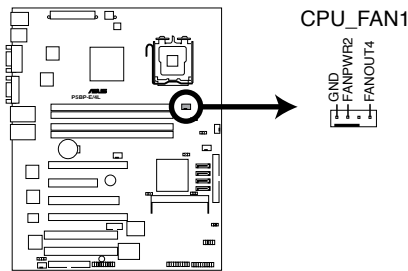
The Serial port module is purchased separately.

7. CPU fan connector (4-pin CPU_FAN1)

The fan connector supports cooling fan 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.



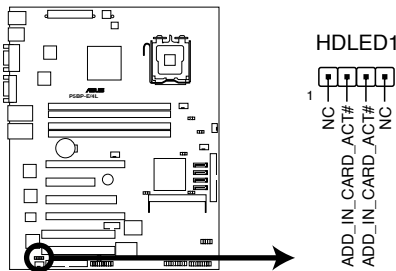
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



P5BP-E/4L CPU Fan Connector

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

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



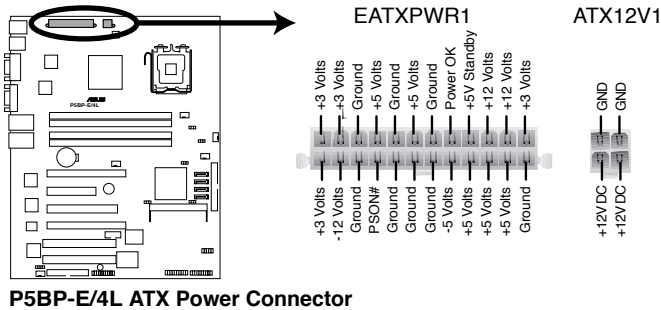
P5BP-E/4L Card Activity LED Connector

9. ATX power connectors (24-pin EATXPWR1, 4-pin ATX12V1)

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



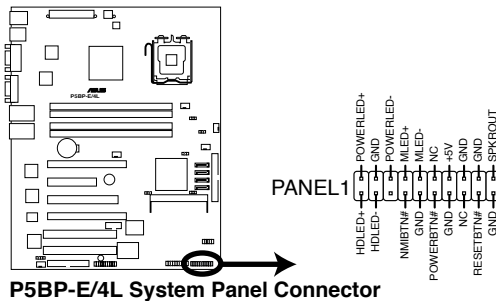
- Use of an ATX 12 V Specification 2.0-compliant power supply unit (PSU) that provides a minimum power of 450 W is recommended for a fully-configured system.
- Do not forget to connect the 4-pin or 8-pin ATX +12 V power plug; otherwise, the system will not boot up.
- We recommend that you use a PSU with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



10. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.

- **System power LED (Green 3-pin PLED)**
This 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.
- **Message LED (Brown 2-pin MLED)**
This connector is for the message LED cable that connects to the front message LED. The message LED indicates the booting status. The LED blinks when the system is in the boot process until the operating system is loaded.
- **Hard disk drive activity LED (Red 2-pin IDE_LED)**
This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.
- **System warning speaker (Orange 4-pin SPEAKER)**
This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.
- **ATX power button/soft-off button (Light Green 2-pin PWRSW)**
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.
- **Reset button (Blue 2-pin RESET)**
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.



P5BP-E/4L System Panel Connector



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

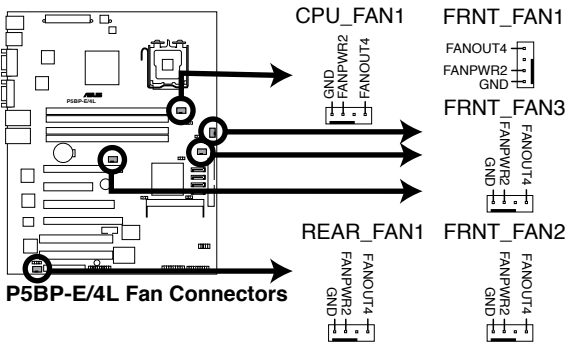
11. CPU, Rear, and Front fan connectors

(CPU_FAN1, 4-pin FRNT_FAN1/FRNT_FAN2/FRNT_FAN3, 4-pin REAR_FAN1)

The fan connectors support cooling fans of 350 mA ~ 2000 mA (24 W max.) or a total of 1 A ~ 3.48 A (41.76 W max.) at +12V. Connect the fan cables to the fan connectors, making sure that the black wire of each cable matches the ground pin of the connector.

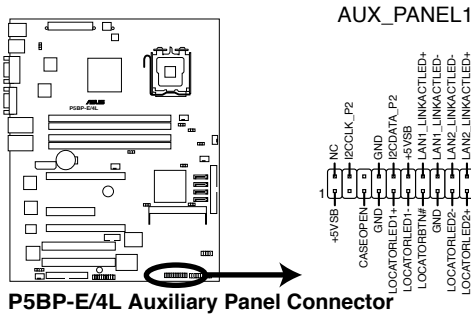


Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



12. System panel auxiliary connector (20-pin AUX_PANEL1)

This connector supports several server system functions.

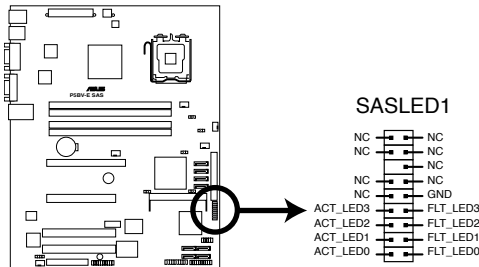


- **Chassis Intrusion connector (3-pin CASEOPEN)**
This lead is for a chassis with an intrusion detection feature. This requires an external detection mechanism such as a chassis intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to this lead to record a chassis intrusion event.
- **LAN1 link activity LED (2-pin LAN1_LINKACTLED)**
This 2-pin connector is for the LAN1 Activity LED. Connect the LAN1 Activity LED cable to this connector. This LED blinks during a network activity and is always lit when linked.
- **LAN2 link activity LED (2-pin LAN2_LINKACTLED)**
This 2-pin connector is for the LAN2 Activity LED. Connect the LAN2 Activity LED cable to this connector. This LED blinks during a network activity and lights up when linked.
- **Locator LED 1 (2-pin LOCATORLED1)**
This 2-pin connector is for the Locator LED 1. Connect the Locator LED 1 cable to this connector. This LED lights up when the Locator button is pressed.
- **Locator LED 2 (2-pin LOCATORLED2)**
This 2-pin connector is for the Locator LED 2. Connect the Locator LED 2 cable to this connector.
- **Locator Button/Switch (2-pin LOCATORBTN)**
This connector is for the locator button. This button queries the state of the system locator.
- **Front Panel SMBus (6-1 pin)**
This connector allows you to connect SMBus (System Management Bus) devices to the system front panel. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.

13. SAS LSI1064E ports LED connector (18-1 pin SASLED1)

(For P5BV-E/SAS model only)

This connector is for the front panel LED port indicator that shows the SAS HDD status.

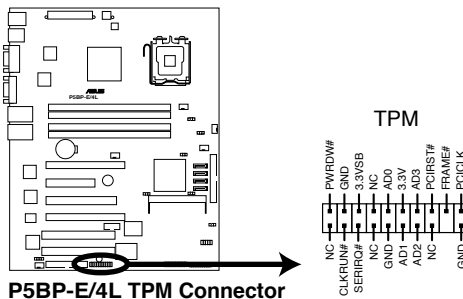


P5BV-E/SAS SASLED Connector

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..

14. TPM connector (20- pin TPM)

This connector is used to connect a Trusted Platform Module (TPM) Card. You need to install ASUS TPM card to use this feature function.



P5BP-E/4L TPM Connector



The TPM module is purchased separately.

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

Powering up 3

Chapter summary

3

- 3.1 Starting up for the first time..... 3-1
- 3.2 Powering off the computer..... 3-2

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

AMI BIOS beep codes

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

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	4-1
4.2	BIOS setup program	4-10
4.3	Main menu	4-13
4.4	Advanced menu	4-18
4.5	Power Configuration.....	4-27
4.6	Boot menu	4-31
4.7	Exit menu.....	4-36

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 3** (Updates the BIOS using a bootable floppy or USB Flash disk 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

1. Do either one of the following to create a bootable floppy disk.
DOS environment
 - a. Insert a 1.44MB floppy disk into the drive.
 - b. At the DOS prompt, type `format a: /s` then press <Enter>.

Windows® 2000 environment

To create a set of boot disks for Windows® 2000:

- a. Insert a formatted, high density 1.44 MB floppy disk into the drive.
- b. Insert the Windows® 2000 CD to the optical drive.
- c. Click **Start**, then select **Run**.
- d. From the Open field, type
`D:\bootdisk\makeboot a:`
assuming that D: is your optical drive.
- e. Press <Enter>, then follow screen instructions to continue.

Windows® XP environment

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

2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

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 /iP5BPE4L.ROM
```

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

```
A:\>afudos /iP5BPE4L.ROM
AMI Firmware Update Utility - Version 1.19 (ASUS V2.07 (03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

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

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



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

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

```
A:\>afudos /iP5BPE4L.ROM
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

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

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

Please restart your computer

A:\>
```

Updating the BIOS file using a USB flash drive

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

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

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

To update the BIOS file:

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

4.1.3 ASUS CrashFree BIOS 3 utility

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



-
- Prepare the USB flash disk, or the floppy disk containing the updated motherboard BIOS before using this utility.
 - Ensure that you rename the original or updated BIOS file in the floppy disk or the USB flash disk to **P5BPE4L.ROM**, **P5BVESAS.ROM**, or **P5BV-E.ROM**.
-
- Visit ASUS website (www.asus.com) to download the latest BIOS file.
-

Recovering the BIOS from the USB flash disk

To recover the BIOS from the USB flash disk:

1. Insert the USB flash disk that contains BIOS file to the USB port.
2. Turn on the system.
3. The utility will automatically checks the devices for the BIOS file when found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.
4. Restart the system after the utility completes the updating process.



-
- Only the USB flash disk with FAT 32/16 format and single partition can support ASUS CrashFree BIOS 3. The device size should be smaller than 8GB.
 - DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!
-

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

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

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

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

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
Floppy found!
Reading file "P5BPE4L.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.

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.

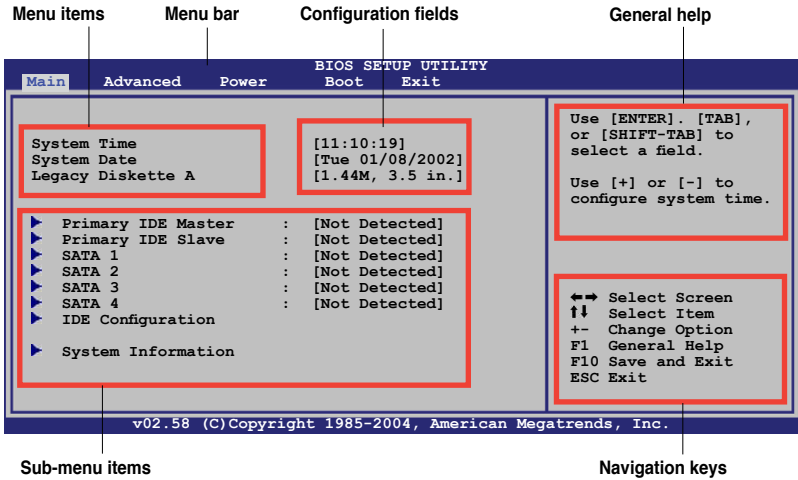
If you wish to enter Setup after POST, restart the system by pressing <Ctrl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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 “4.7 Exit Menu.”
 - The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
 - Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.
-

4.2.1 BIOS menu screen



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
- Power** For changing the Advanced Power Management (APM) configuration
- Boot** For changing the system boot configuration
- Exit** For selecting the exit options and loading default settings

To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

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.

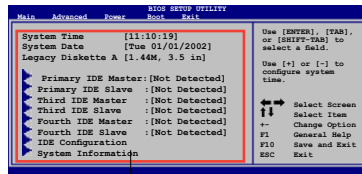


Some of the navigation keys differ from one screen to another.

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 item 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.

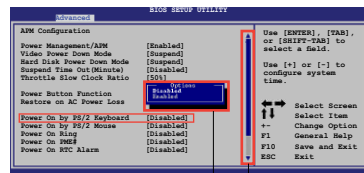
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to “4.2.7 Pop-up window.”

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

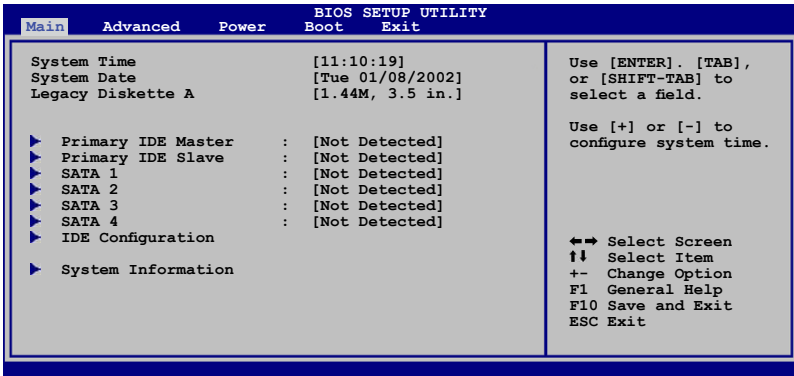
At the top right corner of the menu screen is a brief description of the selected item.

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.



4.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

4.3.2 System Date [Day xx/xx/xxxx]

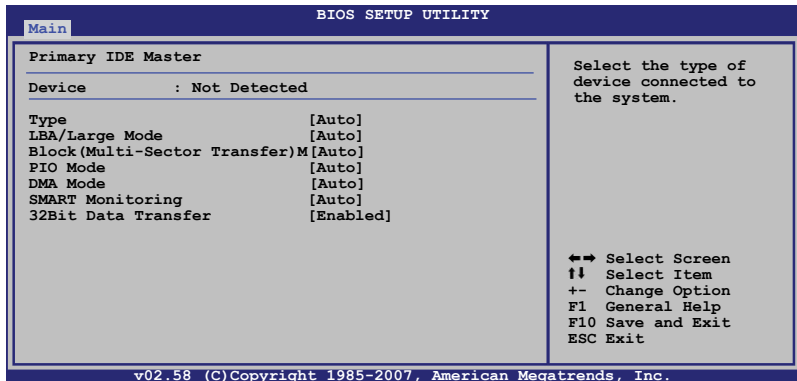
Allows you to set the system date.

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 Primary IDE Master/Slave, SATA1, SATA 2, SATA3, SATA4

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



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

Type [Auto]

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

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

LBA/Large Mode [Auto]

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

Block (Multi-sector Transfer) M [Auto]

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

[Disabled] [Auto]

PIO Mode [Auto]

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

DMA Mode [Auto]

Selects the DMA mode. Configuration options: [Auto]

SMART Monitoring [Auto]

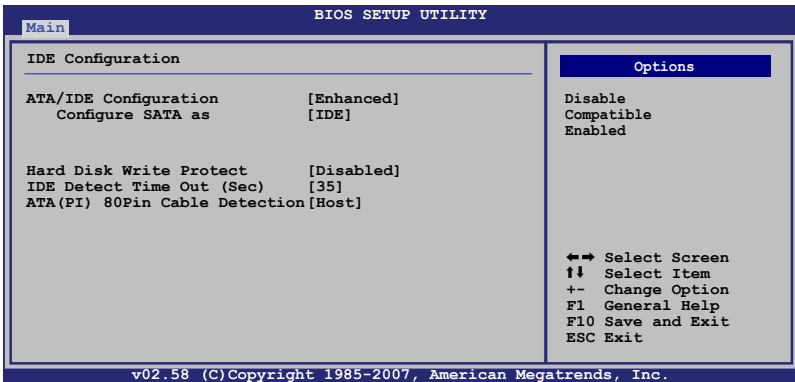
Sets the Smart Monitoring, Analysis, and Reporting Technology. Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

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

4.3.5 IDE Configuration

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



IDE Configuration [Enhanced]

Set the IDE Configuration. Configuration options: [Disabled] [Compatible] [Enhanced]

Configure SATA as [IDE]

Set the SATA configuration. Configuration options: [IDE] [RAID] [AHCI]

Hard Disk Write Protect [Disabled]

Enables or disables the device write protection. This will be effective only if device is accessed through BIOS.

Configuration options: [Disabled] [Enabled]

IDE Detect Time Out (Sec) [35]

Selects the time out value for detecting ATA/ATAPI devices.

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

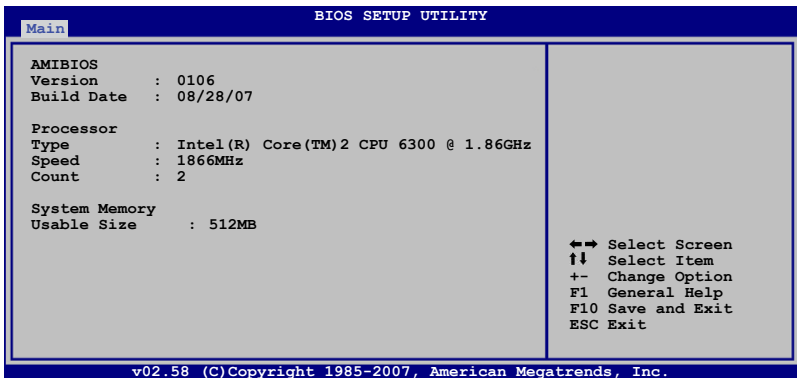
ATA(PI) 80Pin Cable Detection [Host]

Selects the mechanism for detecting 80Pin ATA(PI) Cable.

Configuration options: [Host & Device] [Host] [Device]

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.



AMI BIOS

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

Displays the auto-detected total system memory.



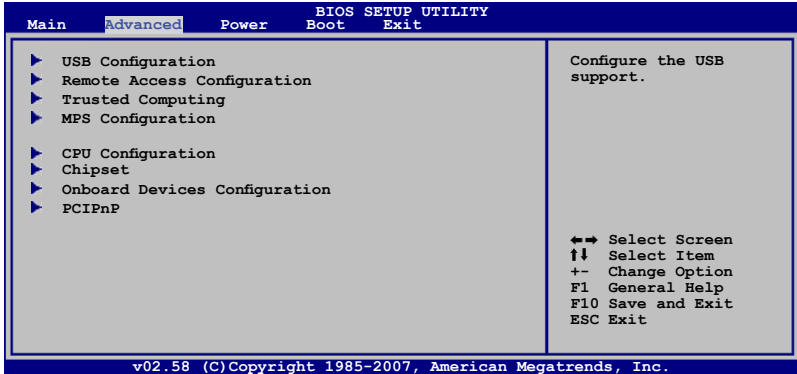
The System information screen may not exactly match the information on your screen. It will change according to your actual system configuration.

4.4 Advanced menu

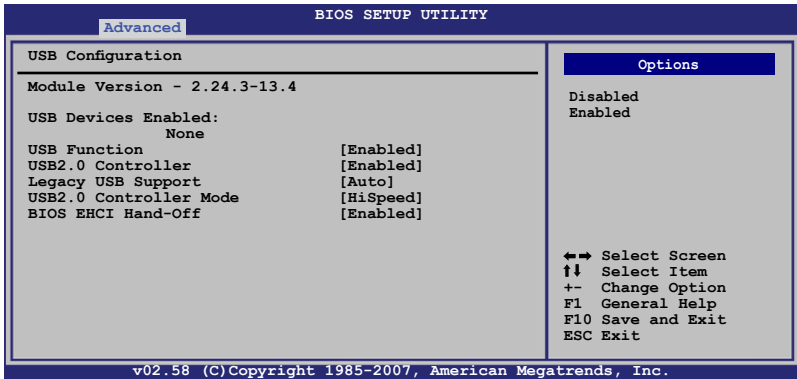
The Advanced menu items allow you to change the settings for the CPU and other system devices.



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



4.4.1 USB Configuration



USB Function [Enabled]

Allows you to enable a specific number of USB ports, or disable the USB function.

Configuration options: [Disabled] [Enabled]



The following items appear only when **USB Functions** item is set to [Enabled] .

Legacy USB Support [Auto]

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

USB 2.0 Controller [Enabled]

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

USB2.0 Controller mode [HiSpeed]

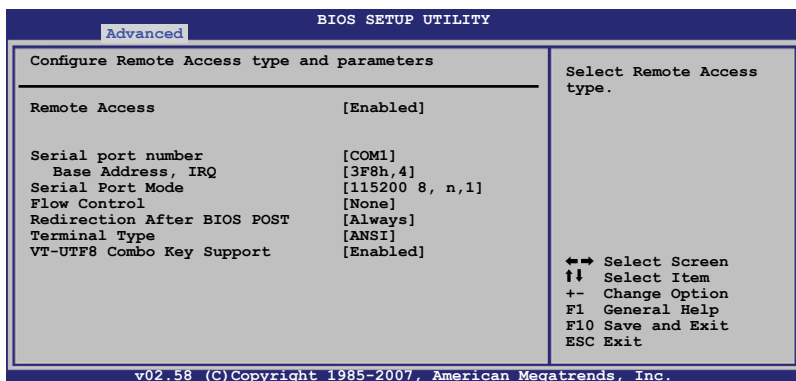
Allows you to select the USB2.0 controller mode.
Configuration options: [HiSpeed] [FullSpeed]

BIOS EHCI Hand-Off [Enabled]

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

4.4.2 Remote Access Configuration

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



Remote Access [Disabled]

Enables or disables the remote access feature.

Configuration options: [Disabled] [Enabled]



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

Serial port number [COM1]

Allows you to select a serial port for console redirection.

Configuration options: [COM1] [COM2]

Serial Port Mode [115200 8, n,1]

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

[57600 8,n,1] [38400 8,n,1] [19200 8,n,1] [09600 8,n,1]

Flow Control [None]

Allows you to set the flow control for console redirection.

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

Redirection After BIOS POST [Always]

Sets the redirection mode after the BIOS Power-On Self-Test (POST). Some operating systems may not work when this item is set to Always.

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

Terminal Type [ANSI]

Allows you to select the target terminal type.

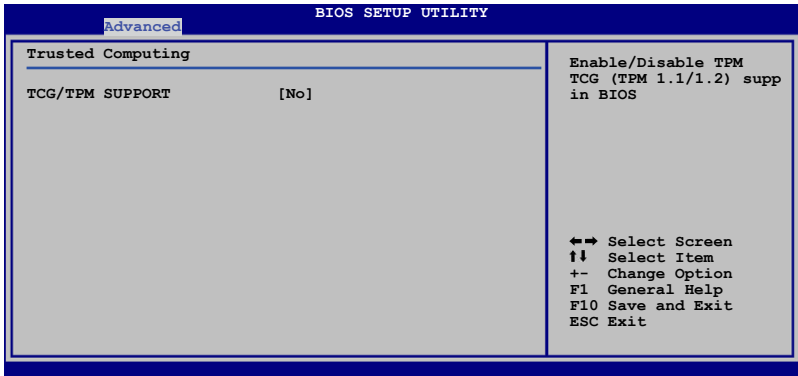
Configuration options: [ANSI] [VT100] [VT-UTF8]

VT-UTF8 Combo Key Support [Enabled]

Allows you to enable or disable VT-UTF8 Combination Key Support for ANSI/

VT100 terminals. Configuration options: [Enabled] [Disabled]

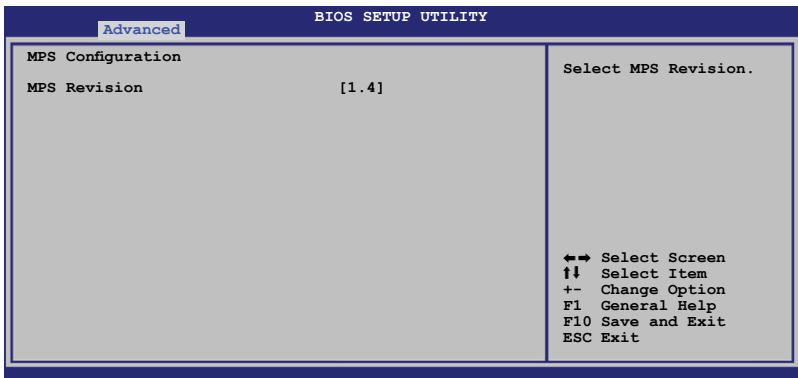
4.4.3 Trusted Computing



TCG/TPM SUPPORT [No]

Allows you to set the TCG/TPM SUPPORT. Configuration options: [No] [Yes]

4.4.4 MPS Configuration

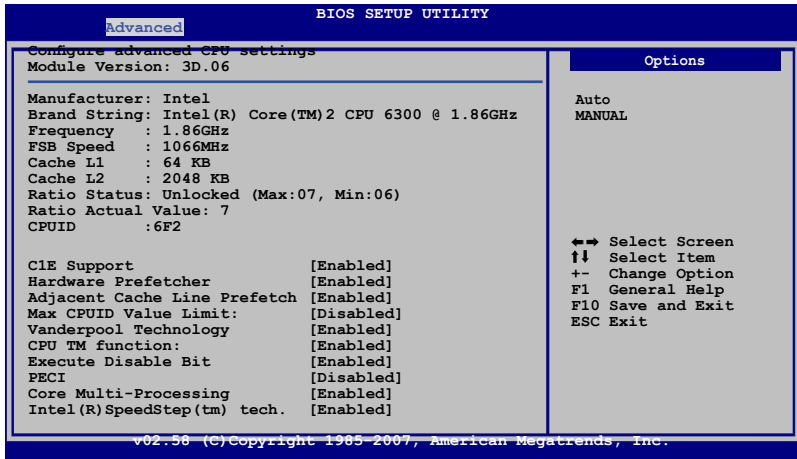


MPS Revision [1.4]

Allows you to select the MPS revision. Configuration options: [1.1] [1.4]

4.4.5 CPU Configuration

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



C1E Support [Enabled]

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

Hardware Prefetcher [Enabled]

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

Adjacent Cache Line Prefetch [Enabled]

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

Max CPUID Value Limit [Disabled]

Enable this item to boot legacy operating systems that cannot support CPUs with extended CPUID functions. Configuration options: [Disabled] [Enabled]

Vanderpool Technology [Enabled]

Enable this item when the processor supports Vanderpool Technology.
Configuration options: [Disabled] [Enabled]

CPU TM function: [Enabled]

When enabled and CPU support this function, this function will work.
Configuration options: [Disabled] [Enabled]

Execute Disable Bit [Enabled]

When disabled, forces the XD feature flag to always return to 0.
Configuration options: [Disabled] [Enabled]

PECI [Disabled]

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

Core Multi-Processing [Enabled]

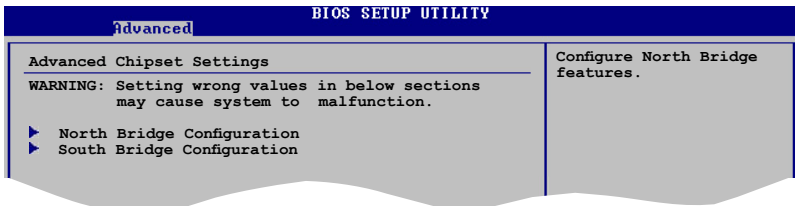
Allows you to enable or disable one execution core.
Configuration options: [Disabled] [Enabled]

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

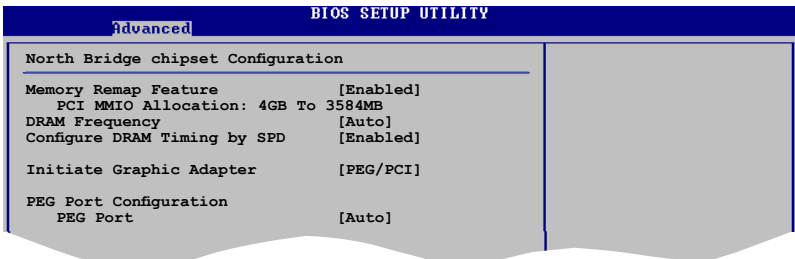
Allows you to enable or disable it.
Configuration options: [Disabled] [Enabled]

4.4.6 Chipset Configuration

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



North Bridge Configuration



Memory Remap Feature [Enabled]

Allows you to enable or disable the remapping of the overlapped PCI memory above the total physical memory. Enable this option only when you install 64-bit operating system. Configuration options: [Disabled] [Enabled]

DRAM Frequency [Auto]

Allows you to set the DDR operating frequency.
Configuration options: [Auto] [667 MHz] [800 MHz]

Configure DRAM Timing by SPD [Enabled]

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

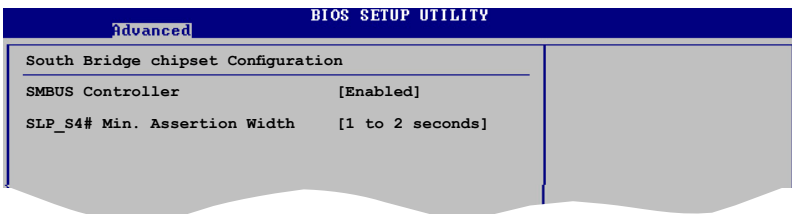
Initiate Graphic Adapter [PEG/PCI]

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

PEG Port Configuration

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

South Bridge Configuration



SMBUS Controller [Enabled]

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

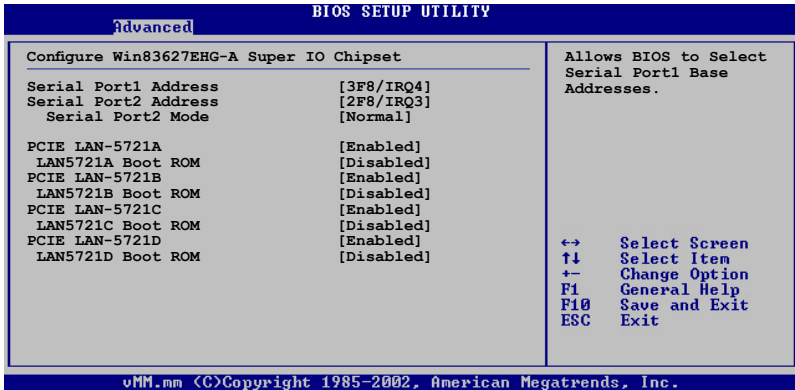
SLP_S4# Min. Assertion Width [1 to 2 seconds]

Allows you to select the SLP_S4# Min. Assertion Width.
Configuration options: [4 to 5 seconds] [3 to 4 seconds] [2 to 3 seconds] [1 to 2 seconds]

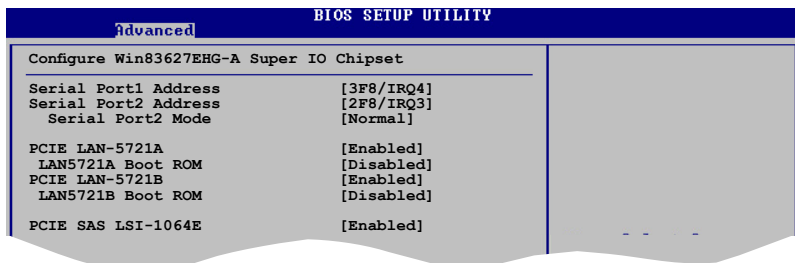
4.4.7 Onboard Devices Configuration

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

For P5BV-E and P5BP-E/4L:



For P5BV-E/SAS model only:



Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.

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

Serial Port2 Address [2F8/IRQ3]

Allows you to select the Serial Port2 base address.

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

Serial Port2 Mode [Normal]

Allows you to select the Serial Port2 mode.

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

PCIE LAN-5721A, B, C, or D [Enabled]

Allows you to hide or active PCIE LAN-5721A, B, C, or D.
Configuration options: [Disabled] [Enabled]

LAN5721A/LAN5721B/LAN5721C/ LAN5721D Boot ROM [Disabled]

Allows you to Configure LAN5721A, LAN5721B, LAN5721C or LAN5721D Boot ROM.
Configuration options: [Disabled] [Enabled]

PCIE SAS LSI-1064E [Enabled]

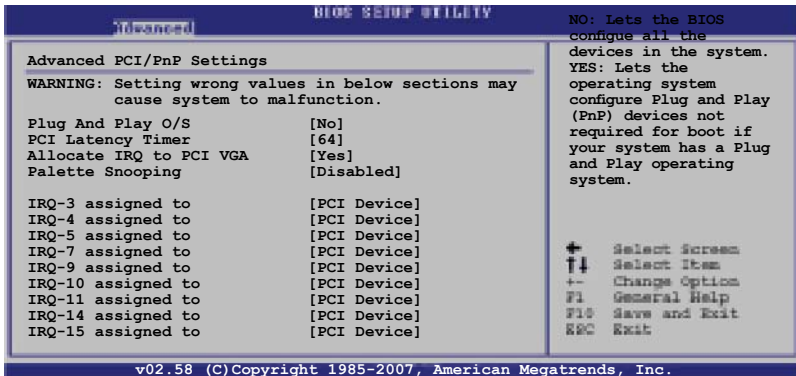
Allows you to hide or active PCIE SAS LSI-1064E.
Configuration options: [Disabled] [Enabled]

4.4.8 PCI PnP

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



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



Plug And Play O/S [No]

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

PCI Latency Timer [64]

Allows you to select the value in units of PCI clocks for the PCI device latency timer register. Configuration options: [32] [64] [96] [128] [160] [192] [224] [248]

Allocate IRQ to PCI VGA [Yes]

When set to [Yes], BIOS assigns an IRQ to PCI VGA card if the card requests for an IRQ. When set to [No], BIOS does not assign an IRQ to the PCI VGA card even if requested. Configuration options: [No] [Yes]

Palette Snooping [Disabled]

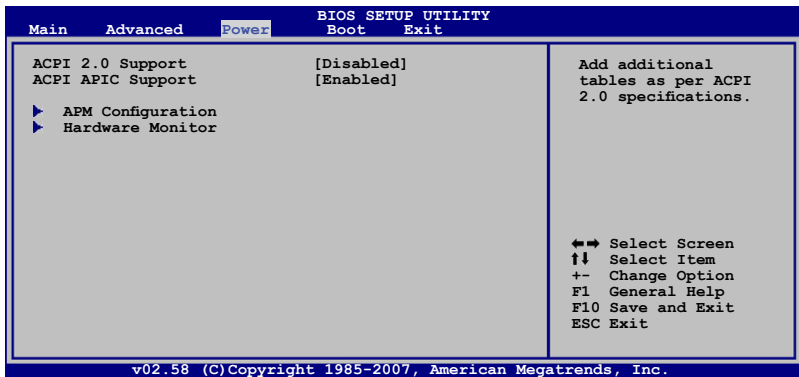
When set to [Enabled], the palette snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

IRQ-xx assigned to [PCI Device]

When set to [PCI Device], the specific IRQ is free for use of PCI/PnP devices. When set to [Reserved], the IRQ is reserved for legacy ISA devices. Configuration options: [PCI Device] [Reserved]

4.5 Power Configuration

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



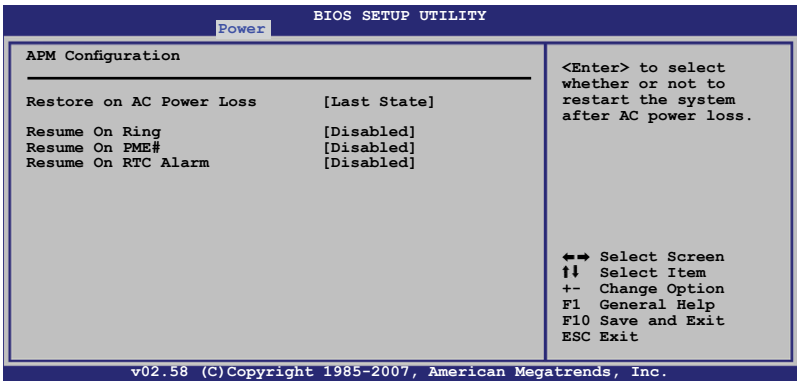
ACPI 2.0 Support [Disabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) 2.0 Support. Configuration options: [Disabled] [Enabled]

ACPI APIC Support [Enabled]

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

4.5.1 APM Configuration



Restore on AC Power Loss [Last State]

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

Configuration options: [Power Off] [Power On] [Last State]

Resume On Ring [Disabled]

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

Configuration options: [Disabled] [Enabled]

Resume On PME# [Disabled]

Allows you to enable or disable the Resume On PME# function.

Configuration options: [Disabled] [Enabled]

Resume On RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake event. When this item is set to [Enabled], the items RTC Alarm Date, RTC Alarm Hour, RTC Alarm Minute, 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 [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]

RTC Alarm Hour [12]

To set the alarm hour, highlight this item and press the <+> or <-> key to make the selection. Configuration options: [00] [01] [02] [03]...[23]

RTC Alarm Minute (Second) [30]

To set the alarm minute (second≠), highlight this item and press the <+> or <-> key to make the selection. Configuration options: [00] [01] [02] [03]...[59]

4.5.2 Hardware Monitor

BIOS SETUP UTILITY	
Power	
Hardware Monitor	CPU Temperature
CPU Temperature [15°C/59°F]	
MB Temperature [37°C/98.5°F]	
CPU Fan1 Speed [2884RPM]	
CPU Smart Fan Control [Enabled]	
CPU Fan Ratio [Auto]	
CPU Target Temperature [50°C]	
FRNT_Fan1 Speed [N/A]	
FRNT_Fan2 Speed [N/A]	
FRNT_Fan3 Speed [N/A]	
Rear_Fan1 Speed [N/A]	
VCORE Voltage [1.288V]	↔ Select Screen
3.3V Voltage [3.248V]	↑↓ Select Item
5V Voltage [4.608V]	+− Change Option
12V Voltage [11.352V]	F1 General Help
VBAT Voltage [3.152V]	F10 Save and Exit
3VSB Voltage [3.216V]	ESC Exit

CPU Temperature [xxx°C/xxx°F]

MB Temperature [xxx°C/xxx°F]

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

CPU_Fan1 Speed [xxxxRPM] or [N/A]

FRNT_Fan1/2/3 Speed [N/A]

Rear_Fan1 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.

CPU Smart Fan Control [Enabled]

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

Configuration options: [Disabled] [Enabled]



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

CPU Fan Ratio [XXX]

CPU Target Temperature [XXX]

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

FRNT_Fan1/2/3 Speed [N/A]

Rear_Fan1 Speed [N/A]

Allows you to enable or disable the front and rear fans.

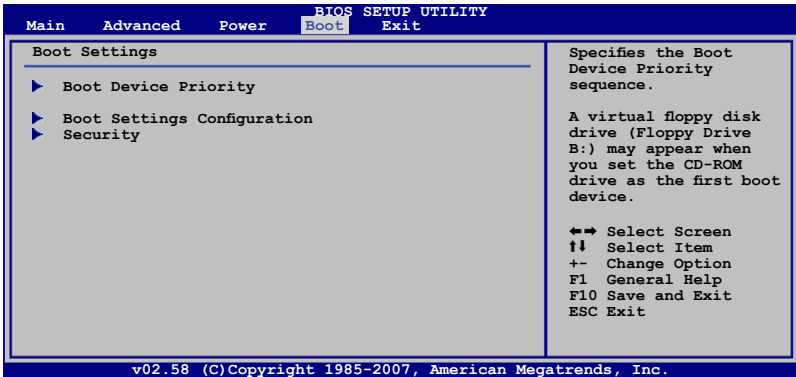
Configuration options: [Ignored] [N/A]

VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage, VBAT Voltage, and 3VSB Voltage

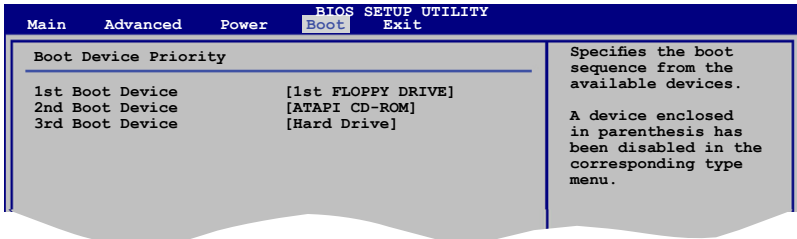
The onboard hardware monitor automatically detects the voltage outputs through the onboard voltage regulators.

4.6 Boot menu

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



4.6.1 Boot Device Priority



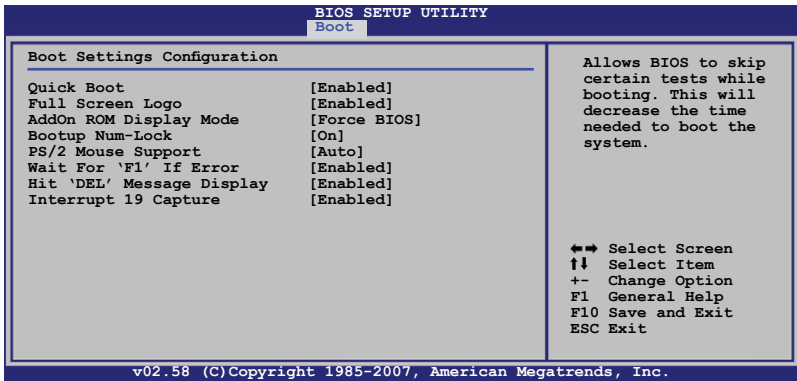
1st Boot Device [1st FLOPPY DRIVE]

2nd Boot Device [ATAPI CD-ROM]

3rd Boot Device [Hard Drive]

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

4.6.2 Boot Settings Configuration



Quick Boot [Enabled]

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

Configuration options: [Disabled] [Enabled]

Full Screen Logo [Enabled]

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



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

AddOn ROM Display Mode [Force BIOS]

Allows you to set display mode for optional ROM. Configuration options: [Force BIOS] [Keep Current]

Bootup Num-Lock [On]

Allows you to select the power-on state for the NumLock.

Configuration options: [Off] [On]

PS/2 Mouse Support [Auto]

Allows you to enable or disable support for PS/2 mouse.

Configuration options: [Disabled] [Enabled] [Auto]

Wait for 'F1' If Error [Enabled]

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

Hit 'DEL' Message Display [Enabled]

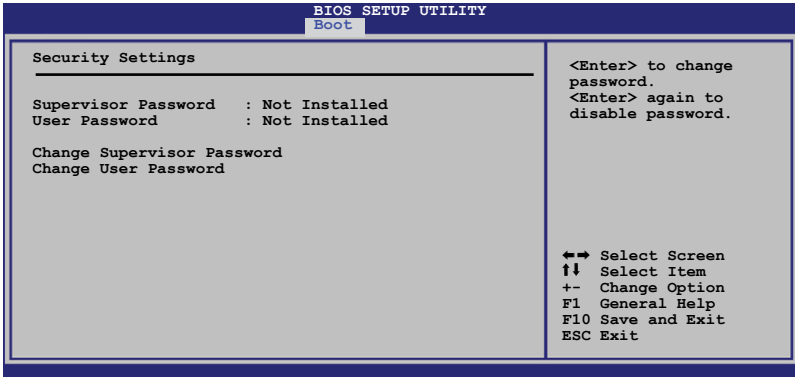
When set to Enabled, the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Enabled]

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

4.6.3 Security

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



Change Supervisor Password

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

To set a Supervisor Password:

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

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

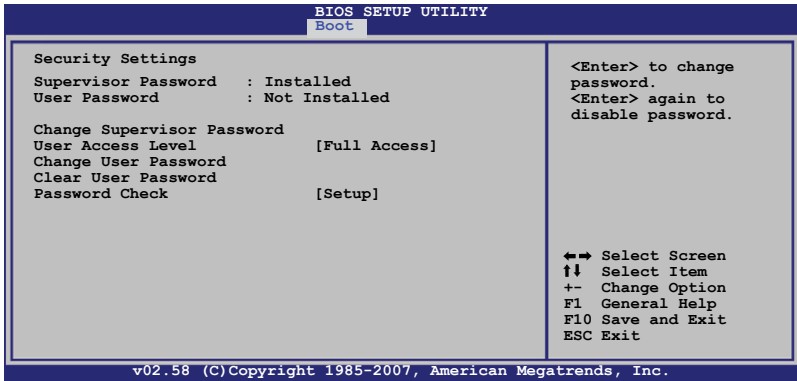
To change the supervisor password, follow the same steps as in setting a user password.

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



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

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



User Access Level [Full Access]

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

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

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

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

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

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

Clear User Password

Select this item to clear the user password.

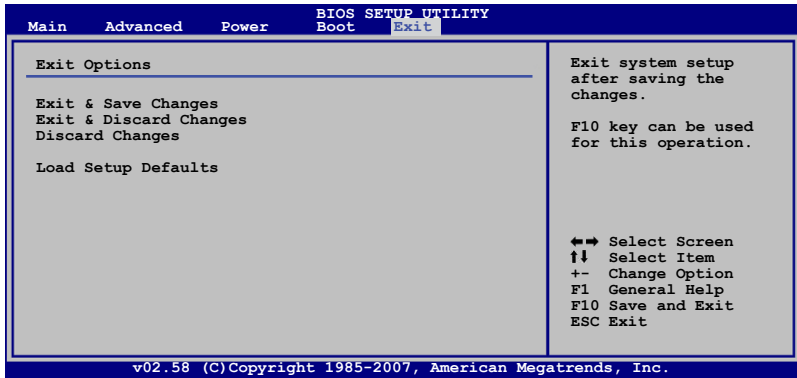
Password Check [Setup]

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

Configuration options: [Setup] [Always]

4.7 Exit menu

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



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

Exit & Save Changes

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

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

Exit & Discard Changes

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

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

Discard Changes

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

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

Load Setup Defaults

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

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

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

5 RAID configuration

5.1	RAID configurations	5-1
5.2	Intel Matrix Storage Manager option ROM utility	5-6
5.3	LSI Logic Embedded SATA RAID Setup Utility.....	5-17
5.4	LSI1064E IR RAID Function.....	5-39
5.5	Global Array Manager	5-39

5.1 RAID configurations

The server system/motherboard comes with Intel® ICH7R chipset.

The Intel® ICH7R Southbridge chip comes with the LSI Logic Embedded SATA RAID and the Intel® Matrix Storage Manager. These utilities allow you to configure IDE and Serial ATA hard disk drives as RAID sets.

For P5BV-E/SAS only: LSI SAS1064E PCI-E four-port, 3.0 Gbit/s SAS/SATA controller supports four additional SAS/SATA hard drives that allows you to leave the Integrated RAID configuration.

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.

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

RAID 10 is a striped configuration with RAID 1 segments whose segments are RAID 1 arrays. This configuration has the same fault tolerance as RAID 1, and has the same overhead for fault-tolerance as mirroring alone. RAID 10 achieves high input/output rates by striping RAID 1 segments. In some instances, a RAID 10 configuration can sustain multiple simultaneous drive failure. A minimum of four hard disk drives is required for this setup.

Intel® Matrix Storage. The Intel® Matrix Storage technology supported by the ICH7R chip allows you to create a RAID 0 and RAID 1 set using only two identical hard disk drives. The Intel® Matrix Storage technology creates two partitions on each hard disk drive to create a virtual RAID 0 and RAID 1 sets. This technology also allows you to change the hard disk drive partition size without losing any data.



If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support CD to a floppy disk before you install an operating system to the selected hard disk drive. Refer to section “6.1 RAID driver installation” for details.

5.1.2 Installing Serial ATA hard disks

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

To install the SATA hard disks for a RAID configuration:

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

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(s). To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main** Menu, select **IDE Configuration**, then press <Enter>.
3. Select the item **Configure SATA as**, then press <Enter> to display the configuration options.
4. Select **RAID** from the Configure SATA as item options, then press <Enter>.
5. Save your changes, then exit the BIOS Setup.



Refer to Chapter 4 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 “2.6 Jumpers” for details on the RAID_SEL1 jumper settings.

Use the Intel® Matrix Storage Manager to create a RAID 0, RAID 1, RAID 10, or software RAID 5 under Windows® 2000/2003 Server/XP operating system.

Use the LSI Logic Embedded SATA RAID Setup Utility to create a RAID 0, RAID 1, or RAID 10 under Windows® 2000/2003 Server/XP or Red Hat® Enterprise ver. 3.0 operating system.

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

5.2 Intel® Matrix Storage Manager Option ROM Utility

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

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

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

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

[ MAIN MENU ]

1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
None defined.

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

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

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

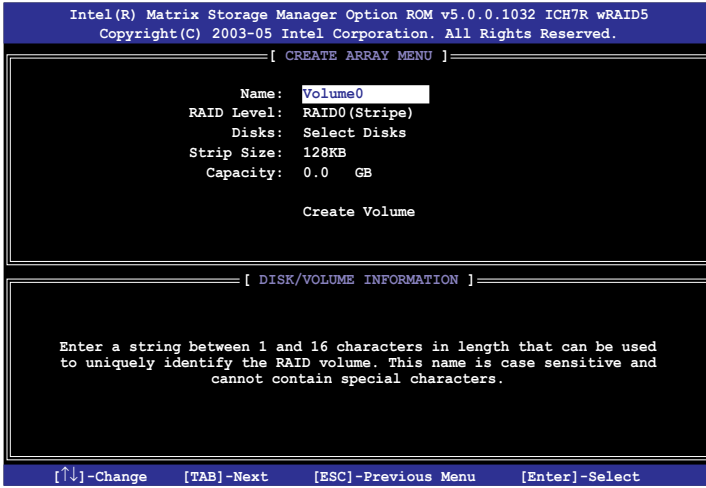


The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

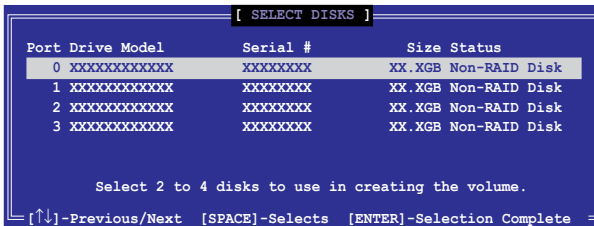
5.2.1 Creating a RAID 0 set (stripe)

To create a RAID 0 set:

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



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



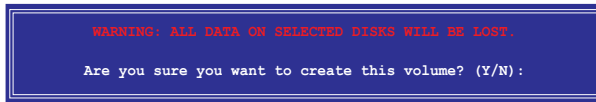
5. Use the up/down arrow key to highlight a drive, then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.

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



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

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

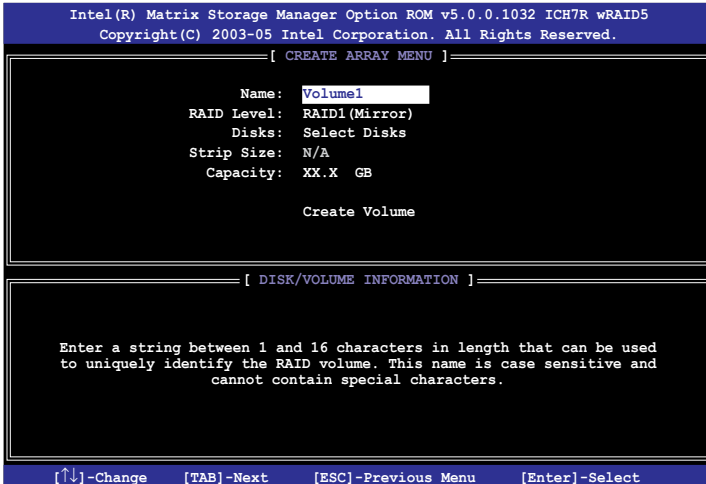


9. Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the Create Volume menu.

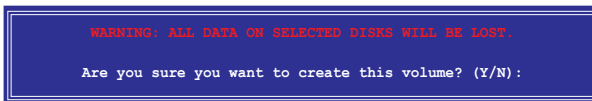
5.2.2 Creating a RAID 1 set (mirror)

To create a RAID 1 set:

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



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

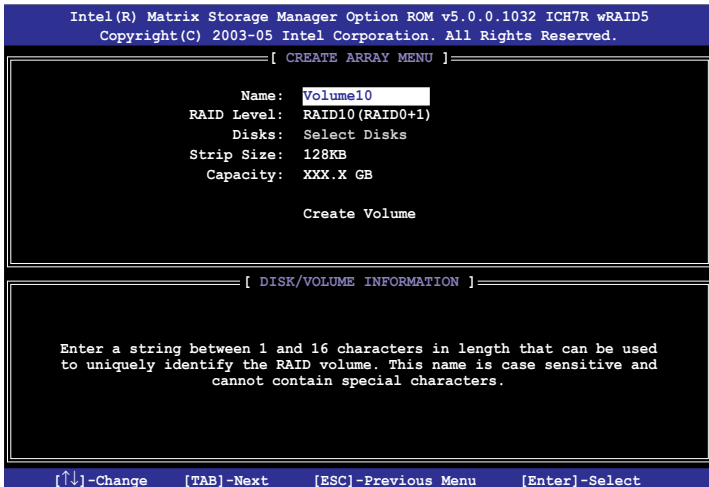


8. Press <Y> to create the RAID volume and return to main menu or <N> to go back to Create Volume menu.

5.2.3 Creating a RAID 10 set (RAID 10)

To create a RAID 10 set:

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



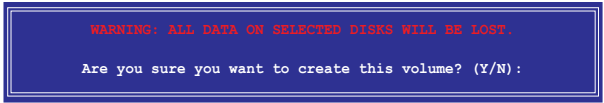
2. Enter a name for the RAID 10 set, then press <Enter>.
3. When the **RAID Level** item is highlighted, press the up/down arrow key to select **RAID 10(RAID0+1)**, then press <Enter>.
4. When the **Disks** item is highlighted, press <Enter> to select the hard disk drives to configure as RAID. The **SELECT DISKS** screen appears.
5. Use the up/down arrow key to highlight a drive, then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.
6. When the **Stripe Size** item is highlighted, press the up/down arrow key to select the stripe size for the RAID 10 array, then press <Enter>. The available stripe size values range from 8 KB to 128 KB. The default stripe size is 64 KB.



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

7. Key in the RAID volume capacity that you want then press <Enter> when the **Capacity** item is highlighted. The default value indicates the maximum allowed capacity.

- Press <Enter> when the **Create Volume** item is highlighted. This warning message appears.



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

5.2.4 Creating a RAID 5 set (parity)

To create a RAID 5 set:

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



- Enter a name for the RAID 5 set, then press <Enter>.
- When the **RAID Level** item is highlighted, press the up/down arrow key to select **RAID 5(Parity)**, then press <Enter>.

- When the **Disks** item is highlighted, press <Enter> to select the hard disk drives to configure as RAID. The **SELECT DISKS** screen appears.

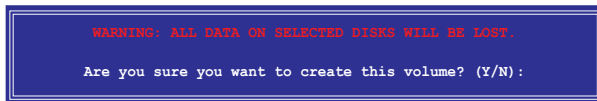


- Use the up/down arrow key to highlight the drive you want to set, then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.
- When the **Stripe Size** item is highlighted, press the up/down arrow key to select the stripe size for the RAID 5 array, then press <Enter>. The available stripe size values range from 8 KB to 128 KB. The default stripe size is 64 KB.



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

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



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

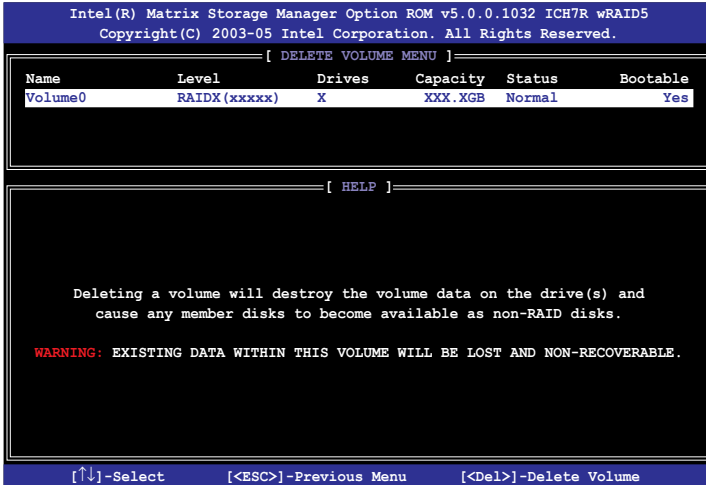
5.2.5 Deleting a RAID set



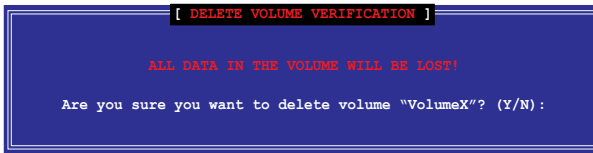
Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

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



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



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

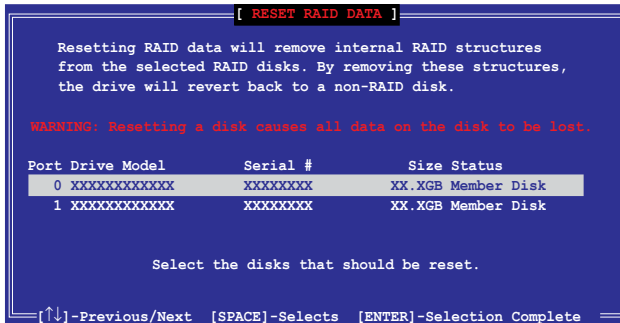
5.2.6 Resetting Disks to Non-RAID



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

To reset a RAID set hard disk drive:

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



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

5.2.7 Exiting the Intel® Matrix Storage Manager utility

To exit the utility:

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



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

5.2.8 Rebuilding the RAID



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

Rebuilding the RAID with other non-RAID disk

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

To rebuild the RAID with other non-RAID disk:

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

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

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

Port Drive Model      Serial#      Size
3HDS722580VLSA80     VN6Bxxxx    76.7GB

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



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

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

```
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
*****[ MAIN MENU ]*****
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
*****[ DISK/VOLUME INFORMATION ]*****
RAID Volumes:
* ID Name Level Strip Size Status Bootable *
* 0 Volume0 RAID1(Mirror) N/A 74.5GB Rebuild Yes *
Physical Disks:
* Port Drive Model Serial # Size Type/Status(Vol ID) *
* 1 ST380013AS 5JV7KSE9 74.5GB Member Disk(0) *
* 3 HDS722580VLSA80 VN6BHECBW1EKMC 76.7GB Member Disk(0) *
*****
Volumes with "Rebuild" status will be rebuilt within the operating system.
*****[**]-Select [ESC]-Exit [ENTER]-Select Menu*****
```

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

Rebuilding the RAID with a new hard disk

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

To rebuild the RAID with a new hard disk:

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



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

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

5.2.9 Setting the Boot array in the BIOS Setup Utility

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



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

To set the boot array in the BIOS:

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

5.3 LSI Logic Embedded SATA RAID Setup Utility (For P5BV-E and P5BP-E/4L only)

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



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

To enter the LSI Logic Embedded SATA RAID Setup Utility:

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

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

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

LSI Logic Embedded SATA RAID Not Configured!

New Drive(s) Found.

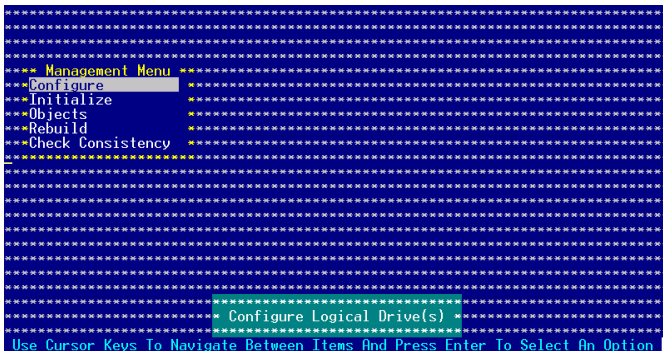
Press Ctrl-M to run LSI Logic Embedded SATA RAID Setup Utility.
```



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

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

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



Menu	Description
Configure	Allows you to create RAID 0, RAID 1, or RAID 10 set using the Easy Configuration or the New Configuration command. This menu also allows you to view, add, or clear RAID configurations or select the boot drive
Initialize	Allows you to initialize the 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

5.3.1 Creating a RAID set

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

In **Easy Configuration**, the logical drive parameters are set automatically including the size and stripe size.

In **New Configuration**, you manually set the logical drive parameters and assign the set size and stripe size.

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



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

```

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

```

8. When creating a RAID_1 or a RAID_10 set, select **Stripe Size** from the **Logical Drive** menu, then press <Enter>.
When creating a RAID_0 set, proceed to step 10.
9. Key in the stripe size, then press <Enter>.

```

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

```



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

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

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

- Follow steps 5 to 10 to configure additional logical drives.
- When prompted, save the configuration, then press <Esc> to return to the Management Menu.

```
***** Configuration Menu ***** Save Configuration ? *****  
***** Easy Configuration ***** Yes *****  
***** Management ***** New Configuration ***** No *****  
***** Configure ***** View/Add Configuration *****  
***** Initialize ***** Logical Drive(s) Configured *****  
***** Objects ***** LD RAID Size #Stripes StripeSz Status *****  
***** Rebuild ***** 0 1 114376MB 2 64 KB ONLINE *****  
***** Check Con *****  
*****  
*****  
*****  
***** Select YES Or NO *****  
***** Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option *****
```

Using New Configuration



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

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

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

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

*****

***** Defines Physical Arrays. An Array Will Automatically Become A Logical Drive *****
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

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

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

- Management
- Configure
- Initialize
- Objects
- Rebuild
- Check Consistency

***** Enter Logical Drive Size (MB) :114376 *****
***** Logical Drive 0 *****
RAID = 1
Size = 114376MB
Stripe Size
Accept
SPAN = NO

***** Enter Logical Drive Size (MB) :
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

6. Follow steps 8 to 12 of the previous section to create the RAID set.

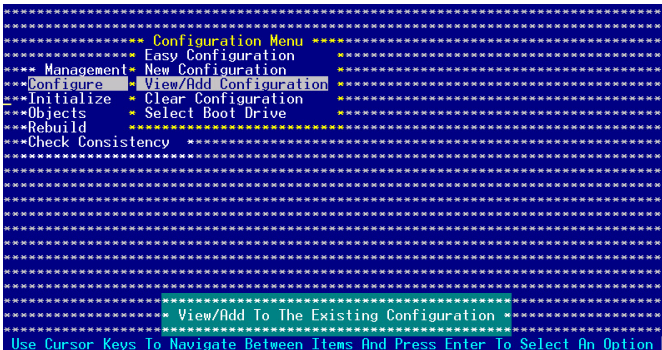
5.3.2 Adding or viewing a RAID configuration

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

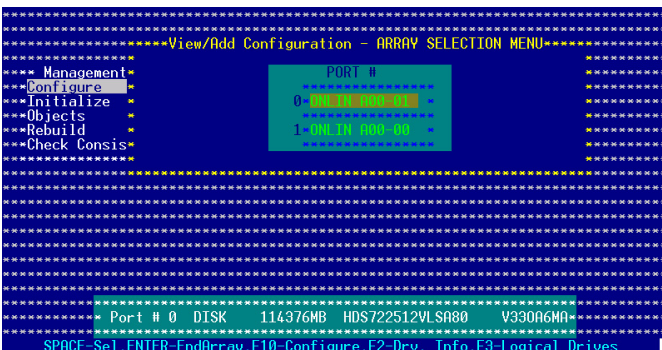
Adding a new RAID configuration

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.

```
*****View/Add Configuration - ARRAY SELECTION MENU*****
Management
Configure
Initialize
Objects
Rebuild
Check Consis
*****

PORT #
0 ONLINE RAID 0
1 ONLINE RAID 1

*****
Port # 1 DISK 114376MB HDS722512VL SA80 V330A6MA
SPACE-Sel ENTER-EndArray F10-Configure F2-Drv. Info F3-Logical Drives
```

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

```
*****View/Add Configuration - ARRAY SELECTION MENU*****
Management
Configure
Initialize
Objects
Rebuild
Check Consis
*****

*****Select Configurable Array(s)*****

Cursor Keys. SPACE-(De)Select F2-ChIdInfo F3-SlotInfo F10-Configure F5C-Quit
```

The logical drive information appears including a Logical Drive menu that allows you to change the logical drive parameters.

```
***** Logical Drive(s) Configured *****
LD RAID Size #Stripes StripeSz Status
0 1 114376MB 2 64 KB ONLINE
Management
Configure
Initialize
Objects
Rebuild
Check Con
*****

Logical Drive 0
RAID = 1
Size = 114376MB
Stripe Size
Accept
SPAN = NO
*****
Choose RAID Level For This Logical Drive
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

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

```

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

```

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

5.3.3 Initializing the logical drives

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

Using the Initialize command

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

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

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

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

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

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

```

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

```



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.

```

*****
*****                               Logical Drive(s) Configured *****
*** Management Menu ** LD   RAID     Size    #Stripes  StripeSz  Status
*** Configure
*** Initialize          * 0     1     114376MB  2         64 KB    ONLINE
*** Objects
*** Rebuild Array Initialization Under Progress. Press ESC to ABORT
*** Check C
***
*****
*****                = 16 % Completed
*****
***** Logical Drives *****
*****
*****SPACE-(De)Select, F10-Initialize*****

```


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

```
*****Objects*****
ManagementAdapter
Configure Logical Drive
Initialize Physical Drive
Objects
Rebuild
Check Consistency

Change Logical Drive Parameters

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

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

```
*****Logical Drives(1)*****
Logical Drive 0
*****Obj*****
ManagementAdapter
Configure Logical Drive
Initialize Physical Drive
Objects
Rebuild
Check Consistency

Select Logical Drive

Press ENTER To Select A Logical Drive <Del> To Delete A Logical Drive Array
```

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

```
*****Logical Drives(1)*****
Logical Drive 0
*****Obj*****
ManagementAdapter
Configure Logical Drive
Initialize Physical Drive
Objects
Rebuild
Check Consistency
*****Logical Drive 0*****
Initialize
Check Consistency
View/Update Parameters

Initialize Logical Drive

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

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

```
=====
Logical Drives(1)
Logical Drive 0
Obj
ManagementAdapter
Configure Logical Drive
Initial Logical Drive
Physical Drive
Objects
Rebuild Logical Drive 0
Check Consistency
Check Consistency
View/Update Initialize
Ves
No
=====
Initialize Logical Drives In Progress
=====
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

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

```
=====
Logical Drives(1)
Logical Drive 0
Obj
ManagementAdapter
Configure Logical Drive
Initial Logical Drive
Physical Drive
Objects
Rebuild Logical Drive 0
Check Consistency
Check Consistency
View/Update Initialize
Ves
No
=====
Initialize Logical Drives In Progress
=====
Array Initialization Under Progress. Press ESC to ABORT
=====
/ 23 % Completed
=====
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

- When initialization is completed, press <Esc>.

```
=====
Logical Drives(1)
Logical Drive 0
Obj
ManagementAdapter
Configure Logical Drive
Initial Logical Drive
Physical Drive
Objects
Rebuild Logical Drive 0
Check Consistency
Check Consistency
View/Update Initialize
Ves
No
=====
Initialize Logical Drives In Progress
=====
Array Initialization Complete !! Press ESC..
=====
| 100% Completed
=====
Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```


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

```
*****Rebuild - PHYSICAL DRIVES SELECTION MENU*****
Management
Configure
Initialize
Objects
Rebuild
Check Consis

PORT #
0 RBLD 000-01
1 UNLN 000-00

Port # 0 DISK 114376MB HDS722512VL SA80 V330A6WA
SPACE-(De)Select,F10-Start Rebuild,F2-Drive Information,F3-View Logical Drives
```

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

```
*****Rebuild - PHYSICAL DRIVES SELECTION MENU*****
Management
Configure
Initialize
Objects

Rebuilding Drive Will Take Few Minutes. Start Rebuilding Drive (Y/N)?

Port # 0 DISK 114376MB HDS722512VL SA80 V330A6WA
SPACE-(De)Select,F10-Start Rebuild,F2-Drive Information,F3-View Logical Drives
```

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

5.3.5 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>.

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

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

```
*****
*****
***** Management Menu *****
***Configure*****
***Initialize*****
***Objects*****
***Rebuild*****
***Check Consistency*****
*****
*****
***** Logical Drives *****
*****
***** Select Logical Drive *****
SPACE-(De)Select, F10-Check Consistency
```

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

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

```

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

```

A progress bar appears on screen.

```

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

```

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

Using the Objects command

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

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

5.3.6 Deleting a RAID configuration

To delete a RAID configuration:

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

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

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

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

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

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

The utility clears the current array.

3. Press any key to continue.

5.3.7 Selecting the boot drive from a RAID set

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

To select the boot drive from a RAID set:

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

```

*****
***** Configuration Menu *****
***** Easy Configuration *****
***** Management *****
***** Configure View/Add Configuration *****
***** Initialize Clear Configuration *****
***** Objects Select Boot Drive *****
***** Rebuild *****
***** Check Consistency *****
*****
*****
*****
***** Specify A Logical Drive As Boot Drive On This Adapter *****
***** Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option *****

```

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

```

*****
***** Bootable Logical Drives (4): Currently (0) *****
***** Config Boot Drive *****
***** Easy Co- Boot Drive 1 *****
***** Management New Con- Boot Drive 2 *****
***** Configure View/Ad- Boot Drive 3 *****
***** Initialize Clear C *****
***** Objects Select Boot Drive *****
***** Rebuild *****
***** Check Consistency *****
*****
*****
*****
***** Specify A Logical Drive As Boot Drive On This Adapter *****
***** Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option *****

```

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

5.3.8 Enabling the WriteCache

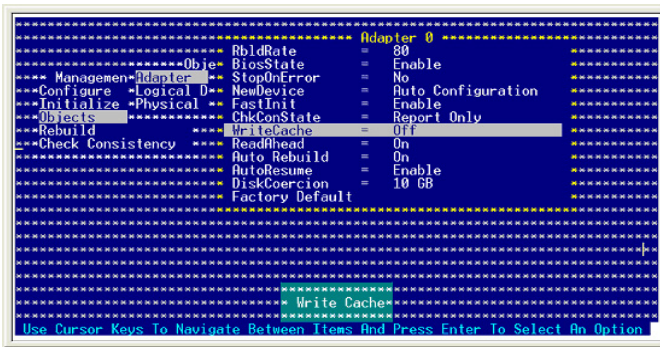
You may enable the RAID controller's **WriteCache** option to improve the data transmission performance.



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

To enable WriteCache:

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



3. When finished, press any key to continue.

5.4 LSI Logic MPT Setup Utility (P5BV-E/SAS model only)

The LSI Logic MPT Setup Utility is an integrated RAID solution that allows you to allow you to create the following RAID set(s) from SAS hard disk drives supported by the LSI SAS1064E PCI-E SAS controller:

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

5.4.1 Integrated Mirroring

Overview

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

The IM feature supports hot swap capability, so when a disk in an IM volume fails, 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 disk drives in one volume.
- The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.

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-6.16.00.00 (2007.05.07)
Copyright 2000-2007 LSI Logic Corp.

Adapter(s) disabled by user
Press Ctrl-C to start LSI Logic Configuration Utility..
```

- The following screen appears. Select a channel and press <Enter> to enter the setup.

```

LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Adapter List Global Properties
Adapter  PCI      PCI      PCI      PCI      FW Revision  Status  Boot
          BUS     Dev     Func    Slot
-----  ---     ---     ---     ---     -
04      03     00     00     1.22.01.00-IR  Enabled  0
  
```

Esc = Exit Menu F1/Shift+1 = Help
 Alt+N = Global Properties -/+ = Alter Boot Order Ins/Del = Alter Boot List



The numbers of the channel depend on the controller.

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

```

LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Adapter Properties -- SAS1064E
Adapter          SAS1064E
PCI Slot         00
PCI Address (Bus/Dev/Func)  04:00:00
MPT Firmware Revision  1.22.01.00-IR
SAS Address      500B0101:23456712
NVDATA Version   2B.00
Status          Enabled
Boot Order      0
Boot Support    Enabled BIOS & OS
  
```

RAID Properties
 SAS Topology
 Advanced Adapter Properties

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

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

```

LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Select New Array Type -- SAS1064E
  
```

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

Create IMS Volume Create Integrated Mirrored Enhanced Array of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on array disks will be DELETED!

Create IS Volume Create Integrated Striping array of 2 to 10 disks. ALL DATA on array disks will be DELETED!

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

6. 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 Config Utility          v6.16.00.00 (2007.05.07)
Create New Array -- SAS1064E

Array Type:                       IM
Array Size (MB):                   -----

Slot  Device Identifier           RAID  Hot  Drive  Pred  Size
Num   Num                        Disk  Spr  Status Fail  (MB)
-----
0     SEAGATE ST373454SS           0003  [NO] [NO]  -----  ---  70007
1     SEAGATE ST373454SS           0003  [NO] [NO]  -----  ---  70007
2     SEAGATE ST373454SS           0003  [NO] [NO]  -----  ---  35003
3     SEAGATE ST373454SS           0003  [NO] [NO]  -----  ---  35003

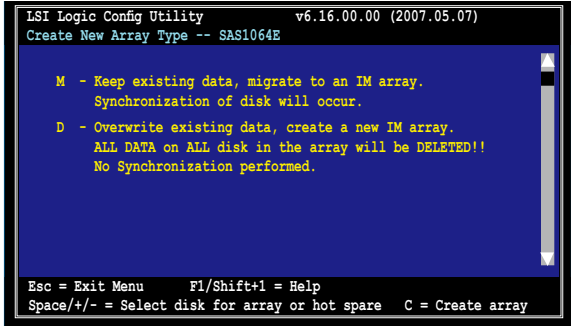
Esc = Exit Menu  F1/Shift+1 = Help
SPACE/+/- = Select disk for array or hot spare  C = Create array
```



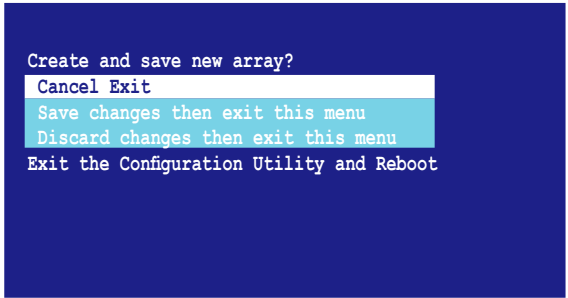
By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

- 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.

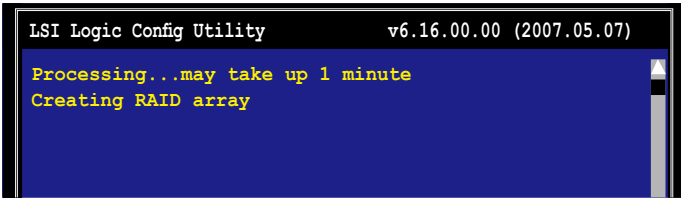
7. A confirmation screen appears.
 Press <M> to keep existing data on the first disk. If you choose this option, data on the first disk will be mirrored on the second disk that you will add to the volume later. Make sure the data you want to mirror is on the first disk.
 Press <D> to overwrite any data and create the new IM array.



8. Repeat steps 5 and 6 to add the second disk to the volume.
9. When done, press <C> to create the array, then select Save changes then exit this menu.



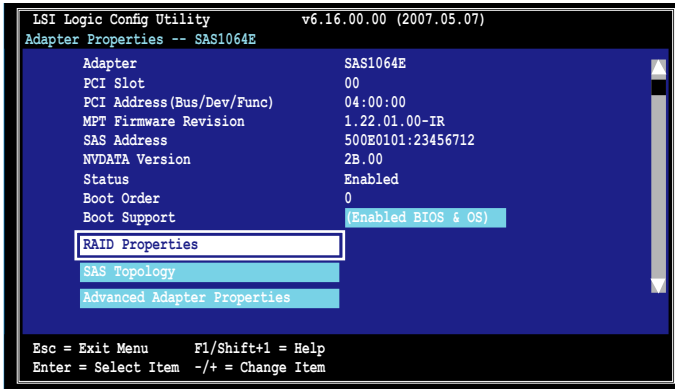
10. The utility creates the array.



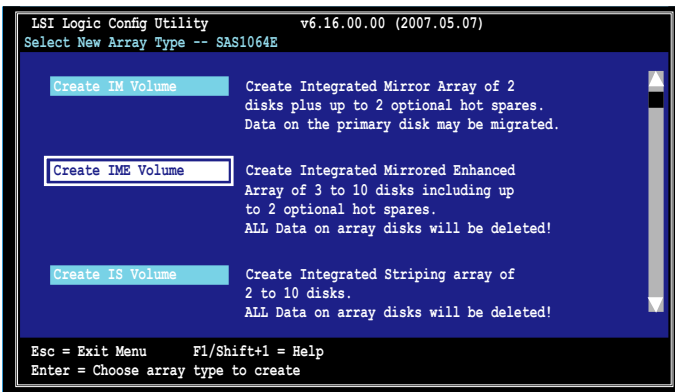
5.4.2 Integrated Mirroring Enhanced

To create an IME volume:

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



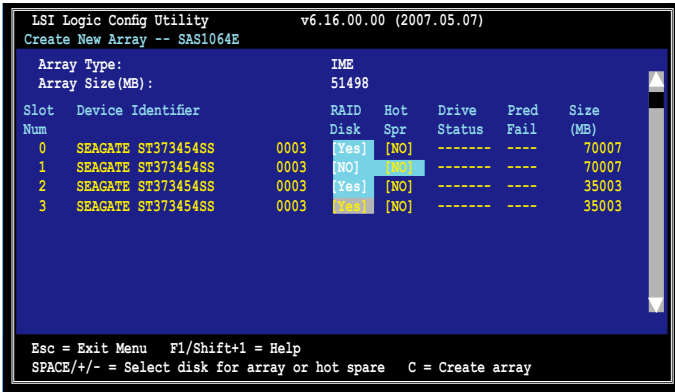
2. The **Select New Array Type** screen appears.
Use the arrow keys to select **Create IME Volume**, then press <Enter>.



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

Integrated Mirroring Enhanced (IME) supports three to ten disks, or seven mirrored disks plus two hot spare disks. 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>.

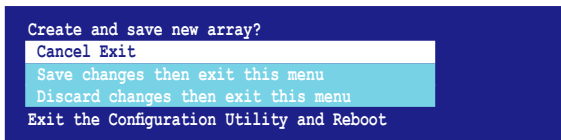
You may also specify the Hot Spare disk here. Select the disk, then move the cursor to the Hot Spr column, then press <+>, <->, or <Space>.



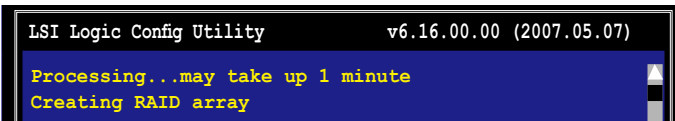
By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

- 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.

- Repeat step 5 to add the other disks to the volume.
- When done, press <C> to create the array, then select Save changes then exit this menu then exit this menu.



- The utility creates the array.



5.4.3 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 disk drives 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-6.16.00.00 (2007.05.07)
Copyright 2000-2007 LSI Logic Corp.

Adapter(s) disabled by user
Press Ctrl-C to start LSI Logic Configuration Utility...
```

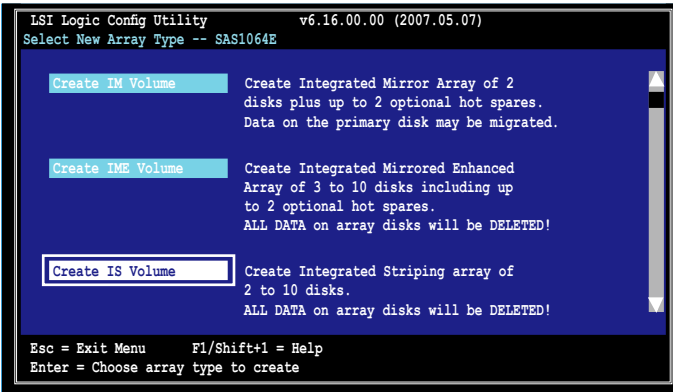
3. The **Adapter Properties** screen appears. Use the arrow keys to select **RAID Properties**, then press <Enter>.

```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Adapter Properties -- SAS1064E

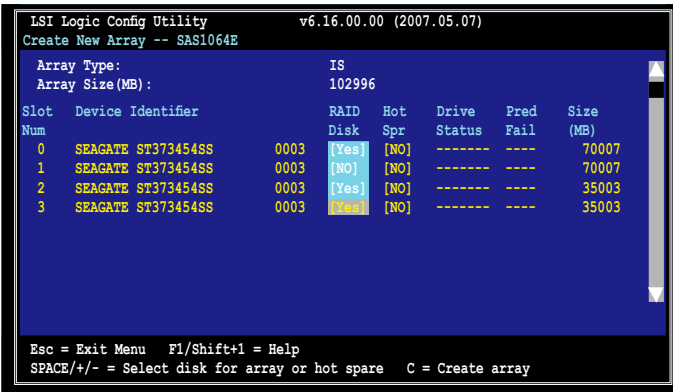
Adapter          SAS1064E
PCI Slot         00
PCI Address(Bus/Dev/Func)  04.00:00
MPT Firmware Revision  1.22.01.00-IR
SAS Address       500E0101:23456712
NVDATA Version    2B.00
Status            Enabled
Boot Order        0
Boot Support      [Enabled BIOS & OS]
RAID Properties
SAS Topology
Advanced Adapter Properties

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

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



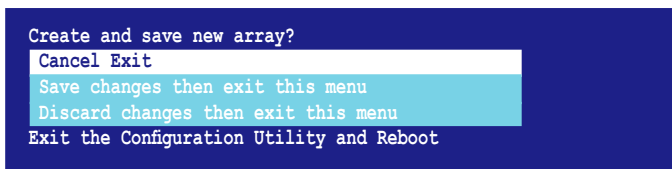
5. The **Create New Array** screen shows the disks you can add to make up the IS volume. Use the arrow key to select a disk, then move the cursor to the RAID Disk column. To include this disk in the array, press <+>, <->, or <Space>.



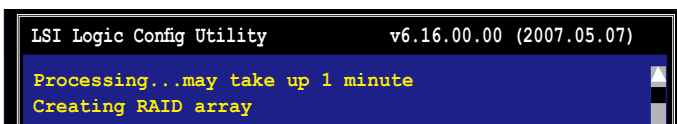
By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

- 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.

- Repeat step 5 to add the other disks to the volume.
- When done, press <C> to create the array, then select **Save changes then exit this menu**.



- The utility creates the array.



5.4.4 Managing Arrays

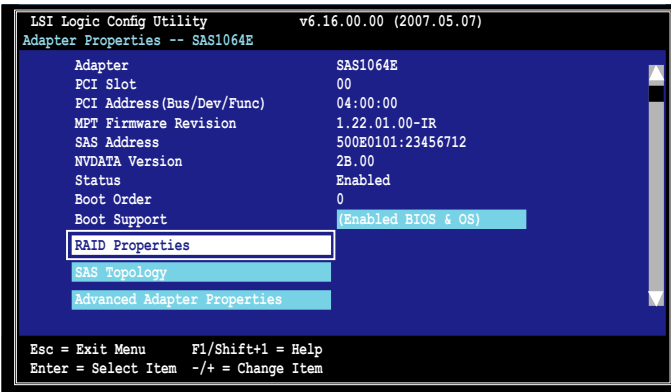
The LSI Logic MPT Setup Utility allows you to perform other tasks related to configuring and maintaining IM and IME volumes.

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

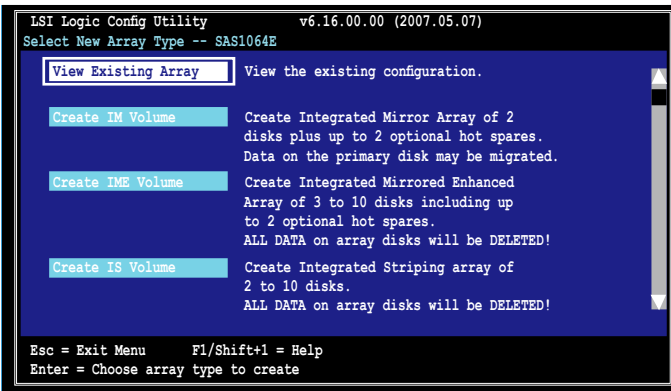
Viewing volume properties

To view volume properties:

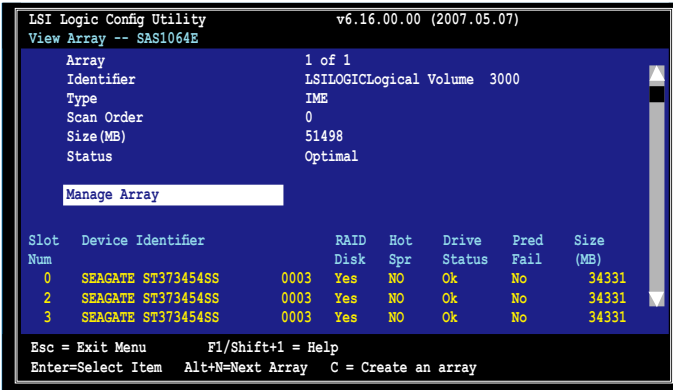
1. On the main menu, select **RAID Properties**.



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



- The **View Existing 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>.



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>.

```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
View Array -- SAS1064E
  Array                          1 of 1
  Identifier                      LSILOGICLogical Volume 3000
  Type                            IME
  Scan Order                      0
  Size (MB)                      51498
  Status                          Optimal

  Manage Array

Slot  Device Identifier          RAID  Hot  Drive  Pred  Size
Num   Disk Spr Status Fail (MB)
0     SEAGATE ST373454SS        0003  Yes  NO    Ok    No    34331
2     SEAGATE ST373454SS        0003  Yes  NO    Ok    No    34331
3     SEAGATE ST373454SS        0003  Yes  NO    Ok    No    34331

Esc = Exit Menu      F1/Shift+1 = Help
Enter=Select Item   Alt+N=Next Array  C = Create an array
```

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

```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Manage Array -- SAS1064E
  Identifier                      LSILOGICLogical Volume 3000
  Type                            IME
  Scan Order                      0
  Size (MB)                      51498
  Status                          Optimal

  Manage Hot Spare
  Synnchronize Array
  Activate Array
  Delete Array

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

- 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.

```

LSI Logic Config Utility                v6.16.00.00 (2007.05.07)
Manage Hot Spare -- SAS1064E

Identifier                               LSILOGICLogical Volume 3000
Type                                     IME
Scan Order                               0
Size (MB)                                51498
Status                                   Optimal

Slot  Device Identifier                Hot   Drive   Pred   Size
Num   Spr   Status   Fail   (MB)
0     [---] [NO]  Ok    No    34331
1     SEAGATE ST373454SS             0003 [NO]  Ok    No    34331
2     SEAGATE ST373454SS             0003 [NO]  Ok    No    34331
3     SEAGATE ST373454SS             0003 [Yes] Hot Spare No    35003
      [----] -----  --    -----

Esc = Exit Menu      F1/Shift+1 = Help
SPACE/+/- = Change Item      C = Commit 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:

- Follow steps 1 ~ 3 of the section **Viewing volume properties** and step 2 of the section **Managing hot spares**.
- From the **Manage Array** screen select **Synchronize Array**, then press <Enter>.

```

LSI Logic Config Utility                v6.16.00.00 (2007.05.07)
Manage Array -- SAS1064E

Identifier                               LSILOGICLogical Volume 3000
Type                                     IME
Scan Order                               0
Size (MB)                                51498
Status                                   Optimal

Manage Hot Spare
Synchronize Array
Activate Array
Delete Array

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

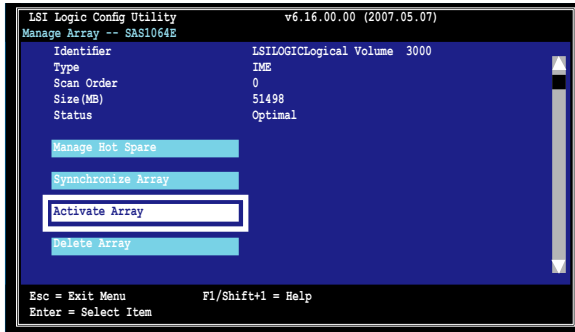
- Press <Y> to begin the synchronization, or <N> to cancel.

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.

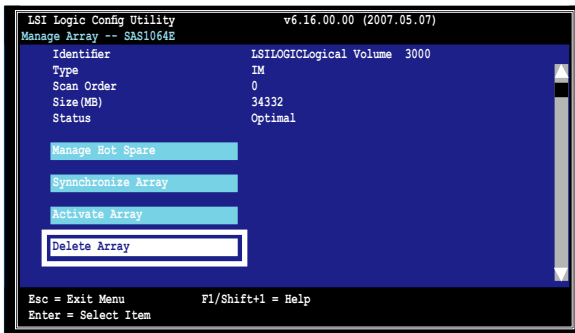
Deleting an array



- 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:

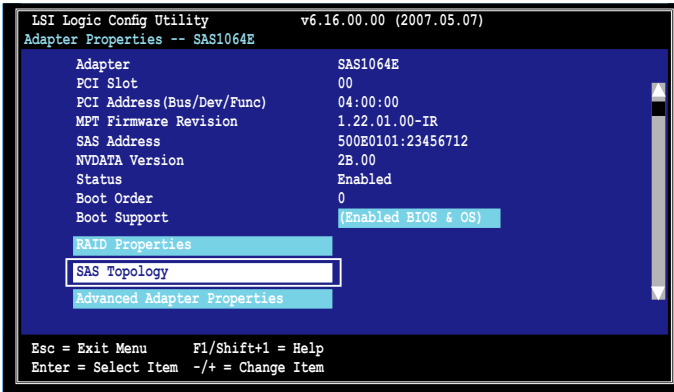
1. From the **Manage Array** screen, select **Delete Array**, then press <Enter>.



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

5.4.5 Viewing SAS topology

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

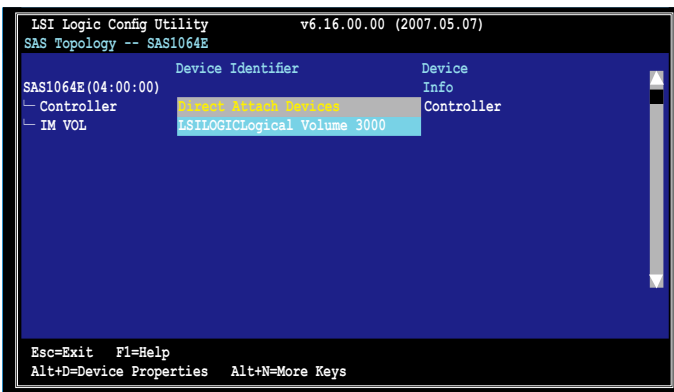


Press <Alt+D> to display device properties, or <Alt+M> to display more keys.

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.



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 **LSI Logic Config Utility**, 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.



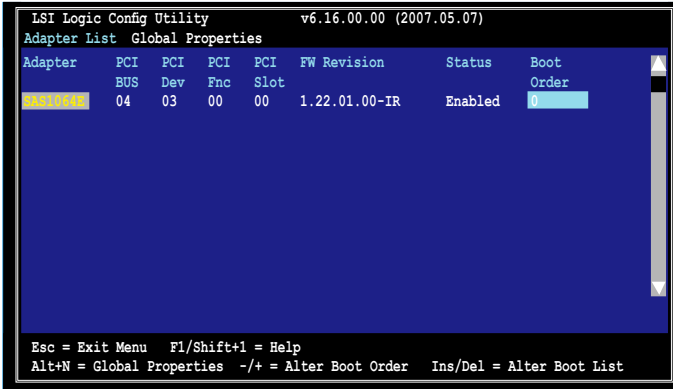
The firmware must be configured correctly in order for the **Alt+B** feature to work.

```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Adapter List  Global Properties
Adapter  PCI   PCI   PCI   PCI   FW Revision   Status   Boot
        BUS  Dev  Fnc  Slot
00000000 04   03   00   00   1.22.01.00-IR Enabled   0
```

Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Global Properties -/+ = Alter Boot Order Ins/Del = Alter Boot List

5.5.6 Global Properties

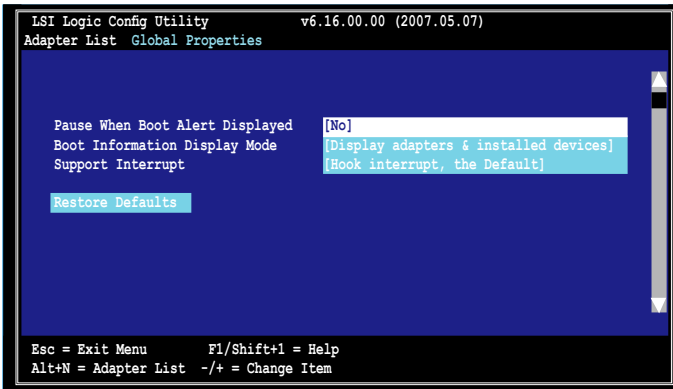
From the **Setup Utility** screen, press <Alt+N> to enter **LSI Logic Configuration**, then select **Global Properties**. The **Global Properties** menu allows you to change related settings.



Pause When Boot Alert Displayed

Sets whether to pause or not when the boot alert displays.

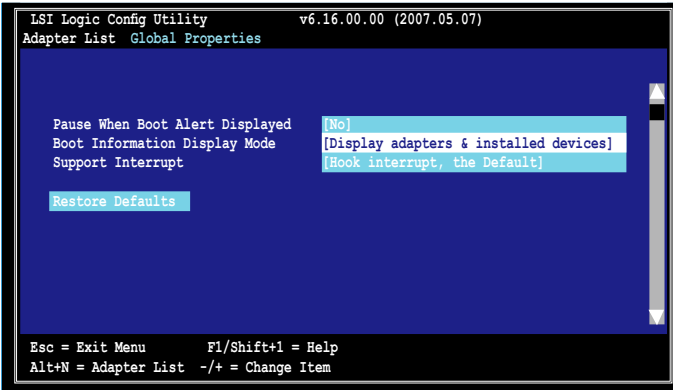
Configuration options: [Yes] [No]



Boot Information Display Mode

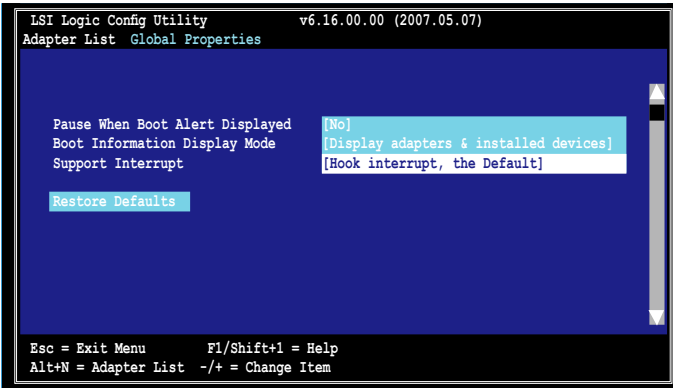
Sets the disk information display mode.

Configuration options: [Display adapters & installed devices]
[Display adapters only] [Display adapters and all devices]
[Display minimal information]



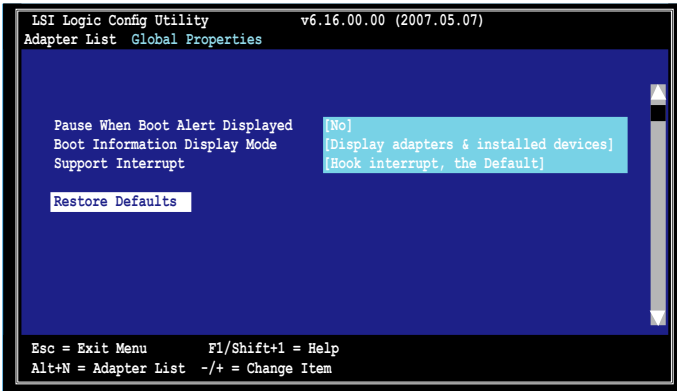
Support Interrupt

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.

6 Driver installation

6.1	RAID driver installation	6-1
6.2	LAN driver installation.....	6-11
6.3	VGA driver installation.....	6-13
6.4	Management applications and utilities installation	6-15

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® 2003 or Red Hat® Enterprise ver. 3.0/SuSE operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support CD).

To create a RAID driver disk in DOS environment:

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

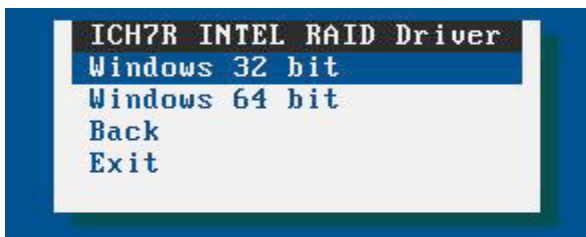
```
Loading FreeDOS FAT KERNEL GO!  
Press any key to boot from CDROM...
```

The Makedisk menu appears.



6. Use the arrow keys to select the type of RAID driver disk you want to create and press <Enter> to enter the sub-menu.

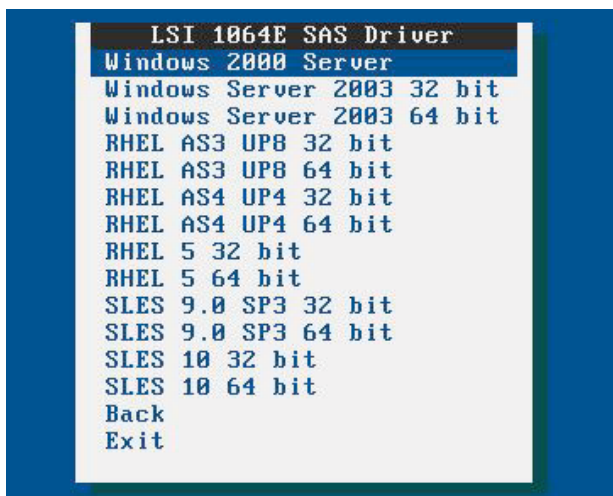
ICH7R INTEL RAID Driver



ICH7R LSI RAID Driver



LSI 1064E SAS Driver



Broadcom ASF Firmware Update



7. Locate the RAID driver and place a blank, high-density floppy disk to the floppy disk drive.
8. Press <Enter>.
9. Follow screen instructions to create the driver disk.

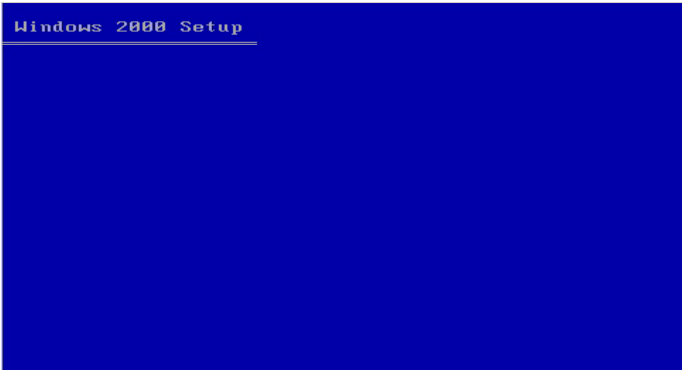
6.1.2 Installing the RAID controller driver

Windows® 2000/2003 Server OS

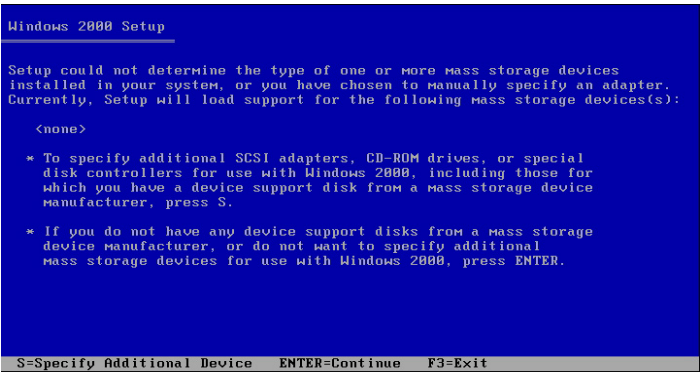
During Windows® 2000/2003 Server OS installation

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

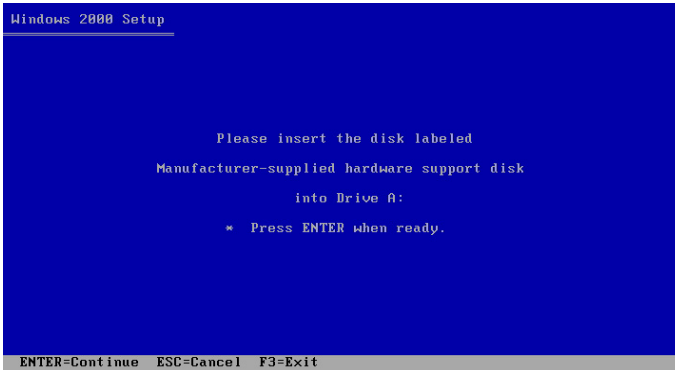
1. Boot the computer using the Windows® 2000/2003 Server installation CD. The **Windows® 2000/2003 Setup** starts.



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



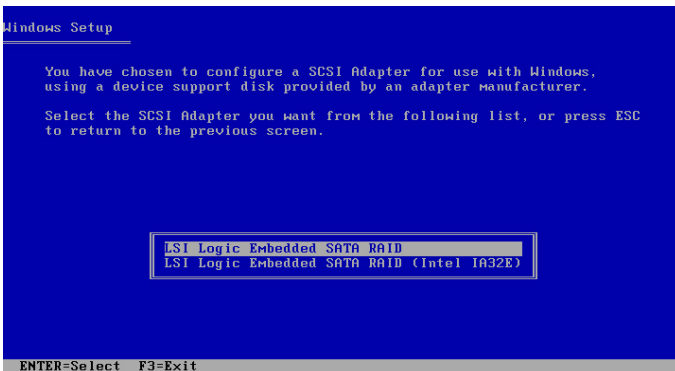
4. Insert the RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.



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

LSI Logic SATA RAID

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



Intel Matrix Storage

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

If you configured SATA as AHCI Mode in the BIOS setup utility of IDE Configuration, first install the **Intel SATA AHCI Driver** during windows setup. Then, select the **“Intel(R) 82801GR/GH SATA AHCI Controller (Desktop ICH7RDH)”** from the list. Refer to section “6.1.1 Creating a RAID driver disk” to create the Intel SATA Driver for windows system.

```
Windows Setup
*****

You have chosen to configure a SCSI Adapter for use with Windows,
using a device support disk provided by an adapter manufacturer.

Select the SCSI Adapter you want from the following list, or press ESC
to return to the previous screen.

*****
* Intel(R) 82801GR/GH SATA RAID Controller (Desktop ICH7R/DH) *
* Intel(R) 82801GR/GH SATA AHCI Controller (Desktop ICH7R/DH) *
* Intel(R) 82801FR SATA RAID Controller (Desktop ICH6R) *
* Intel(R) 82801FR SATA AHCI Controller (Desktop ICH6R) *
* Intel(R) 82801FBM SATA AHCI Controller (Mobile ICH6M) *
* Intel(R) 82801ER SATA RAID Controller (Desktop ICH5R) *
* Intel(R) 6300ESB SATA RAID Controller *
*****

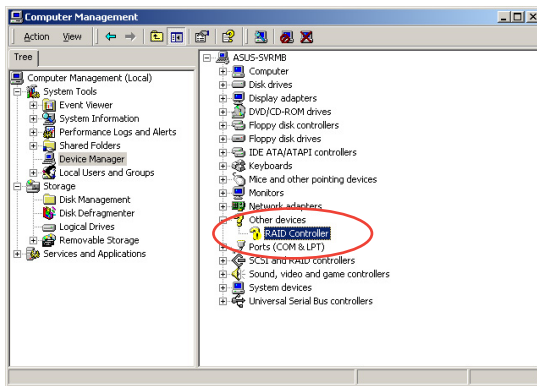
ENTER=Select F3=Exit
```

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

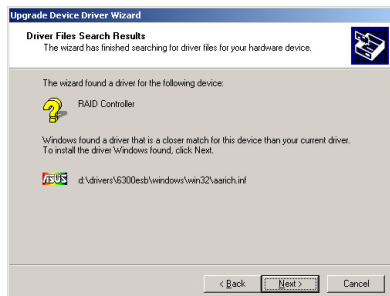
To an existing Windows® 2000/2003 Server OS

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

1. Restart the computer, then log in with **Administrator** privileges.
2. Windows® automatically detects the RAID controller and displays a **New Hardware Found** window. Click **Cancel**.
3. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
4. Click the **Hardware** tab then click the **Device Manager** button to display the list of devices installed in the system.

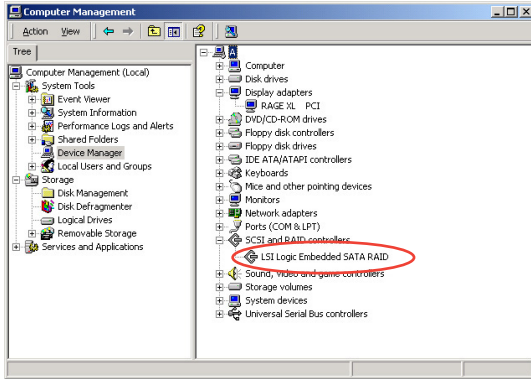


5. Right-click the **RAID controller** item, then select **Properties**.
6. Click the **Driver** tab, then click the **Update Driver** button.
7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.
8. Insert the RAID driver disk you created earlier to the floppy disk drive.
9. Select the option **“Search for a suitable driver for my device (recommended)”**, then click Next.
10. The wizard searches the RAID controller drivers. When found, click **Next** to install the drivers.
11. Click **Finish** after the driver installation is done.



To verify the RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the “+” sign before the item **SCSI and RAID controllers**. The **LSI Logic Embedded SATA RAID** or **Intel® 8201 GR/GH SATA RAID** items should appear.

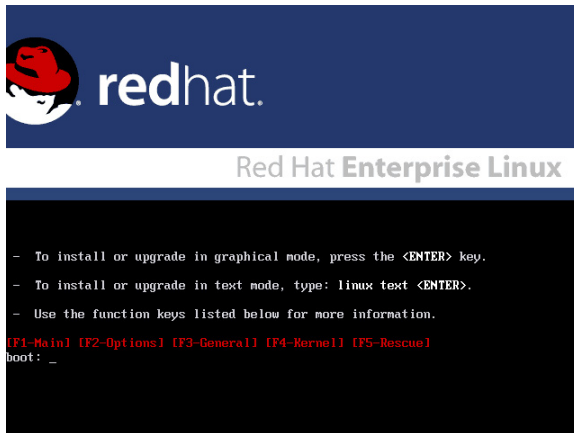


4. Right-click the **RAID controller driver** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

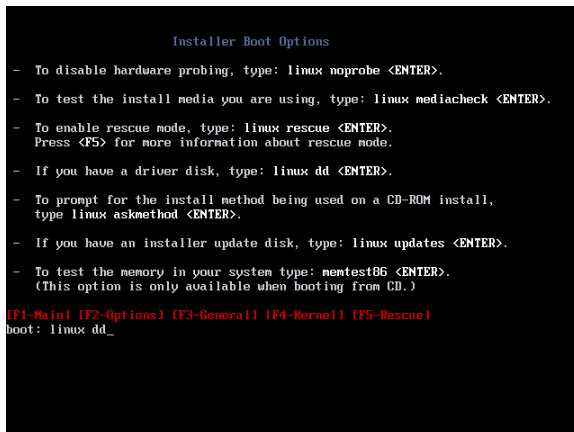
Red Hat® Enterprise ver. 3.0

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

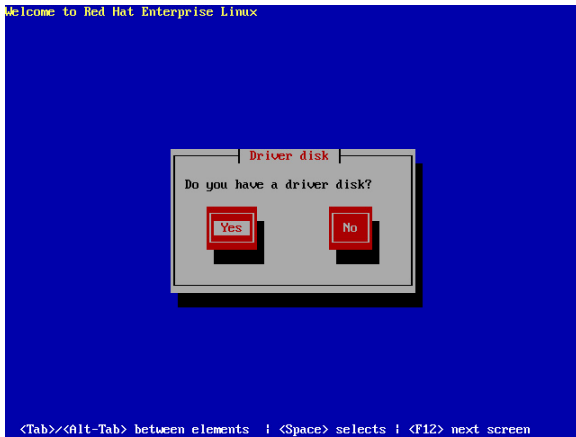
1. Boot the system from the Red Hat® Installation CD.



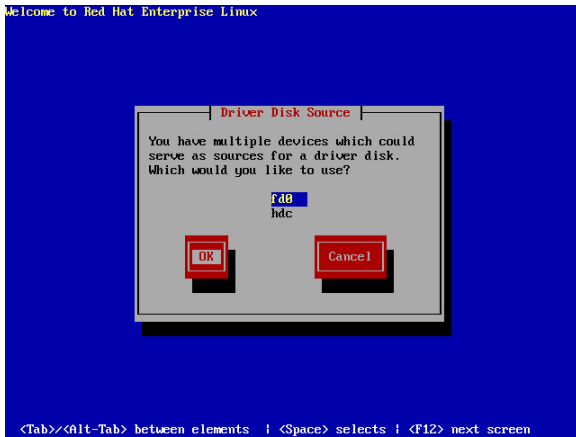
2. At the `boot:`, type `linux dd` , then press <Enter>.



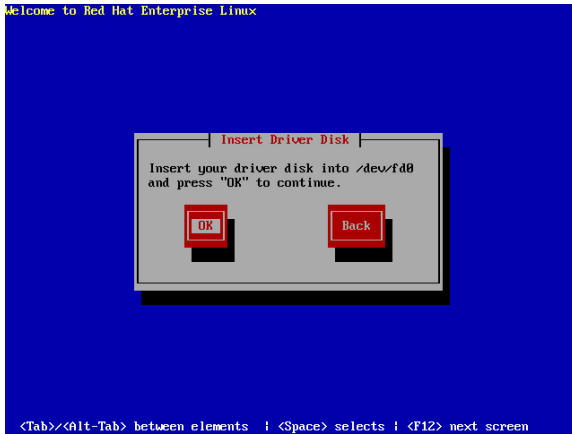
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>



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

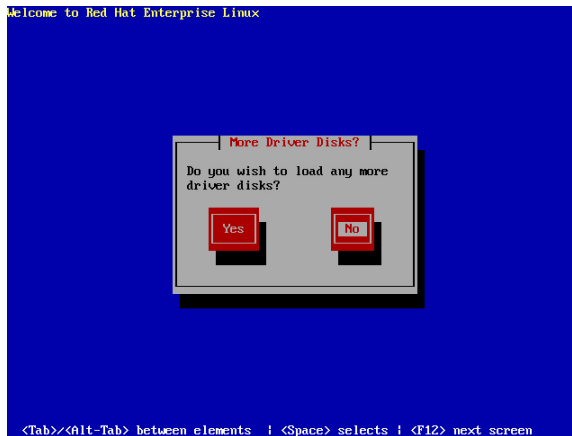


- When prompted, insert the Red Hat® Enterprise ver. 3.0 RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



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

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

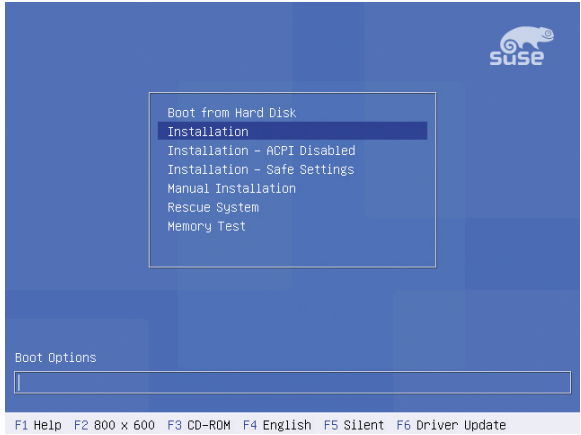


- Follow screen instructions to continue the OS installation.

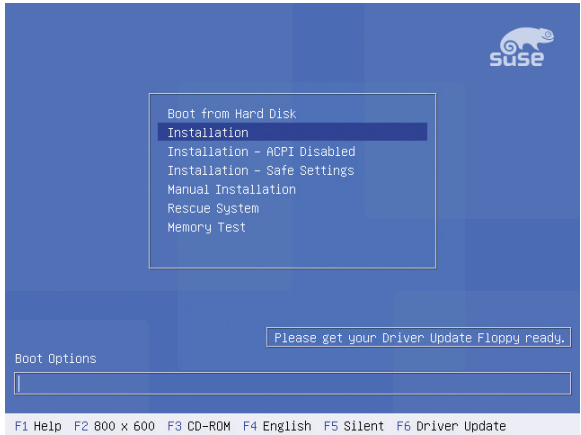
SuSE Linux

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

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

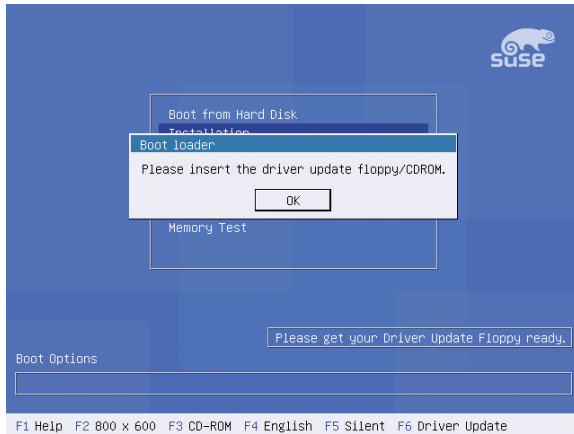


3. A message instructs you to prepare the RAID driver disk. Press <F6>.

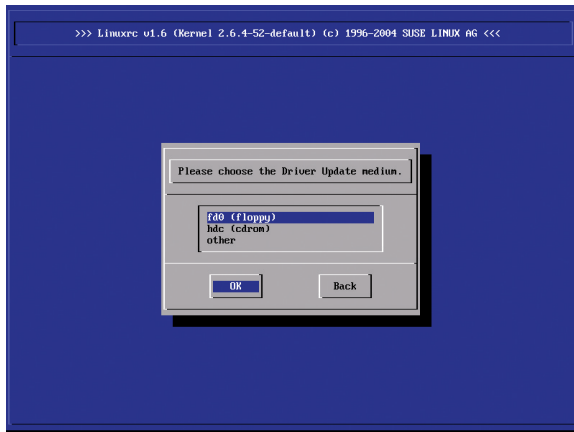


For SuSE Linux Enterprise Server 9.0 SP1 operating system, do not use OS bundled driver, otherwise your computer may become unstable due to OS limitation.

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



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



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

6.2 LAN driver installation

This section provides instructions on how to install the Broadcom BCM5721 LAN controller driver.

6.2.1 Windows® 2000/2003 Server

To install the Broadcom BCM5721 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.

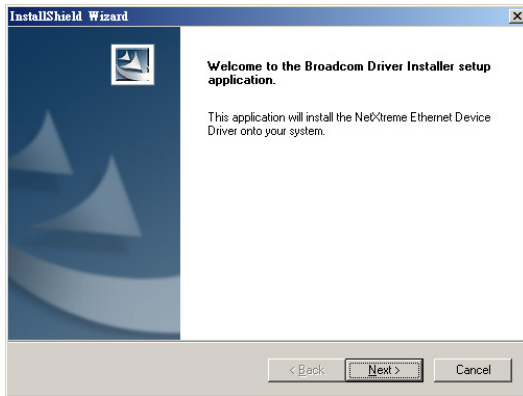


- Windows® automatically detects the LAN controllers and displays a **New Hardware Found** window. Click **Cancel** to close this window.
- If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the **ASSETUP.EXE**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

3. Click the **Broadcom BCM5721 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 ver. 3.0

Follow these instructions when installing the Broadcom 5721 LAN controller base driver for the Red Hat® Enterprise ver. 3.0 operating system.

Building the driver



Install first the Kernel Development tools before building the driver from the TAR file.

To build the driver from the TAR file:

1. Create a directory and extract the TAR files:
`tar xvzf bcm5700-<version>.tar.gz`
2. Build the driver `bcm5700.o` as a loadable module for the running kernel:
`cd bcm5700-<version>/src`
`make`
3. Test the driver by loading it:
`insmod bcm5700.o`
4. Install the driver and man page:
`make install`
5. Refer to Red Hat distribution documentation to configure the network protocol and address.

6.3 VGA driver installation

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

6.3.1 Windows® 2003 Server

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

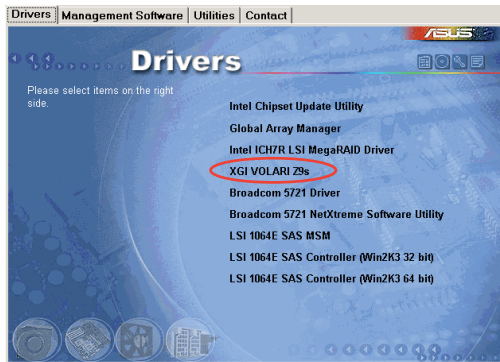
To install the XGI Graphicsdriver:

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

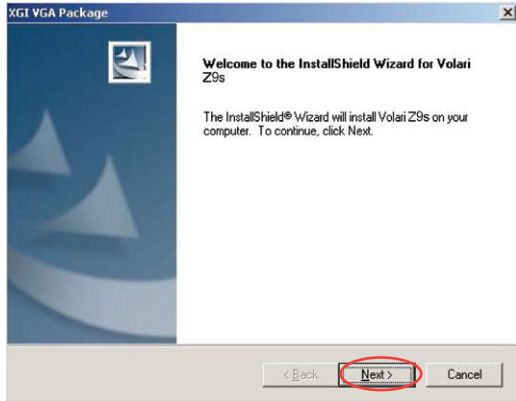


Windows® automatically detects the VGA controller and displays a **New Hardware Found** window. Click **Cancel** to close this window.

3. Click the item **XGI VOLARI Z9s** from the Drivers menu.



4. The **XGI VOLARI Z9s** window appears. Click **Next**. Follow screen instructions to complete installation.



6.3.2 Red Hat® Enterprise ver. 4.0

The Red Hat® Enterprise ver. 4.0 operating system automatically recognizes the XGI Graphics driver during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

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.

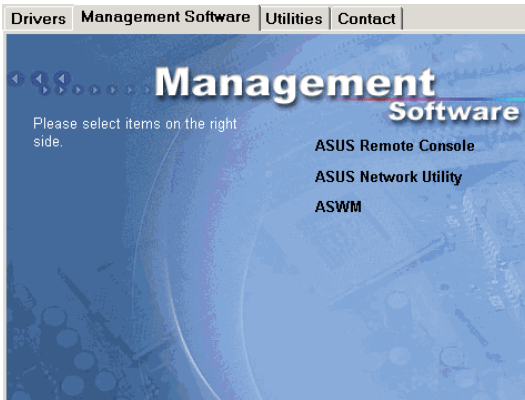


The screen display and driver options vary under different operating system versions.



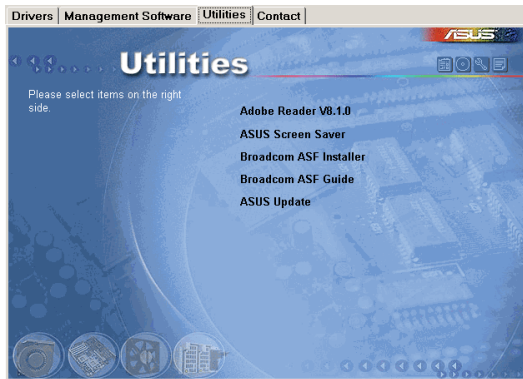
6.4.3 Management Software menu

The **Management Software** menu displays the available network and server monitoring application. 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.



The screenshot shows a web browser window with a navigation bar containing 'Drivers', 'Management Software', 'Utilities', and 'Contact'. The 'Contact' tab is selected. The page title is 'Contact' and the ASUS logo is in the top right. The content is organized into four columns, each representing a different region:

- ASUSTek COMPUTER INC. (Taiwan)**
 - Address: c. Li Te Road, Peitou, Taipei, Taiwan 11259
 - Telephone: +86-2-2894-3447
 - Fax: +86-2-2890-7798
 - Email: inf@asus.com.tw
 - Web site: <http://www.asus.com.tw>
 - Technical Support
 - Telephone: +86-2-2868-0909
 - +86-2-2894-3447 (0800-093-456)
 - Online Support: <http://support.asus.com/techserv/techserv.aspx>
- ASUS COMPUTER GmbH (Germany & Austria)**
 - Address: Harkort Str. 25, D-40890 Ratingen, Germany
 - Telephone: +49-2102-9599-0
 - Fax: +49-2102-9599-11
 - Web site: <http://www.asus.com.de>
 - Online Catalog: <http://www.asus.com.de/sales>
 - Technical Support
 - Telephone: +49-2102-9599-0
 - Fax: +49-2102-9599-11
 - Online Support: <http://support.asus.com/techserv/techserv.aspx>
- ASUS COMPUTER INTERNATIONAL (America)**
 - Address: 9730 Wilshire Drive, Fremont, CA 94538, USA
 - Telephone: +1-510-627-3398
 - Fax: +1-510-627-3398
 - Web site: usa.asus.com
 - Technical Support
 - Telephone: +1-510-797-3598
 - General Support: +1-810-797-3700
 - Online Support: <http://support.asus.com/techserv/techserv.aspx>
- ASUSTek COMPUTER INC.(China)**
 - Address: No.593, Changhai Road, Xinzhuang Industrial Zone, Minhang District, Shanghai, China
 - Telephone: +86-21-54421816
 - Fax: +86-21-54420099
 - Web site: <http://www.asus.com.cn>
 - Technical Support
 - Telephone: +86-21-34074610 (800-520-8655)
 - Online Support: <http://support.asus.com/techserv/techserv.aspx>

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

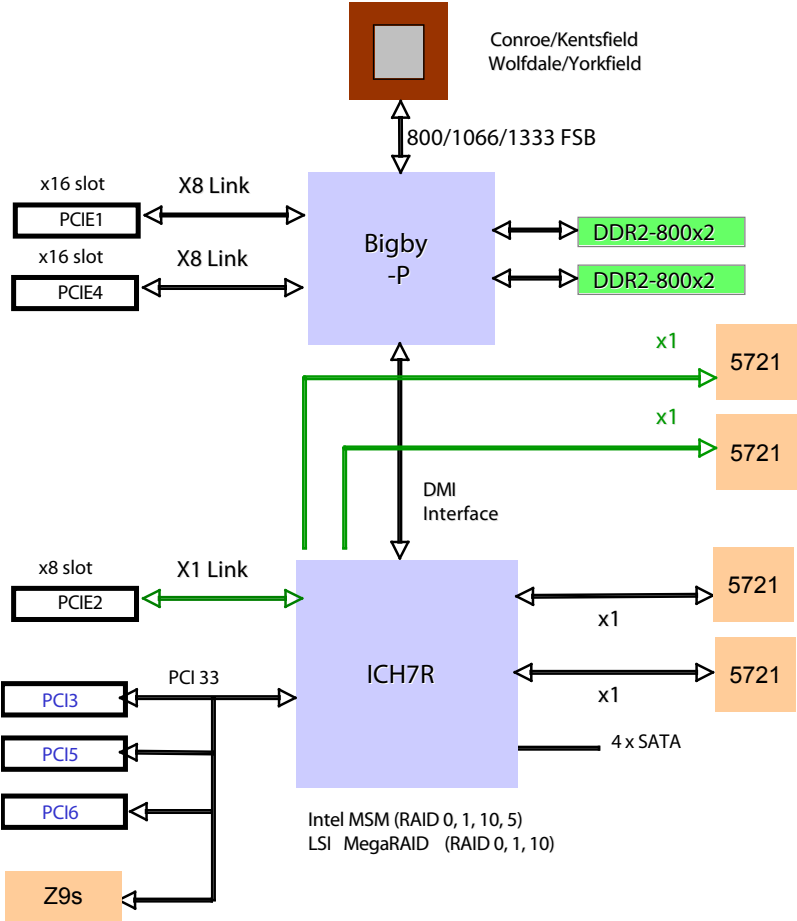
Reference information

Chapter summary

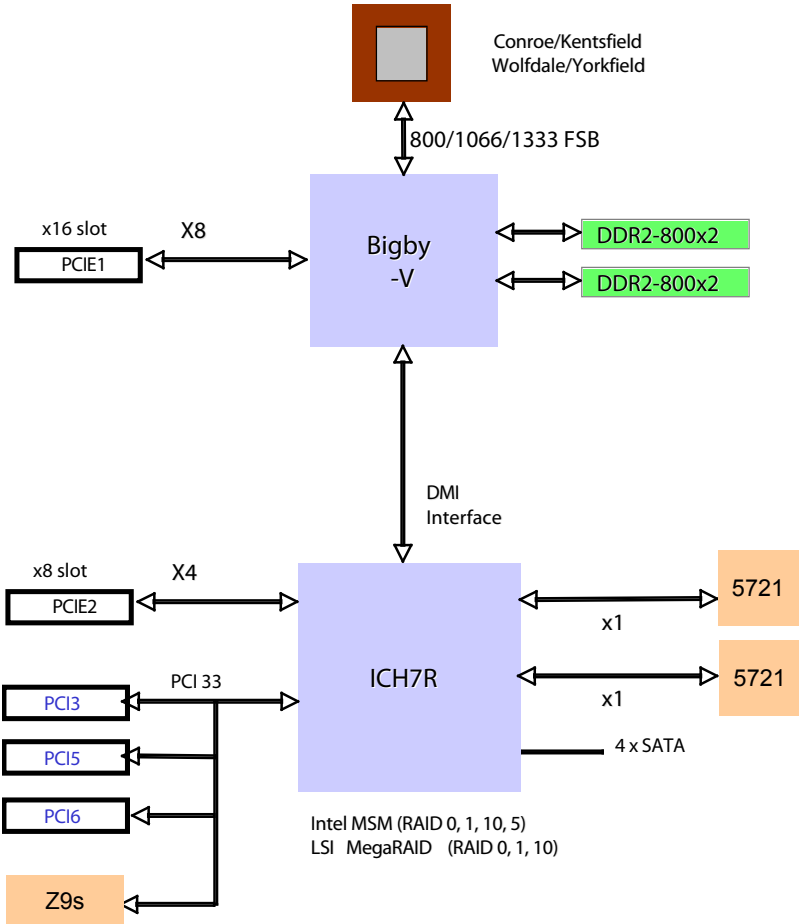


- A.1 P5BP-E/4L block diagram A-1
- A.2 P5BV-E block diagram A-2
- A.3 P5BV-E/SAS block diagram A-3

A.1 P5BP-E/4L block diagram



A.2 P5BV-E block diagram



A.3 P5BV-E/SAS block diagram

