

ASUS[®]

TS100-E5/P14

Intel[®] Xeon

3300/3200/3100/3000 Series

LGA775 Pedestal Server



E3763

First Edition

April 2008

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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.



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

Canadian Department of Communications Statement

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

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



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

Safety information

Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, contact a qualified service technician or your dealer. Ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you service.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Servicing of this product or units is to be performed by trained service personnel only.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.



This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

Lithium-Ion Battery Warning

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

CAUTION! This server system is heavy. Ask for assistance when moving or carrying the system.

About this guide

Audience

This user guide is intended for system integrators and experienced users with at least basic knowledge of configuring a server.

Contents

This guide contains the following parts:

1. **Chapter 1: Product Introduction**

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

2. **Chapter 2: Hardware setup**

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

3. **Chapter 3: Motherboard information**

This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.

4. **Chapter 4: BIOS information**

This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.

5. **Chapter 5: RAID configuration**

This chapter provides information on how to configure your hard disk drives as RAID sets.

6. **Chapter 6: Driver installation**

This chapter provides information on how to create a RAID set and how to install the drivers for system components. This chapter also describes the software applications that the barebone server supports.

7. **Appendix: Reference information**

This section provides information about the power supply unit and a troubleshooting guide for solving common problems when using the barebone server.

Conventions

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



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



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



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



NOTE: Tips and information to aid in completing a task.

Reference

Visit the ASUS websites worldwide that provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information for details.

Chapter 1

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



ASUS TS100-E5/PI4

Product introduction

1.1 System package contents

Check your system package for the following items.

Model Name	TS100-E5/PI4
Chassis	ASUS T10 Pedestal Chassis
Motherboard	ASUS P5BV-C/4L/TS100-E5
Component	1 x 300W Single Power Supply 1 x 95mm System Fan 4 x SATA Cables 1 x Floppy Disk Drive 4 x Internal HDD trays 1 x Front I/O Board
Accessories	1 x ASUS TS100-E5/PI4 User's Guide 1 x ASUS ASWM 2.0 User's Guide 1 x TS100-E5/PI4 Support CD (including ASWM*) 1 x IDE Cable (or pre-installed) 1 x AC Power Cable 1 x CPU Heatsink
Optional Items	CA eTrust Anti-virus Software CD SATA Backplane Board for Easy Swap

*ASUS System Web-based Management

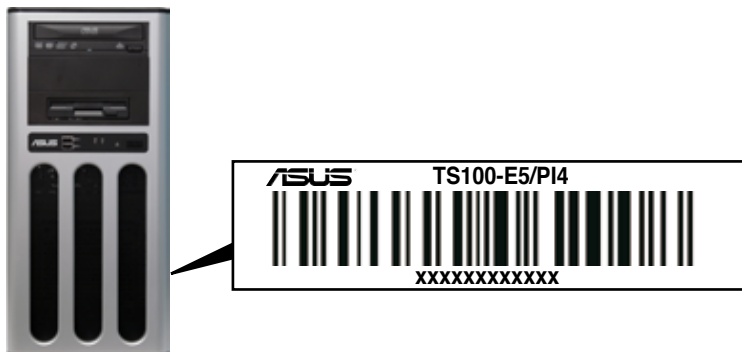


If any of the above items is damaged or missing, contact your retailer.

1.2 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 12 characters such as xxxxxxxxxxxx. See the figure below.

With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.



1.3 System specifications

The ASUS TS100-E5/PI4 is a server featuring the ASUS P5BV-C/4L/TS100-E5 motherboard. The server supports Intel® LGA775 Xeon® 3300 / 3200 / 3100 / 3000 Series processors with EM64T technology, plus other latest technologies through the chipsets onboard.

Model Name		TS100-E5/PI4
Processor / System Bus		1 x Socket LGA775
		Intel® Xeon® 3300 / 3200 / 3100 / 3000 Series processors
		Quad-Core/Dual-Core
		FSB 1333 / 1066 / 800 MHz with EM64T
Core Logic		Intel® 3200 Memory Controller Hub (MCH) Intel® ICH7R
ASUS Features	Smart Fan	√
	ASWM2.0	√
Memory	Total Slots	4 (Dual-Channel)
	Capacity	Maximum up to 8GB
	Memory Type	Unbuffered ECC or non-ECC DDR2 800 / 667 memory modules
	Memory Size	512MB, 1GB, and 2GB
Expansion Slots	Total PCI/PCI-X/PCI-E Slots	5
	Slot Type	1 x PCIe x16 slot (x8 link) 1 x PCIe x8 slot (x1 link) 3 x PCI 32-bit / 33MHz slot (5V)
Storage	SATA Controller	8 x SATAII 300MB/s ports Intel® ICH7R: Intel Matrix Storage (for Windows only) - Supports software RAID 0, 1, 5 and 10 LSI MegaRAID (for Linux and Windows) - Supports software RAID 0,1, and 10 Marvell 6145 SATA Controller: - Supports software RAID 0, 1, and 10 (for Linux) - Supports software RAID 0, 1, 10 and 5 (for Windows)
HDD Bays	I = internal A or S will be hot-swappable	4 x Internal SATAII HDD Bays
Networking	LAN	4 x Marvell® 8056 PCI-E GbE LANs
Graphic	VGA	XGI Z9S VGA Controller / 32MB DDRII SDRAM

(continued on the next page)

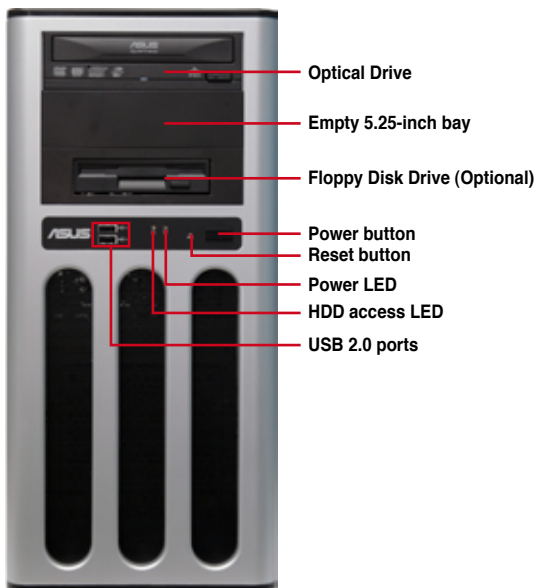
Auxiliary Storage FDD / CD / DVD		1 xFDD (Optional) 2 x 5.25" Optical Drives (Options: 16X DVD-ROM / DVD-RW)
Onboard I/O		1 x External Serial Port 4 x RJ-45 ports 4 x USB 2.0 ports (Front x 2, Rear x 2) 1 x VGA port 1 x PS/2 keyboard port 1 x PS/2 mouse port
OS Support		Windows® Server 2003 R2 Enterprise 32/64-bit RedHat® Enterprise Linux AS5.0 32/64-bit SuSE® Linux Enterprise Server 10.0 32/64-bit (Subject to change without any notice)
Anti-virus Software		CA® eTrust™ 7.1 anti-virus software (Optional)
Management Solution	Software	ASUS ASWM 2.0
Dimension (HH x WW x DD)		441mm x 207mm x 517mm
Net Weight Kg (CPU, DRAM & HDD not included)		16 Kg
Power Supply		300W Single Power Supply (Non-Auto Switching)
Environment		Operation temperature: 10°C~35°C Non operation temperature: -40°C~70°C Non operation humidity: 20%~90% (Non-condensing)

*Specifications are subject to change without notice.

1.4 Front panel features

The barebone server displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators, optical drive, and two USB ports are located on the front panel.

The drive bays, power and reset buttons, LED indicators, CD/DVD-ROM drive, floppy drive, and USB 2.0 ports are located on the front panel. For future installation of 5.25-inch devices, two drive bays are available.



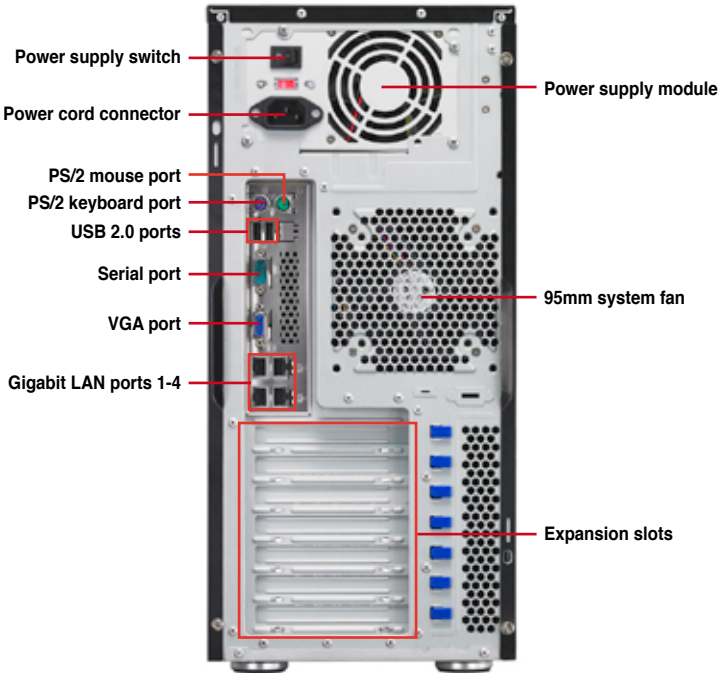
Refer to section 1.7.1 **Front panel LEDs** for the LED descriptions.

1.5 Rear panel features

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

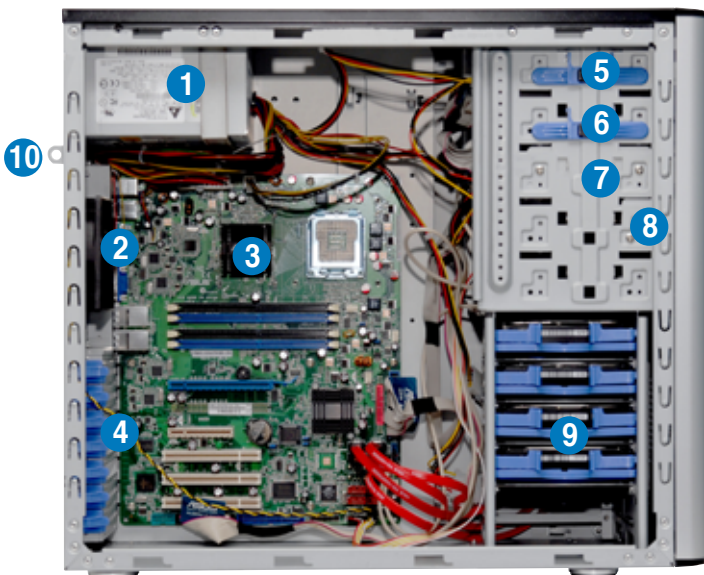


The ports for the PS/2 keyboard, PS/2 mouse, USB, VGA, and Gigabit LAN do not appear on the rear panel if motherboard is not present.



1.6 Internal features

The barebone server includes the basic components as shown.



1. Power supply unit
2. 95mm system fan
3. ASUS P5BV-C/4L/TS100-E5 motherboard
4. Expansion card locks
5. Optical drive
6. 5.25-inch drive bay
7. Floppy disk drive
8. Front I/O board (hidden)
9. Internal HDD bays
10. Chassis intrusion switch

1.7 LED information

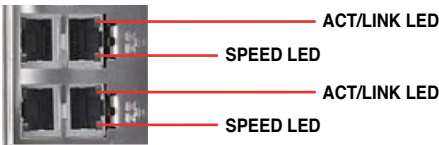
1.7.1 Front panel LEDs



HDD Access LED Power LED

LED	Icon	Display status	Description
Power LED		ON	System power ON
HDD Access LED		OFF Blinking	No activity Read/write data into the HDD

1.7.2 LAN (RJ-45) LEDs



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

Chapter 2

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



ASUS TS100-E5/PI4

Hardware setup

2.1 Chassis cover

2.1.1 Removing the left side cover

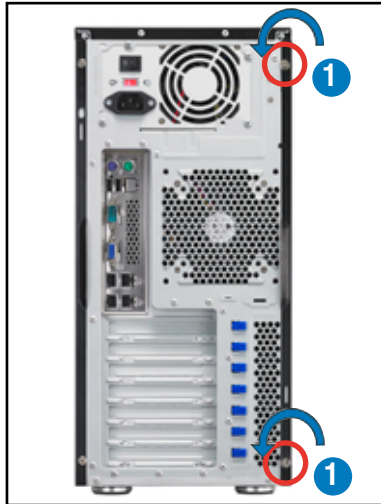
You have to remove the left side cover to install or replace internal components of the server system.



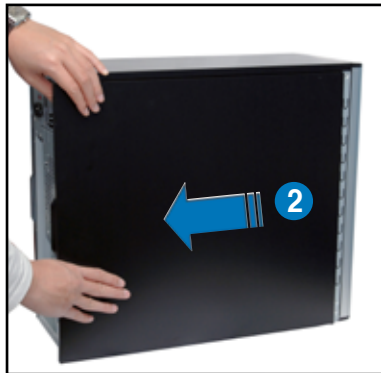
- Ensure that you unplug the power cord before removing the side cover.
- Take extra care when removing the side cover. Keep your fingers from components inside the chassis that can cause injury, such as the CPU fan, rear fan, and other sharp-edged parts.

To remove the left side cover

1. Remove the two screws that secure the left side cover to the chassis.



2. Slide the left side cover for about half an inch toward the rear until it is disengaged from the chassis.
3. Carefully lift the cover and set it aside.



2.1.2 Removing the right side cover

Most internal components can be installed or replaced after removing the left side cover. However, for components such as Serial ATA hard disk drives, you may have to remove the right side cover for easier component installation or replacement.

To remove the right side cover

1. Remove the two screws that secure the left side cover to the chassis.



2. Slide the right side cover for about half an inch toward the rear until it is disengaged from the chassis.
3. Carefully lift the cover and set it aside.



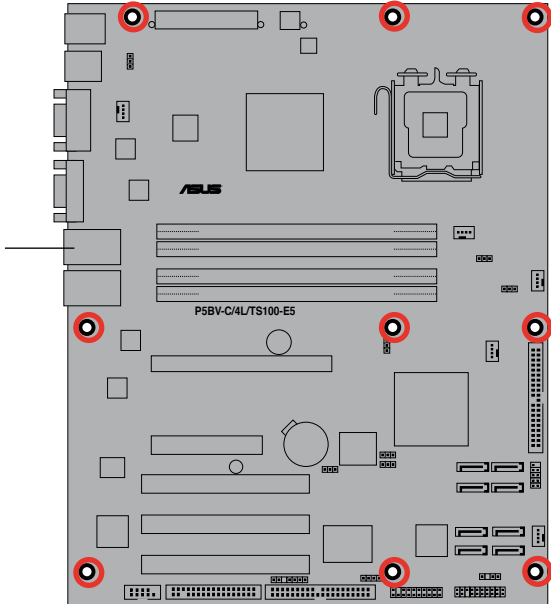
2.2 Motherboard overview

The barebone server comes with the P5BP-C/4L/TS100-E5 motherboard already installed. The motherboard is secured to the chassis by nine (9) screws as indicated by the circles in the illustration below.



Refer to **Chapter 3: Motherboard information** for detailed information on the motherboard.

Place this side towards the rear of the chassis



Ensure to unplug the power cord before installing or removing any motherboard component or connection. Failure to do so can cause you physical injury and damage motherboard components.

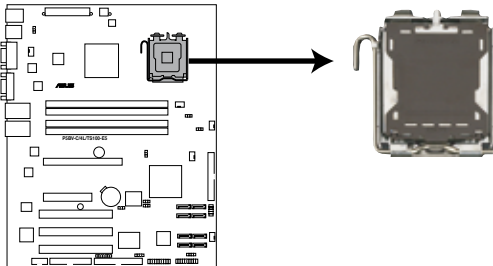
2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Xeon 3300 / 3200 / 3100 / 3000 Series processor in the 775-land package

2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

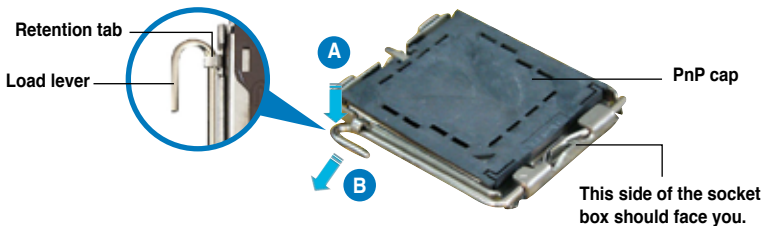


P5BV-C/4L/TS100-E5 CPU Socket 775



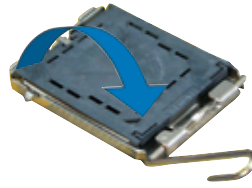
Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

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

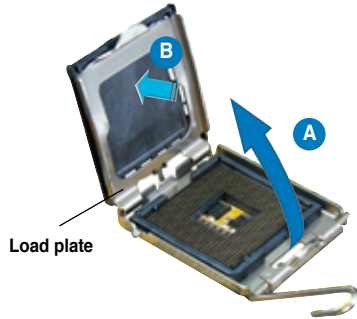


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

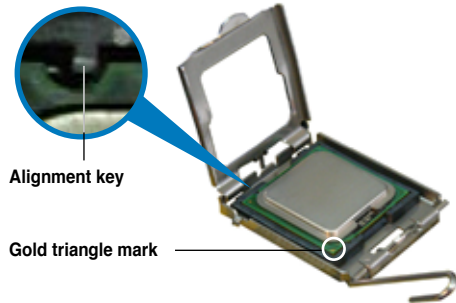
3. Lift the load lever in the direction of the arrow to a 135° angle.



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



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



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

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



The motherboard supports Intel® Xeon 3300 / 3200 / 3100 / 3000 Series 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

The Intel® Xeon™ processors require an Intel certified or ASUS qualified heatsink and fan assembly to ensure optimum thermal condition and performance.

When you buy a boxed Intel CPU, the package includes the cooler, fan, retention brackets, screws, thermal grease, installation manual, and other items that are necessary for CPU installation.



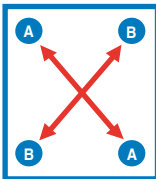
- Ensure that you have applied the thermal grease to the top of the CPU before installing the heatsink and fan.
- Refer to the installation manual that came with the CPU package for details on heatsink/fan assembly and installation.

To install the CPU cooler and fan

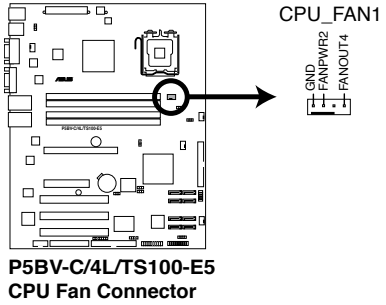
1. Place the cooler on top of the installed CPU, making sure that the four screws match the holes on the support plate.



2. Use a screwdriver to tighten the four cooler screws in a diagonal sequence.



3. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN1.



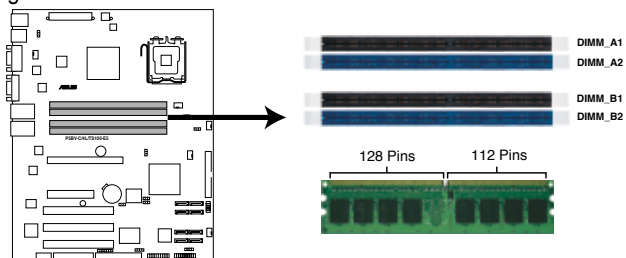
Do not forget to connect the CPU_FAN1 connector! Hardware monitoring errors can occur if you fail to plug this connector.

2.4 System memory

2.4.1 Overview

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

The figure illustrates the location of the DDR2 DIMM sockets:



P5BV-C/4L/TS100-E5 240-pin DDR2 DIMM Sockets

2.4.2 Memory configurations

You may install 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, it is recommended that you obtain memory modules from the same vendor. Refer to the DDR2 Qualified Vendors List at the ASUS web site.
- When installing one or two DIMMs, install the DIMM(s) to the blue slots (DIMM_A2/DIMM_B2).
- Three DDR 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.

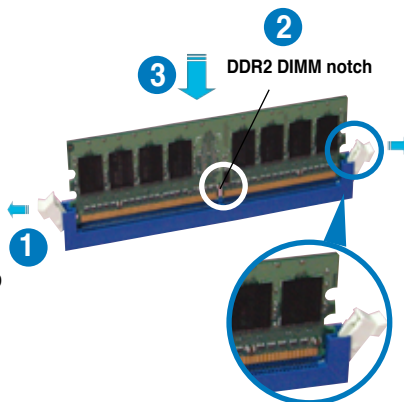
2.4.3 Installing a DIMM



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.



Unlocked retaining clip



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

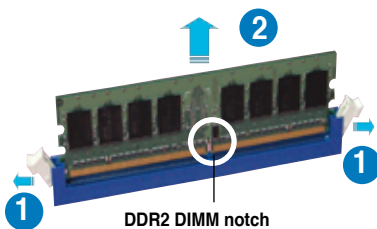
2.4.4 Removing a DIMM

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.



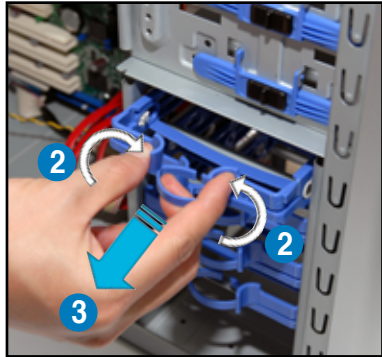
2. Remove the DIMM from the socket.

2.5 Installing hard disk drives

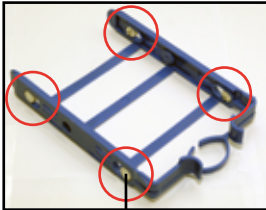
The server system supports four Serial ATA hard disk drives through screw-free hard disk drive holders.

To install a Serial ATA hard disk drive

1. Follow the instruction in section **2.1.2 Removing the right side cover** to remove the right side cover.
2. Slightly push inward the HDD holder handles to release the HDD holder lock from the HDD bay, as shown in the right figure.
3. Carefully pull the HDD holder out of the HDD bay, as shown in the right figure.



4. Locate the four pin caps on the HDD holder. Align one side of the HDD screw holes to one side of the cage pin caps, as shown in the right figure.



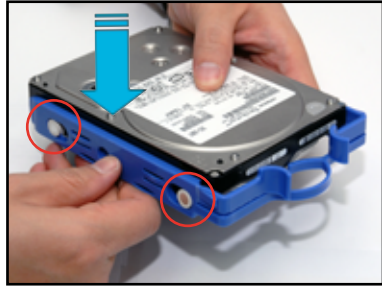
Pin cap



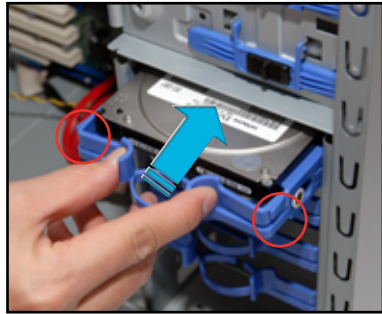
5. Follow the direction of the arrow in the right figure and slightly bend the HDD holder.



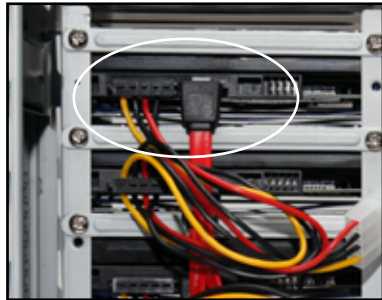
6. Attach the other side of the HDD screw holes to the cage pin caps, as shown in the right figure.



7. Carefully insert the HDD holder and push it all the way to the depth of the bay until the cage handles fix to the HDD bay.



8. From the other side of the chassis, connect one end of the 7-pin SATA cable to the SATA connector at the end of the drive. Connect the other end of the cable to a SATA connector on the motherboard.
9. Connect a 15-pin SATA power plug to the SATA power connector at the back of the drive.



Use either the 15-pin SATA power connector OR the legacy 4-pin power connector. DO NOT use both to prevent damage to components and to keep the system from becoming unstable.

2.6 Installing 5.25-inch drives



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

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



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



2.6.1 Removing the front panel cover

To remove the front panel cover

1. Follow the instructions in section **2.1 Chassis cover** to remove both the side covers.
2. Locate the front cover slot on the bottom of the front cover.



3. Carefully remove the front panel cover, and then set aside.



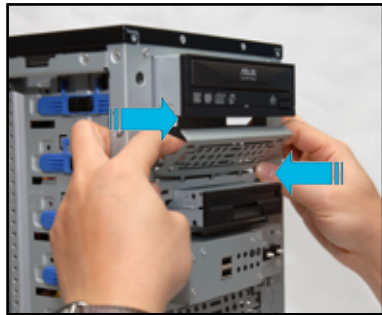
2.6.2 Installing an additional optical drive



Configure your optical drive as Master/Slave device before installing it to the drive bay. Refer to the optical drive documentation for details.

To install an additional optical drive

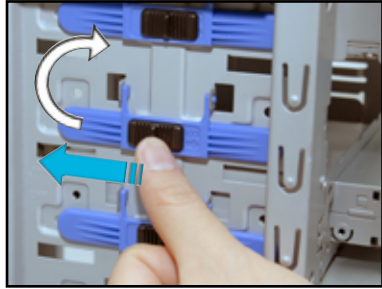
1. Select the drive bay you intend to use. Push the knock down metal cover in and out of the chassis until it is removed.



Take extra care when removing the knock down metal cover. Use tools such as a screw driver to bend and remove the metal cover to avoid physical injury.



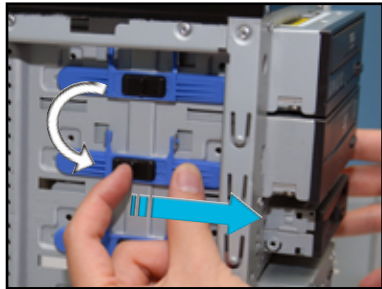
2. Follow the direction of the arrows in the figure to unlock and lift the drive bay lock.



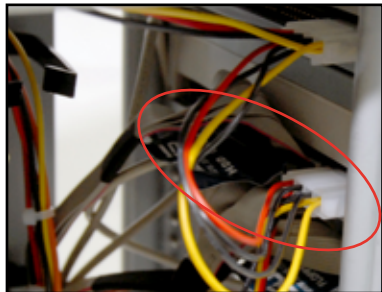
3. Carefully insert the drive to the bay.



4. Align the drive to the bay screw holes, and then lock the drive bay lock.



5. Connect a 40-pin IDE cable (from the first optical drive) and a 4-pin power plug (from the power supply unit) to the connectors on the drive.



6. Remove the front panel bay cover opposite the drive bay you used by pressing the hooks inward.



7. Reinstall the front panel and side covers when done.



2.7 Installing expansion cards

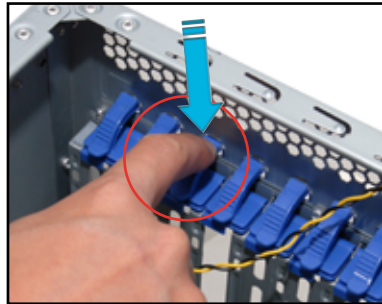
The system comes with one PCI Express x16 slot (x8 link), one PCI Express x8 slot (x1 link), and three PCI 32-bit / 33MHz slots.



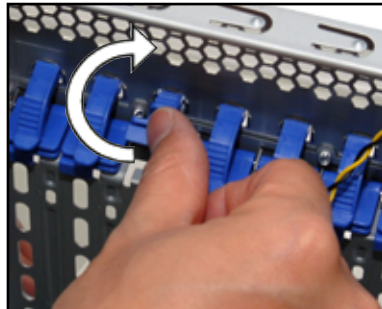
Ensure to unplug the power cable before installing or removing an expansion card. Failure to do so may cause severe damage to the motherboard and other system components!

To install an expansion card

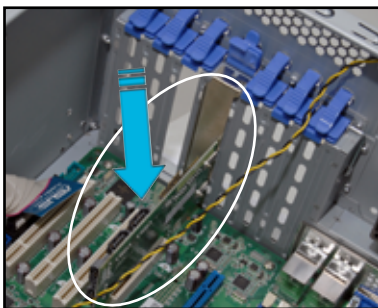
1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Lay the system on its side on a flat, stable surface.
3. Select the slot that you intend to use, and then remove the knock down metal cover.
4. Slightly push down the expansion card lock to unlock it from the chassis.



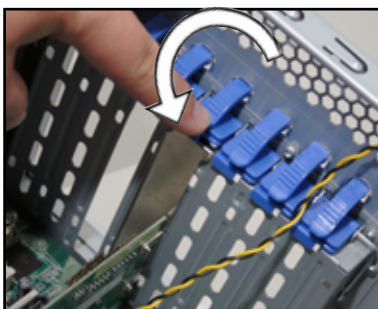
5. Lift the expansion card lock by following the direction of the arrow in the right figure.



6. Align the card connector with the slot, then press firmly until the card is completely seated on the slot.



7. Restore the expansion card lock to its original position and push it down until you hear a click sound.



2.8 Removing components

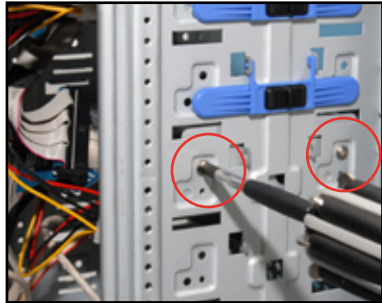
You may need to remove previously installed system components when installing or removing other system components, or when replacing a defective component. This section tells how to remove the following components:

1. Floppy disk drive (FDD)
2. System fan

2.8.1 Removing the floppy disk drive

To remove the FDD

1. Disconnect the FDD power plug and signal cable.
2. Remove all four screws on the both side of the FDD bay.



3. Carefully pull the FDD bay from the chassis.



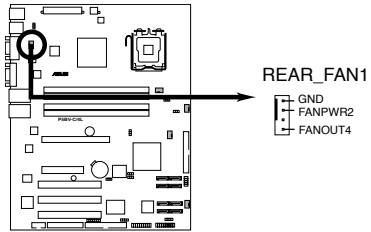
4. Remove the four screws from the FDD bay to release the FDD.



2.8.2 Removing the system fan

To remove the system fan

1. Disconnect the chassis fan cable from the REAR_FAN1 connector on the motherboard.

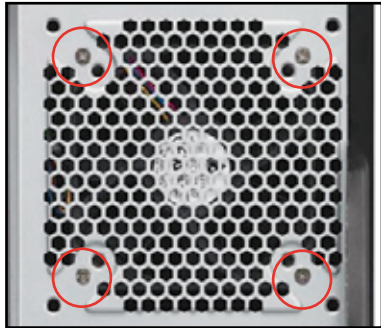


P5BV-C/4L/TS100-E5 Rear Fan Connector

2. Locate and remove four system fan screws at the rear panel. Keep the screws for later use.



Hold the system fan with one hand while removing the system screws.



3. Remove the system fan, and then set aside.

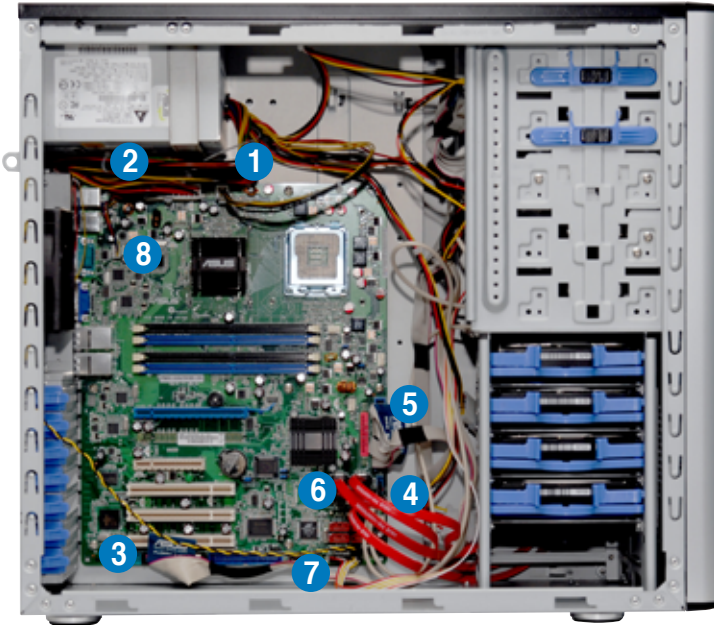


2.9 Connecting cables

The TS100-E5/PI4 chassis includes the power and signal cables that you need to connect to the motherboard, storage drives, and other devices that you intend to install.



- The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.
- Refer to Chapter 3 for detailed information on the connectors.



Standard cables connected to the motherboard

- | | |
|-----------------------------------|-----------------------------|
| 1. 4-pin ATX 12V power plug | 5. IDE signal cable |
| 2. 24-pin ATX power plug | 6. Serial ATA signal cables |
| 3. Floppy disk drive ribbon cable | 7. System panel cable |
| 4. Front panel USB 2.0 cable | 8. System fan cable |

Chapter 3

This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.



ASUS TS100-E5/PI4

Motherboard info

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3.	Force BIOS recovery settings (3-pin RECOVERY1)	3-5
4.	Fan mode setting (3-pin CPUFAN_SET1 and CHAFAN_SET1)	3-6

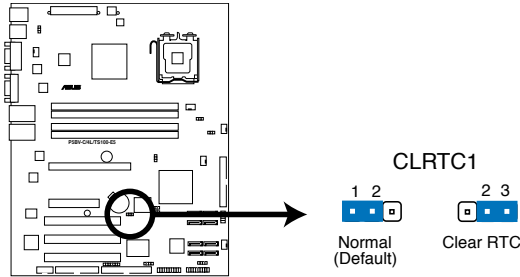
Rear panel connectors		Page
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2.	PS/2 keyboard port (purple)	3-7
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5.	USB connector (10-1 pin USB34)	3-11
6.	Serial port connector (10-1 pin COM2)	3-12
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9.	Backplane SMBus connector (6-1 pin BPSMB1)	3-14
10.	CPU, Rear, and Front fan connectors (4-pin FRNT_FAN1-3, REAR_FAN1 and CPU_FAN1)	3-14
11.	Chassis intrusion connector (4-1 pin CHASSIS)	3-15
12.	TPM connector (20-pin TPM)	3-15
13.	System panel connector (20-pin PANEL1)	3-16

3.2 Jumpers

1. Clear RTC RAM (CLRRTC1)

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



P5BV-C/4L/TS100-E5 Clear RTC RAM

To erase the RTC RAM:

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



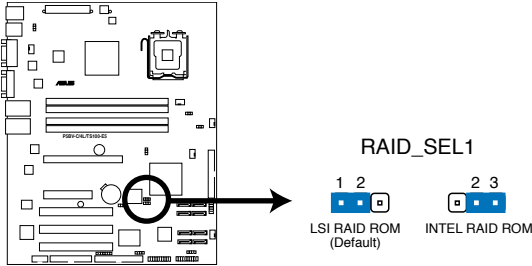
Except when clearing the RTC RAM, never remove the cap on CLRRTC jumper default position. Removing the cap will cause system boot failure!



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

2. RAID controller selection (3-pin RAID_SEL1)

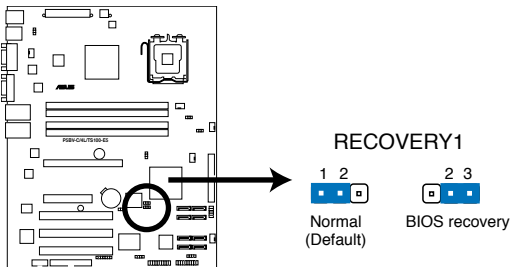
This jumper allows you to select the RAID configuration utility to use when you create disk arrays. Place the jumper caps over pins 1–2 if you want to use the LSI Logic Embedded SATA RAID Setup Utility (default); otherwise, place the jumper caps over pins 2–3 to use the Intel® Matrix Storage Manager.



P5BV-C/4L/TS100-E5 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.



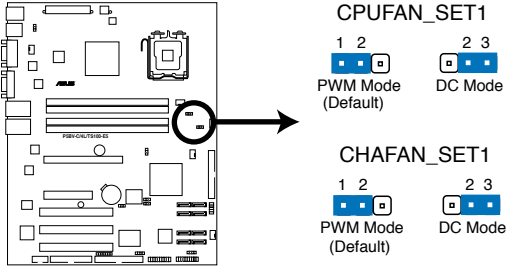
P5BV-C/4L/TS100-E5 BIOS Recovery Setting

To update the BIOS

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

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

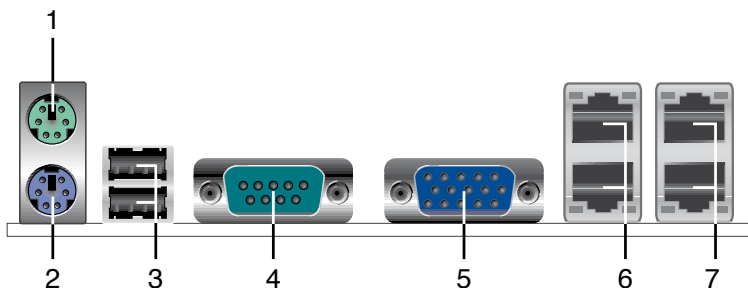
These jumpers allow you to connect either a 3-pin or a 4-pin fan cable plug to the CPU fan or Chasis fan connectors Set these jumpers to pins 1-2 Short PWM mode if you are using a 4-pin fan cable plug, or to pins 2-3 Short DC mode if you are using a 3-pin plug.



P5BV-C/4L/TS100-E5 Fan Mode Setting

3.3 Connectors

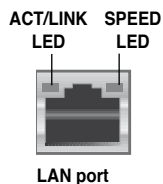
3.3.1 Rear panel connectors



1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.
3. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
4. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.
5. **VGA port.** This port is for a VGA monitor or other VGA-compatible devices.
6. **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.)
7. **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.)

LAN port LED indications

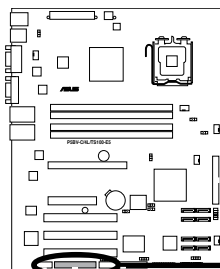
Activity/Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	No link or 10 Mbps connection
GREEN	Linked	YELLOW	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



3.3.2 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.



FLOPPY



PIN1

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

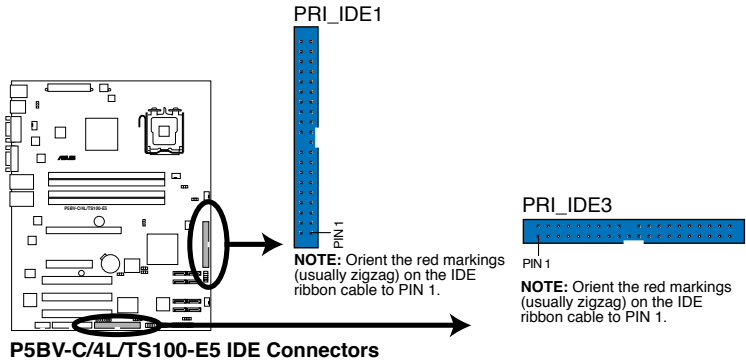
**P5BV-C/4L/TS100-E5
Floppy Disk Drive Connector**



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

2. ICH7R Primary IDE connector (40–1 pin PRI_IDE1 and PRI_IDE3)

The onboard IDE connector is for the Ultra DMA 133/100 signal cable. There are three connectors on each Ultra DMA 133/100 signal cable: blue, black, and gray. Connect the blue connector to the motherboard's IDE connector, then select one of the following modes to configure your device.



	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
	Slave	Slave	



- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra ATA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra ATA 100/66/33 IDE devices.

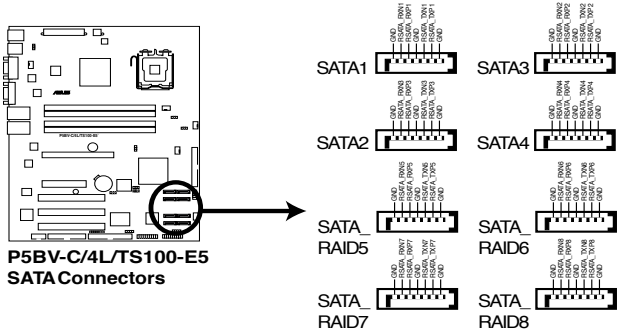


If any device jumper is set as "Cable-Select," make sure all other device jumpers have the same setting.

3. Serial ATA connectors (7-pin SATA1-4)

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 10 and RAID 5 configuration using the Intel® Matrix Storage Technology or RAID 0, RAID 1 and RAID 10 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 **4.3.5 IDE Configuration** for details.



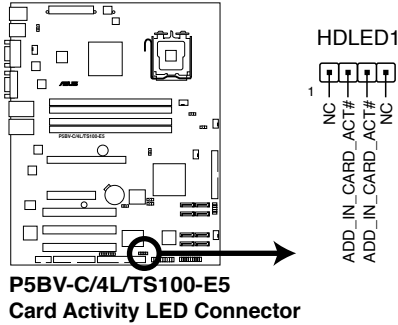
- Use only two Serial ATA RAID connectors for each RAID 0 or RAID 1 set.
- When using the connectors in **IDE** mode, connect the primary (boot) hard disk drive to the SATA1 or SATA3 connector. Refer to the table below for the recommended SATA hard disk drive connections.

Serial ATA hard disk drive connection

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

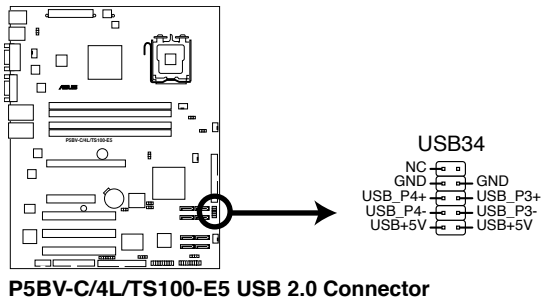
4. Hard disk activity LED connector (4-pin HDLED1)

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



5. USB connector (10-1 pin USB34)

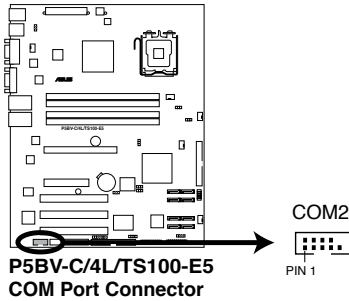
This connector is for USB 2.0 ports. Connect the USB module cable to this connector, then install the module to a slot opening at the back of the system chassis. This USB connector complies with USB 2.0 specification that supports up to 480 Mbps connection speed.



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.



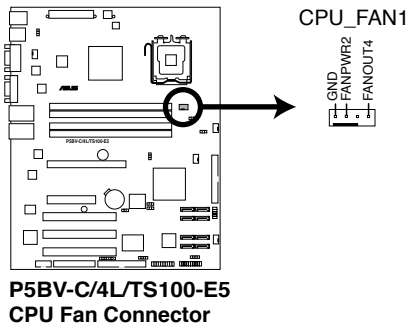
The Serial port module is purchased separately.

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.

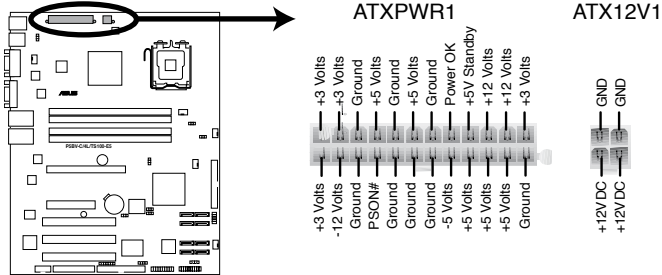


Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



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

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



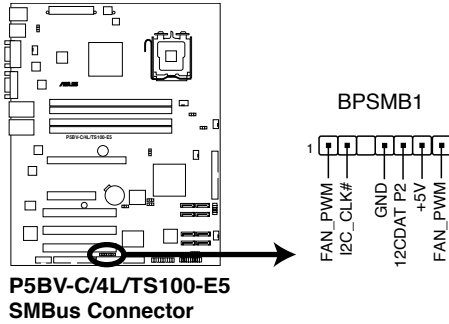
P5BV-C/4L/TS100-E5 ATX Power Connector



- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 450 W.
- Do not forget to connect the 4-pin ATX12V1 power plug; otherwise, the system will not boot.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- If you are uncertain about the minimum power supply requirement for your system, refer to the **Recommended Power Supply Wattage Calculator** at <http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us> for details.

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

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

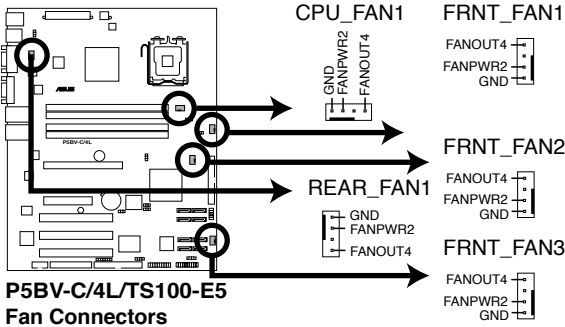


10. CPU, Rear, and Front Fan connectors (4-pin FRNT_FAN1-3, REAR_FAN1 and CPU_FAN1)

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 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!

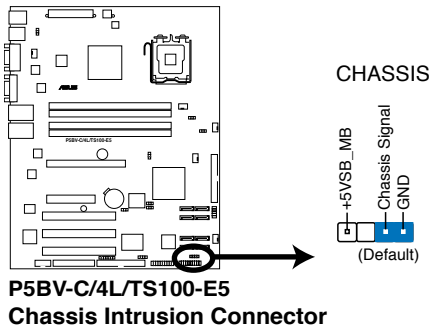


Only the CPU_FAN1 connector supports the ASUS Smart Fan feature.

11. Chassis intrusion connector (4-1 pin CHASSIS)

This connector is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.

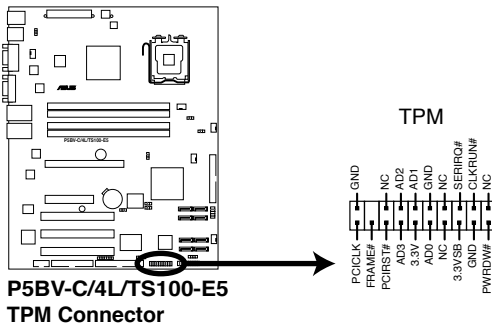
By default, the pins labeled “Chassis Signal” and “Ground” are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.



12. TPM connector (20- pin TPM)

This connector is used to connect a Trusted Platform Module (TPM) Card.

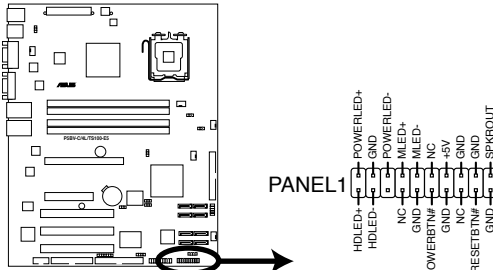
You need to install ASUS TPM card to use this feature function.



The TPM module is purchased separately.

13. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.



P5BV-C/4L/TS100-E5
System Panel Connector

- **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.

Chapter 4

This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.



ASUS TS100-E5/PI4

BIOS information

4.1 Managing and updating your BIOS

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

1. **ASUS AFUDOS** (Updates the BIOS in DOS mode using a bootable floppy disk.)
2. **ASUS CrashFree BIOS 2** (Updates a corrupted BIOS file using the floppy disk that contains the updated BIOS file.)

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 AFUDOS utility.

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® Server 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:



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

1. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.
2. Boot the system in DOS mode, then at the prompt type:

```
afudos /o[filename]
```

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

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

Main filename Extension name

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

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

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

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

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



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

2. Copy the AFUDOS utility (`afudos.exe`) from the motherboard support CD to the bootable floppy disk you created earlier.
3. Boot the system in DOS mode, then at the prompt type:

```
afudos /i [filename]
```

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

```
A:\>afudos /iTS100-E5.ROM
```

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

```
A:\>afudos /iTS100-E5.ROM

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

- Bootblock checksum ...OK
- Module checksums .....OK
- Erasing flash.....done
- Writing flash .....0x0008cc00 (9%)

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 /iTS100-E5.ROM
=====
                        AMI Firmware Update Utility
      Copyright (C)2004 American Megatrends Inc. All Rights Reserved.  Ver.4.04
                        ASUSTEK Ver. 3.12
=====

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

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 2 utility

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



- Prepare 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 to **TS100-E5.ROM**.

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

1. Turn on the system.
2. Insert the floppy disk with the original or updated BIOS file to the floppy disk drive.



Download the original or the latest BIOS file for this motherboard from ASUS website (www.support.asus.com/download).

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 "TS100-E5.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 during the Power-On-Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

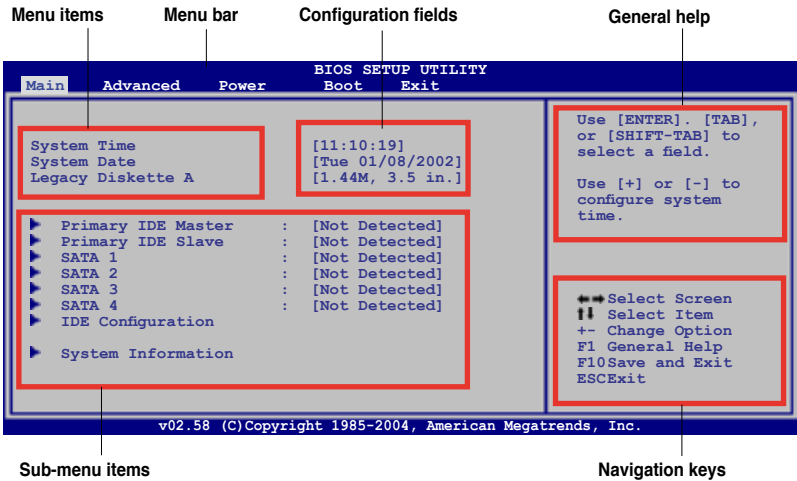
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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.

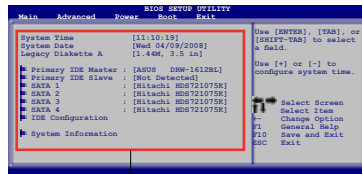


Some of the navigation keys differ from one screen to another.

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.

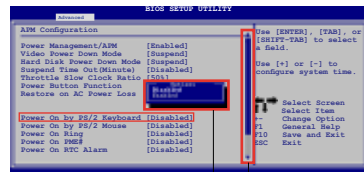
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to **4.2.7 Pop-up window**.

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

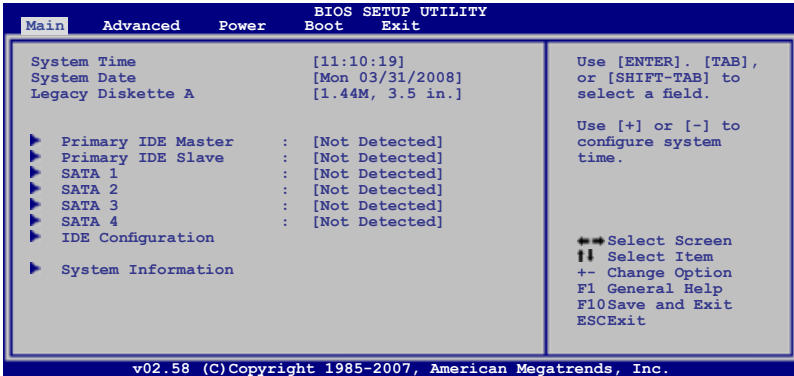
At the top right corner of the menu screen is a brief description of the selected item.

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 Date [Day xx/xx/xxxx]

Allows you to set the system date.

4.3.2 System Time [xx:xx:xx]

Allows you to set the system time.

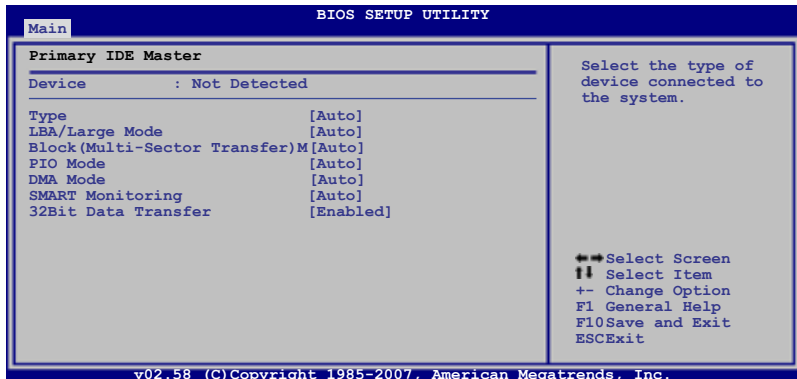
4.3.3 Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed.

Configuration options: [Disabled] [360K, 5.25 in.] [1.2M , 5.25 in.] [720K , 3.5 in.] [1.44M, 3.5 in.] [2.88M, 3.5 in.]

4.3.4 Primary IDE Master/Slave, SATA1/2/3/4

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

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

Configuration options: [Disabled] [Auto]

PIO Mode [Auto]

Selects the PIO mode.

Configuration options: [Auto] [0] [1] [2] [3] [4]

DMA Mode [Auto]

Selects the DMA mode.

Configuration options: [Auto] [SWDMA0~2] [MWDMA0~2] [UDMA0~5]

SMART Monitoring [Auto]

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

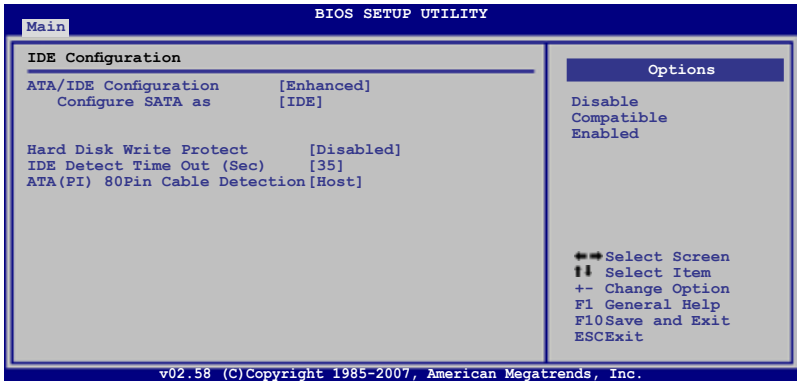
32Bit Data Transfer [Enabled]

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.



ATA/IDE Configuration [Enhanced]

Disables or allows selection of the IDE operation mode depending on the operating system (OS) that you installed. Set to [Enhanced Mode] if you are using native OS, such as Windows® 2000/XP/Vista. Set to [Compatible Mode] if you are using legacy OS, such as Windows® ME/98/NT and MS-DOS.

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



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

Configure SATA as [IDE]

This sub-item appears only when you set the **SATA Configuration** item to [Compatible] or [Enhanced] and allows you to set the SATA configuration.

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



- If you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices, keep the default setting [IDE].
- If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), set this item to [AHCI]. The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.
- If you want to create a RAID 0, RAID 1, RAID 5, RAID 10, or the Intel® Matrix Storage Technology configuration from the Serial ATA hard disk drives, set this item to [RAID].

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]

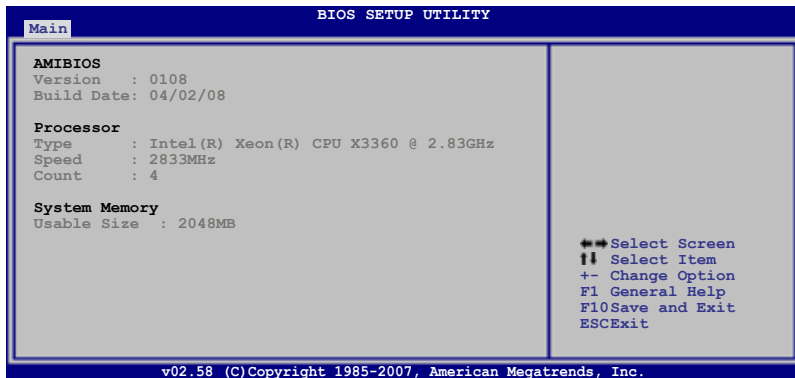
ATA(PI) 80Pin Cable Detection [Host]

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

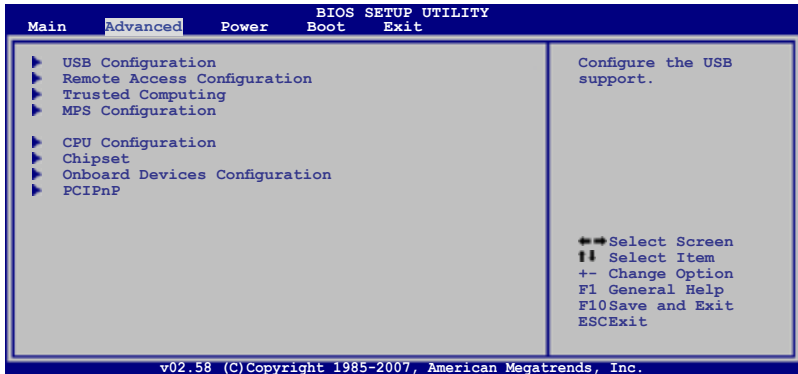
Displays the auto-detected total system memory.

4.4 Advanced menu

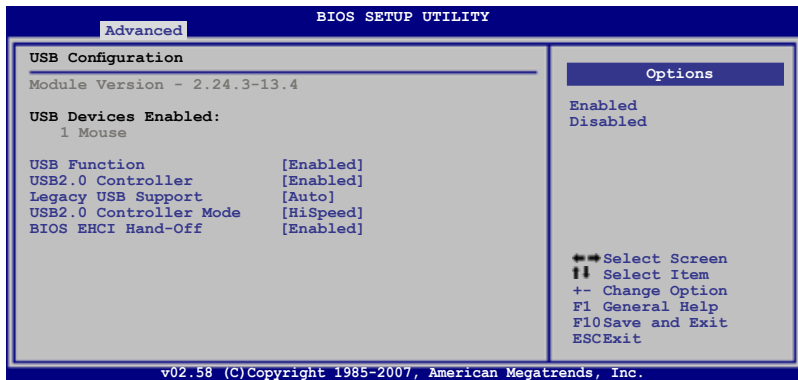
The Advanced menu items allow you to change the settings for the CPU and other system devices.



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 or disable the USB function.

Configuration options: [Disabled] [Enabled]



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

USB 2.0 Controller [Enabled]

Allows you to enable or disable the USB 2.0 controller.

Configuration options: [Enabled] [Disabled]

Legacy USB Support [Auto]

Allows you to enable or disable support for legacy USB. The AUTO option disables legacy support if there is no USB device connected.

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

USB2.0 Controller mode [HiSpeed]

Allows you to set the USB2.0 controller mode to HiSpeed (480 Mbps) or FullSpeed (12 Mbps).

Configuration options: [HiSpeed] [FullSpeed]

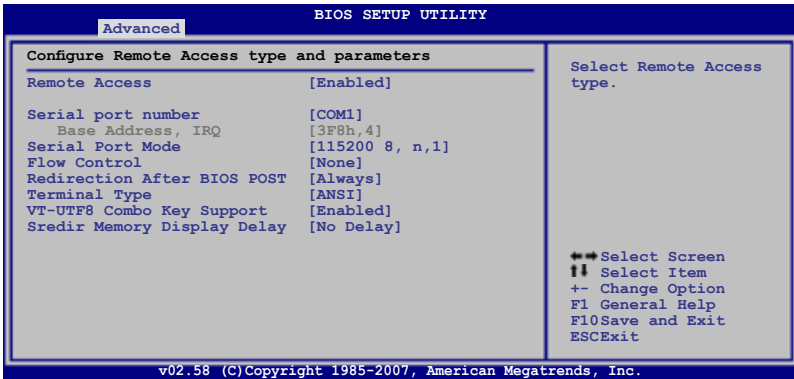
BIOS EHCI Hand-Off [Enabled]

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 on the next page 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.

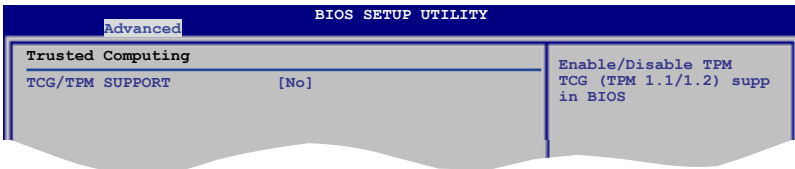
Configuration options: [Disabled] [Enabled]

Sredir Memory Display Delay [No Delay]

Allows you to set the delay in seconds to display memory information.

Configuration options: [No Delay] [Delay 1 Sec] [Delay 2 Sec] [Delay 4 Sec]

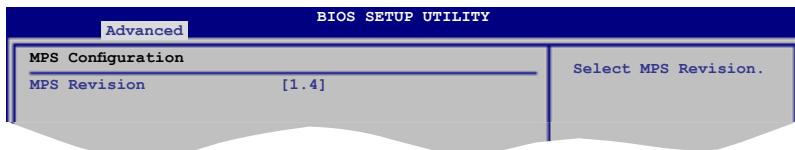
4.4.3 Trusted Computing



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]

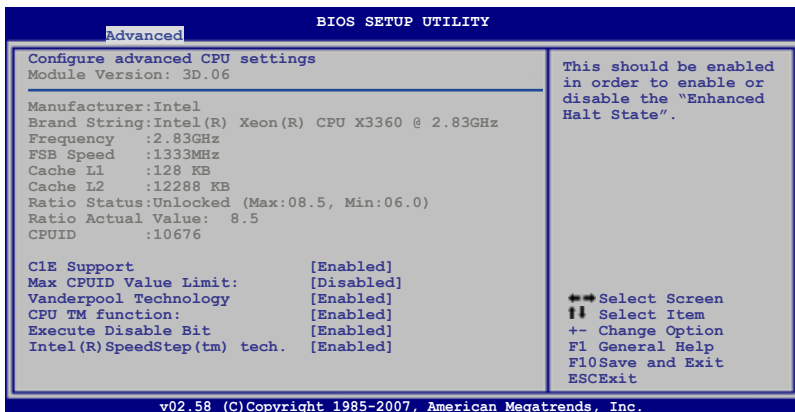
Allows you to select the MPS revision. Configuration options: [1.1] [1.4]

4.4.5 CPU Configuration

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



The items shown in this screen may be different due to the CPU you installed.



C1E Support [Enabled]

Allows you to enable or disable the Enhanced Halt State.

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]

The Vanderpool Technology allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

Configuration options: [Disabled] [Enabled]

CPU TM function: [Enabled]

This function enables the overheated CPU to throttle the clock speed to cool down.

Configuration options: [Disabled] [Enabled]

Execute Disable Bit [Disabled]

When disabled, forces the XD feature flag to always return to 0.

Configuration options: [Disabled] [Enabled]

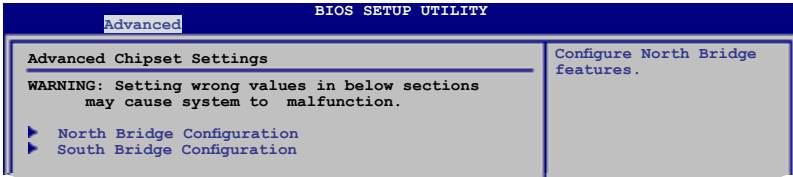
Intel (R) SpeedStep (tm) tech. [Enabled]

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

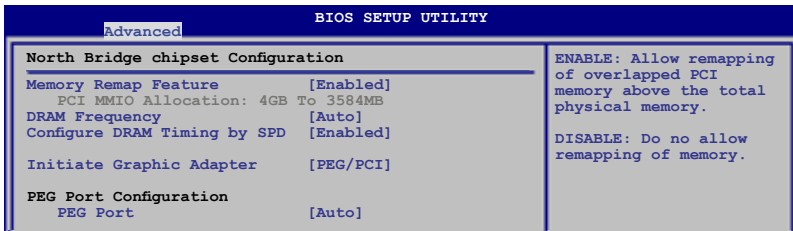
Configuration options: [Enabled] [Disabled]

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]



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

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]

DRAM CAS# Latency [5]

Controls the latency between the SDRAM read command and the time the data actually becomes available. Configuration options: [3] [4] [5] [6]

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

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

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

DRAM RAS# Precharge [6 DRAM Clocks]

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

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

DRAM RAS# Activate to Precharge Delay [15 DRAM Clocks]

Configuration options: [9 DRAM Clocks] [10 DRAM Clocks] ~ [15 DRAM Clocks]

Initiate Graphic Adapter [PEG/PCI]

Allows you to select the graphics controller as the primary boot device.

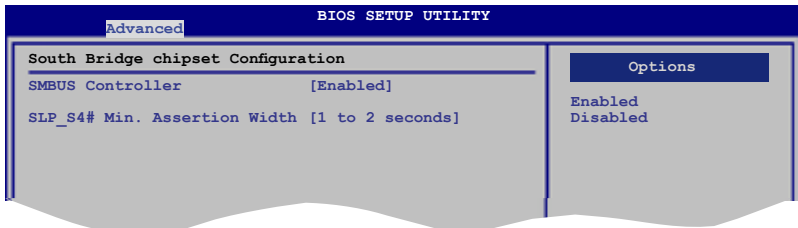
Configuration options: [PCI/PEG] [PEG/PCI]

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: [Enabled] [Disabled]

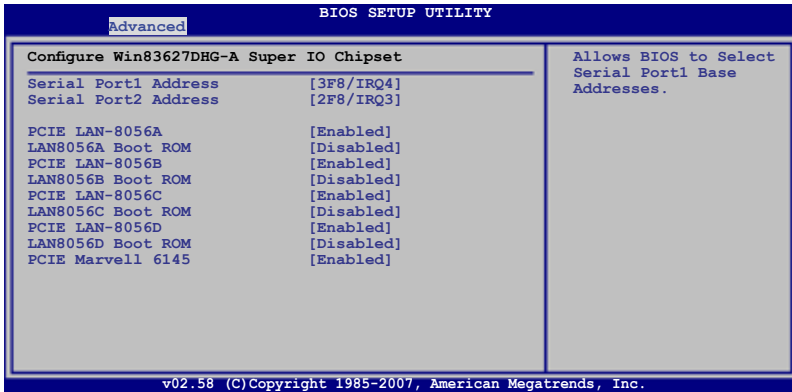
SLP_S4# Min. Assertion Width [1 to 2 seconds]

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.



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]

PCIE LAN-8056A / B / C / D [Enabled]

Allows you to hide or active PCIE LAN-8056A, B, C, or D.

Configuration options: [Disabled] [Enabled]

LAN8056A / B / C / D Boot ROM [Disabled]

Allows you to enable or disalbe the Boot ROM of LAN8056A, B, C or D.

Configuration options: [Disabled] [Enabled]

PCIE Marvell 6145 [Enabled]

Allows you to enable or disable the Marvell 6145 SATA controller.

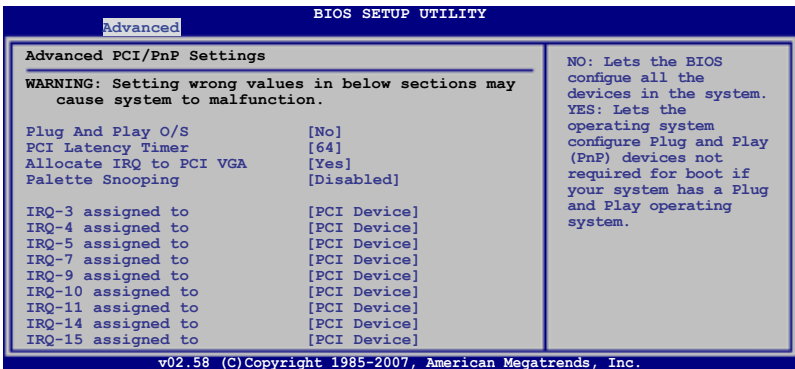
Configuration options: [Disabled] [Enabled]

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: [Yes] [No]

Palette Snooping [Disabled]

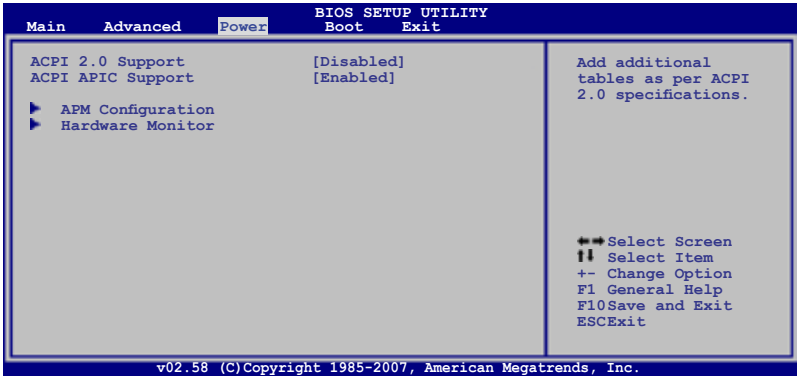
When set to [Enabled], the palette snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

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.

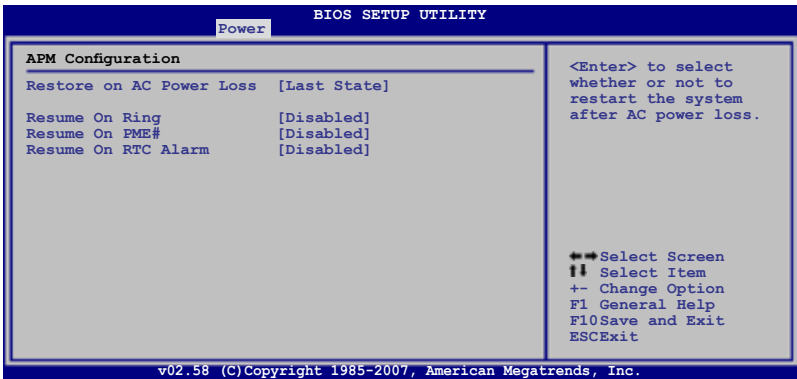
Configuration options: [Disabled] [Enabled]

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 [30]

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

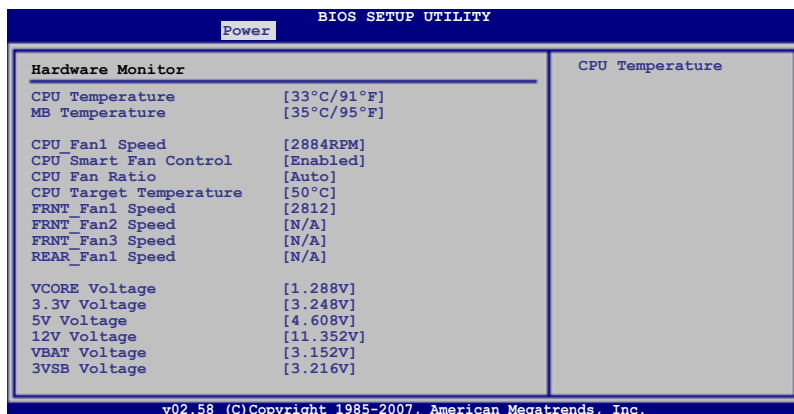
Configuration options: [00] [01] [02] [03]...[59]

RTC Alarm Second [30]

To set the alarm 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



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 [xxxxRPM] or [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.

Front_Fan1/2/3 Fan Speed [xxxxRPM] or [N/A] or [Ignored]**Rear_Fan1 Speed [xxxxRPM] or [N/A] or [Ignored]**

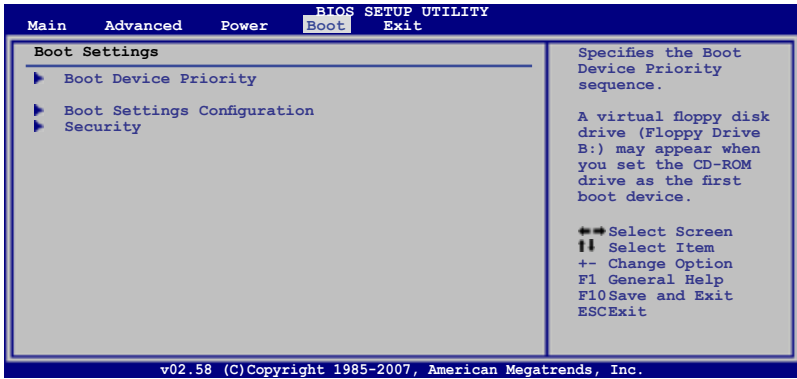
The onboard hardware monitor automatically detects and displays the chassis fan speed in rotations per minute (RPM). If the fan is not connected to the chassis, the specific field shows N/A. Select [Ignored] if you do not wish to display the detected speed.

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

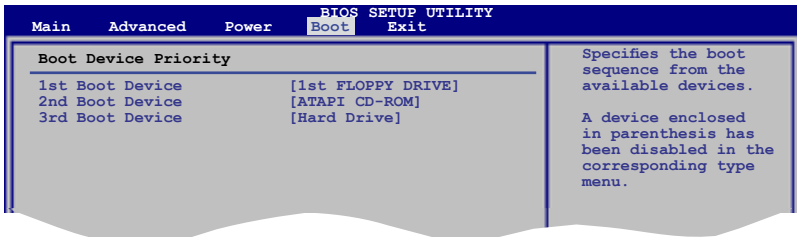
The onboard hardware monitor automatically detects the voltage outputs through the onboard voltage regulators.

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]

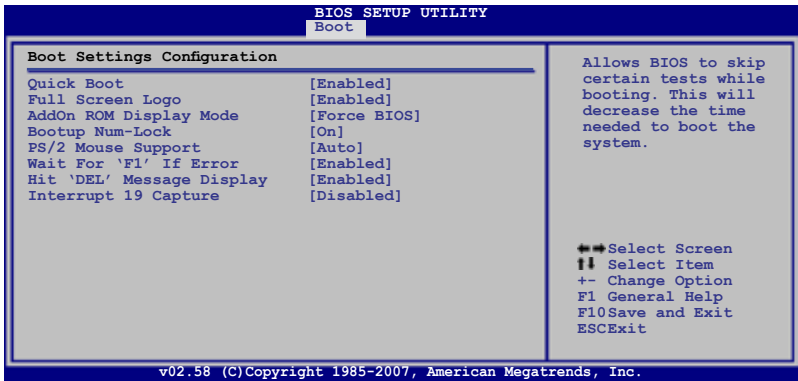
2nd Boot Device [ATAPI CD-ROM]

3rd Boot Device [Hard Drive]

These items specify the boot 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]

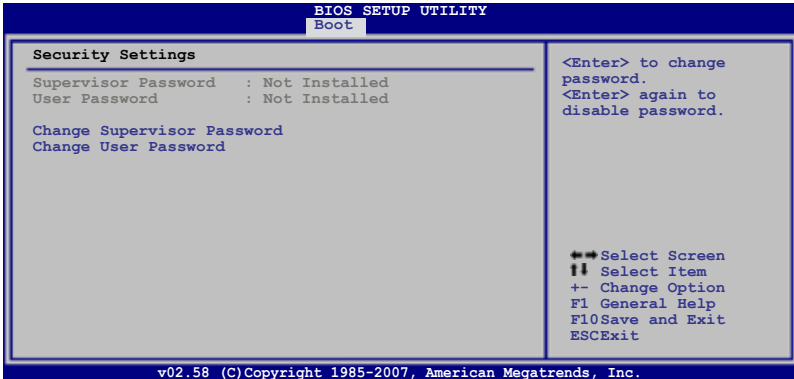
When set to [Enabled], the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Disabled]

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.

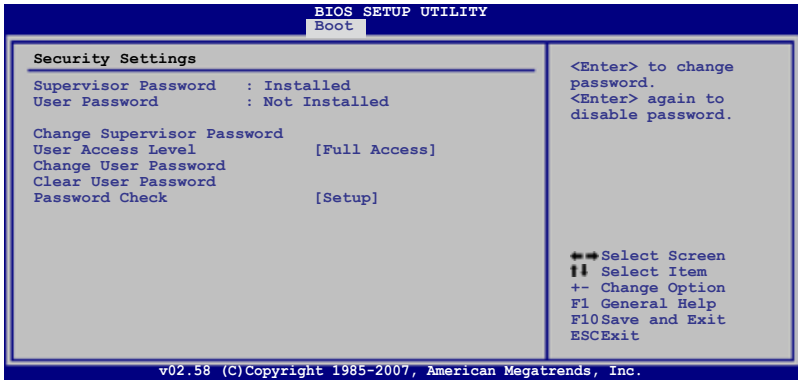
To change the supervisor password, follow the same steps as in setting a user password.

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 **3.2 Jumpers** for information on how to erase the RTC RAM.

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



User Access Level [Full Access]

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

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

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

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

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

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

Clear User Password

Select this item to clear the user password.

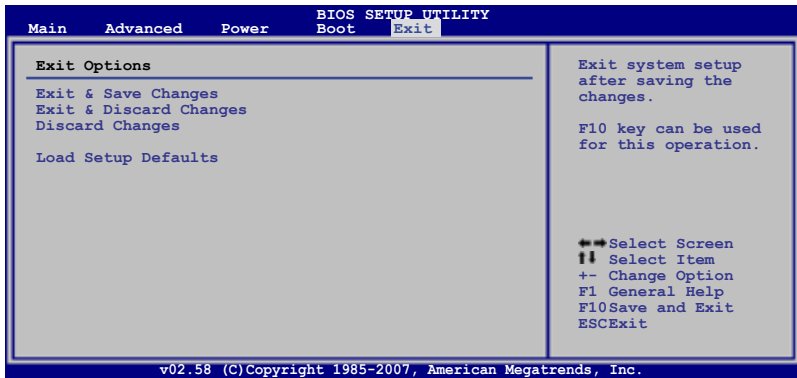
Password Check [Setup]

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.



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

Exit & Save Changes

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



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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

Chapter 5

This chapter provides information on how to configure your hard disk drives as RAID sets.



ASUS TS100-E5/PI4

RAID configuration

5.1 Setting up RAID

The server system/motherboard comes with Intel® ICH7R and Marvell® 88SE6145 chipsets.

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 the IDE and Serial ATA hard disk drives as RAID sets.

The Marvell® 88SE6145 chip is a host bus adapter chip between PCI-Express and Serial ATA (SATA)/Parallel ATA (PATA) devices. It employs the latest Serial ATA (SATA) Phy technology, operating at 1.5 Gb/s or 3.0 Gb/s.

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.

5.1.2 Installing hard disk drives

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 **3.2 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® Server operating system.

Use the **LSI Logic Embedded SATA RAID Setup Utility** to create a RAID 0, RAID 1, or RAID 10 under Windows® Server or Red Hat® Linux operating system.

5.2 Marvel® 88SE6145 RAID BIOS Configuration Utility

The Marvell® 88SE6145 RAID BIOS Configuration utility allows you to create RAID 0, RAID 1, RAID 10, or 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 Marvell® RAID BIOS Configuration utility:

1. Install all the Serial ATA hard disk drives at Red SATA Connector.
2. Turn on the system.
3. During POST, press <Ctrl> + <M> to enter the utility main menu.

```
ENTER/SPACE>Select, ESC:Back/Exit
[Adapter] [Create] [Delete]
Adapter 1
Arrays Information:
  No array is defined!

Disks Information:
ID Port  Disk Name                Size  Speed  Status
0  0   SATA: Hitachi HDS721010KLA330  1TB   SATA II  FREE
4  1   SATA: Hitachi HDS721010KLA330  1TB   SATA II  FREE
8  2   SATA: Hitachi HDS721010KLA330  1TB   SATA II  FREE
12 3   SATA: Hitachi HDS721010KLA330  1TB   SATA II  FREE

Marvell BIOS Setup (c) 2006 Marvell Technology, Ltd.
```

4. Press <Enter> and select a desired adapter for RAID configuration.

```
ENTER/SPACE>Select, ESC:Back/Exit
[Adapter] [Create] [Delete]
Select Adapter
Adapter 1
Adapter 2

Marvell BIOS Setup (c) 2006 Marvell Technology, Ltd.
```



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 set

To create a RAID set:

1. From the utility menu bar, select Create on the top.

```
ENTER/SPACE:Select, ESC:Back/Exit
[Adapter] [Create] [Delete]
Adapter 1
Arrays Information:
  No array is defined!

Disks Information:
ID Port  Disk Name                               Size  Speed  Status
0  0     SATA: Hitachi HDS721010KLA330          1TB   SATA II  FREE
4  1     SATA: Hitachi HDS721010KLA330          1TB   SATA II  FREE
8  2     SATA: Hitachi HDS721010KLA330          1TB   SATA II  FREE
12 3     SATA: Hitachi HDS721010KLA330          1TB   SATA II  FREE

Marvell BIOS Setup (c) 2006 Marvell Technology, Ltd.
```

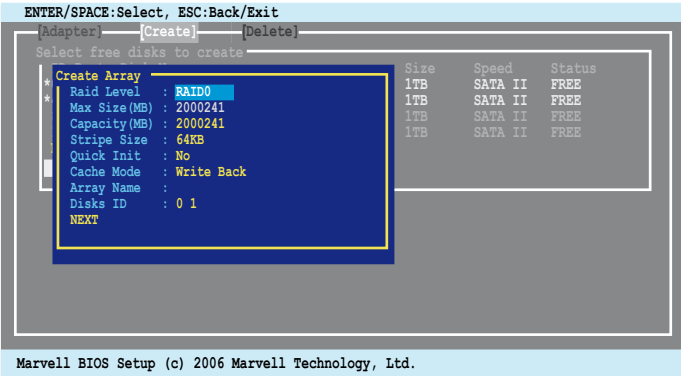
2. Press <Enter>. The screen shows the disks you can add to make up the RAID set. Use the arrow key to select a disk and press <Enter> or <Space> to include this disk in the array.

```
ENTER/SPACE:Select, ESC:Back/Exit
[Adapter] [Create] [Delete]
Select free disks to create
ID Port  Disk Name                               Size  Speed  Status
0  0     SATA: Hitachi HDS721010KLA330          1TB   SATA II  FREE
4  1     SATA: Hitachi HDS721010KLA330          1TB   SATA II  FREE
8  2     SATA: Hitachi HDS721010KLA330          1TB   SATA II  FREE
12 3     SATA: Hitachi HDS721010KLA330          1TB   SATA II  FREE
NEXT

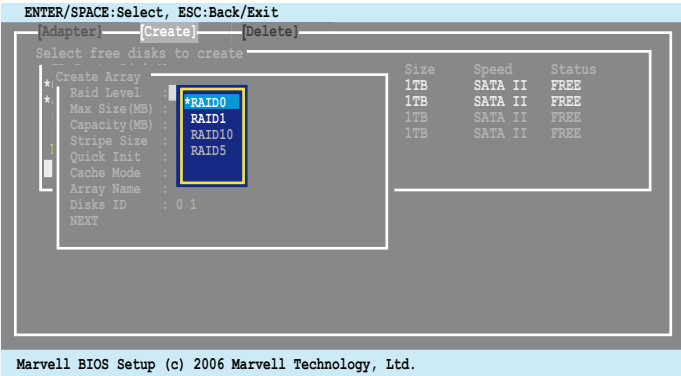
Marvell BIOS Setup (c) 2006 Marvell Technology, Ltd.
```

3. After you have selected the desired disks, select **NEXT** to create array.

4. The **Create Array** screen appears.

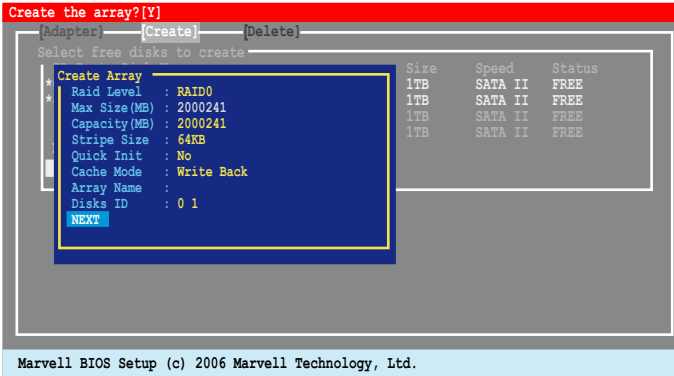


5. Use the arrow key to select the **RAID Level** item and press <Enter> to display the available RAID set. Select a RAID set and press <Enter> to create.

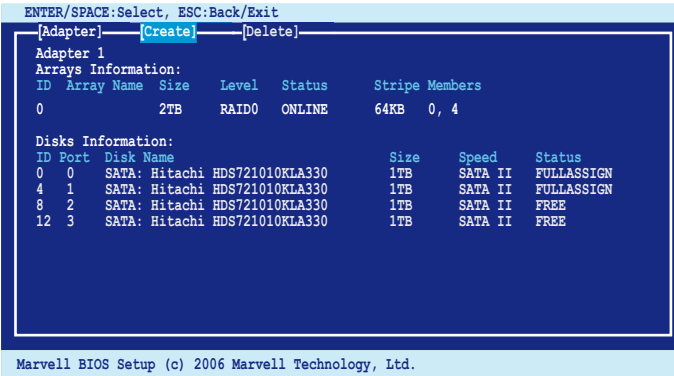


- The available RAID sets vary with the number of disks you select. The RAID sets that you are not allowed to create are grayed out.
- Except for the **RAID Level** item, we recommend you keep the default values for the other items in **Create Array** screen.

- A confirmation screen appears. Press <Y> to confirm the array creation.



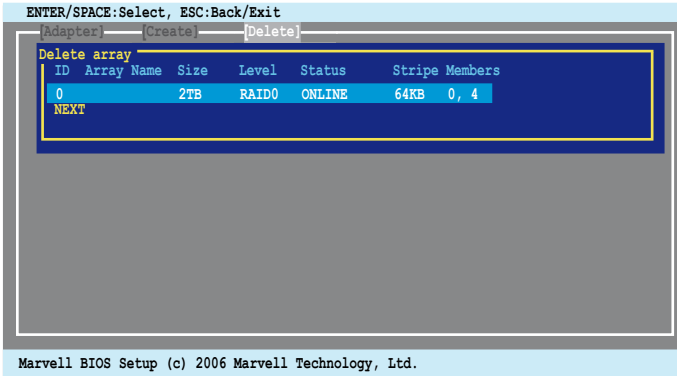
- The newly created array appears in **Arrays Information**.



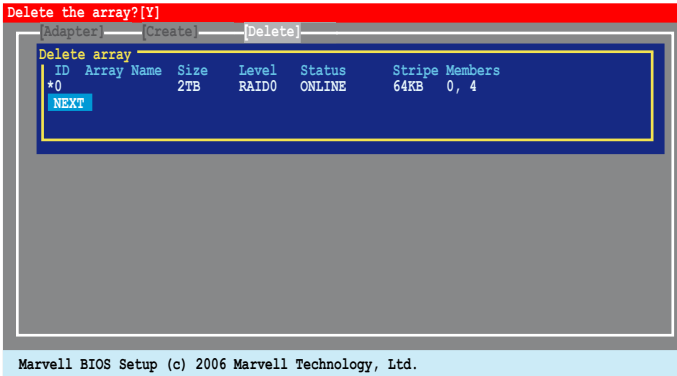
5.2.2 Deleting an array

To delete a RAID set:

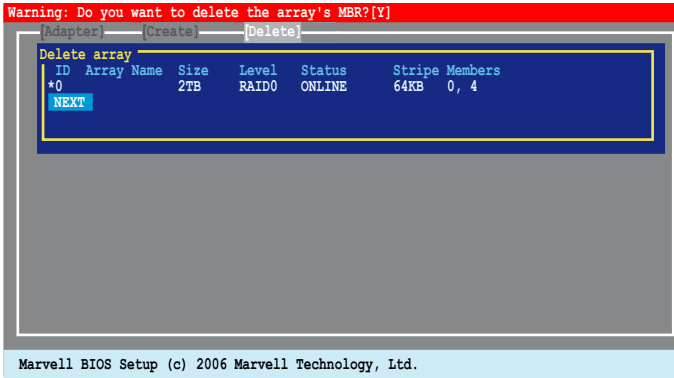
1. From the utility menu bar, select Delete on the top and press <Enter> and the **Delete array** screen appears.



2. Select a desired array to delete and select **NEXT**. Press <Y> after the confirmation screen appears.



3. Press <Y> again to confirm and delete the selected array.



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

5.3 Intel® Matrix Storage Manager Option ROM Utility

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

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

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

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

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

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
None defined.

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

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

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

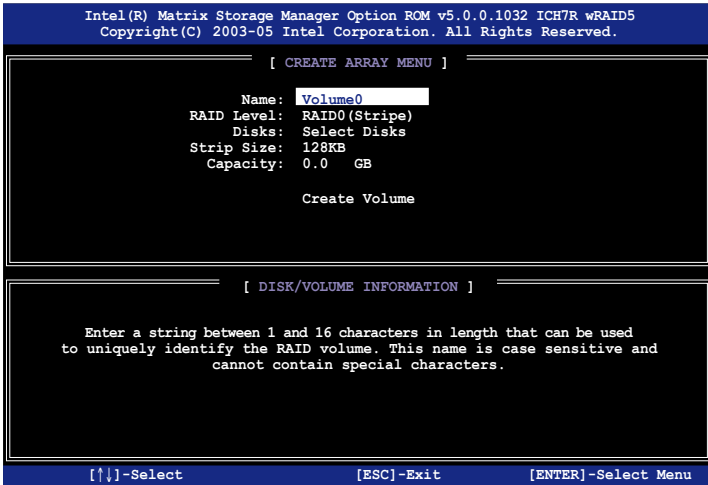


The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

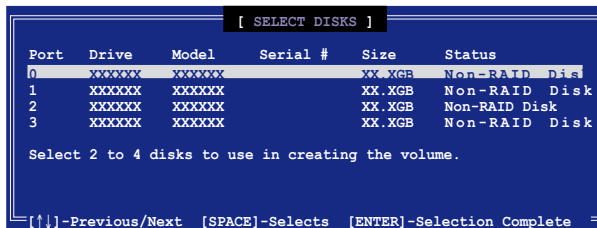
5.3.1 Creating a RAID 0 set (Stripe)

To create a RAID 0 set:

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



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



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

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



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

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

A blue rectangular box with a double border containing a warning message in red and white text.

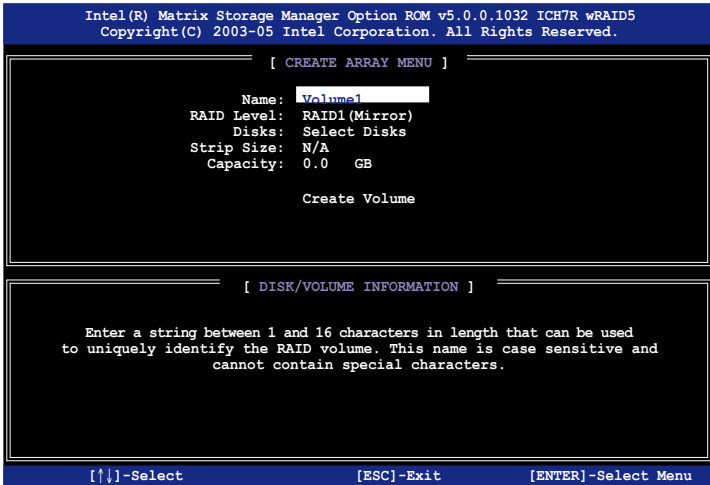
WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.
Are you sure you want to create this volume? (Y/N) :

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

5.3.2 Creating a RAID 1 set (Mirror)

To create a RAID 1 set:

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

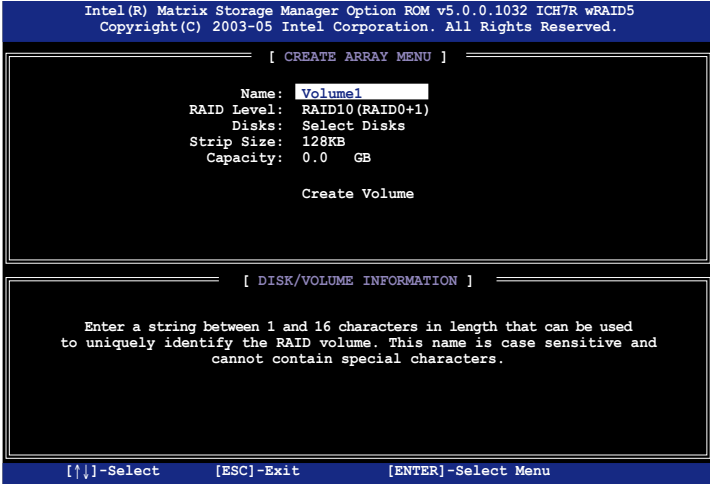


2. Enter a name for the RAID 1 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select **RAID 1 (Mirror)**, then press <Enter>.
4. Follow steps 4 to 5 and 7 to 9 of the previous section to create the RAID 1 set.

5.3.3 Creating a RAID 10 set (Stripe + Mirror)

To create a RAID 10 set:

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

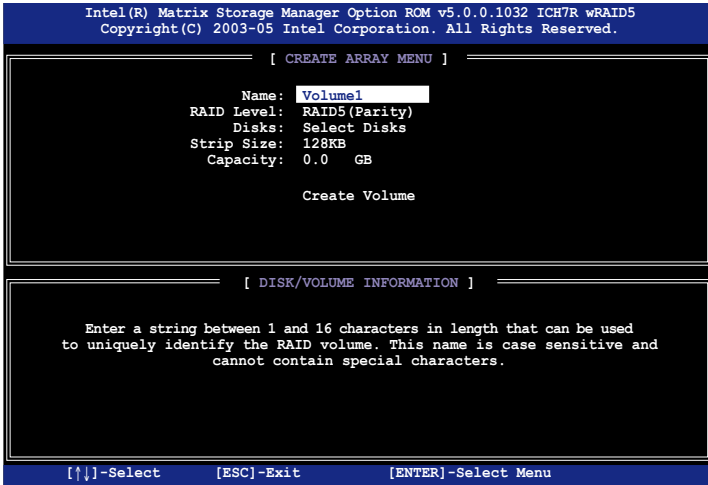


2. Enter a name for the RAID 10 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select RAID 10 (RAID0+1), then press <Enter>.
4. Follow steps 4 to 9 of section 5.3.1 **Creating a RAID 0 set (striped)** to create the RAID 10 set.

5.3.4 Creating a RAID 5 set (Parity)

To create a RAID 5 set:

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



2. Enter a name for the RAID 10 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select RAID 5, then press <Enter>.
4. Follow steps 4 to 9 of section **5.3.1 Creating a RAID 0 set (striped)** to create the RAID 5 set.

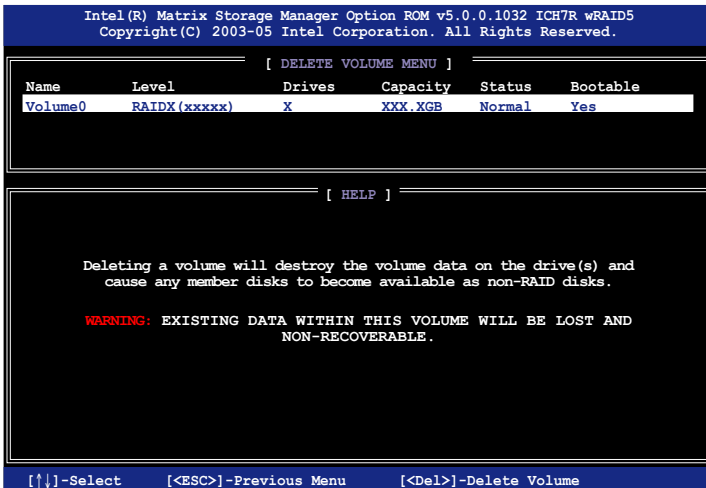
5.3.5 Deleting a RAID set



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

To delete a RAID set:

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



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.

5.3.6 Resetting disks to Non-RAID



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

To reset a RAID set hard disk drive:

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

```
[ RESET RAID DATA ]

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

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

Port  Drive Model      Serial #      Size      Status
0      XXXXXXXXXXXX      XXXXXXXX      XX.XGB    Member Di
1      XXXXXXXXXXXX      XXXXXXXX      XX.XGB    Member Disk

Select the disks that should be reset.

[Left/Right]-Previous/Next  [SPACE]-Selects  [ENTER]-Selection Complete
```

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

5.3.7 Rebuilding the RAID



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

Rebuilding the RAID with other non-RAID disk:

1. If one member of physical SATA Hard disk within the array is off-line or failed, the status of array will become to be degraded from normal. The following displays as:

```
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID1(Mirror) N/A 74.5GB Degraded Yes

Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
1 ST380013FS 5JY7XSE9 74.5GB Member Disk(0)
3 HDS722580VLSA80 VN6GHCCEW1EKMC 76.7GB Non-RAID Disk

Press <Ctrl>+<D> to enter Configuration Utility....
```

2. Press <Ctrl-I> to enter the Intel Matrix Storage Manager RAID configuration utility after POST.
3. If there is available Non-RAID SATA Hard Disk, the utility will prompt the windows for rebuilding the RAID. Press <Enter> to select the port of destination disk for rebuilding or press <ESC> to exit



The size of destination disk for rebuilding should be the same or bigger as the original hard disk.

4. After selecting, the volumes with **Rebuild** status will be rebuilt within the operating system.



5. Exit the SATA RAID utility. When operating system is running, select the Intel Matrix Storage Console from the Start Menu or click the Intel Matrix Storage Manager tray icon.
6. From the **View** menu, select **Advanced Mode** to display a detailed view of the Intel Matrix Storage Console.
7. From the **Volumes** view in the device pane, select the RAID volume. The status will display **Rebuilding % complete**. After the rebuild is complete, the status will display **Normal**.

Rebuilding the RAID with new installed disk:

1. If one member of physical SATA Hard disk within the array is off-line or failed, the status of array will become to be degraded from normal. The following displays as.

```
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID1(Mirror) N/A 74.5GB Degraded Yes

Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
1 ST380013AS SJV7KSE9 74.5GB Member Disk(0)
3 HDS722580VLSA80 VNG6HECBWLEKMC 76.7GB Non-RAID Disk

Press <Ctrl><M> to enter Configuration Utility.....
```

2. Remove the failed SATA hard disk and install the same specification of new SATA hard disk into the same SATA Port. After reboot, the rebuild will occur automatically.



The size of new disk for rebuilding should be the same or bigger as the original hard disk.

3. After selecting, the volumes with **Rebuild** status will be rebuilt within the operating system.

```
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 SJV7KSE9 74.5GB Member Disk(0)
3 HDS722580VLSA80 VNG6HECBWLEKMC 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 SATA RAID utility. When the operating system is running, select the Intel Matrix Storage Console from the Start Menu or click the Intel Matrix Storage Manager tray icon.
5. From the **View** menu, select **Advanced Mode** to display a detailed view of the Intel Matrix Storage Console.
6. From the **Volumes** view in the device pane, select the **RAID** volume. The status will display **Rebuilding % complete**. After the rebuild is complete, the status will display **Normal**.

5.3.8 Exiting the Intel® Matrix Storage Manager

To exit the utility:

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



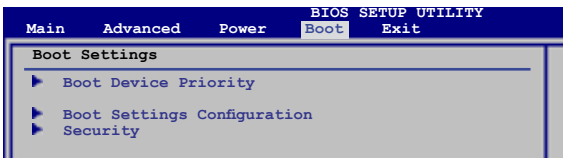
2. Press <Y> to exit or press <N> to return to the utility main menu.

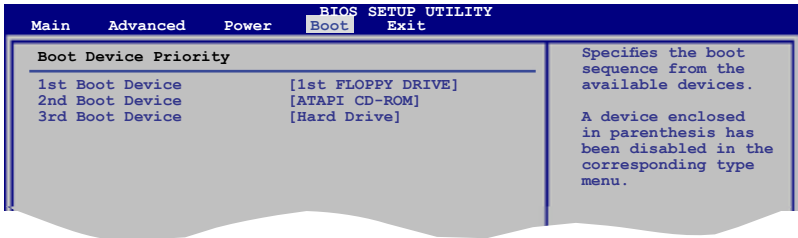
5.3.9 Setting the Boot array use MB BIOS Setup Utility

1. When creating multi-raid via Intel(r) Matrix Storage Manager RAID, we would like to assign one array to be the boot drive. The following shows as the status of current arrays:



2. Re-boot the system and press to enter the Motherboard BIOS Setup Utility during POST.
3. Go to [Boot] menu → [Boot Device Priority]. Then, select the desired boot array and use <+> or <-> key to change the boot device priority.





4. Exit the BIOS Setup Utility and save the changes.

5.3.10 Global Array Manager

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



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

5.4 LSI Software RAID Configuration Utility

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

To enter the LSI Logic Embedded SATA RAID Setup Utility:

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

```
LSI MegaRAID Software RAID BIOS Version A.01 08131852R
LSI SATA RAID Found at PCI Bus No: Dev No:1F
Device present at Port 0      HDS722512VLSA80  117800MB
Device present at Port 1      HDS722512VLSA80  117800MB

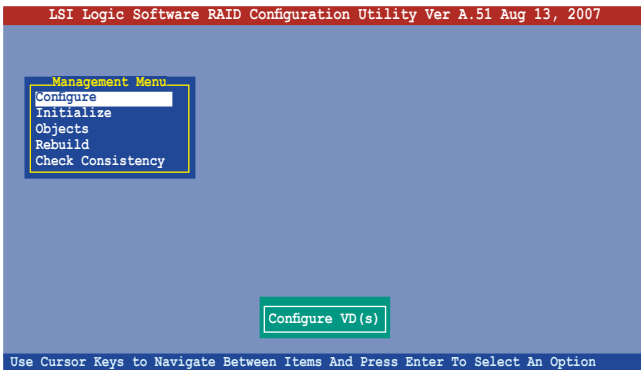
Press Ctrl-M or Enter to run LSI Software RAID Setup Utility.
```



- The LSI Software RAID Configuration Utility auto configures to RAID 1 when the SATA to RAID Mode is enabled.
- The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.
- When you create RAID sets with the LSI Software RAID configuration utility, the boot priority of the SATA optical drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

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

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



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

5.4.1 Creating a RAID 0 or RAID 1 set

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

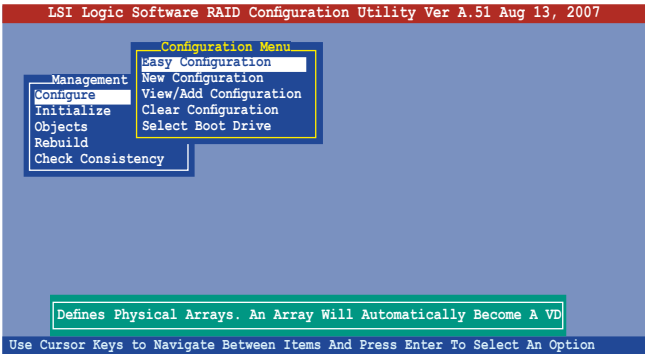
In **Easy Configuration**, the logical drive parameters are set automatically including the size and stripe size (RAID 1 only).

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

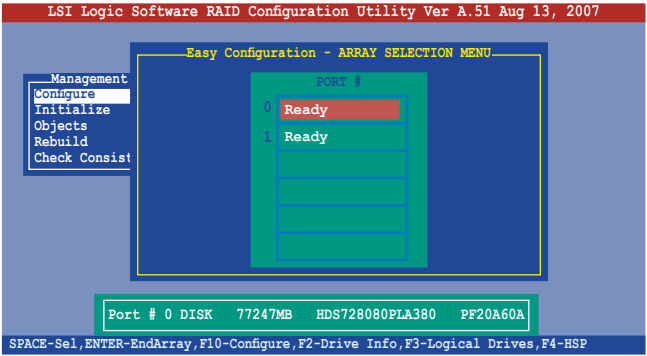
Using Easy Configuration

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

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

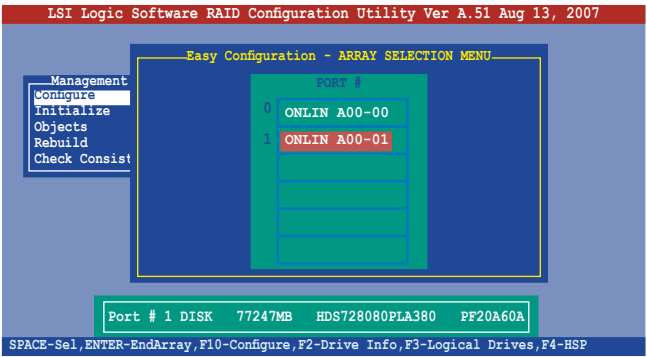


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drives you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

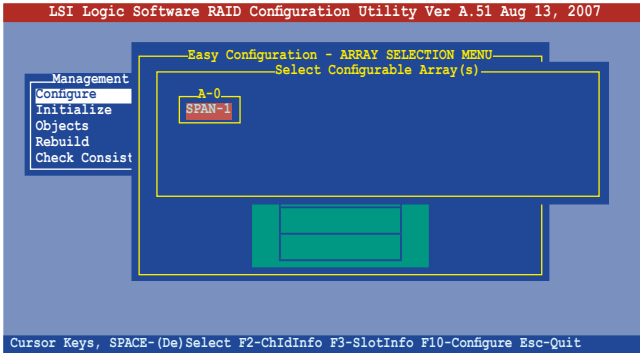


The information of the selected hard disk drive displays at the bottom of the screen.

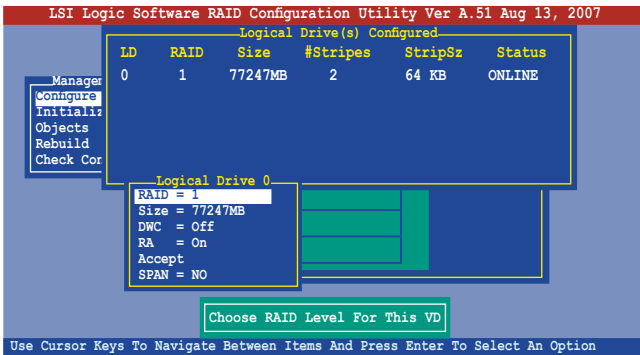
4. Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.



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



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



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



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

LSI Logic Software RAID Configuration Utility Ver A.51 Aug 13, 2007

Logical Drive(s) Configured

LD	RAID	Size	#Stripes	StripSz	Status
0	1	77247MB	2	64 KB	ONLINE

Manager
 Configure
 Initializ
 Objects
 Rebuild
 Check Cor

Logical Drive 0

RAID = 1 RAID Level
 Size = 77247MB RAID 0
 DWC = Off RAID 1
 RA = On
 Accept
 SPAN = NO

Choose RAID Level For This VD

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

8. When creating a **RAID 1** set, select **DWC** from the **Logical Drive** menu, then press <Enter>.
- When creating a **RAID 0** set, proceed to step 10.
9. Select **On** to enable the Disk Write Cache setting, then press <Enter>.

LSI Logic Software RAID Configuration Utility Ver A.51 Aug 13, 2007

Logical Drive(s) Configured

LD	RAID	Size	#Stripes	StripSz	Status
0	1	77247MB	2	64 KB	ONLINE

Manager
 Configure
 Initializ
 Objects
 Rebuild
 Check Cor

Logical Drive 0

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

Change DWC
 Off
 On

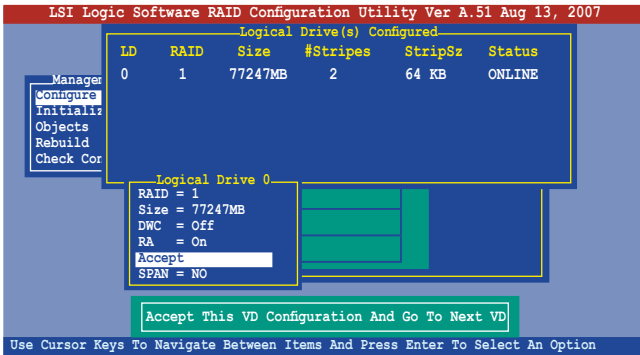
Disk Write Cache Setting Of VD

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

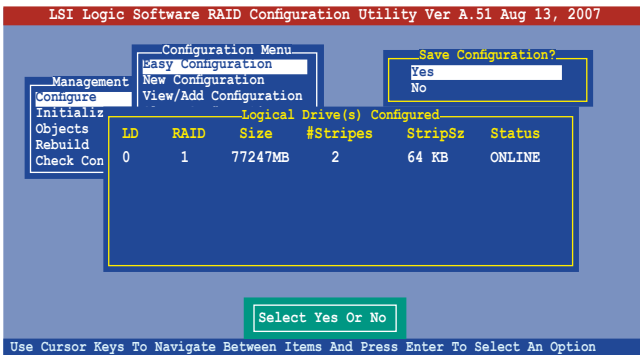


Enabling DWC can improve the performance, but with the risk of data loss.

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



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



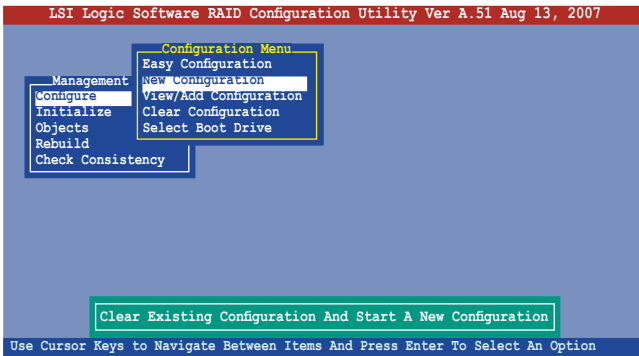
Using New Configuration



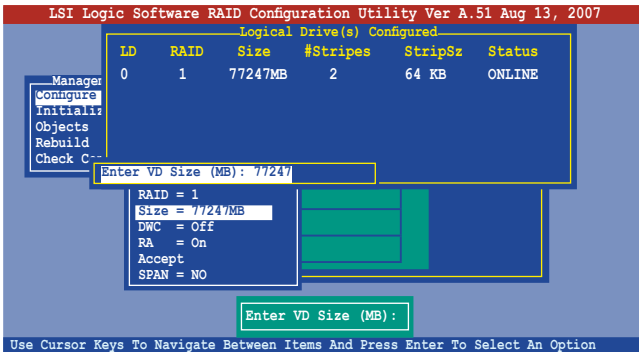
When a RAID set is already existing, using the **New Configuration** command erases the existing RAID configuration data. If you do not want to delete the existing RAID set, use the **View/Add Configuration** command to view or create another RAID configuration.

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

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



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



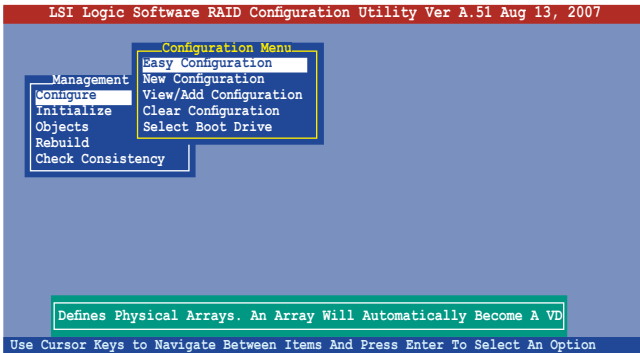
6. Follow steps 8 to 13 of the previous section to create the RAID set.

5.4.2 Creating a RAID 10 set

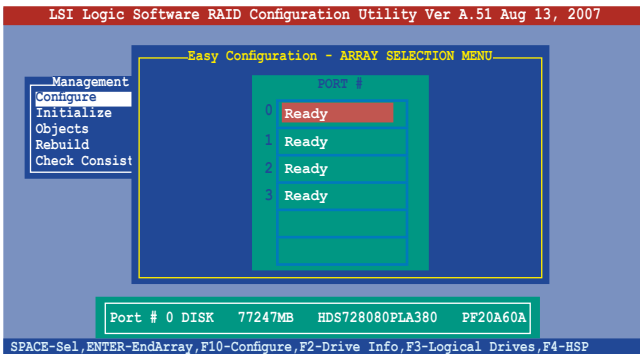
You can create a RAID 10 set using four identical hard disk drives.

To create a RAID 10 set using the Easy Configuration option:

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

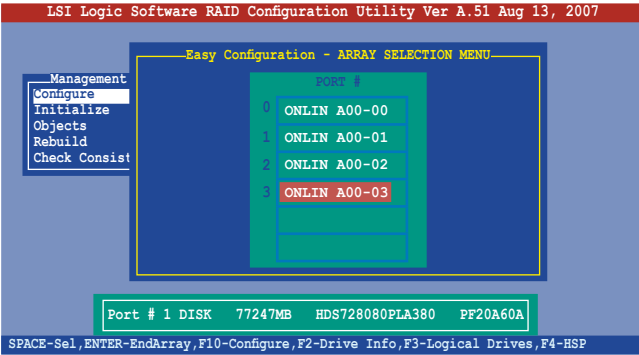


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

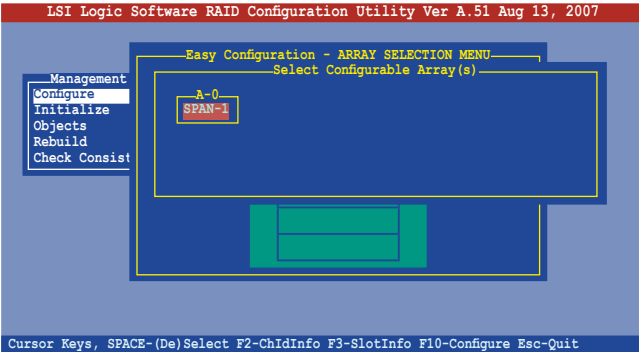


The information of the selected hard disk drive displays at the bottom of the screen.

4. Select all the drives required for the RAID 10 set, then press <Enter>. The configurable array appears on screen.



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



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

6. Select **RAID** from the **Logical Drive** menu, then press <Enter>.
7. Select **RAID 10** from the menu, then press <Enter>.



You need at least four identical hard disk drives when creating a RAID 10 set.

LSI Logic Software RAID Configuration Utility Ver A.51 Aug 13, 2007

Logical Drive(s) Configured

LD	RAID	Size	#Stripes	StripSz	Status
0	0	308988MB	4	64 KB	ONLINE

Manager
Configure
Initializ
Objects
Rebuild
Check Cor

Logical Drive 0

RAID = 0
Size = 308988MB
DWC = Off
RA = On
Accept
SPAN = NO

RAID Level

RAID = 0
RAID 5
RAID 10

Choose RAID Level For This VD

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

8. Select **DWC** from the **Logical Drive** menu, then press <Enter>.
9. Select **On** to enable the **Disk Write Cache** setting, then press <Enter>.

LSI Logic Software RAID Configuration Utility Ver A.51 Aug 13, 2007

Logical Drive(s) Configured

LD	RAID	Size	#Stripes	StripSz	Status
0	10	308988MB	4	64 KB	ONLINE

Manager
Configure
Initializ
Objects
Rebuild
Check Cor

Logical Drive 0

RAID = 1
Size = 154494MB
DWC = Off
RA = On
Accept
SPAN = NO

Change DWC

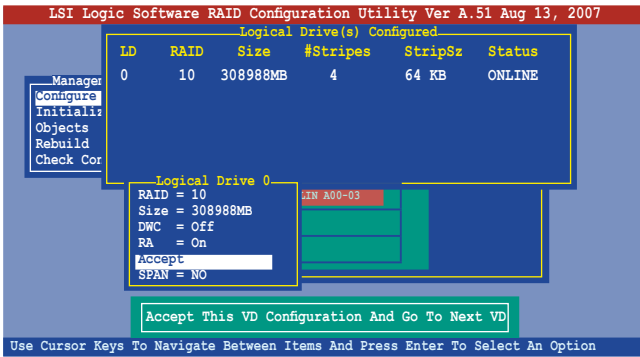
Off
On

DISK A00-03

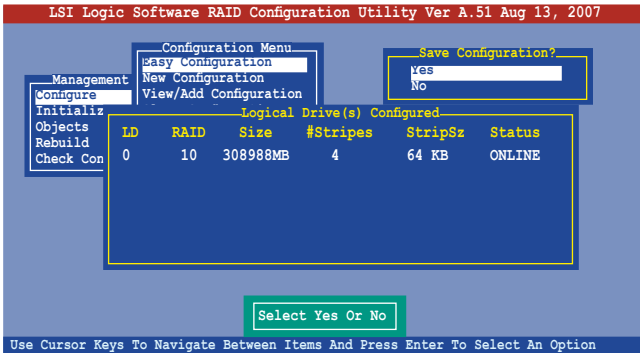
Disk Write Cache Setting Of VD

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

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



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



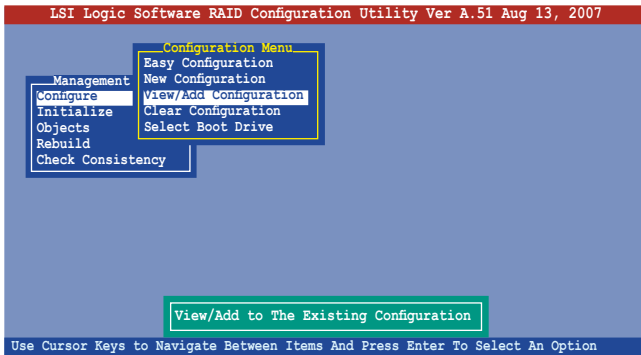
5.4.3 Adding or viewing a RAID configuration

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

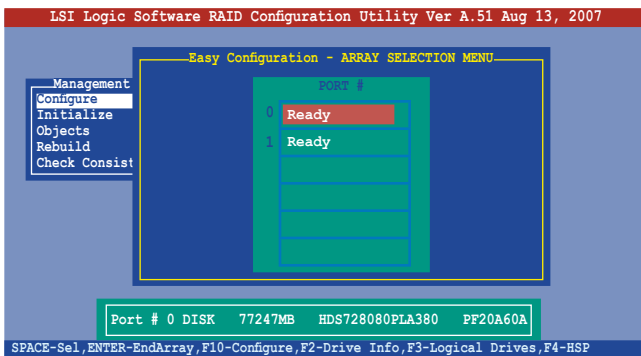
Adding a new RAID configuration

To add a new RAID configuration:

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

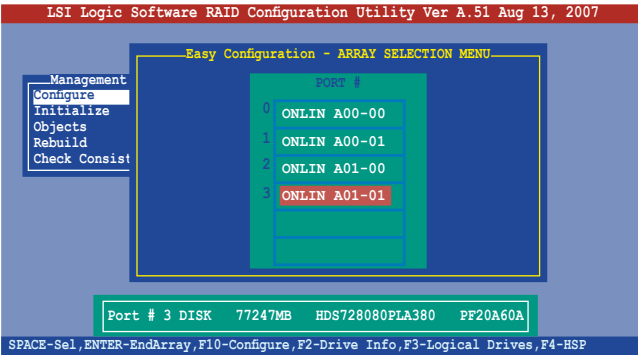


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

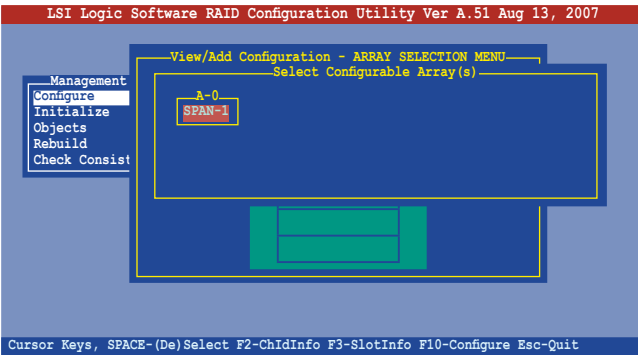


The information of the selected hard disk drive displays at the bottom of the screen.

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

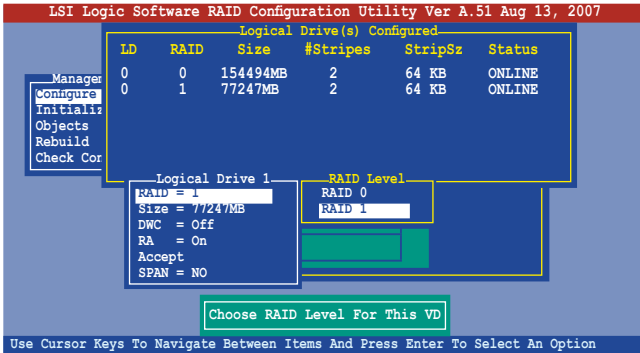


5. Press <F10>, select the configurable array, then press <SpaceBar>.

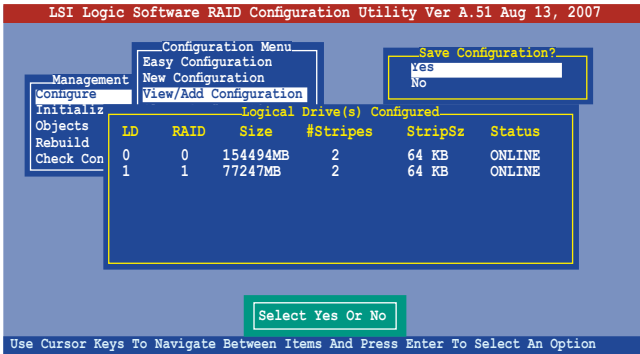


6. Press <F10> again, and select **RAID** from the **Logical Drive** menu, then press <Enter>.

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



8. Follow steps 8 to 12 of the **Creating a RAID set: Using Easy Configuration section**.
9. When prompted, save the configuration, then press <Esc> to return to the **Management Menu**.



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

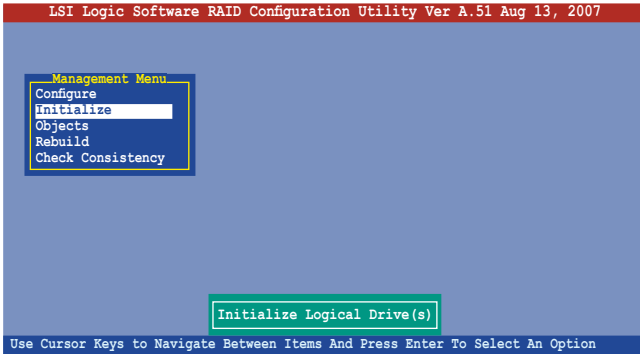
5.4.4 Initializing the logical drives

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

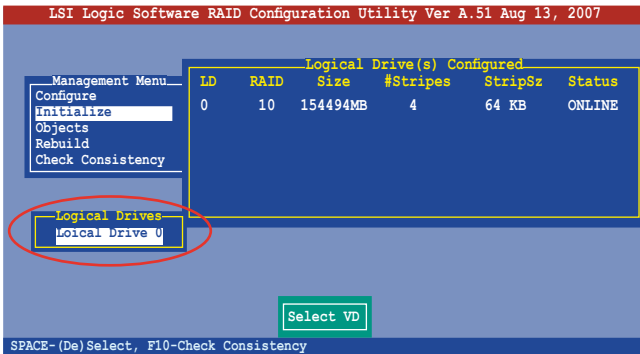
Using the Initialize command

To initialize the logical drive using the Initialize command:

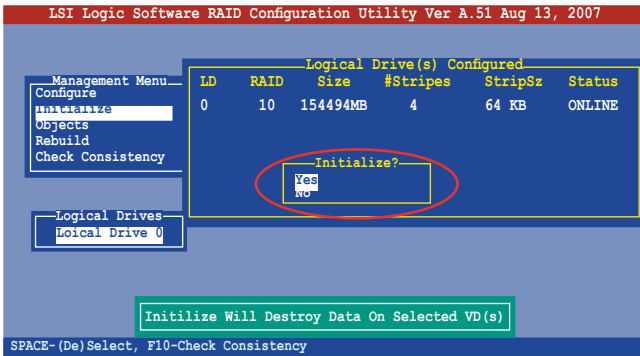
1. From the **Management Menu**, highlight **Initialize**, then press <Enter>.



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

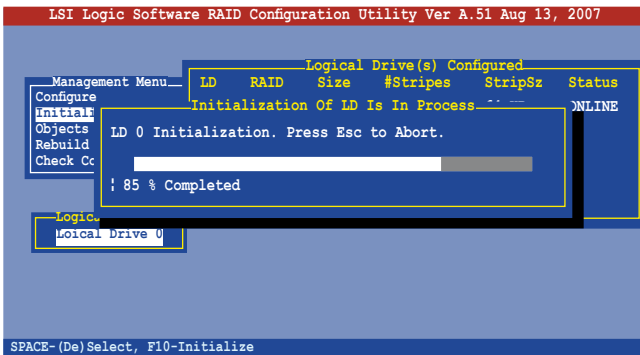


- When prompted, press the <SpaceBar> to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.

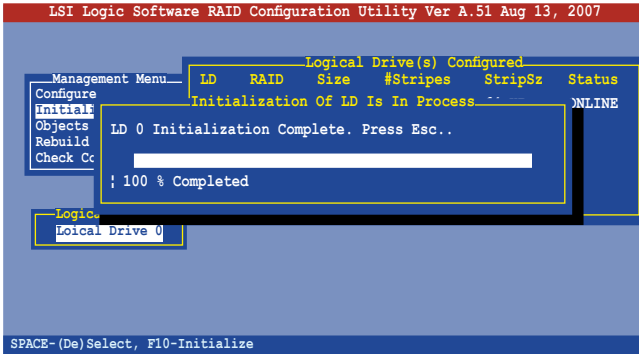


Initializing a logical drive(s) erases all data on the drive.

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



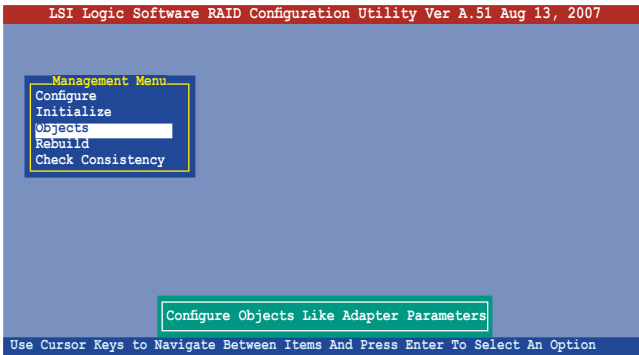
- When initialization is completed, press <Esc>.



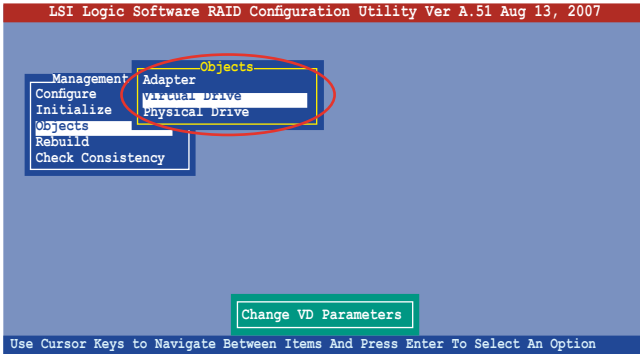
Using the Objects command

To initialize the logical drives using the **Objects** command:

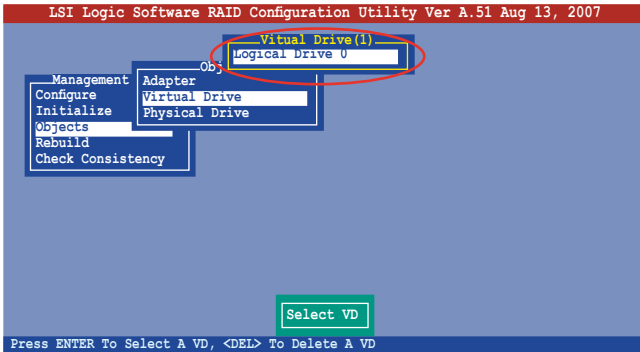
- From the **Management Menu**, highlight **Objects**, then press <Enter>.



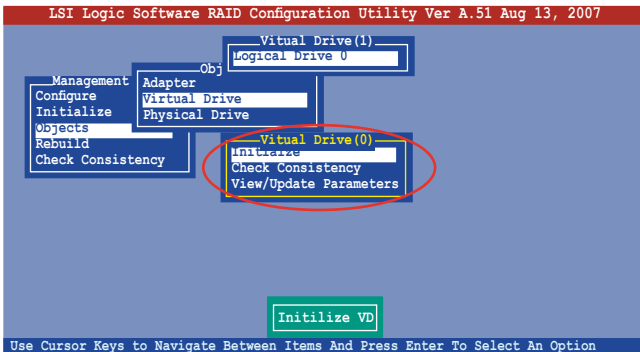
2. Select **Virtual Drive** from the **Objects** sub-menu, then press <Enter>.



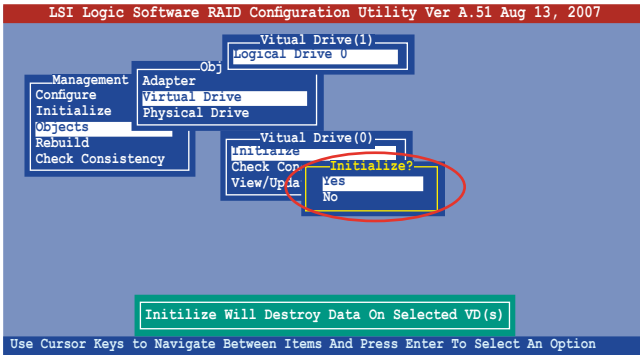
3. Select the logical drive to initialize from the **Virtual Drives** sub-menu, then press <Enter>.



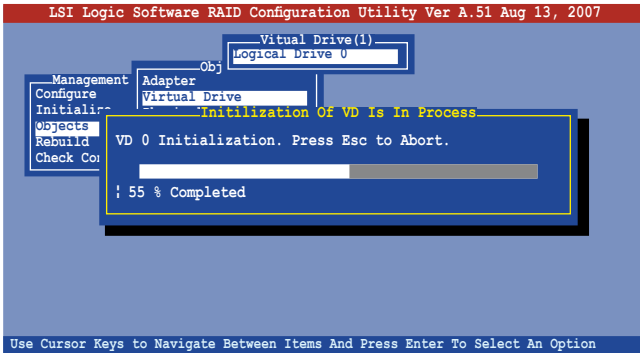
4. Select **Initialize** from the pop-up menu, then press <Enter> to start initialization.



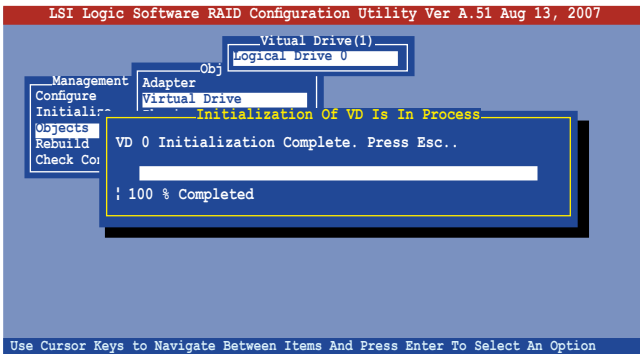
- When prompted, press the <SpaceBar> to select **Yes** from the **Initialize?** dialog box, then press <Enter>.



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



- When initialization is completed, press <Esc>.

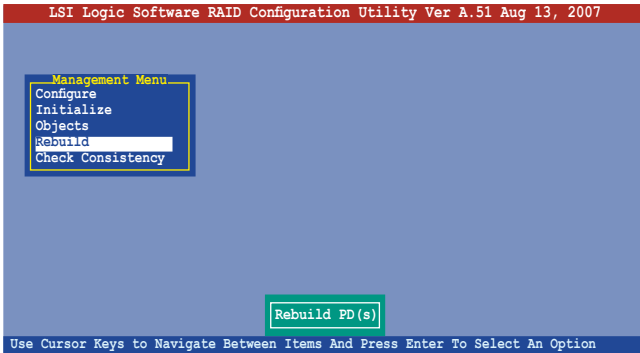


5.4.5 Rebuilding failed drives

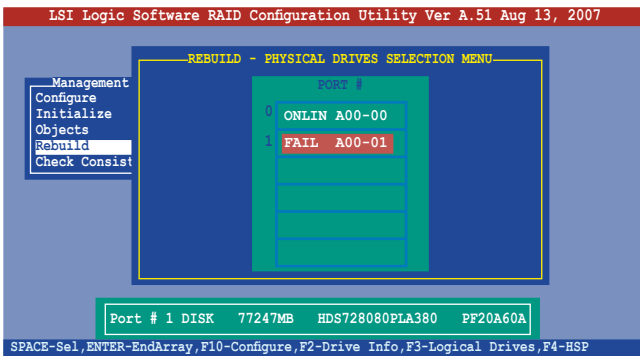
You can manually rebuild failed hard disk drives using the Rebuild command in the Management Menu.

To rebuild a failed hard disk drive:

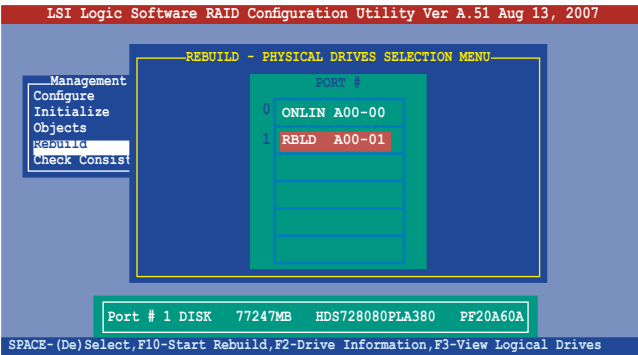
1. From the **Management Menu**, highlight **Rebuild**, then press <Enter>.



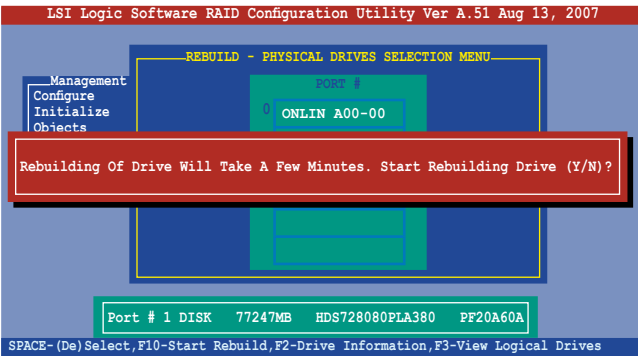
2. The **PHYSICAL DRIVES SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive you want to rebuild, then press <SpaceBar>.



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



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



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

5.4.6 Checking the drives for data consistency

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

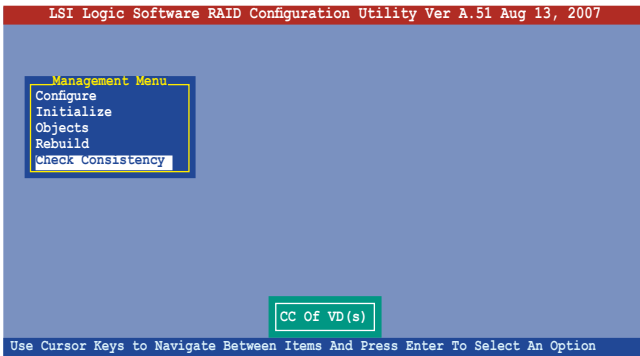


The **Check Consistency** command is available only for logical drives included in a RAID 1 set.

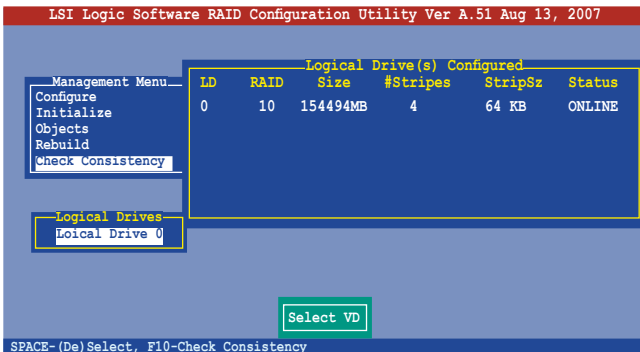
Using the Check Consistency

To check data consistency using the Check Consistency command:

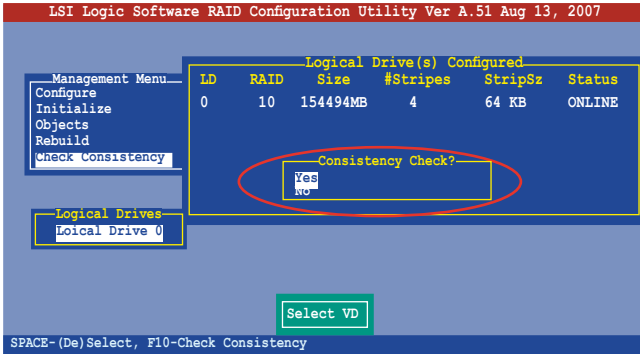
1. From the **Management Menu**, select **Check Consistency**, then press <Enter>.



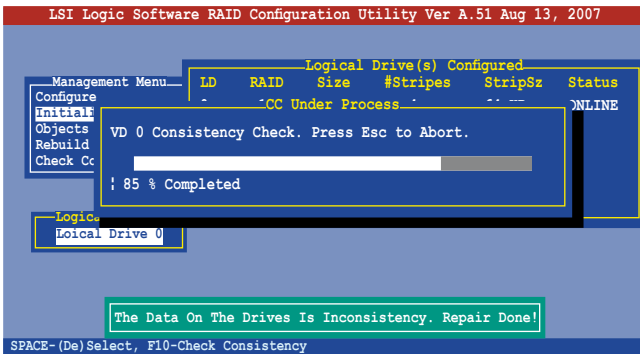
2. The screen displays the available RAID set(s) and prompts you to select the logical drive to check. Press the <Spacebar> to select the logical drive from the **Logical Drive** selection, then press <F10>.



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



A progress bar appears on screen.



- 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

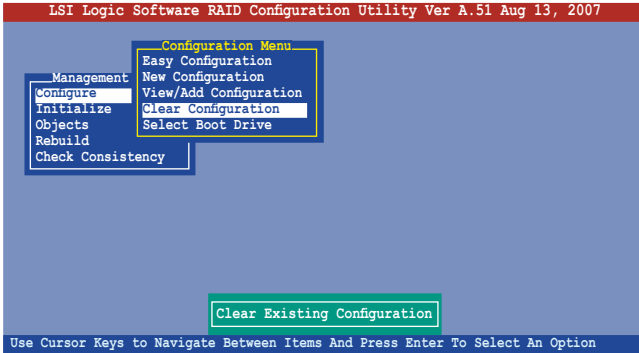
To check data consistency using the Objects command:

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

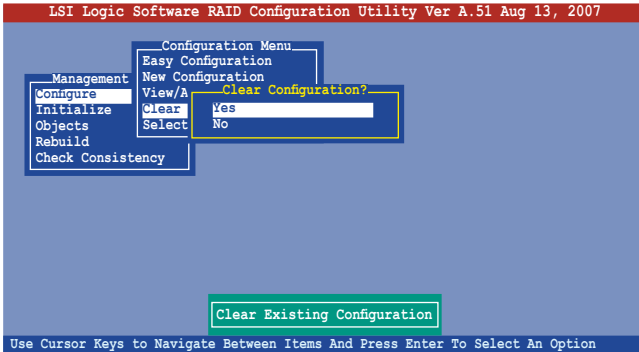
5.4.7 Deleting a RAID configuration

To delete a RAID configuration:

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



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



The utility clears the current array.

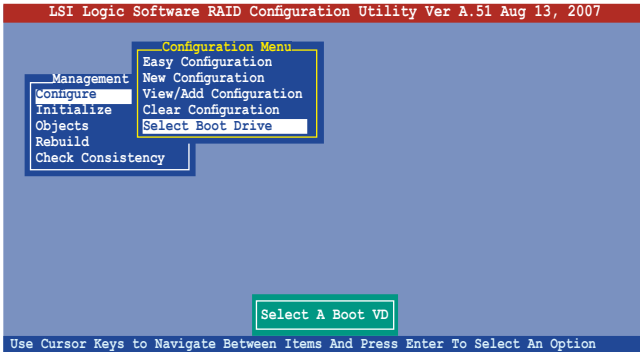
3. Press any key to continue.

5.4.8 Selecting the boot drive from a RAID set

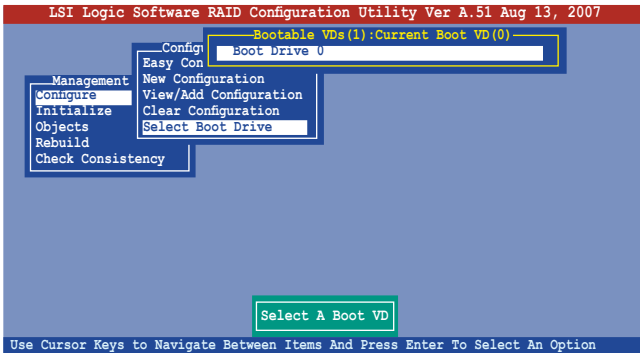
You must have created a new RAID configuration before you can select the boot drive from a RAID set. Refer to the Creating a RAID set: Using New Configuration section for details.

To select the boot drive from a RAID set:

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



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



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

5.4.9 Enabling the WriteCache

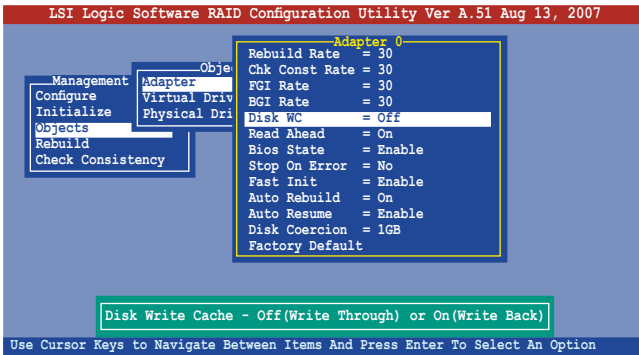
You may enable the RAID controller's **WriteCache** option to improve the data transmission performance.



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.

Chapter 6

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



ASUS TS100-E5/PI4

Driver installation

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

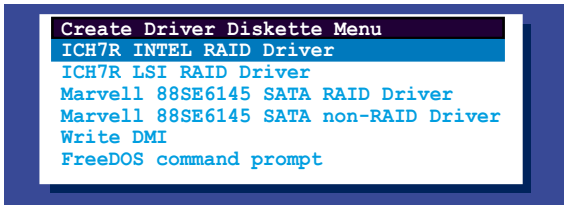
Boot from CD-ROM (DOS)

To create a RAID driver disk in DOS environment:

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

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

The Makedisk menu appears.



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

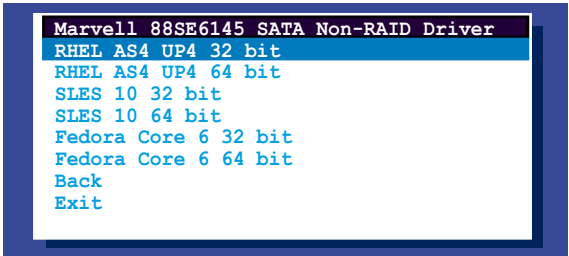
ICH7R LSI RAID Driver

```
ICH7R LSI RAID Driver
Windows Server 2003 32 bit
Windows Server 2003 64 bit
RHEL AS3 UP8 32/64 bit
RHEL AS4 UP5 32/64 bit
RHEL 5 32/64 bit
SLES 9.0 SP3 32 bit
SLES 9.0 SP3 64 bit
SLES 10 SP1 32 bit
SLES 10 SP1 64 bit
Back
Exit
```

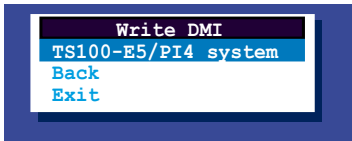
Marvell 88SE6145 SATA RAID Driver

```
Marvell 88SE6145 SATA RAID Driver
Windows 32/64 bit
RHEL AS4 UP4 32 bit
RHEL AS4 UP4 64 bit
RHEL 5 32 bit
RHEL 5 64 bit
SLES 10 32 bit
SLES 10 64 bit
Back
Exit
```

Marvell 88SE6145 SATA Non-RAID Driver



Write DMI



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.



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

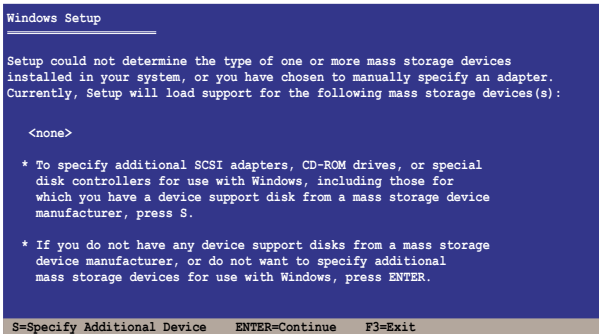
6.1.2 Installing the RAID controller driver

Windows® Server

During Windows® Server installation

To install the RAID controller driver when installing Windows® Server

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



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

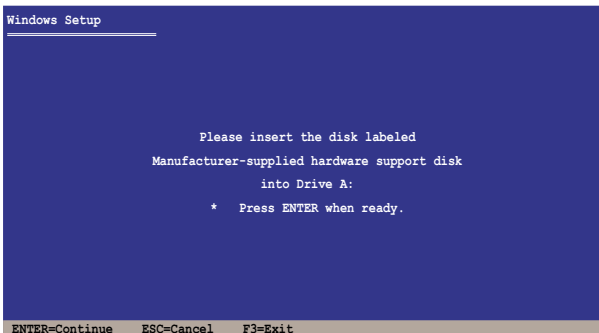
<none>

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

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

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

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



```
Windows Setup
-----

Please insert the disk labeled
Manufacturer-supplied hardware support disk
into Drive A:

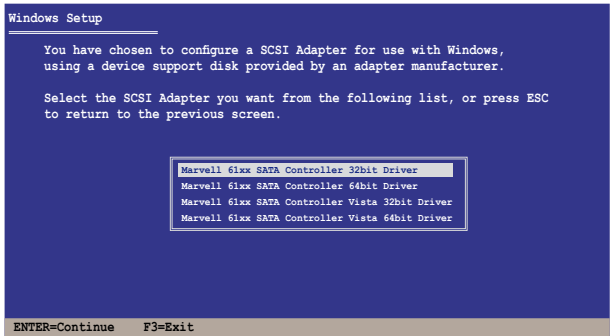
* Press ENTER when ready.

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

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

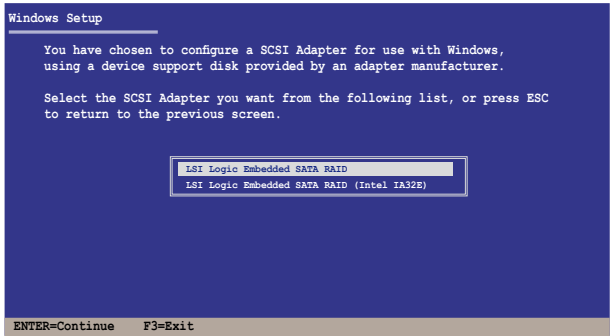
Marvell 6145 SATA Controller

Select **Marvell 61XX SATA Controller 32bit Driver** for 32bit Windows Server OS, **Marvell 61XX SATA Controller 64bit Driver** for 64bit Windows Server OS, **Marvell 61XX SATA Controller Vista 32bit Driver** for 32bit Windows Vista OS, or **Marvell 61XX SATA Controller Vista 64bit Driver** for 64bit Windows Vista OS, and then press <Enter>.



LSI Logic SATA RAID

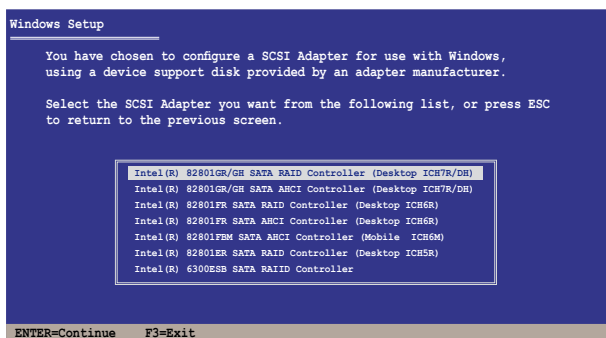
Select **LSI Logic Embedded SATA RAID** for Windows 2000 or 32bit Windows 2003 Server OS from the list, then press <Enter>. For 64bit Windows 2003 Server OS, please select **LSI Logic Embedded SATA RAID (Intel IA32E)** item.



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.

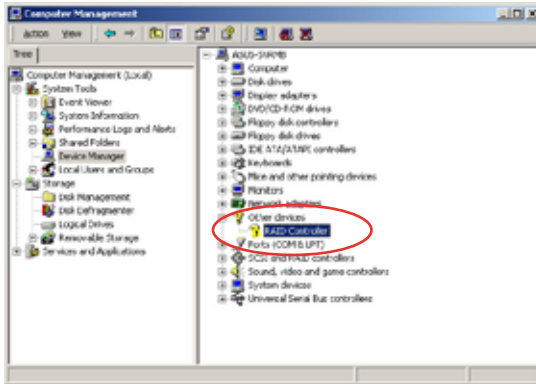


6. The Windows® Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

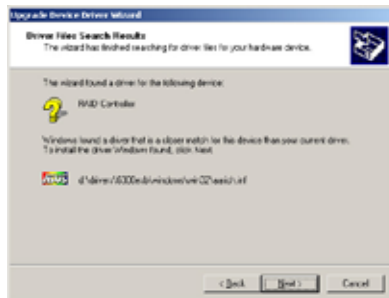
To an existing Windows® Server

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

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

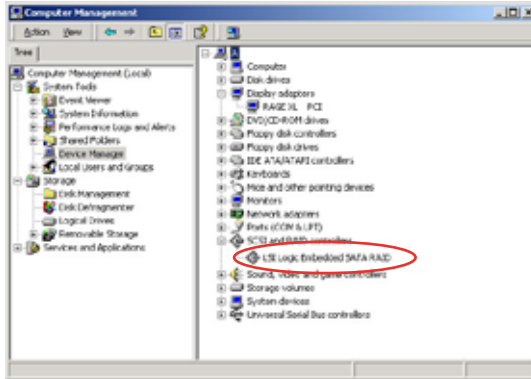


5. Right-click the **RAID controller** item, then select **Properties**.
6. Click the **Driver** tab, then click the **Update Driver** button.
7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.
8. Insert the RAID driver disk you created earlier to the floppy disk drive.
9. Select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



To verify the RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the “+” sign before the item **SCSI and RAID controllers**. 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.

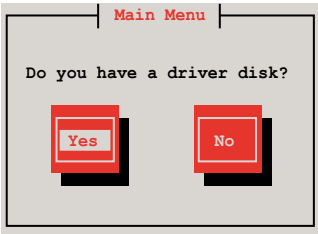
Red Hat® Enterprise

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

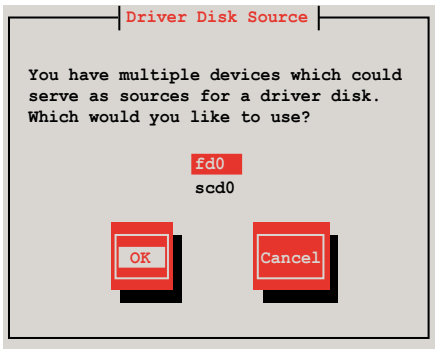
1. Boot the system from the Red Hat® Installation CD.
2. At the `boot:`, type `linux dd`, then press <Enter>.

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

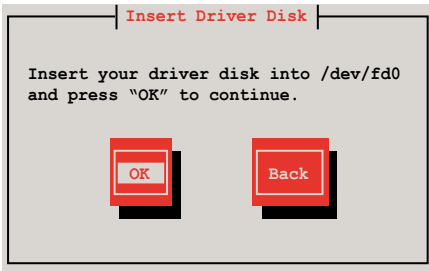
3. Select **Yes** using the <Tab> key when asked if you have the driver disk, then press <Enter>.



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

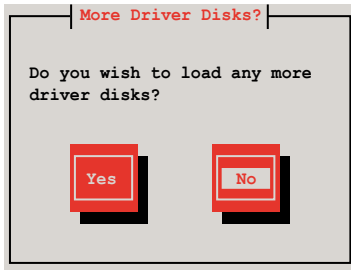


5. Insert the Red Hat® Enterprise RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



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

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

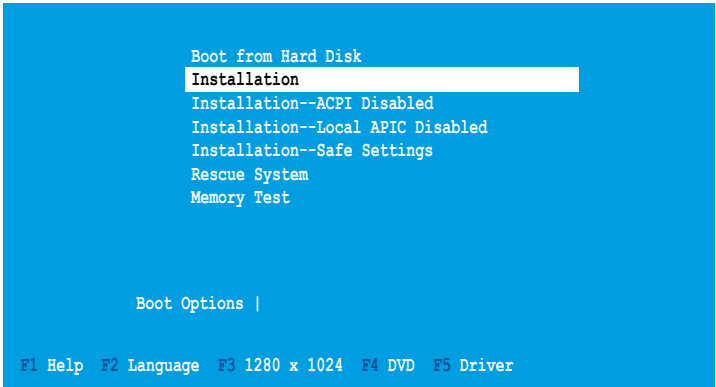


7. Follow the screen instructions to continue the OS installation.

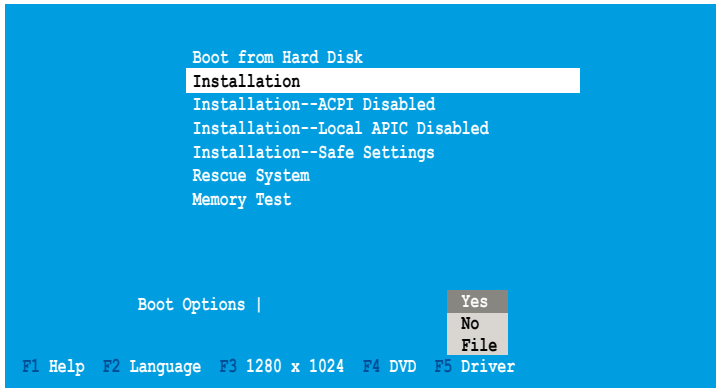
SUSE Linux OS

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

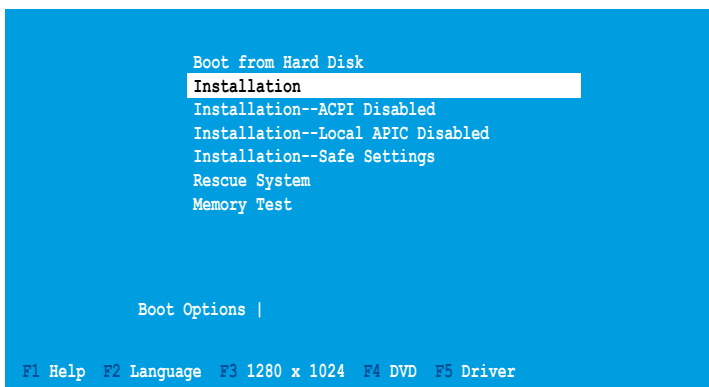
1. Boot the system from the SUSE OS installation CD.
2. Use the arrow keys to select **Installation** from the **Boot Options** menu.



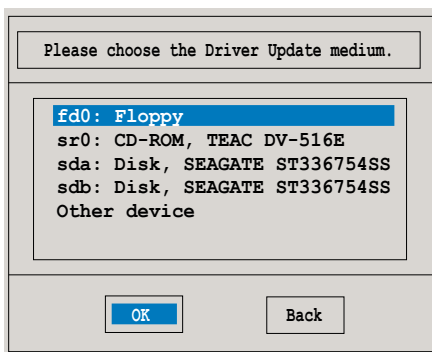
3. Press <F5>, then select **Yes** from the menu. Press <Enter>.



4. Insert the RAID driver disk to the floppy disk drive. Make sure that **Installation** from the **Boot Options** menu is selected, then press <Enter>.



5. When below screen appears, 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® Server

To install the Marvell® 88E8056 LAN controller driver on a Windows® 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 **Marvell LAN CPA Config** tool option to begin installation.



4. Click **Next** when the InstallShield Wizard window appears. Follow screen instructions to continue installation.



6.2.2 SuSE® Linux

Follow these instructions when installing the Marvell® 88E8056 LAN controller base driver for the SuSE® Linux OS:



The following instructions are for Marvell® 88E8056 Linux LAN driver V10.22.4.1 or above. Visit <http://support.asus.com> for the latest Linux LAN driver before continuing the driver installation.

Building the driver



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

To build the driver

1. Copy the Lan Driver from the SCD to local disk.
cp install_vxx.xx.x.x.tar.bz2 /
2. Decompress the file.
tar xfvj install_vxx.xx.x.x.tar.bz2
3. Change to the driver source directory.
cd /DriverInstall/
4. In the **DriverInstall** directory, install the LAN driver.
sh install.sh
5. In the next step, enter **1** to continue.

```
Installation script for sk98lin driver.
Version xx.xx.x.x (Oct-19-2007)
(C) Copyright 2003-2007 Marvell(R) .
=====
Add to your trouble-report the logfile install.log
which is located in the DriverInstall directory.
=====

1) installation
2) generate patch
3) exit
Choose your favorite installation method:
```

6. Read the message on the screen and enter **Y** to continue.

```
Please read this carefully!

This script will automatically compile and load the sk98lin
driver on your host system. Before performing both compilation
and loading, it is necessary to shutdown any device using the
sk98lin kernel module and to unload the old sk98lin kernel
module. This script will do this automatically per default.

Please plug a card into your machine. Without a card we aren't
able to check the full driver functionality.

Do you want proceed? (y/N)
```

7. Confirm the installed driver version. For example, enter:
dmesg |grep sk98lin
8. Refer to SuSE distribution documentation to configure the network protocol and address.

6.2.3 Red Hat® Linux

Follow these instructions when installing the Marvell® 88E8056 LAN controller base driver for the Red Hat® Linux OS:

Before installation

Follow the instruction below to prepare your Red Hat® Linux OS for Marvell® LAN driver installation.

To prepare your Red Hat® Linux OS

1. Place the motherboard support CD in the optical drive.
2. Log in as **root**.
3. Ensure whether you have the needed kernel version and kernel source installed in your system.

Enter **rpm -qa |grep kernel**

```
[root@localhost tmp]# rpm -qa |grep kernel
kernel-headers-2.6.18-8.el5
kernel-devel-2.6.18-8.el5
kernel-2.6.18-8.el5
```

4. Copy the Marvell® LAN driver from the support CD and save it in **/tmp**.
5. Enter **# cd/usr/src**
Enter **In-s /usr/src/kernels/<KERNELVERSION> /usr/src/linux**
6. Enter **make menuconfig**, select **Device Drivers > Network device support > Ethernet (1000 Mbit) > Marvell Yukon Chipset / SysKonnect SK-98xx Support > Enable loadable module support** from the prompt menu, and then save the new kernel configuration.

Building the driver



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

To build the driver

1. Decompress the file.

```
tmp#tar vxjf install_v10.0.5.3.tar.Z
```

2. Change to the driver source directory.

```
cd /DriverInstall/
```

3. In the **DriverInstall** directory, install the LAN driver.

```
./install.sh
```

```
[root@localhost tmp]# cd DriverInstall/  
[root@localhost DriverInstall]# ./install.sh
```

4. In the next step, enter **1** to continue.

```
Installation script for sk98lin driver.  
Version 10.0.5.3 (Mar-12-2007)  
(C) Copyright 2003-2006 Marvell (R) .  
=====  
Add to your trouble-report the logfile install.log  
which is located in the DriverInstall directory.  
=====  
  
1) installation  
2) generate patch  
3) exit  
Choose your favorite installation method:
```

5. Enter **cd /usr/src/linux/**

```
cat /tmp/DriverInstall/sk98lin_v10.0.5.3_2.6.18_patch | patch -p1
```

6. Enter **modprobe sk98lin**

7. Confirm the installed driver version with the **lsmod** command.

8. 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® Server

You need to manually install the XGI Graphics driver on a Windows® 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.

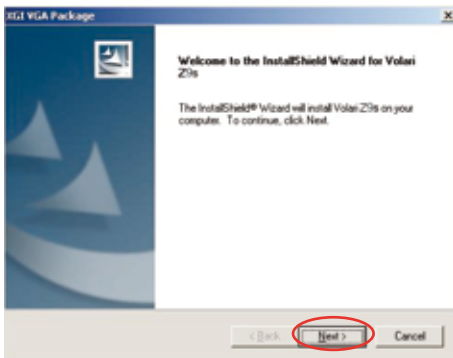


Windows® automatically detects the VGA controller and displays a **New Hardware Found** window. Click **Cancel** to close this window.

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.





The VGA driver does not obtain the authorization from Microsoft® WHQL 2003, but it supports Microsoft® Windows® Server.

6.3.2 Red Hat® Enterprise

The Red Hat® Enterprise 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.



Appendix

This section provides information about the power supply unit and a troubleshooting guide for solving common problems when using the barebone server.



ASUS TS100-E5/P14

A.1 Intel® EM64T



- The motherboard is fully compatible with Intel® Pentium® 4 LGA775 processors running on 32-bit operating systems.
 - The motherboard comes with a BIOS file that supports EM64T. You can download the latest BIOS file from the ASUS website (www.asus.com/support/download/) if you need to update the BIOS file. See Chapter 5 for details.
 - Visit www.intel.com for more information on the EM64T feature.
 - Visit www.microsoft.com for more information on Windows® 64-bit OS.
-

Using the Intel® EM64T feature

To use the Intel® EM64T feature:

1. Install an Intel® Pentium® 4 CPU that supports the Intel® EM64T.
 2. Install a 64-bit operating system (Windows® XP Professional x64 Edition).
 3. Install the 64-bit drivers for the motherboard components and devices from the support CD.
 4. Install the 64-bit drivers for expansion cards or add-on devices, if any.
-



Refer to the expansion card or add-on device(s) documentation, or visit the related website, to verify if the card/device supports a 64-bit system.

A.2 Enhanced Intel SpeedStep® Technology (EIST)



- The motherboard comes with a BIOS file that supports EIST. You can download the latest BIOS file from the ASUS website (www.asus.com/support/download/) if you need to update the BIOS. See Chapter 5 for details.
 - Visit www.intel.com for more information on the EIST feature.
-

A.2.1 System requirements

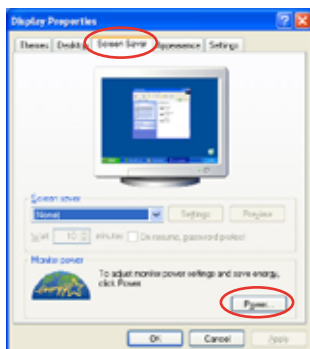
Before using EIST, check your system if it meets the following requirements:


- Intel® Pentium® 4 processor with EIST support
- BIOS file with EIST support
- Operating system with EIST support (Windows® XP SP2/Linux 2.6 kernel or later versions)

A.2.2 Using the EIST

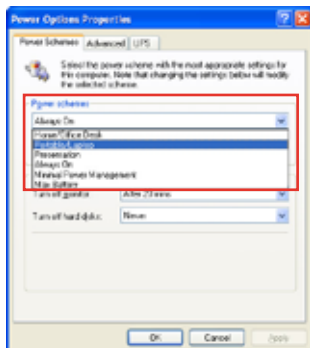
To use the EIST feature:

1. Turn on the computer, then enter the BIOS Setup.
2. Go to the **Advanced** Menu, highlight **CPU Configuration**, then press <Enter>.
3. Set the **Intel(R) SpeedStep Technology** item to [Automatic], and then press <Enter>. See page 4–19 for details.
4. Press <F10> to save your changes and exit the BIOS setup.
5. After the computer restarts, right click on a blank space on the desktop, then select **Properties** from the pop-up menu.
6. When the **Display Properties** window appears, click the **Screen Saver** tab.
7. Click the **Power** button on the **Monitor** power section to open the **Power Options Properties** window.



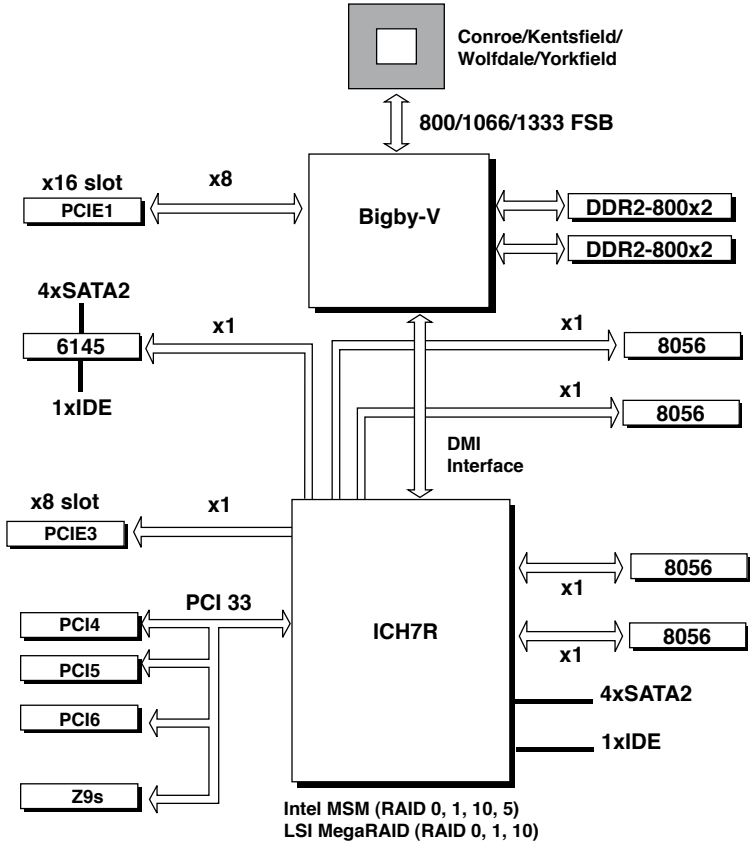
8. On the **Power schemes** section, click , then select any option except Home/Office Desktop or Always On.
9. Click **Apply**, then click **OK**.
10. Close the **Display Properties** window.

After you adjust the power scheme, the CPU internal frequency slightly decreases when the CPU loading is low.



The screen displays and procedures may vary depending on the operating system.

A.3 Block diagram



A.4 Simple fixes



Some problems that you may encounter are not due to defects on the system or the components. These problems only requires simple troubleshooting actions that you can perform by yourself.

Problem	Action
The power LED on the server or on the monitor do not light up	<ol style="list-style-type: none">1. Check if the power cable is properly connected to the power connector in the system rear panel.2. Ensure that the power cables are connected to a grounded power outlet.3. Press the power button to make sure that the system is turned on.
The keyboard does not work	Check if the keyboard cable is properly connected to the PS/2 keyboard port.
The mouse does not work	Check if the mouse cable is properly connected to the mouse port.
The system does not perform power-on self tests (POST) after it was turned on	<ol style="list-style-type: none">1. Check the memory modules and make sure you installed the DIMMs the system supports.2. Ensure that the DIMMs are properly installed on the sockets.
The system continuously beeps after it was turned on.	<ol style="list-style-type: none">1. Check the memory modules and make sure you installed supported DIMMs.2. Ensure that the DIMMs are properly installed on the sockets.
The message “Non-system disk or disk error” appears	<ol style="list-style-type: none">1. Check if a bootable HDD is active.2. Check if the HDDs are properly installed.
Network connection not available	<ol style="list-style-type: none">1. Ensure that the network cable is connected to the LAN port on the rear panel.2. Ensure that you have installed the LAN drivers from the support CD.

