

ASUS[®]

TS300-E4

Intel® Xeon 3000 Series LGA775
Pedestal/5U Server



E2876

First Edition V1
November 2006

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Notices

Federal Communications Commission Statement

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

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

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



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.

Safety information

Electrical Safety

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

Operation Safety

- Any mechanical operation on this server must be conducted by certified or experienced engineers.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.



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

Lithium-Ion Battery Warning

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

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

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

About this guide

Audience

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

Contents

This guide contains the following parts:

1. Chapter 1: Product Introduction

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

2. Chapter 2: Hardware setup

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

3. Chapter 3: Installation options

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

4. Chapter 4: Motherboard information

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

5. Chapter 5: BIOS information

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

6. Chapter 6: RAID configuration

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

7. Chapter 7: 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.

8. 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.

[illegible]

Chapter 1

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



ASUS TS300-E4

Product introduction

1.1 System package contents

Check your ASUS TS300-E4 package with the items on the following table. The package contents vary for the following configurations:

- PA4 (four hot-swap Serial ATA hard disk drives)
- PX4 (four hot-swap SAS hard disk drives)

Item description	Configuration	
	PA4	PX4
ASUS TS300-E4 5U chassis with:		
• ASUS P5M2 motherboard	●	
• ASUS P5M2/SAS motherboard		●
• 450 W single power supply	●	●
• SATA backplane board	●	
• SAS backplane board		●
• Floppy disk drive	●	●
• 9 cm HDD Blower	●	●
• 12 cm Chassis fan	●	●
• Hot-swap HDD trays (including HDD screws)	4	4
• Chassis roller wheels	4	4
• Front I/O board	●	●
Cables		
• AC power cable	●	●
• SATA signal cables (pre-installed)	●	
• SAS signal cables (pre-installed)		●
• SMBus cable (pre-installed)	●	●
System screws and cables	●	●
System keys (2 pcs.)	●	●
Bundled CDs		
• TS300-E4 support CD with ASWM*	●	●
• Computer Associates® eTrust™ anti-virus CD	●	●
Documentation		
• ASUS TS300-E4 user guide	●	●
• ASUS ASWM 2.0 user guide	●	●
Optional items		
• 52x IDE CD-ROM or 16X DVD-ROM drive	●	●
• ASUS TS300-E4 rackmount rail kit	●	●

*ASUS System Web-based Management

1.2 System specifications

The ASUS TS300-E4 is a barebone server system featuring the ASUS P5M2 Series motherboard. The server supports an Intel® Pentium® 4/Pentium® D processor in the 775-land package, and includes the latest technologies through the chipsets embedded on the motherboard.

Chassis	Pedestal or 5U with removable front door bezel and chassis foot stand or roller-wheels.
Motherboard	ASUS P5M2 (PA4 model) ASUS P5M2/SAS (PX4 model) ATX compatible form factor: 12 in x 9.6 in
Chipset	Northbridge: Intel® 3000 Memory Controller Hub (MCH) Southbridge: Intel® ICH7R I/O Bridge: Intel® 6702 PXH
Processor	LGA775 socket for Intel® Xeon 3000 series/ Intel Core™ 2 Duo (E6000/ E4000 Series)/ Intel Pentium 4/ Intel Pentium D processor Supports Intel® Enhanced Memory 64 Technology (EM64T) Supports Enhanced Intel SpeedSetp®Technology (EIST)
Memory	Dual-channel memory architecture 4 x 240-pin DIMM sockets support ECC/non-ECC unbuffered 667/533 MHz DDR2 memory modules Supports 256 MB up to 8 GB of system memory
LAN	Dual Broadcom® BCM5721 Gigabit LAN controllers - PCI Express 1.0a specifications compliant
Storage	<u>For PA4 model only</u> Intel® ICH7R Southbridge supports: <ul style="list-style-type: none">- 4 x Serial ATA 3 Gb/s hard disk drives- Intel® Matrix Storage (Windows) support RAID 0, RAID 1, RAID 0+1, and RAID 5 (S/W)- LSI MegaRAID (Linux/Windows) support RAID 0, RAID 1, and RAID 0+1. <u>For PX4 model only</u> LSI1068 PCI-X SAS controller supports: <ul style="list-style-type: none">- 1 x Mini SAS connector (supports 4 hard disk drives) with RAID 0, RAID 1, and RAID 1E configuration- Zero-Channel RAID (<i>optional</i>)

(continued on the next page)

1.2 System specifications

Expansion slots	1 x PCI 33 MHz/32-bit/5V (PCI 2.3) 1 x PCI-X 133/100 MHz/64-bit slot (PCI-X 1.0) 1 x PCI-X 133/100 MHz/64-bit slot (PCI-X 1.0) (<i>supports ZCR, colored green on PX4 model only</i>) 1 x PCI Express™ x16 slot (x8 Link)** 1 x DDR2-SO-DIMM socket for the ASUS Server Management Board
Drive bays	1 x 3.25-inch FDD bay 3 x 5.25-inch drive bays
Graphics	ATI® ES1000 PCI-based VGA controller with 32MB DDR display memory
Front panel	2 x USB 2.0 ports
Rear panel	1 x Serial port (COM1) 1 x Parallel port 1 x PS/2 keyboard port 1 x PS/2 mouse port 2 x LAN (RJ-45) ports 2 x USB 2.0 ports 1 x VGA port
Management	ASUS Server Web-based Management (ASWM) 2.0
Hardware monitors	Voltage, temperature, CPU and memory utilization, storage capacity, and fan speed monitoring Automatic Server Restart (ASR) feature
Power supply	450 W single power supply - Full Range 110-240V, 50Hz~60Hz (<i>with 24-pin and 4-pin power plugs</i>)

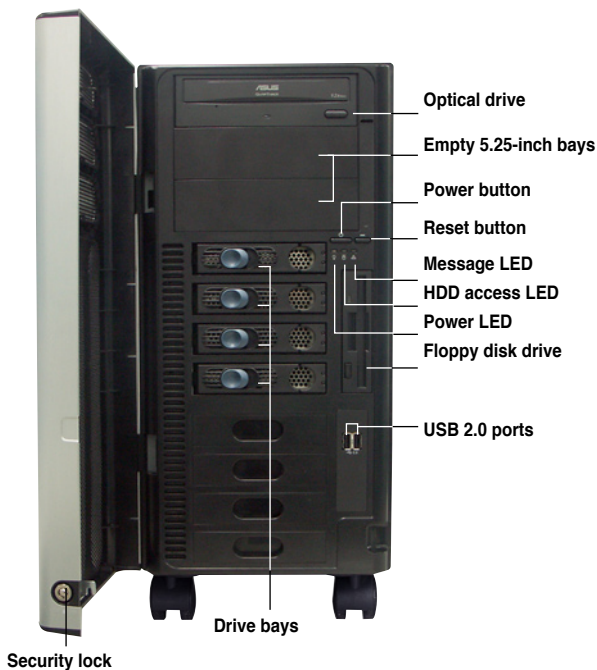


* Only PX4 model supports Zero Channel RAID (ZCR).

1.3 Front panel features

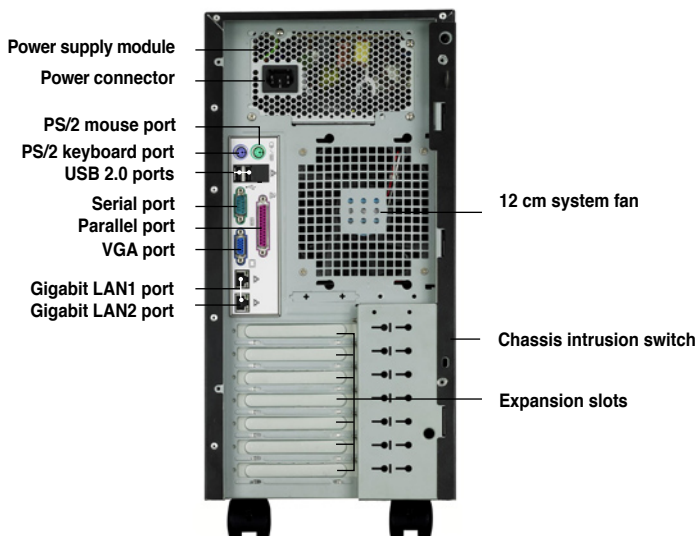
The TS300-E4 chassis displays a stylish front bezel with lock. The bezel covers the system components on the front panel and serves as security. Open the bezel to access the front panel components.

The drive bays, power and reset buttons, LED indicators, optical 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.



1.4 Rear panel features

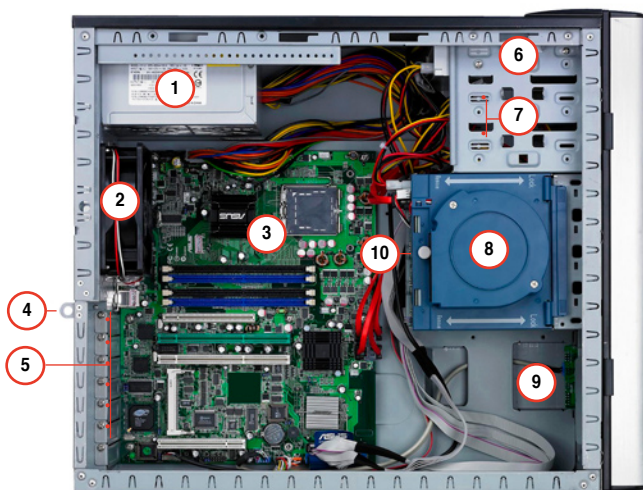
The rear panel includes a slot for the motherboard rear I/O ports, expansion slots, a chassis lock and intrusion switch, a vent for the system fan, and power supply module.



1.5 Internal features

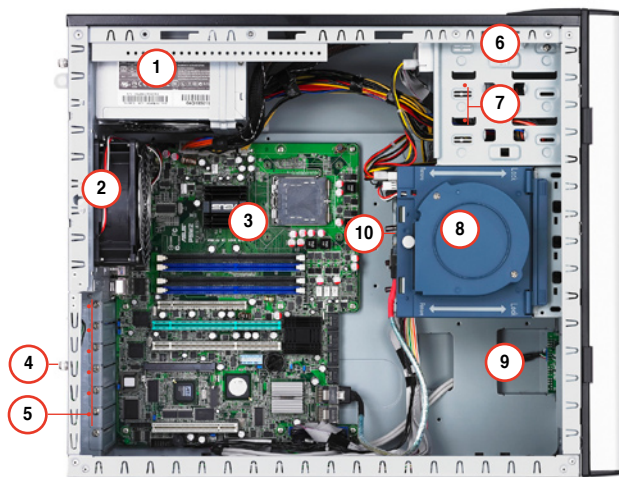
The barebone server system includes the basic components as shown. The photo below shows the TS300-E4 with the hard disk drive blower installed.

PA4 (4 hot-swap SATA configuration)



1. Power supply unit
2. Chassis fan
3. ASUS P5M2 motherboard
4. Chassis intrusion switch
5. Expansion card locks
6. Optical drive
7. 2 x 5.25-inch drive bays
8. HDD blower (HDD drive cage inside)
9. Front I/O board
10. SATA backplane

PX4 (4 hot-swap SAS configuration)

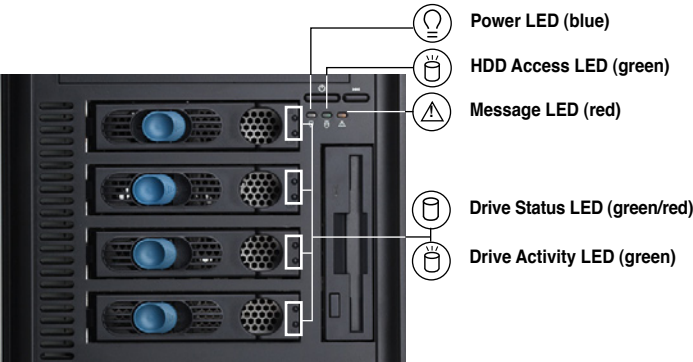


1. Power supply unit
2. Chassis fan
3. ASUS P5M2/SAS motherboard
4. Chassis intrusion switch
5. Expansion card locks
6. Optical drive
7. 2 x 5.25-inch drive bays
8. HDD blower (HDD drive cage inside)
9. Front I/O board
10. SAS backplane

1.6 LED information

The barebone system comes with five LED indicators. Refer to the following table for the LED status description.

1.6.1 System and HDD LED

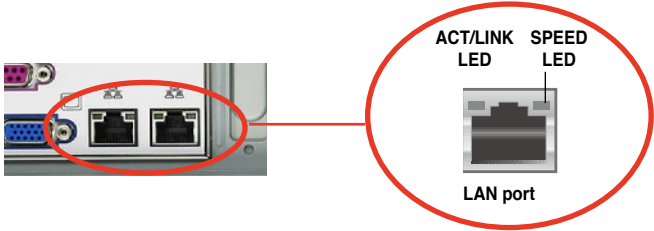


LED	Icon	Display status	Description
System			
Power LED		ON Blinking	System power ON System is in suspend mode
HDD Access LED		OFF Blinking	No activity Read/write data into the HDD
Message LED		OFF Blinking	System is normal; no incoming event ASMS indicates a HW monitor event
Hard disk drives			
Drive Status LED		Green	Bridge board connected to backplane Installed HDD is in good condition
		Red	HDD failure (PX4 model only)
Drive Activity LED		Green/Red - Blinking	HDD rebuilding (PX4 model only)
		Blinking	Read/write data into the HDD (PX4 model only)



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

1.6.2 LAN LED



LAN port LED indications

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

Chapter 2

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



ASUS TS300-E4

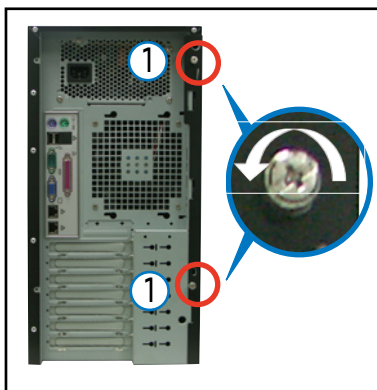
Hardware setup

2.1 Chassis cover

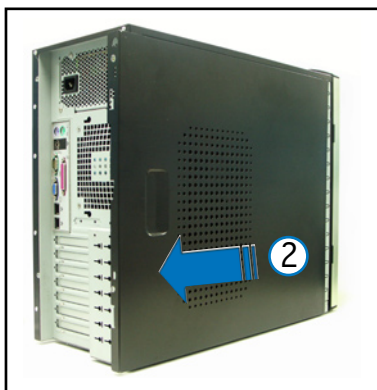
The chassis features a “screwless design” that allows convenient assembly and disassembly. You can simply push or slide mechanical bolts and locks to remove the cover.

2.1.1 Removing the side cover

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



2. Slide the 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.



Viewing the internal structure

Without the side cover, the internal structure and installed components of the barebone server vary depending on the model you purchased. Refer to section “1.5 Internal features” for the different model configurations.

Perform the procedures in the succeeding sections to install the CPU, system memory, disk drives, and expansion cards; replace fans and power supply; and connect the system cables.

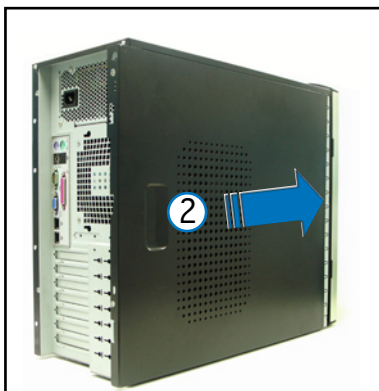


You may need to remove some of the installed components to access the DIMM sockets and internal connectors. Refer to section “2.10 Removable components” for instructions.

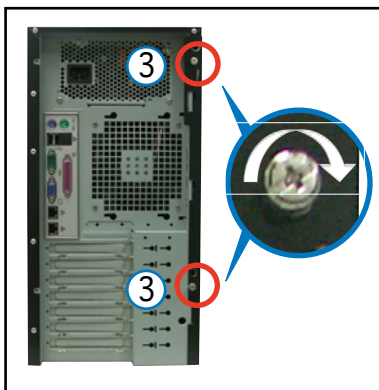
2.1.2 Reinstalling the side cover

To reinstall the side cover:

1. Match and insert the upper hooks and lower sliding edge of the cover to the corresponding chassis holes and edge.
2. Slide the cover toward the front until it snaps in place.



3. Drive in the two screws you removed earlier to secure the side cover.



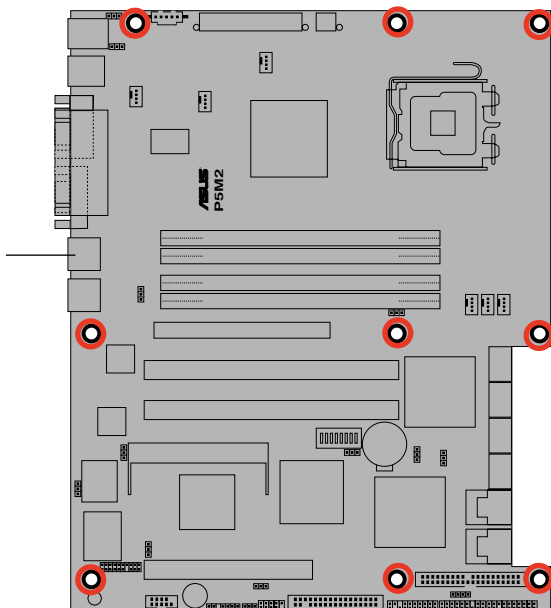
2.2 Motherboard overview

The barebone server comes with the P5M2 (PA4 model) or P5M2/SAS (PX4 model) 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 4 Motherboard information” for detailed information on the motherboard.

Place this side towards
the rear of the chassis



Make sure 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.

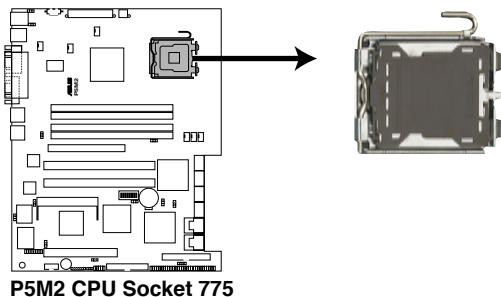
2.3 Central Processing Unit (CPU)

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

2.3.1 Installing the CPU

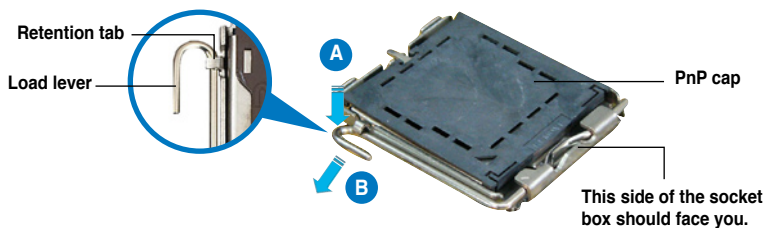
To install a CPU:

1. Locate the CPU socket on the motherboard.



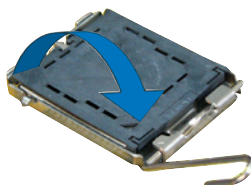
Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

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

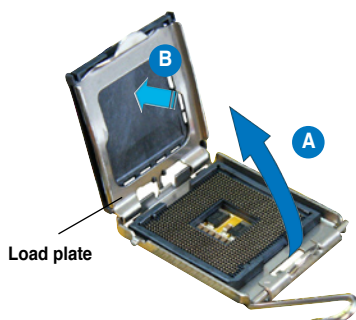


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

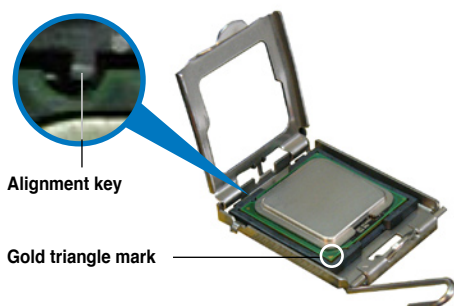
3. Lift the load lever in the direction of the arrow to a 135° angle.



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).



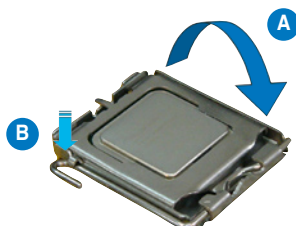
5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.





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 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 Central Processing Unit (CPU)

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 heatsink, fan, retention brackets, screws, thermal grease, installation manual, and other items that are necessary for CPU installation.



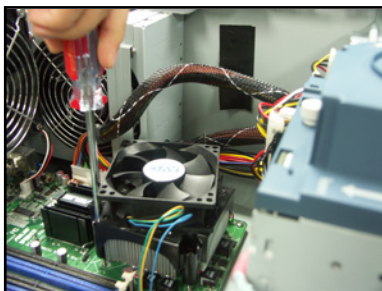
- Make sure that you have applied the thermal grease to the top of the CPU before installing the heatsink and fan.
- Refer to the installation manual that came with the CPU package for details on heatsink/fan assembly and installation.

To install the CPU heatsink and fan:

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



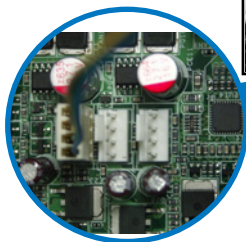
2. Use a screwdriver to tighten the four heatsink screws in a diagonal sequence.



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



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

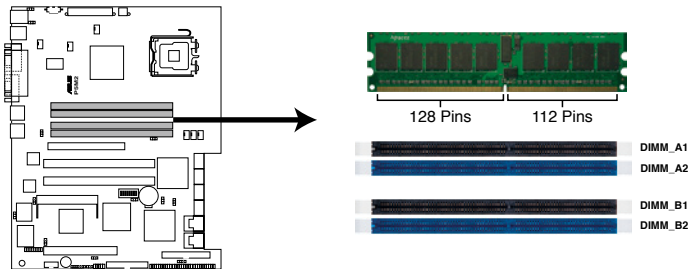


2.4 System memory

2.4.1 Overview

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

The figure illustrates the location of the DDR DIMM sockets:



P5M2 240-pin DDR2 DIMM Sockets

2.4.2 Memory configurations

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



- Always install DIMMs with the same CAS latency. For optimum compatibility, 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 intalled into any three memory sockets will function in dual-channel asmmetric 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.

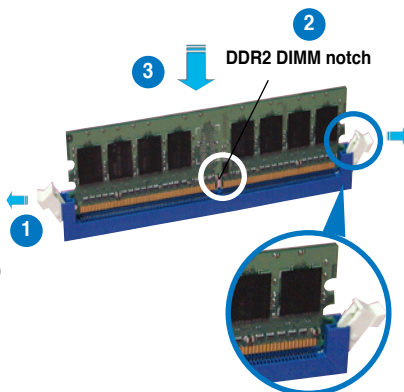
2.4.3 Installing a DIMM



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.

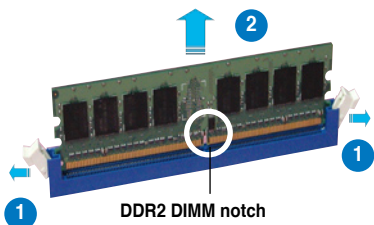
2.4.4 Removing a DIMM

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 Front panel assembly

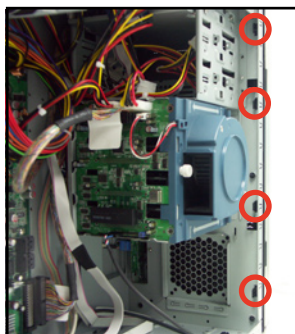
2.5.1 Removing the front panel assembly



Before you can install a 5.25-inch drive, you should first remove the front panel assembly (front bezel and front panel cover). The front panel assembly is attached to the chassis through three hooked tabs on the left side and four hinge-like tabs on the right side.

To remove the front panel assembly:

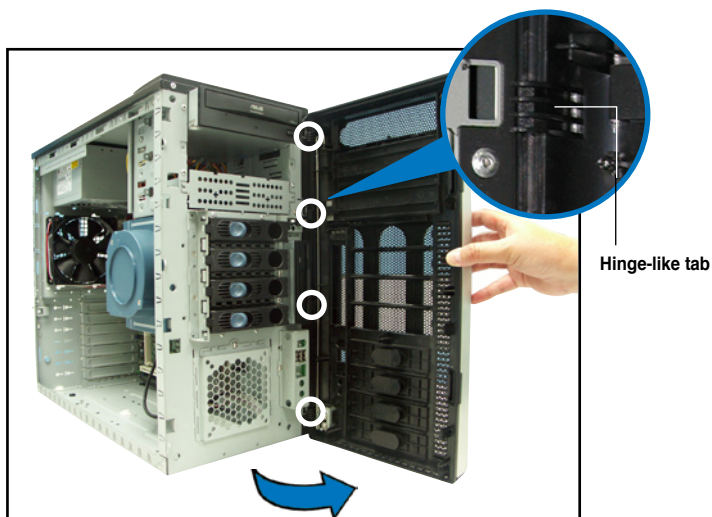
1. Locate the four hooked tabs on the chassis side rail.
2. Press each lock tab to release the front panel from the chassis.
3. Pull and swing the left edge of the front panel outward.



4. Unhook the hinge-like tabs from the holes on the right side of the front panel to completely detach the front panel assembly from the chassis.



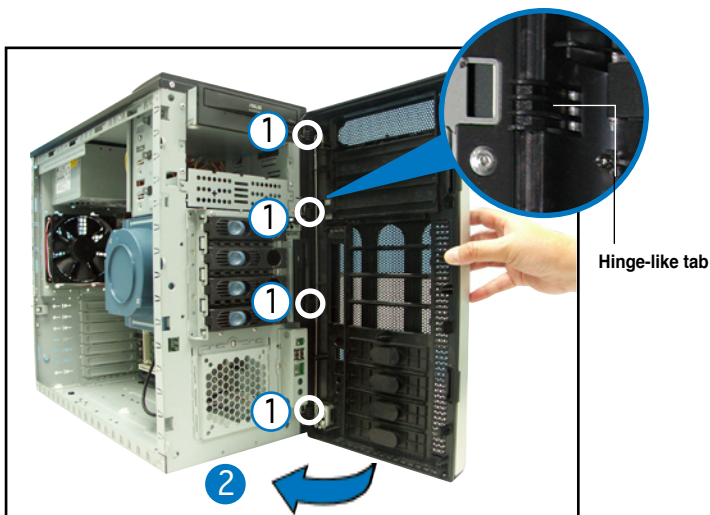
Do not use too much force when removing the front panel assembly.



2.5.2 Reinstalling the front panel assembly

To reinstall the front panel assembly (front bezel and front panel cover):

1. Insert the four hinge-like tabs to the holes on the right edge of the chassis.
2. Swing the front panel to the left and fit the four (4) hooked tabs to the left side of the chassis until the tabs snap back in place.



2.6 5.25-inch drives



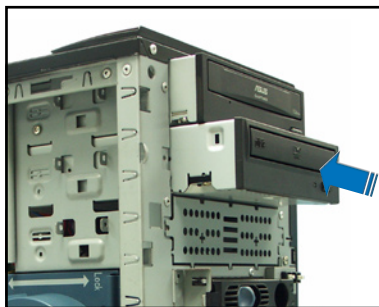
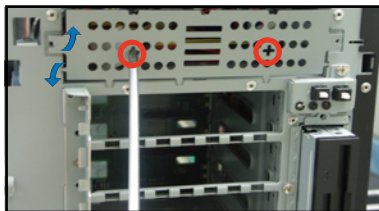
If you have previously used and powered up the system, and that it may be connected to an AC power source, make sure to unplug the power cable before installing or removing any system components. Failure to do so may cause damage to the motherboard and other system components!

Three 5.25-inch drive bays are located on the upper front part of the chassis. A CD-ROM drive that comes standard with the system package occupies the uppermost bay (labeled 1). The two lower bays (labeled 2 and 3) are available for additional 5.25-inch devices.



To install a 5.25-inch drive:

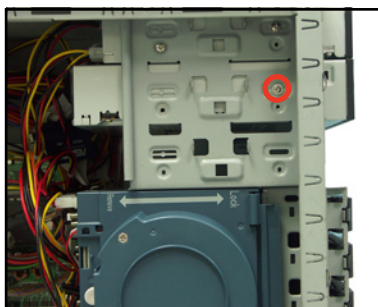
1. Use a Phillips (cross) screwdriver to turn outward and inward the metal cover of the bay until it is completely released.
2. Insert the optical drive into the 5.25-inch drive bay.



3. Make sure that the drive and bay align as shown. When in place, the drive protrudes about an inch from the front panel.

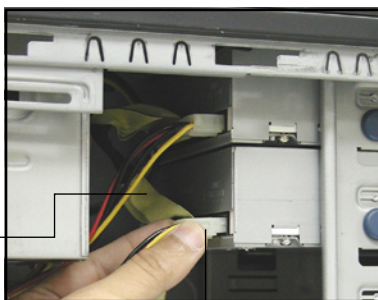


4. Secure the drive with a screw.



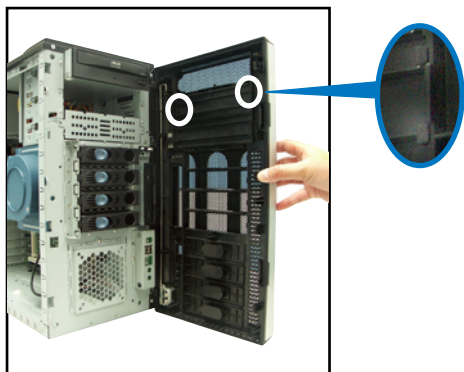
5. Connect the IDE cable to the IDE connector on the back of the drive.
6. Connect a 4-pin plug from the power supply to the power connector on the back of the drive.

IDE cable



Power plug

7. On the front panel assembly, detach the plastic bay cover opposite the 5.25-inch drive that you installed by pressing the two hooked tabs on each side of the bay cover.



8. Reinstall the front panel assembly when done. Refer to section “2.5.2 Reinstalling the front panel assembly” for instructions.

2.7 Hard disk drives

2.7.1 Installing a hot-swap SATA/SAS HDD

Follow the instructions in this section to install a hot-swap SATA (PA4 model) or SAS (PX4 model) hard disk drive (HDD).

1. Open the front bezel to access the hot-swap drive trays.

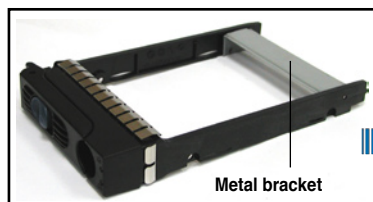
2. Release a drive tray by pushing the spring lock to the right, then pulling the tray lever outward. The drive tray ejects slightly after you pull out the lever.



3. Firmly hold the tray lever and pull the drive tray out of the bay.



4. An empty drive tray requires a metal bracket for support. Use a Phillips (cross) screwdriver to remove the bracket when you are ready to install a hard disk in the drive tray.



5. Place a SATA or a SAS hard disk to the drive tray, and secure it with four screws.



6. Carefully insert drive tray and push it all the way to the depth of the bay until just a small fraction of the tray edge protrudes.



7. Push the tray lever until it clicks, and secures the drive tray in place. The drive tray is correctly placed when its front edge aligns with the bay edge.

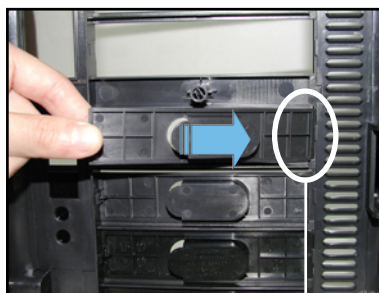


2.7.2 Installing an HDD dummy cover

The HDD dummy covers come pre-installed on the front panel bezel. In case you removed the covers, follow these steps to re-install them.

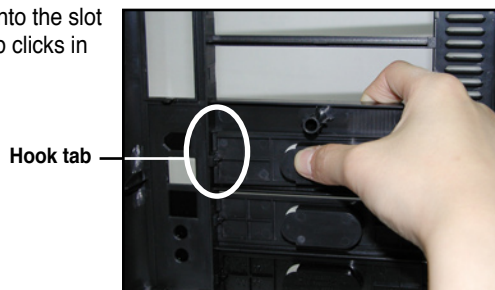
To install an HDD dummy cover:

1. From the inside of the front panel assembly, insert the flat end of a dummy cover into the slot as shown. The end with the hook tab should be close to the front panel LEDs.



Flat end

2. Press the dummy cover into the slot opening until the hook tab clicks in place.



3. When installed, the dummy cover appears as shown.



2.8 Expansion cards

Refer to this section when installing expansion cards.



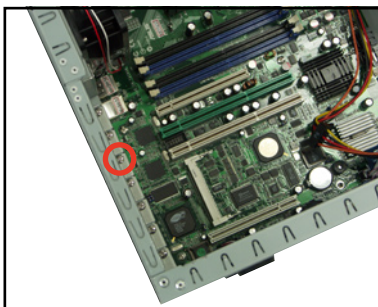
Make sure to unplug the power cord before installing or removing expansion cards. Failure to do so may cause physical injury, and damage to the card and motherboard components!

2.8.1 Installing an expansion card

To install an expansion card:

1. Lay the chassis on its side.
2. Locate the metal bracket opposite the slot you want to use.

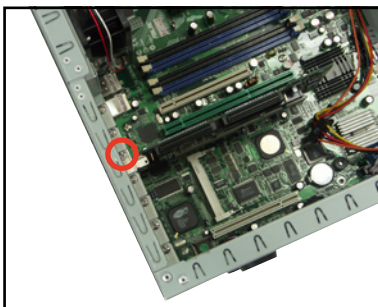
Remove the screw that secures the metal bracket to the chassis. Set aside the metal bracket for future use.



3. Align the card golden fingers to the slot and its metal bracket to the slot opening on the chassis.
4. Press the card firmly until it is properly seated on the slot.



5. Secure the card to the chassis with the bracket screw you removed earlier.



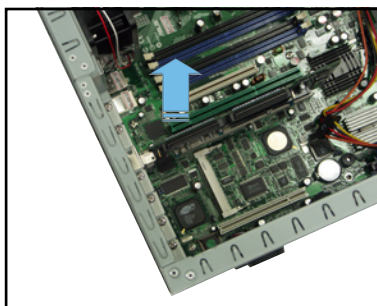
2.8.2 Removing an expansion card

To remove an expansion card:

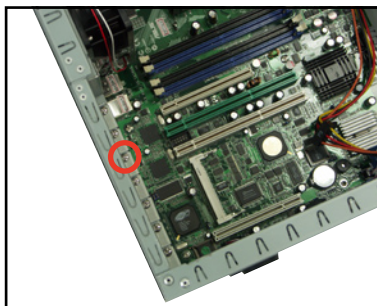
1. Remove the screw that secures the card to the chassis.



2. Carefully remove the card from the slot.



3. Reinstall the metal bracket and secure it to the chassis with the screw that you removed earlier.

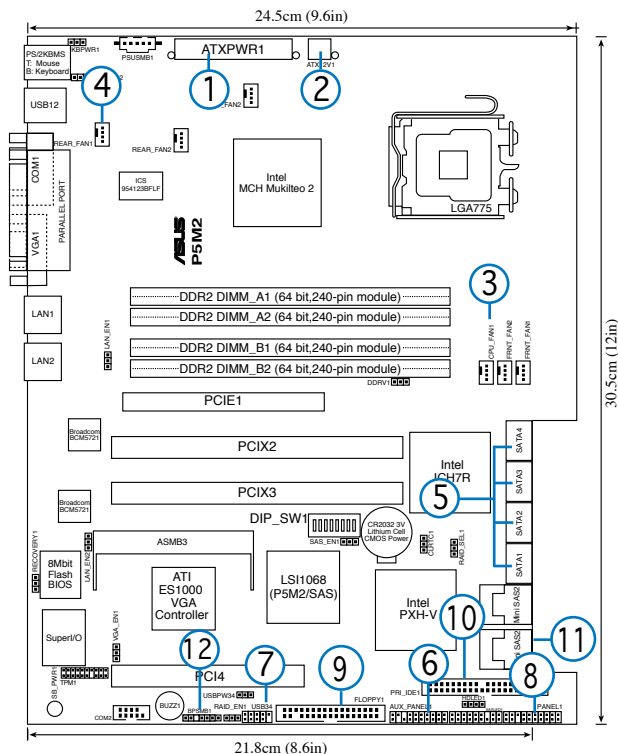


2.9 Cable connections



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

2.9.1 Motherboard connections



Standard cables connected to the motherboard

- | | |
|---|---|
| 1. 24-pin ATX power | 7. Front USB cable (connected to the front panel) |
| 2. 4-pin 12V power | 8. Front panel cable |
| 3. CPU fan 1 (connected to the cooler) | 9. Floppy disk drive |
| 4. Rear fan 1 (connected to the 12cm Rear Fan) | 10. Primary IDE cable (connected to the optional drive) |
| 5. Serial ATA connectors [connected to the SATA backplane (PA4 model only)] | 11. Mini SAS1 connector [connected to the SAS backplane (PX4 model only)] |
| 6. Chassis Intrusion connector (connected to the rear chassis intrusion switch) | 12. SMBus connector (Connected to the backplane) |

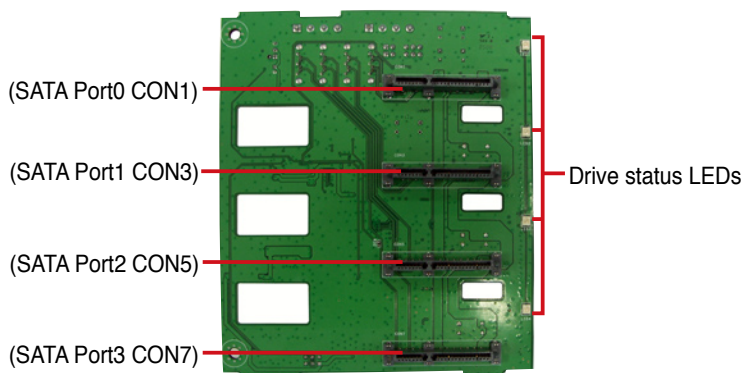
2.9.2 SATA backplane connections

(in PA4 model only)

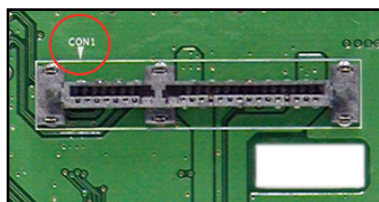
A SATA backplane comes pre-installed in the TS300-E4/PA4 model. The SATA backplane has four 22-pin SATA connectors to support Serial ATA hard disk drives. The backplane design incorporates a hot swap feature to allow easy connection or removal of SATA hard disks. The LEDs on the backplane connect to the front panel LEDs to indicate HDD status. See section “1.6 LED information” for details.

Front side

The front side of the SATA backplane faces the front panel when installed. This side includes four SATA connectors for the hot swap drive trays.



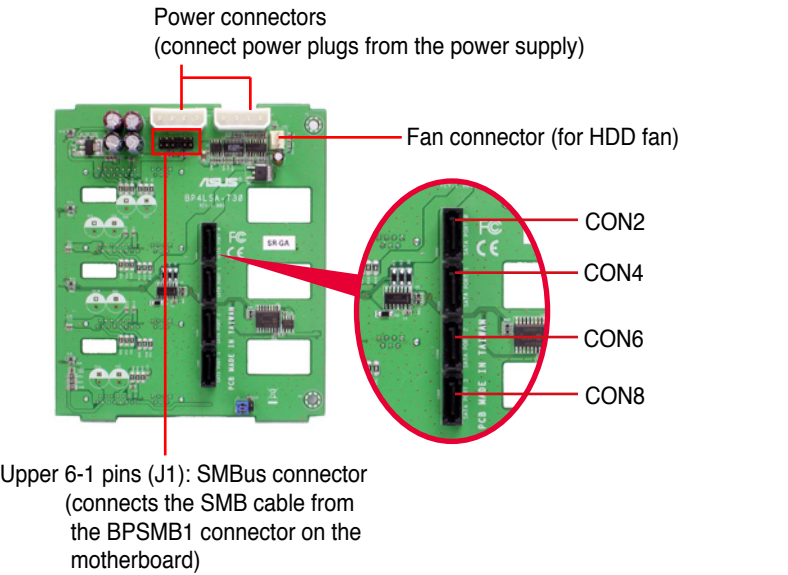
Each SATA connector is labeled (CON1, CON3, CON5, CON7) so you can easily determine their counterpart connectors at the back side of the backplane. Refer to the table for reference.



HDD Device	Front side connector	Back side connector	SATA Port number
HDD 1	CON1	CON2	Port0
HDD 2	CON3	CON4	Port1
HDD 3	CON5	CON6	Port2
HDD 4	CON7	CON8	Port3

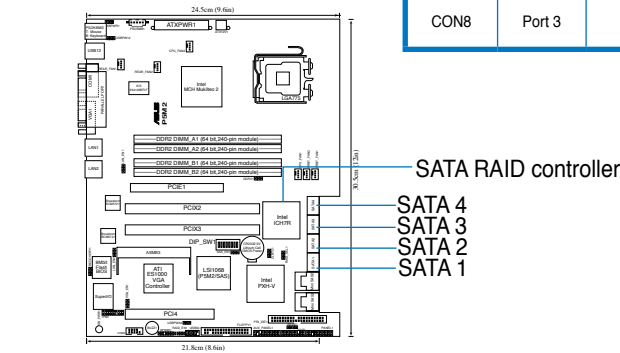
Back side

The back side of SATA backplane faces the rear panel when installed. This side includes the power connectors, SATA interfaces for the motherboard Serial ATA connectors or the SATA/RAID card, an HDD fan connector, and SMBus connectors.



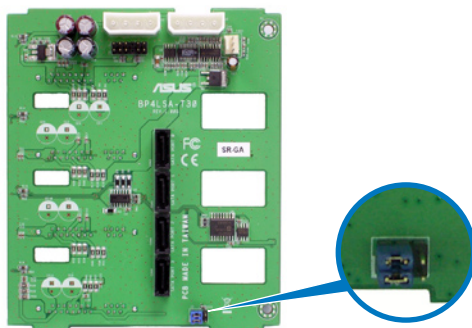
The back side SATA connectors are attached to the motherboard SATA connectors via the supplied SATA cables. Refer to the illustration below for the location of the SATA connectors. Refer to the table on the right for the default SATA cable connections.

Backplane ID	SATA Port number	Connected to (on motherboard)	Controlled by
CON2	Port 0	SATA1	Intel® ICH7R
CON4	Port 1	SATA2	Intel® ICH7R
CON6	Port 2	SATA3	Intel® ICH7R
CON8	Port 3	SATA4	Intel® ICH7R




SATA backplane jumper settings and HDD ID assignments

The 6-pin jumper J3 allows you to define your desired SATA configuration. The picture below shows the location of jumper J3 with pins 1-3 and 2-4 shorted.



Refer to the table for the jumper settings and the appropriate ID# for each SATA HDD bay.

J3 setting	
(1-3 shorted, 2-4 shorted)	
Device	SATA ID#
Drive Bay 1	ID0
Drive Bay 2	ID1
Drive Bay 3	ID2
Drive Bay 4	ID3

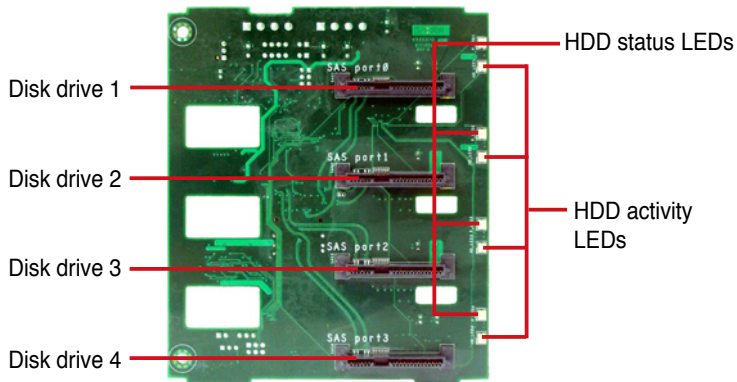
2.9.3 SAS backplane connections

(in PX4 model only)

A SAS backplane comes pre-installed in the TS300-E4/PX4 model. The SAS backplane has four 29-pin SAS connectors to support SAS hard disks. The backplane design incorporates a hot swap feature to allow easy connection or removal of SAS hard disks. The LEDs on the backplane connect to the front panel LEDs to indicate HDD access, HDD failure, thermal failure, or fan failure. See section “1.6 LED information.”

Front side

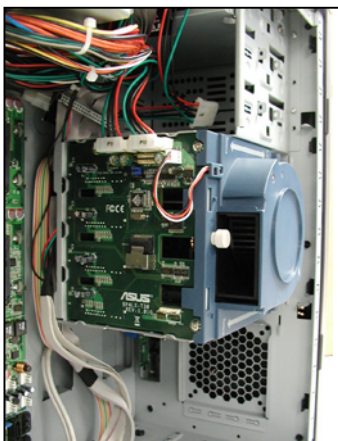
The front side of the SAS backplane faces the front panel when installed. This side includes four SAS connectors for the hot swap drive trays.



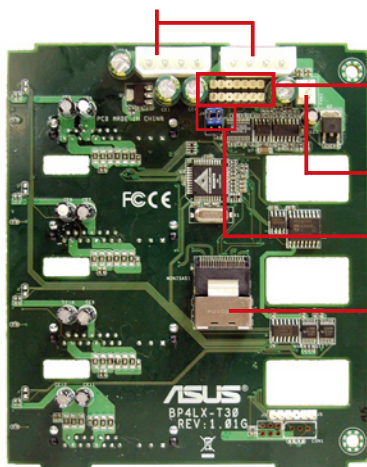
Front Side Connector	SATA Port number	Connected to (on motherboard)	Controlled by
SAS 1	Port 0	Min SAS1	LSI 1068 SAS
SAS 2	Port 1		
SAS 3	Port 2		
SAS 4	Port 3		

Back side

The back side of SAS backplane faces the rear panel when installed. This side includes the power connectors, SAS interfaces for the motherboard SAS connector or the SAS control card, an HDD fan connector, and SMBus connectors.



Power connectors
(connect power plugs
from the power supply)



Upper 6-1 pin (J2): SMBus
connector (connects the SMB
cable from the motherboard)

Fan connector (for HDD fan)

Select Address (as default*)

SAS connector
(connect to the Min SAS1
connector)



* Select Address - You do not have to change these jumpers. Please keep the jumpers as default.

2.10 Removable components

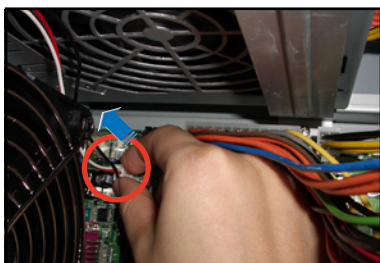
You may need to remove previously installed system components when installing or removing system devices, or when you need to replace defective components. This section tells how to remove the following components:

- | | |
|-----------------------------|---------------------------------------|
| 1. Chassis fan | 5. Front I/O board |
| 2. HDD blowers | 6. Chassis footpads and roller wheels |
| 3. SATA/SAS backplanes | 7. Power supply unit |
| 4. Floppy disk drive module | |

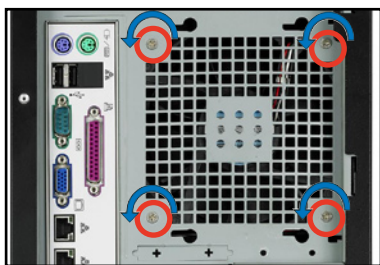
2.10.1 Chassis fan

To remove the chassis fan:

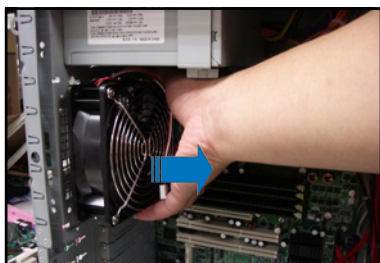
1. Unplug the chassis fan cable from the REAR_FAN1 connector on the motherboard.



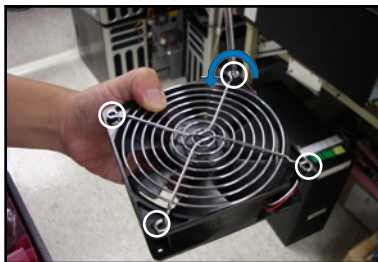
2. Locate the four screws that secure the fan to the chassis.
3. Remove the four screws while carefully supporting the chassis fan with your free hand to prevent it from falling off.
Set the screws aside.



4. Carefully remove the chassis fan.

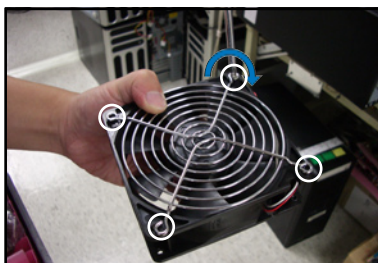


5. Remove the four screws that secure the metal shroud to the fan. Set the screws aside.

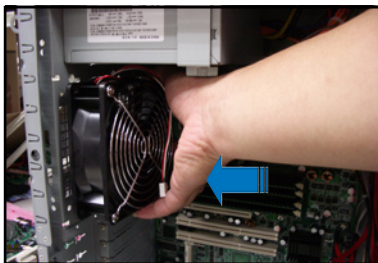


To reinstall the chassis fan:

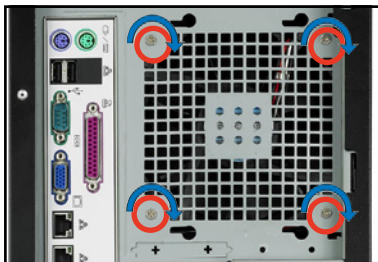
1. Drive in the four screws you removed earlier into the fan screw holes to secure the metal shroud to the fan.



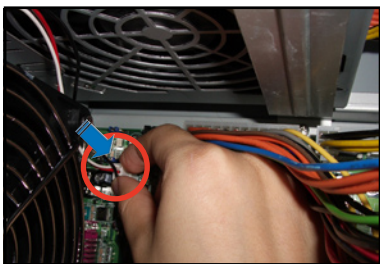
2. Align the chassis fan holes to the screw holes on the chassis.



3. Drive in the four screws you removed earlier to secure the fan to the chassis.



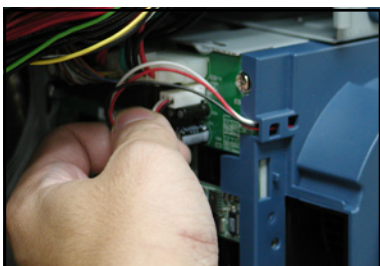
4. Plug the chassis fan cable to the connector Rear_FAN1 on the motherboard.



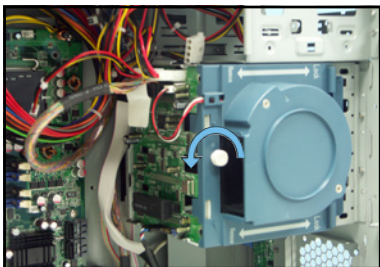
2.10.2 HDD blower

To remove the HDD blower:

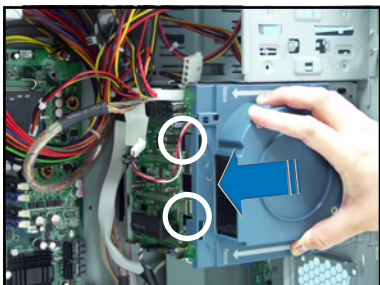
1. Remove the side cover. Refer to section “2.1.1 Removing the side cover” for instructions.
2. Disconnect the 3-pin fan cable from the fan connector on the backplane.



3. Loosen the thumb screw that secures the HDD blower case to the chassis.



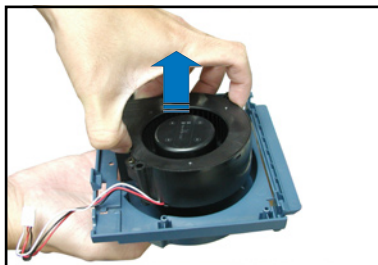
4. Firmly grip the blower case as shown, then slide it out of the chassis in the direction of the arrow until the tabs are released from the holes of the HDD cage.



5. Remove the two screws on the blower case using a Phillips screwdriver. Set the screws aside.

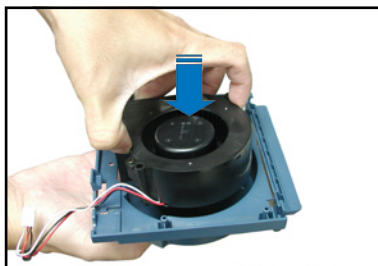


6. Remove the blower from the case.



To reinstall the HDD blower:

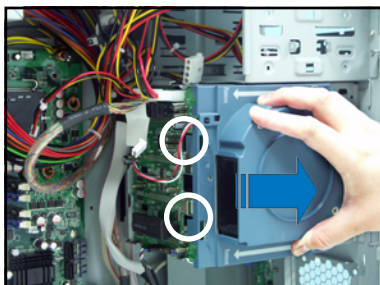
1. Replace the blower into the case.



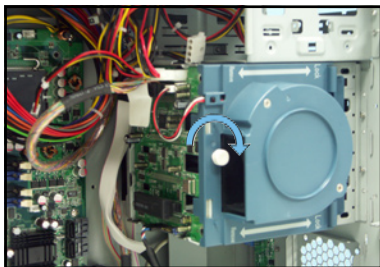
2. Secure the blower to the case with the two screws you removed earlier.



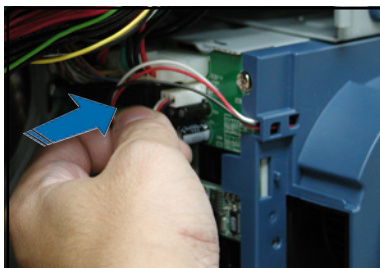
- Slide in the blower case as shown, making sure the tabs fit into the holes on the HDD cage.



- Drive in the thumb screw to secure the HDD blower case.



- Connect the 3-pin fan cable to the fan connector on the backplane.



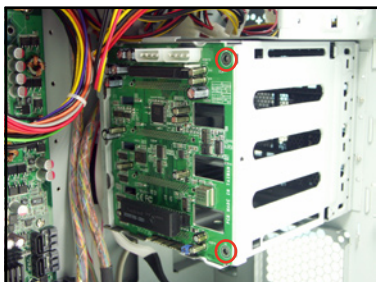
2.10.3 SATA/SAS backplane

To remove the SATA/SAS backplane:

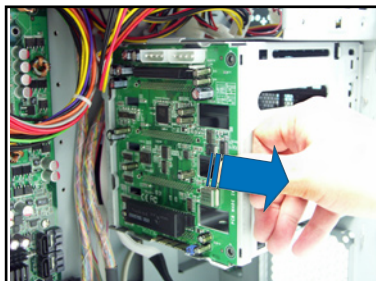
1. Remove the HDD blower case. Refer to section “2.10.2 HDD blowers” for instructions.
2. Disconnect all cables from the SATA/SAS backplane.



When disconnecting a cable, hold and firmly pull the cable plug. DO NOT pull the cable itself. Doing so may damage the cable!

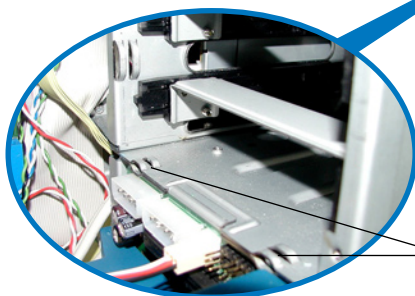
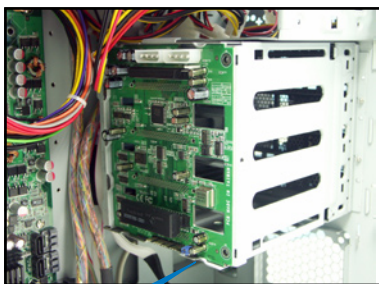


3. Remove the 2 screws on the backplane.
4. From the inner edge, push the backplane outward so that the outer edge protrudes slightly from the slot.
5. From the outer edge, firmly hold the backplane and carefully slide it out.



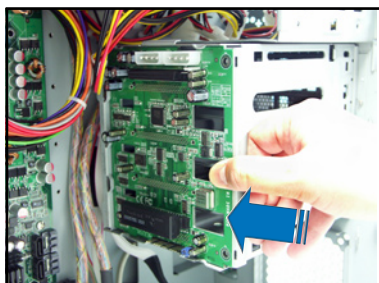
To reinstall a SATA/SAS backplane:

1. Position the backplane into its slot with the component side facing the rear panel, and the power connectors on top.
2. Align the backplane with the rail-like dents on the slot to ensure that it fits securely.



Rail-like dents

3. Slide the backplane into the slot until it fits. If correctly installed, the outer edge of the backplane aligns with the corner of the drive cage.
4. Fasten the 2 screws on the backplane.
5. Connect the appropriate cables to the backplane. Refer to sections "2.9.2 SATA backplane connections" and "2.9.3 SAS backplane connections" for details.



2.10.4 Floppy disk drive



You need to remove the front panel assembly before you can remove the floppy disk drive. Refer to section “2.5.1 Removing the front panel assembly” for instructions.

To remove the floppy disk drive:

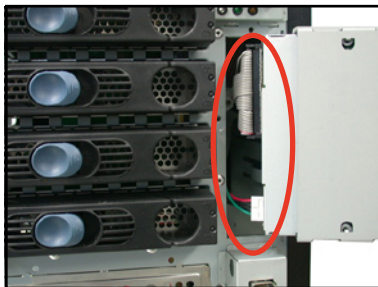
1. Remove the screw that secures the drive to the chassis.



2. Carefully pull out the drive from the chassis until you see the cables connected to the drive.

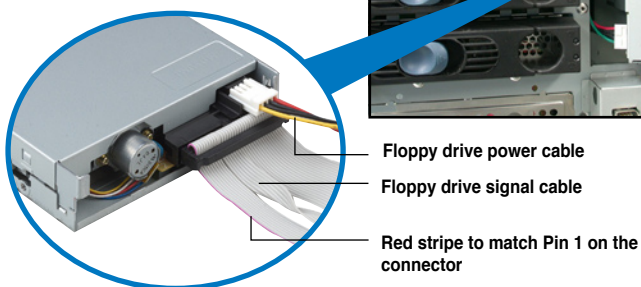


3. Disconnect the floppy disk cable and power cable from the drive to completely release the drive.



To install a floppy disk drive:

1. Position the floppy drive vertically with the eject button on the left side (close to the HDDs).
2. Connect the drive signal cable and power cable.



3. Carefully push the drive into the bay until the drive cage fits the front edge of the bay.



4. Secure the drive cage with a screw.



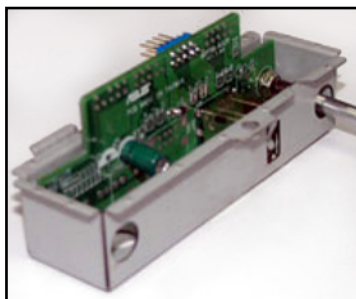
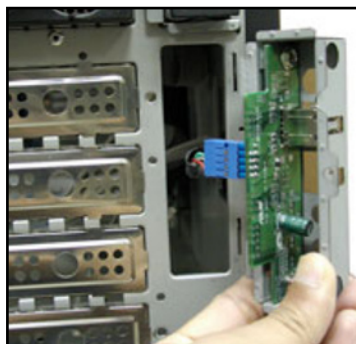
2.10.5 Front I/O board



You need to remove the front panel assembly before you can remove the front I/O board. Refer to section “2.5.1 Removing the front panel assembly” for instructions.

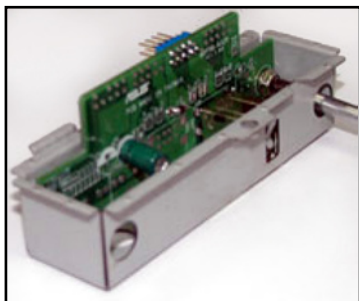
To remove the front I/O board:

1. Remove the screw that secures the front I/O board bracket to the front panel.
2. Carefully pull out the bracket until you see the cables connected to the I/O board.
3. Disconnect all the cables from the I/O board.
4. Remove the screw that secures the I/O board to the bracket.

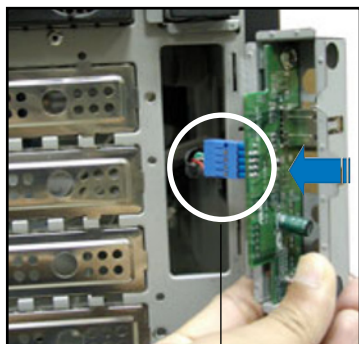


To install the front I/O board:

1. Place the I/O board in the bracket, component side up. Secure the front I/O board to the bracket with a screw.

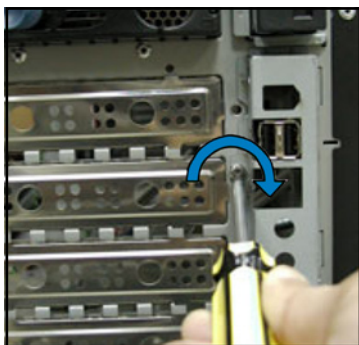


2. Position the I/O board into the bay with the component side to the left (close to the HDDs). Connect the I/O cables to the connectors on the back of the I/O board.



USB 2.0 connector

3. Insert the I/O board into the bay until the bracket fits the front edge of the bay.
4. Secure the I/O board bracket with a screw.



2.10.6 Chassis footpads and roller wheels

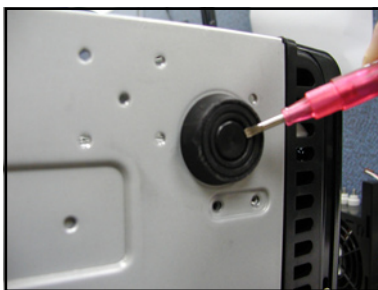
The barebone server system is shipped with four footpads attached to the bottom of the chassis for stability. You need to remove these footpads if:

- if you want to replace the footpads with the bundled roller wheels
- you wish to install the system to a rack

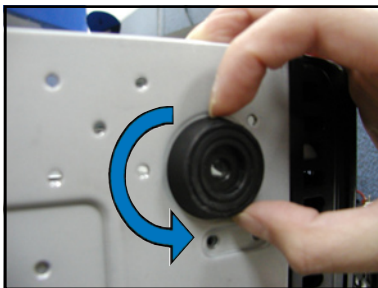
(Refer to “Chapter 3 Installation options” of this user guide, and to the “Rackmount Kit” user guide for instructions)

To remove the footpads:

1. Lay the system chassis on its side.
2. Use a flat screwdriver to flip out the top layer of a footpad.



3. Remove the footpad by rotating it counterclockwise.

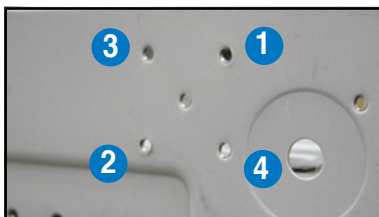


4. Repeat steps 2 and 3 to remove the other three footpads.

For convenient transport, install the roller wheels the came with the system package. Each wheel has a brake lock to stabilize the chassis in place.

To install the chassis wheels:

1. Lay the chassis in its side.
2. Locate the designated screw holes for each of the four wheel sets. Take note of the numbers alongside each hole when placing screws.



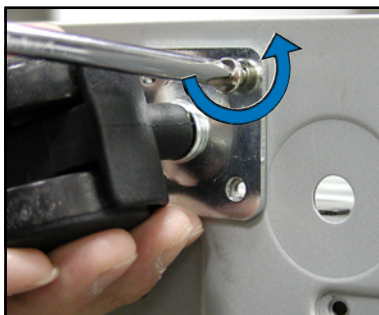
3. Secure each wheel to the bottom of the chassis using four screws.
4. Repeat steps 2 and 3 to install the other three wheels.



Remove the chassis roller wheels if you wish to mount the system to a rack.

To remove the chassis wheels:

1. Lay the system chassis on its side.
2. Use a Phillips screwdriver to remove the screws that secure the wheels to the bottom of the chassis.
3. Repeat step 2 to remove the other three roller wheels.



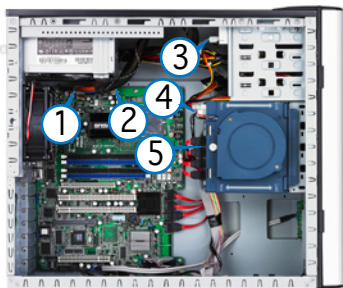
2.10.7 Power supply unit

Refer to this section when removing or installing a power supply unit to the barebone system.



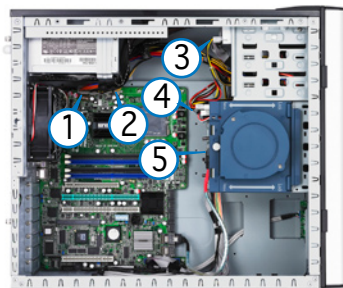
You **MUST** disconnect all power cable plugs from the motherboard and other installed devices before removing the power supply unit.

The picture below shows the motherboard and device connectors where the power plugs are connected. Refer to the Appendix at the end of this document for the power supply specifications.



Model PA4

1. 24-pin ATX (*motherboard power connector*)
2. 4-pin +12V (*motherboard power connector, hidden behind the cables*)
3. 4-pin plug (*optical drive*)
4. 2 x 4-pin plugs (*SATA backplane*)
5. 4-pin plug (*floppy disk drive, hidden behind the backplane*)



Model PX4

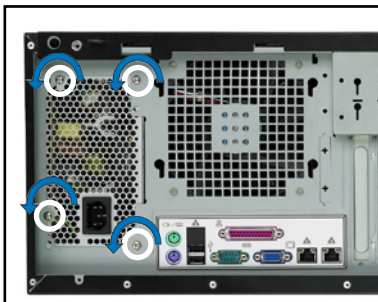
1. 24-pin ATX (*motherboard power connector*)
2. 4-pin +12V (*motherboard power connector, hidden behind the cables*)
3. 4-pin plug (*optical drive*)
4. 2 x 4-pin plugs (*SAS backplane*)
5. 4-pin plug (*floppy disk drive, hidden behind the backplane*)



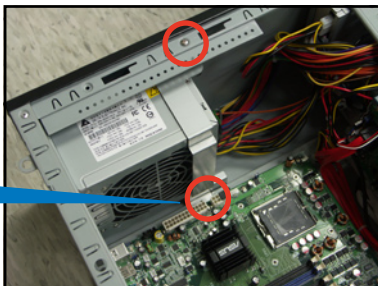
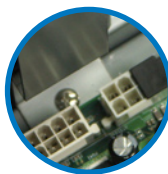
Make sure to unplug ALL power cables from the system devices before removing the power supply unit.

To remove the power supply unit (PSU):

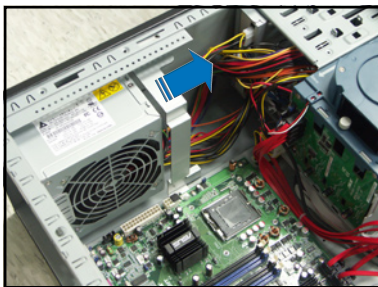
1. Remove the chassis cover. Refer to section “2.1.1 Removing the side cover.”
2. Remove the front panel assembly. Refer to section “2.5.1 Removing the front panel assembly.”
3. Lay the chassis on a flat, stable surface.
4. Locate the four screws on the rear panel. Remove the screws and set them aside.



5. Locate and remove the screws that secure the PSU bracket to the chassis.



6. Slide the bracket in the direction of the arrow and remove it from the chassis.

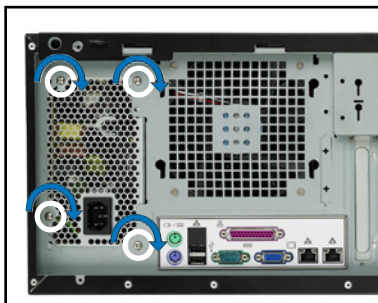


7. Carefully slide the PSU in the direction of the arrow until it disengages from the chassis.

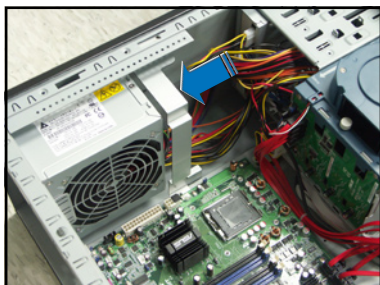


To reinstall the power supply unit:

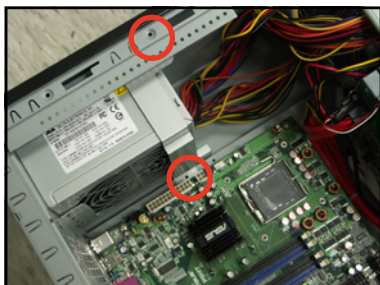
1. Carefully slide the PSU in the direction of the arrow.
2. Secure the PSU to the chassis with the four screws you removed earlier.



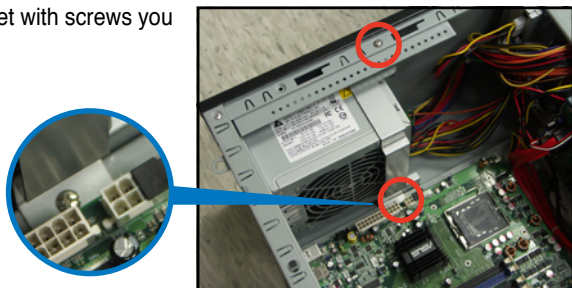
3. Slide in the PSU bracket.



4. Align the screw holes.



5. Secure the bracket with screws you removed earlier.



[illegible]

Chapter 3

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



ASUS TS300-E4

Installation option



The items required for the optional configurations described in this chapter are not included in the standard barebone system package. These items are purchased separately.

Preparing the system for rack mounting

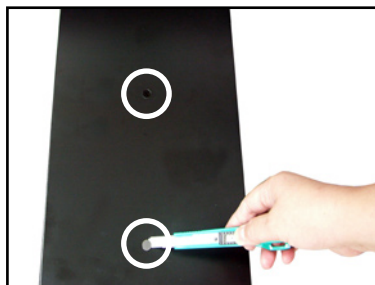
Removing the footpads or roller wheels

Refer to section “2.10.6 Chassis footpads and roller wheels” for instructions on removing the footpads or roller wheels.

Removing the top cover

To remove the top cover:

1. Remove the chassis cover. Refer to section “2.1.1 Removing the side cover.”
2. Remove the front panel assembly. Refer to section “2.5.1 Removing the front panel assembly.”
3. Carefully slide out the protruding portion of the top cover as shown.
4. Locate two round mylars on top cover.
5. Carefully remove each mylar using a sharp, flat object such as the edge of a cutter.



Attaching the rack rails

Refer to the installation guide that came with the Rackmount Rail Kit for instructions on how to attach the rails and on the barebone server system and the corresponding rails on the industrial rack.



We recommend that you allot at least 1U space above the server system to ensure optimal thermal performance.

Chapter 4

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

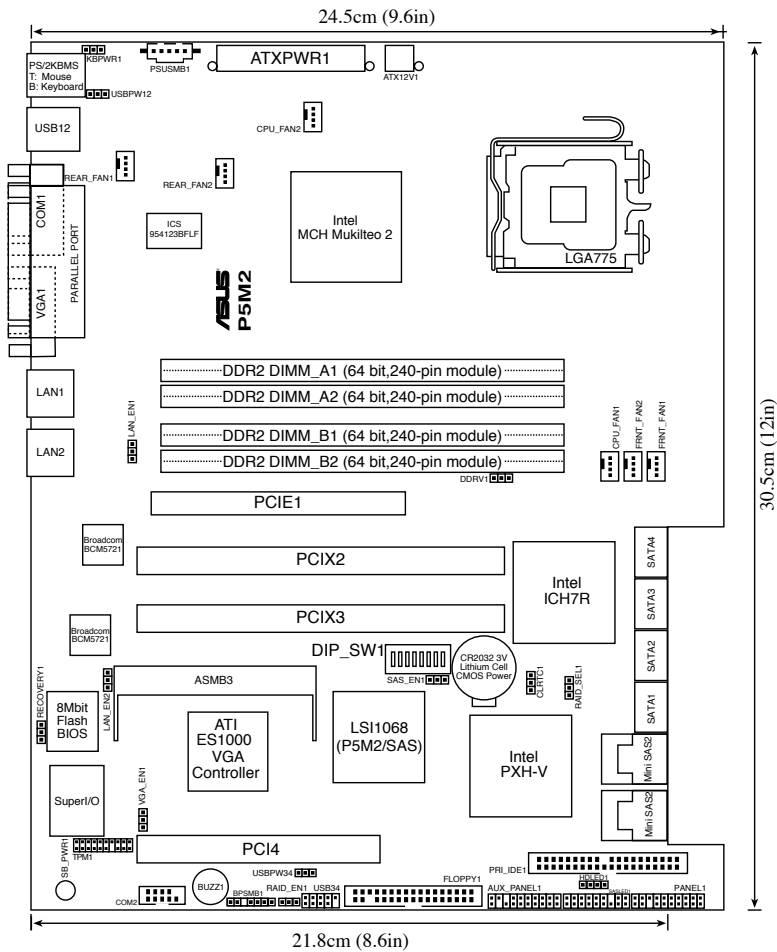


ASUS TS300-E4

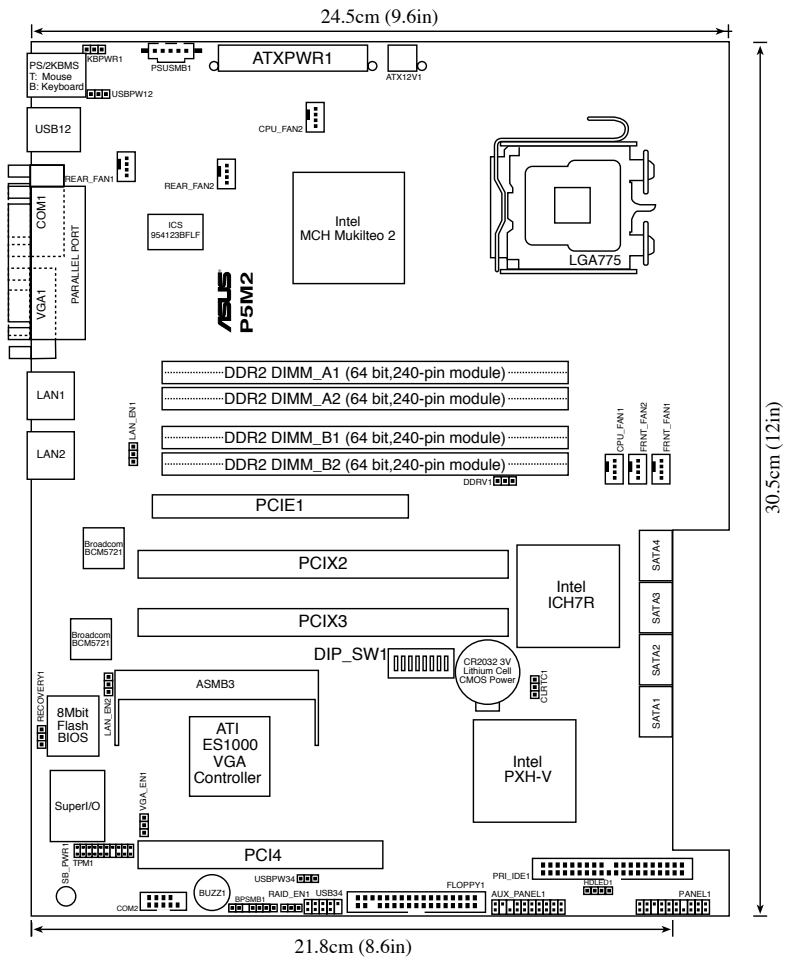
Motherboard info

4.1 Motherboard layouts

P5M2/SAS model



P5M2 model



Layout contents

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1. CPU socket	2-5
2. DDR2 DIMM slots	2-10

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3. Keyboard/Mouse power (3-pin KBPWR1)	4-8
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2.	ICH7R Primary IDE connectors (40-1 pin PRI_IDE1)	4-13
3.	Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4)	4-14
4.	Hard disk activity LED connector (4-pin HDLED1)	4-15
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6.	Serial port connector (10-1 pin COM2)	4-16
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8.	Mini-SAS connectors	4-17
9.	CPU and system fan connectors (4-pin CPU_FAN1/2, REAR_FAN1/2, FRNT_FAN1/2)	4-18
10.	Backplane SMBus connector (6-1 pin BPSMB1)	4-18
11.	Power supply SMBus connector (5-pin PSUSMB1)	4-19
12.	ATX power connectors (24-pin ATXPWR1, 4-pin ATX12V2)	4-19
13.	Auxiliary panel connector (20-pin AUX_PANEL1)	4-20
14.	System panel connector (20-pin PANEL1)	4-21

4.2 Jumpers



The grayed out components in the illustrations may not be present in certain models.

1. Clear RTC RAM (CLRTC1)

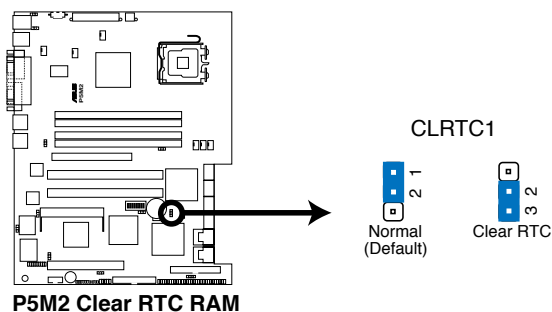
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

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

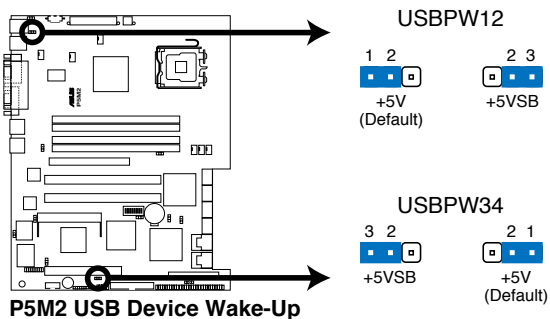


Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



2. USB device wake-up (3-pin USBPW12, USBPW34)

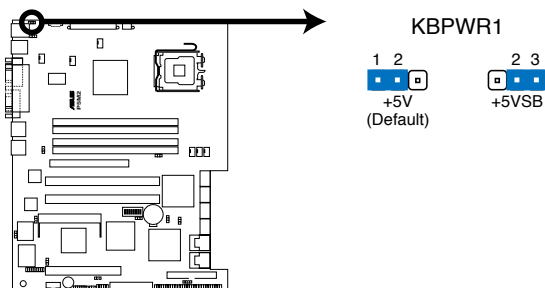
Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set to +5VSB to wake up from S4 sleep mode (no power to CPU, DRAM in slow refresh, power supply in reduced power mode).



- The USB device wake-up feature requires a power supply that can provide 500mA on the +5VSB lead for each USB port; otherwise, the system would not power up.
- If you are using Windows 2000, you need to install Service Pack 4 to wake up the system from S4 sleep mode.
- The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

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

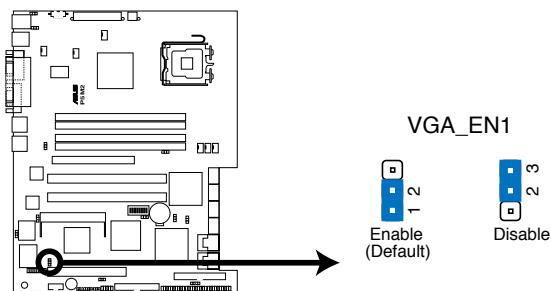
This jumper allows you to enable or disable the keyboard/mouse wake-up feature. Set this jumper to pins 2-3 (+5VSB) to wake up the computer when you press any key on the keyboard (the default is the Space Bar) or click the mouse. This feature requires an ATX power supply that can supply at least 1A on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



P5M2 Keyboard Power Setting

4. VGA controller setting (3-pin VGA_EN1)

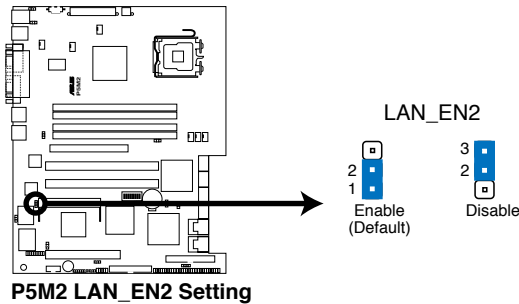
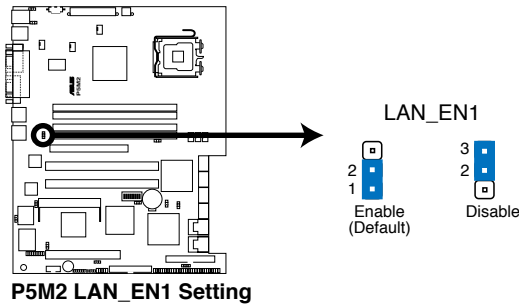
These jumpers allow you to enable or disable the onboard ATI® RAGE-XL PCI VGA controller. Set to pins 1-2 to activate the VGA feature.



P5M2 VGA Setting

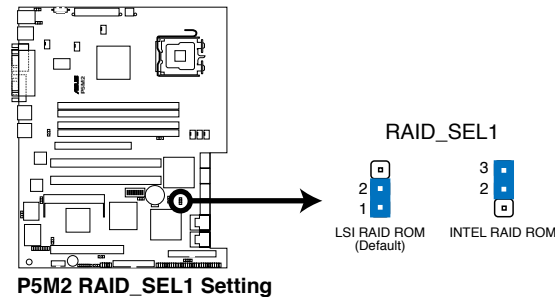
5. Gigabit LAN controller setting (3-pin LAN_EN1, LAN_EN2)

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



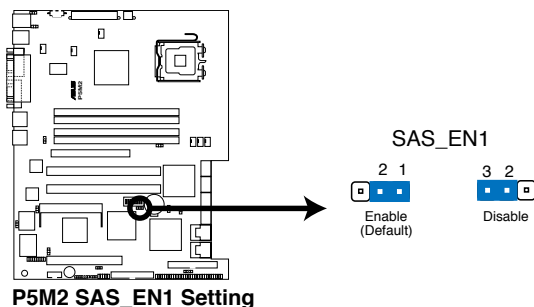
6. RAID controller selection (3-pin RAID_SEL1) [PA4 model only]

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



7. SAS controller setting (3-pin SAS_EN1) [PX4 model only]

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

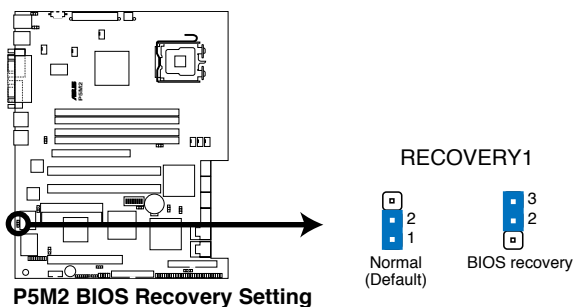


8. Force BIOS recovery setting (3-pin RECOVERY1)

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

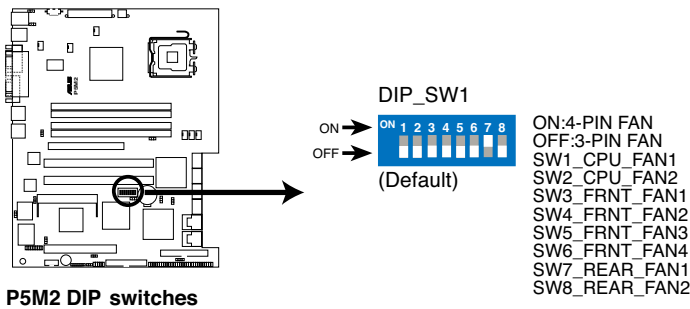
To update the BIOS:

1. Turn off the system.
2. Set the jumper from pins [1-2](default) to pins [2-3].
3. Prepare a floppy disk that contains the latest BIOS for the motherboard (xxxx-xxx.ROM) and the AFUDOS.EXE utility.
4. Insert the floppy disk then turn on the system to update the BIOS.
5. Shut down the system.
6. Set the jumper back to pins [1-2].
7. Turn on the system and hold down the key during the boot process , then enter BIOS setup to re-enter data..



4.3 Switch

The motherboard features a DIP switch for fan pin selection.



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

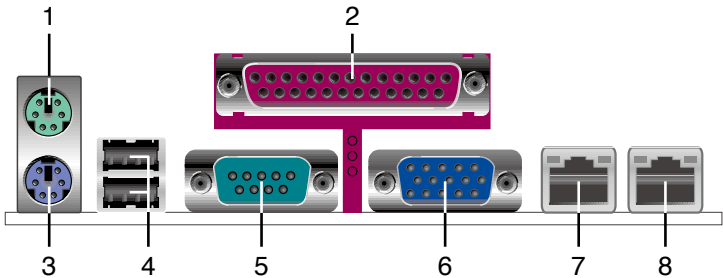
Switch	Fan connector	Default Setting
1	CPU_FAN1	ON
2	CPU_FAN2	ON
3	FRNT_FAN1	ON
4	FRNT_FAN2	ON
5	FRNT_FAN3	ON
6	FRNT_FAN4	ON
7	REAR_FAN1	OFF
8	REAR_FAN2	ON



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

4.4 Connectors

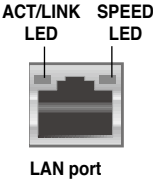
4.4.1 Rear panel connectors



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

LAN port LED indications

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



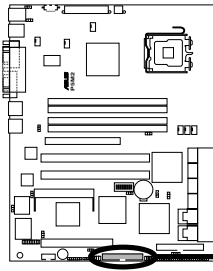
4.4.2 Internal connectors

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

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



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



P5M2 Floppy Disk Drive Connector

FLOPPY1



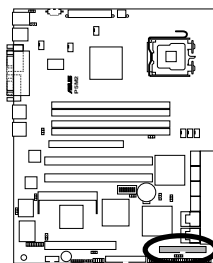
NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.

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

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



- 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.



P5M2 IDE Connector

PRI_IDE1



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

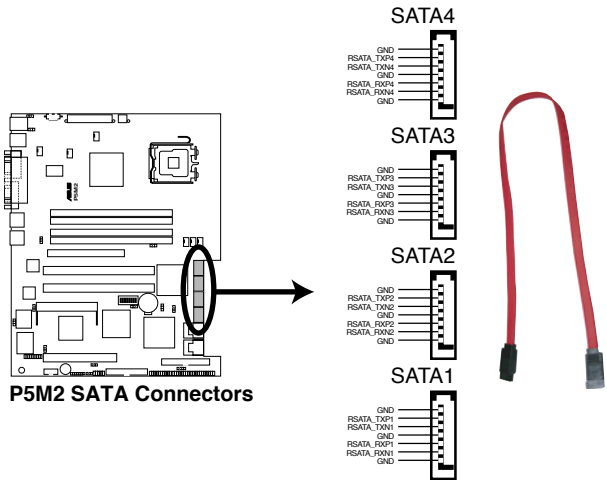
3. **Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4) [PA4 model only]**

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

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



These connectors are set **IDE** mode by default. In **IDE** mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the **Configure SATA as** item in the BIOS to [RAID]. See section “5.3.4 IDE Configuration” for details.



Important notes on Serial ATA

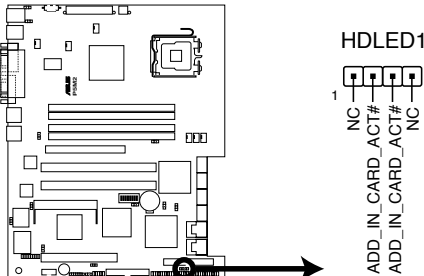
- You must install Windows® 2000 Service Pack 4 or Windows® 2003 before using Serial ATA hard disk drives. The Serial ATA RAID feature (RAID 0/RAID 1) is available only if you are using Windows® 2000/2003.
- Use only two Serial ATA RAID connectors for each RAID 0 or RAID 1 set.
- When using the connectors in IDE mode, connect the primary (boot) hard disk drive to the SATA1 or SATA2 connector. Refer to the table below for the recommended SATA hard disk drive connections.

Serial ATA hard disk drive connection

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

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

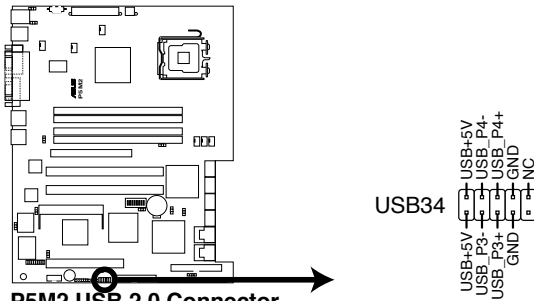
This connector supplies power to the hard disk activity LED. Connect the external LED on the storage card like SCSI card with the onboard HDLED1 to allow the access signal to got through the HDLED pin on the system panel connector.



P5M2 SCSI/SATA Card Activity LED Connector

5. USB connector (10-1 pin USB34)

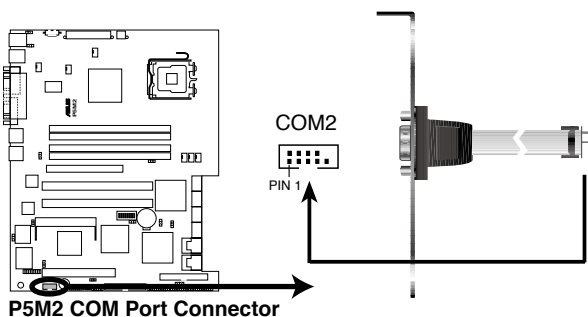
This connector is for USB 2.0 ports. Connect the USB module cable to this connector, then install the module to a slot opening at the back of the system chassis. This USB connector complies with USB 2.0 specification that supports up to 480 Mbps connection speed.



P5M2 USB 2.0 Connector

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

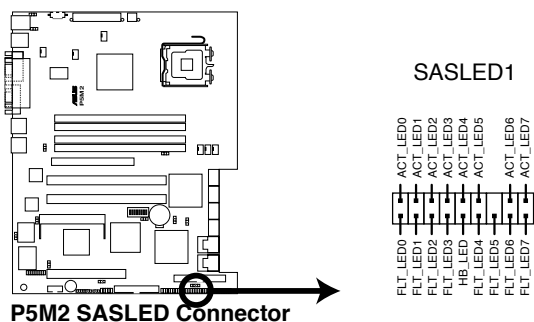
This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis. The serial port module is purchased separately.



7. SAS LSI1068 ports LED connector (18-1 pin SASLED1)

(For PX4 model only)

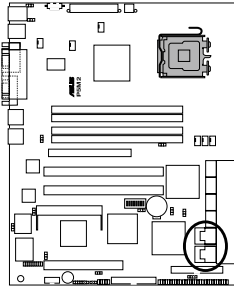
This connector is for SAS link state's LED. The active LOW Fault LED signals are nominally configured to indicate a SAS link fault for each respective phy. The active LOW Activity LED signals are nominally configured to indicate SAS link activity.



8. Mini-SAS connectors

(For PX4 model only)

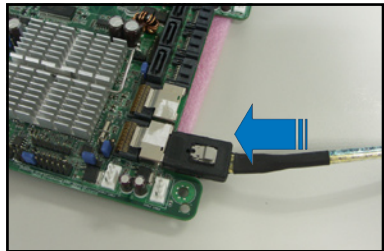
This motherboard comes with two Serial Attached SCSI (SAS) connectors, the next-generation storage technology that supports both Serial Attached SCSI and Serial ATA. Each connector supports up to four (4) devices.



P5M2/SAS MINI SAS connectors

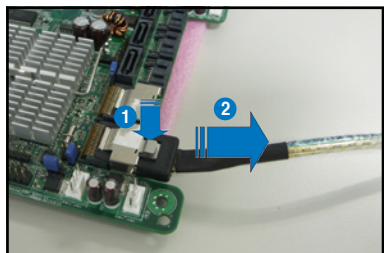
To connect the mini-SAS cable:

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



To disconnect the mini-SAS cable:

1. With your thumb, push down the cable lock to release.
2. While still keeping your thumb's grip on the cable lock, carefully pull away the cable from the connector.



9. CPU and system fan connectors (4-pin CPU_FAN1/2, REAR_FAN1/2, FRNT_FAN1/2)

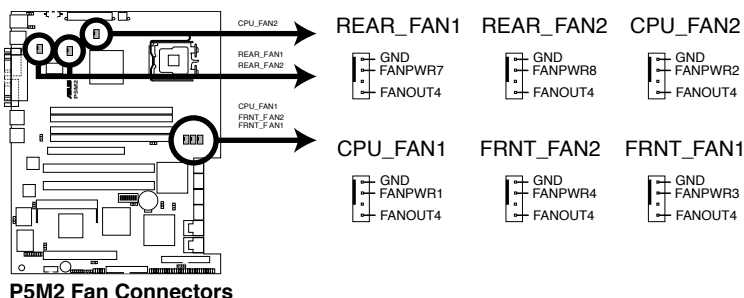
The fan connectors support 3-pin or 4-pin cooling fans of 350 mA ~ 740 mA (8.88 W max.) or a total of 2.1 A ~ 4.44 A (53.28 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.



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

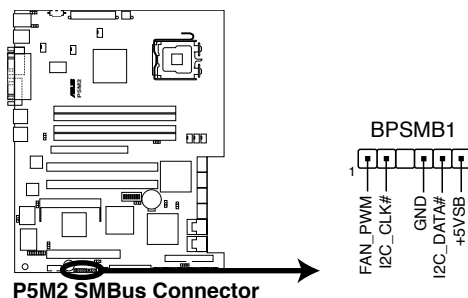


See “Section 4.3 Switch” to get detailed information about DIP switch setting for 4-pin or 3-pin fan cables.



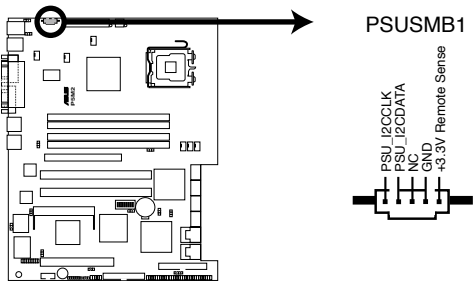
10. Backplane SMBus connector (6-1 pin BPSMB1)

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



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

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



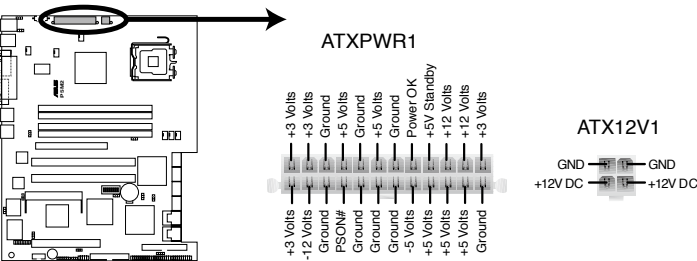
P5M2 Power Supply SMBus Connector

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

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



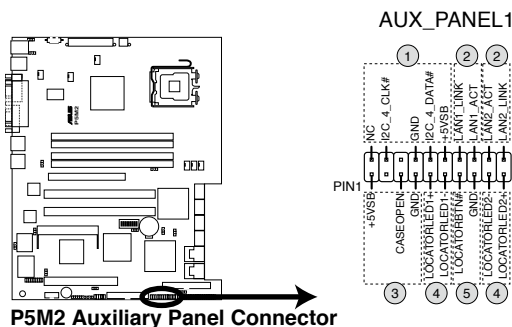
- Do not forget to connect the 4-pin ATX +12 V power plug; otherwise, the system will not boot up.



P5M2 ATX Power Connector

13. Auxiliary panel connector (20-pin AUX_PANEL1)

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



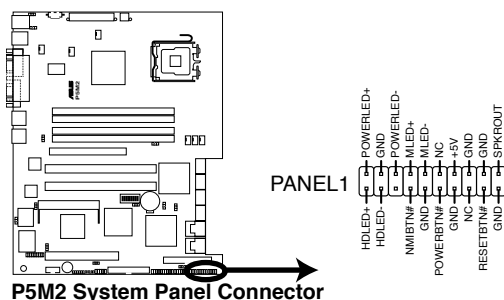
1. Front Panel SMBus (6-1 pin)
These leads connect the front panel SMBus cable.
2. LAN link activity LED (2-pin LAN1_LINKACTLED and 2-pin LAN1_LINKACTLED)
Both of the 2-pin connectors are for the LAN1 and LAN2 Activity LED. Connect the LAN Activity LED cable to this connector.

This LED blinks during a network activity and is always lit when linked.
3. Chassis Intrusion connector (4-1pin CASEOPEN)
This lead is for a chassis with an intrusion detection feature. This requires an external detection mechanism such as a chassis intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to this lead to record a chassis intrusion event. If you like to disable this feature, please place one jumper cap over the CASEOPEN and GND leads.
4. Locator LED (2-pin LOCATORLED1 and 2-pin LOCATORLED2)
Both of the 2-pin connector is for the Locator LED 1 and LED 2. Connect the Locator LED cable to this 2-pin connector.

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

14. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.



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

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

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Chapter 5

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



ASUS TS300-E4

BIOS information

5.1 Managing and updating your BIOS

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

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

Refer to the corresponding sections for details on these utilities.



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

5.1.1 Creating a bootable floppy disk

1. Do either one of the following to create a bootable floppy disk.

DOS environment

- a. Insert a 1.44MB floppy disk into the drive.
- b. At the DOS prompt, type **format A: /S** then press <Enter>.

Windows® XP environment

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

5.1.2 AFUDOS utility

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

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:



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

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

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

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

```
A:\>afudos /oOLD BIOS1.rom
```

Main filename Extension name

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

```
A:\>afudos /oOLD BIOS1.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 /iP5MT.rom
```

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

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

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

- Bootblock 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 /iI8043A0.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 .....done
- Verifying flash.....done
- Program ended normally
```

5.1.3 ASUS CrashFree BIOS 2 utility

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



- Prepare the motherboard support CD or the floppy disk containing the updated motherboard BIOS before using this utility.
- Make sure that you rename the original or updated BIOS file in the floppy disk to **I8043A0.rom** for PA4 or **I8035A0.rom** for PX4.

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

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

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

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

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



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

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

Recovering the BIOS from the support CD

To recover the BIOS from the support CD:

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

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

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

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



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

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



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

5.1.4 ASUS Update utility

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

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

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

Installing ASUS Update

To install ASUS Update:

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



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

Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

1. Launch the ASUS Update utility from the Windows® desktop by clicking **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate**. The ASUS Update main window appears.
2. Select **Update BIOS** from a file option from the drop-down menu, then click **Next**.



3. Locate the BIOS file from the **Open** window, then click **Save**.
4. Follow the screen instructions to complete the update process.

5.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section “5.1 Managing and updating your BIOS.”

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

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

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

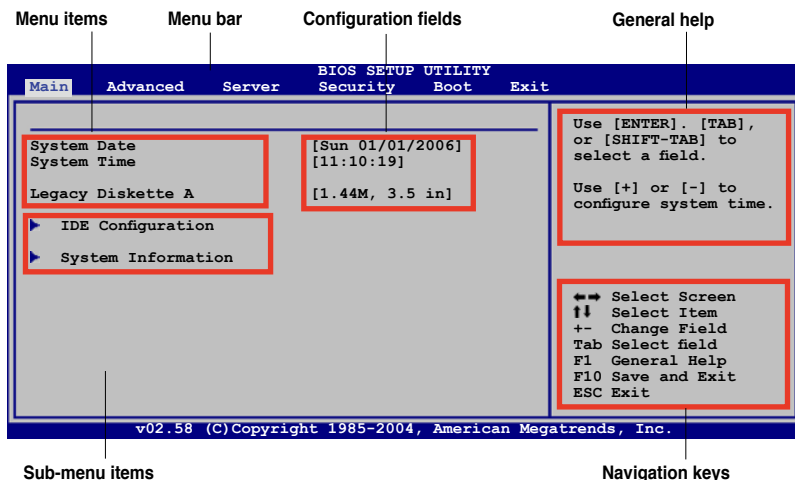
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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



- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section “5.8 Exit Menu.”
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

5.2.1 BIOS menu screen



5.2.2 Menu bar

The menu bar on top of the screen has the following main items:

Main	For changing the basic system configuration
Advanced	For changing the advanced system settings
Server	For changing the advanced server settings
Security	For changing the security settings
Boot	For changing the system boot configuration
Exit	For selecting the exit options and loading default settings

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

5.2.3 Navigation keys

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

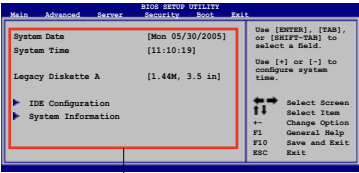


Some of the navigation keys differ from one screen to another.

5.2.4 Menu items

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

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



Main menu items

5.2.5 Sub-menu items

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

5.2.6 Configuration fields

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

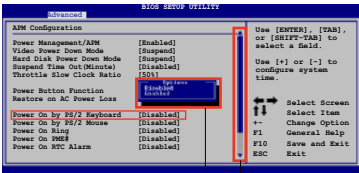
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to “4.2.7 Pop-up window.”

5.2.7 Pop-up window

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

5.2.8 Scroll bar

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



Pop-up window

Scroll bar

5.2.9 General help

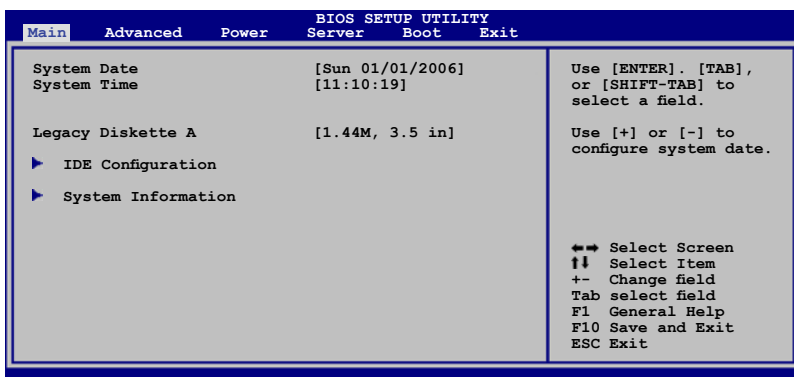
At the top right corner of the menu screen is a brief description of the selected item.

5.3 Main menu

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



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



5.3.1 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

5.3.2 System Time [xx:xx:xx]

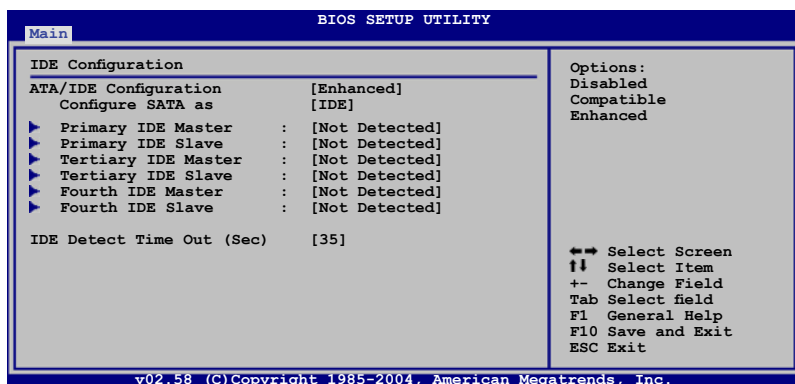
Allows you to set the system time.

5.3.3 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.]

5.3.4 IDE Configuration

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



ATA/IDE Configuration [Enhanced]

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



The items **Configure SATA as** options appear only when you set the **ATA/IDE Configuration** to [Enhanced].



The items **Tertiary** and **Fourth IDE Master/Slave** options appear only when you set **ATA/IDE configuration** to [Enabled] and **configure SATA as** [IDE] or [AHCI].

Configure SATA as [IDE]

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

If you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices, set this item to [IDE].

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



Set the item **Configure SATA as** to [RAID] if you want to use or configure the SATA connectors under SuSE Linux Enterprise Server 9.0 SP1 operating system environment. Due to the OS limitation, you must set a SATA RAID to use any SATA device (at least two SATA devices are needed for the RAID configuration). Refer to Chapter 6 and Chapter 7 for details on how to set a SATA RAID.



For some Linux distributions which can not support SATA RAID, please set “**ATA/IDE Configuration**” as [Compatible]. Otherwise, the Linux can not detect SATA HDD as IDE HDD.

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

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

www.intel.com/support/chipsets/imst/sb/CS-012304.htm

www.intel.com/support/chipsets/imst/sb/CS-012305.htm

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



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

Legacy IDE Channels [SATA Pri, PATA Sec]

Allows you to set Serial ATA, Parallel ATA, or both, to native mode. When set as [SATA Only], SATA1, SATA2, SATA3 and SATA4 ports are available. When set as [SATA Pri, PATA Sec], SATA1, SATA3 and Primary IDE ports are available. When set as [PATA Pri, SATA Sec], SATA2, SATA4 and Primary IDE ports are available. When set as [PATA Only], only Primary IDE ports are available. Configuration options: [SATA Only] [PATA Pri, SATA Sec] [SATA Pri, PATA Sec] [PATA Only]

IDE Detect Time Out (Sec) [35]

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

5.3.5 Primary, Tertiary, Fourth IDE Master/Slave

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

BIOS SETUP UTILITY	
Main	
Primary IDE Master	
Device	: Hard Disk
Vendor	: ST32122A
Size	: 2.1GB
LBA Mode	: Supported
Block Mode	: 16 Sectors
PIO Mode	: Supported
Async DMA	: MultiWord DMA-2
Ultra DMA	: Ultra DMA-5
SMART Monitoring:	Supported
Type	[Auto]
LBA/Large Mode	[Auto]
Block (Multi-sector Transfer)M	[Auto]
PIO Mode	[Auto]
DMA Mode	[Auto]
SMART Monitoring	[Auto]
32Bit Data Transfer	[Enabled]
Select the type of device connected to the system.	
↔ Select Screen !! Select Item +- Change Option Tab Select field F1 General Help F10 Save and Exit ESC Exit	
v02.58 (C)Copyright 1985-2004, American Megatrends, Inc.	

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] [UDMA0~6]

SMART Monitoring [Auto]

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

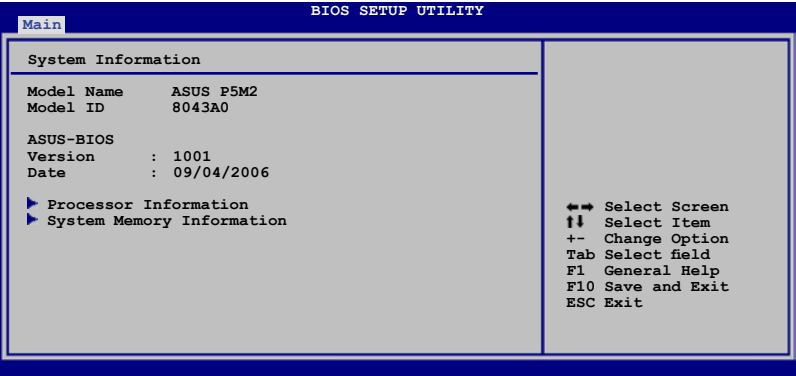
32Bit Data Transfer [Disabled]

Enables or disables 32-bit data transfer.

Configuration options: [Disabled] [Enabled]

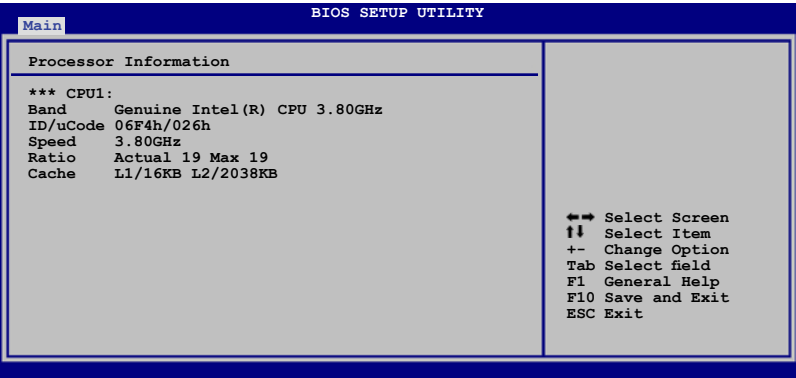
5.3.6 System Information

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



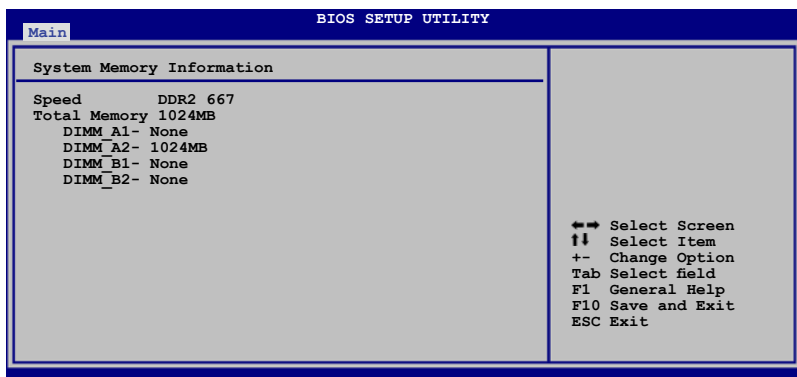
ASUS BIOS

Displays the auto-detected BIOS information.



Processor

Displays the auto-detected CPU specification.



System Memory

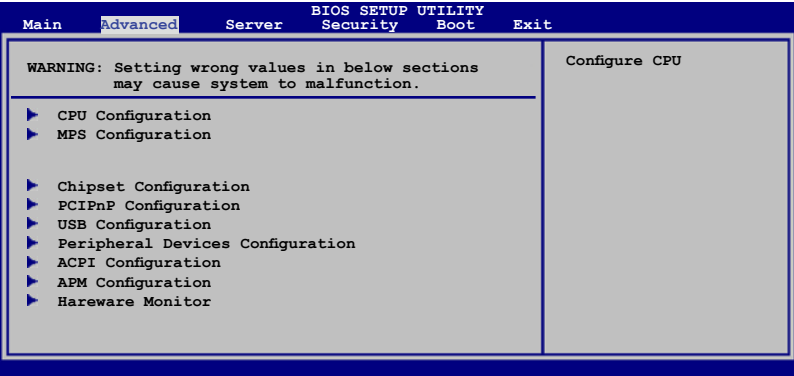
Displays the auto-detected total system memory.

5.4 Advanced menu

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

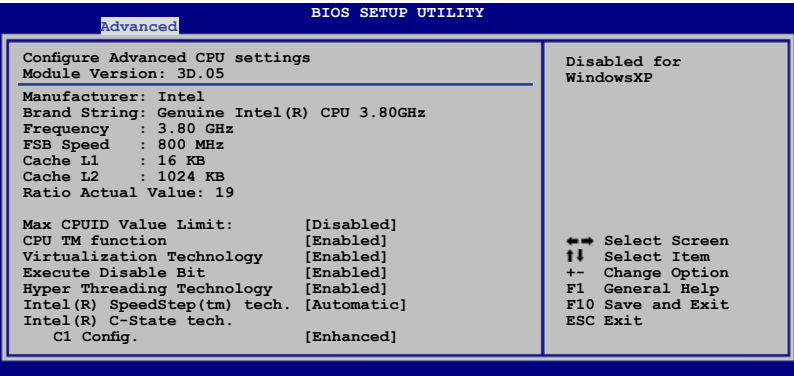


Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



5.4.1 CPU Configuration

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



Max CPUID Value Limit [Disabled]

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

Configuration options: [Disabled] [Enabled]

Execute Disable Bit [Enabled]

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



The Virtualization Technology item appears only when you install an Intel Pentium D or Core 2 Due CPU and the CPU also supports this feature.

Virtualization Technology [Enabled]

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



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

Hyper-Threading Technology [Enabled]

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



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

Single Logical Processor Mode [Disabled]

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



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

Core Multi-Processing [Enabled]

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



The following item appear only when you installed an CPU that supports Intel Speedstep Technology.

Intel(R) SpeedStep Technology [Automatic]

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

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

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



The motherboard comes with a BIOS file that supports EIST.



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

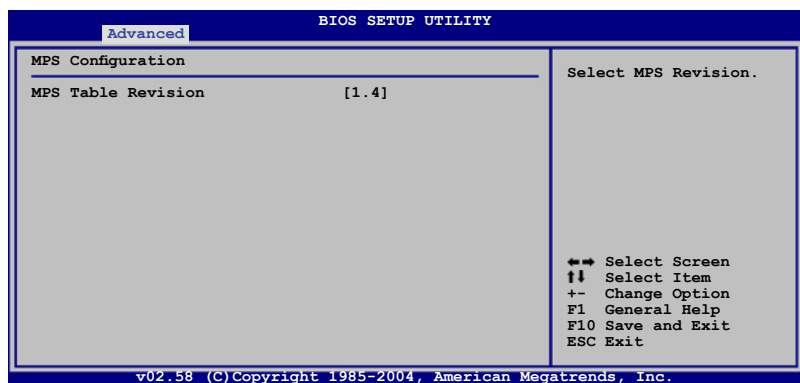
Intel C-state tech.

C1 Config. [Enhanced]

When set to [Standard], it runs in the conventional C-State. When set to [Enhanced], it runs in the enhanced C-State.

Configuration options: [Standard] [Enhanced]

5.4.2 MPS Configuration



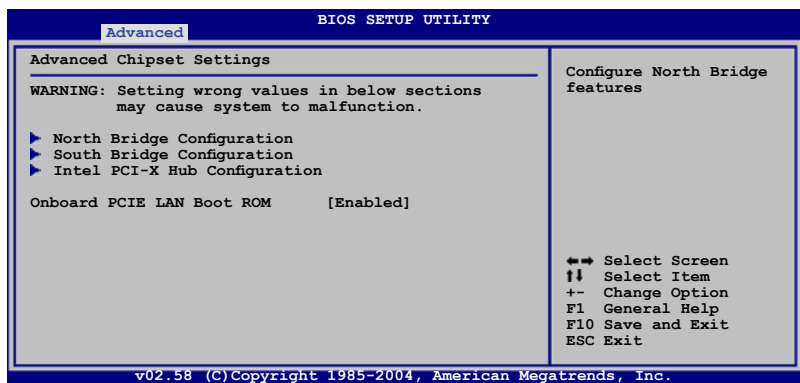
MPS Table Revision [1.4]

Allows you to select the multi-processor system version.

Configuration options: [1.1] [1.4]

5.4.3 Chipset Configuration

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



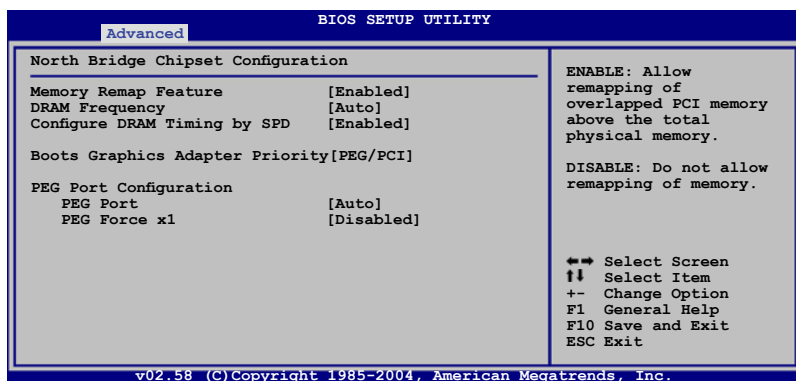
Onboard PCIE LAN Boot ROM [Enabled]

Allows you to enable or disable the option ROM in the onboard LAN controller.

Configuration options: [Disabled] [Enabled]

NorthBridge Configuration

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



Memory Remap Feature [Enabled]

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



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

DRAM Frequency [Auto]

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

Configure DRAM Timing by SPD [Enabled]

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

DRAM CAS# Latency [5]

Controls the latency between the SDRAM read command and the time the data actually becomes available.

Configuration options: [5] [4] [3]

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

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

DRAM RAS# Precharge [6 DRAM Clocks]

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

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

Configuration options: [4 DRAM Clocks] [5 DRAM Clocks] ~ [15 DRAM Clocks]

Boot Graphic Adapter Priority [PCI/PEG]

Allows selection of the graphics controller to use as primary boot device.

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

PEG Port Configuration

PEG Port [Auto]

Allows you to set or disable the PCI Express Graphic port.

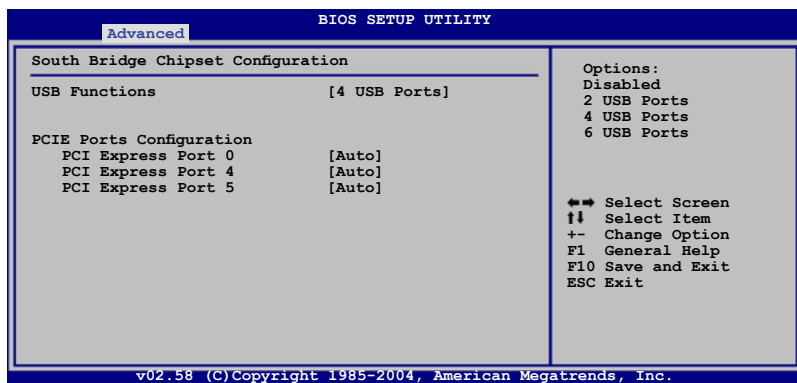
Configuration options: [Auto] [Disabled]

PEG Force x1 [Disabled]

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

SouthBridge Configuration

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



USB Function [4 USB Ports]

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

Configuration options: [Disabled] [2 USB Ports] [4 USB Ports] [6 USB Ports]

PCI Express Port Configuration

PCI Express Port 0 [Auto]

Allows you to set or disable the PCI Express Port 0.

Configuration options: [Auto] [Disabled]

PCI Express Port 4 [Auto]

Allows you to set or disable the PCI Express Port 4.

Configuration options: [Auto] [Disabled]

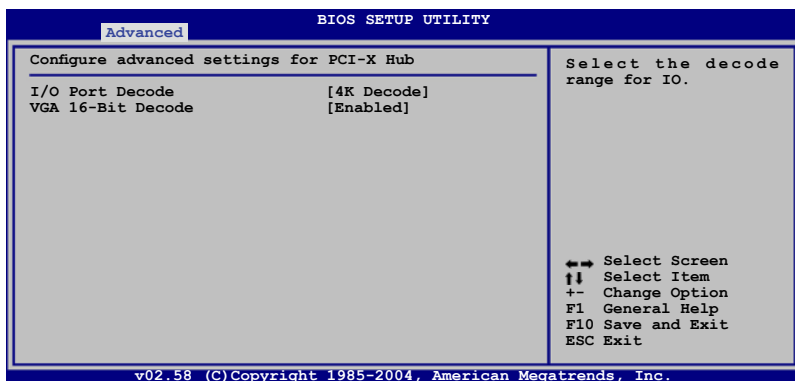
PCI Express Port 5 [Auto]

Allows you to set or disable the PCI Express Port 5.

Configuration options: [Auto] [Disabled]

Intel PCI-X Hub Configuration

The Intel PCI-X Hub Configuration menu allows you to change the Intel PCI Express controller related settings.



I/O Port Decode [4K Decode]

Allows you to set the decode range for the I/O controller.

Configuration options: [4K Decode] [1K Decode]

VGA 16-Bit Decode [Enabled]

Allows you to enable or disable the decode of VGA devices behind PXH.

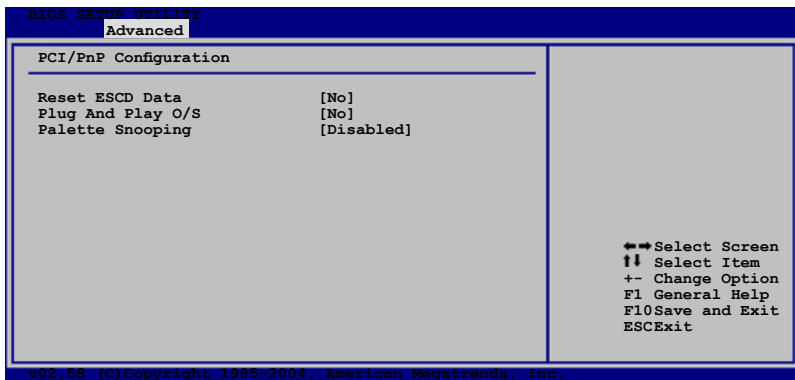
Configuration options: [Disabled] [Enabled]

5.4.4 PCI/PnP Configuration

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



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



Reset ESCD [No]

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

Plug And Play O/S [No]

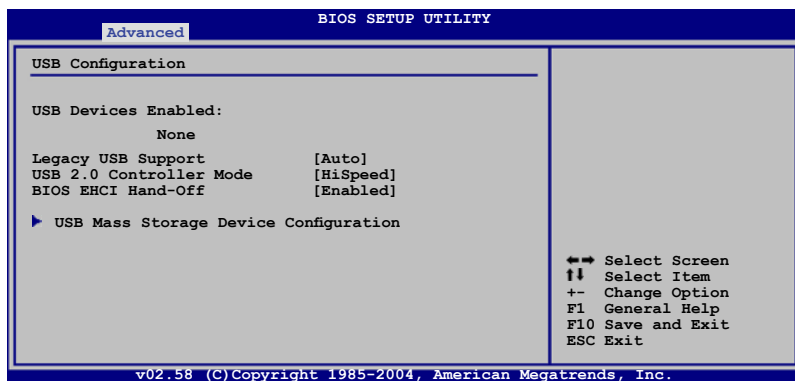
When set to [No], BIOS configures all the devices in the system. When set to [Yes] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot. Configuration options: [No] [Yes]

Palette Snooping [Disabled]

When set to [Enabled], the 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]

5.4.5 USB Configuration

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



Legacy USB Support [Auto]

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

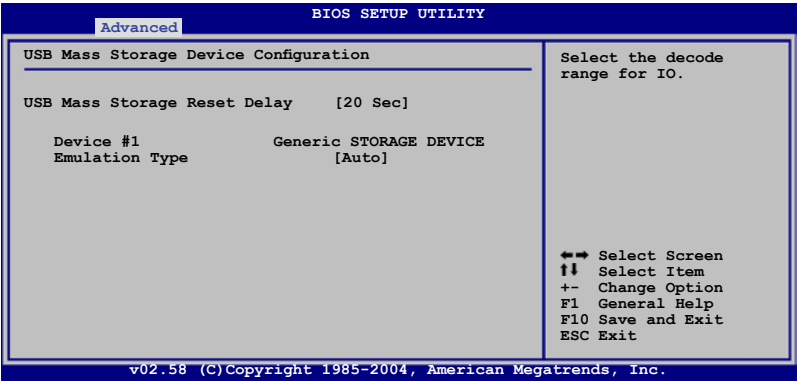
USB 2.0 Controller Mode [HiSpeed]

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

BIOS EHCI Hand-Off [Enabled]

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

USB Mass Storage Device Configuration



USB Mass Storage Reset Delay [20 Sec]

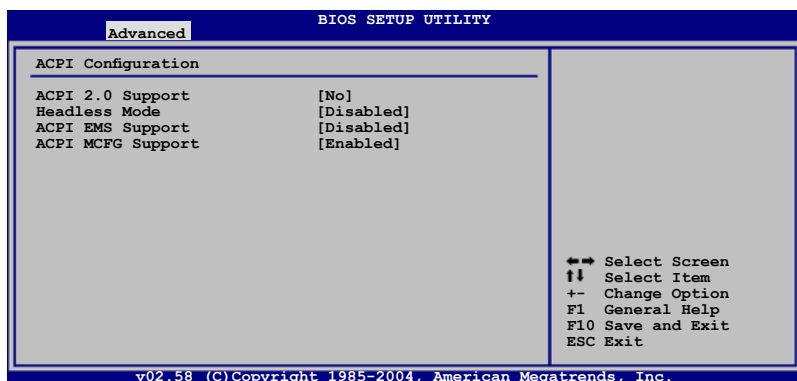
Allows you to set the time that POST waits for the USB mass storage device after starting unit command. Configuration options: [10 Sec] [20 Sec] [30 Sec] [40 Sec]

Emulation Type [Auto]

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

5.4.6 ACPI Configuration

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



ACPI 2.0 Support [No]

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

Headless Mode [Disabled]

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

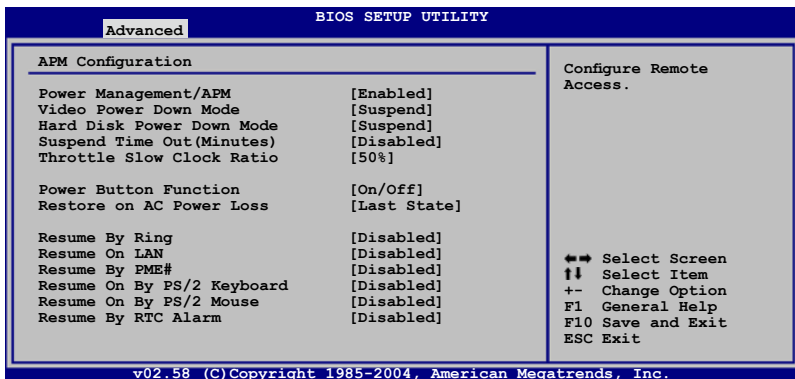
ACPI EMS Support [Disabled]

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

ACPI MCFG Support [Enabled]

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

5.4.7 APM Configuration



Power Management/APM [Enabled]

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



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

Video Power Down Mode [Suspend]

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

Hard Disk Power Down Mode [Suspend]

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

Suspend Time Out [Disabled]

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

Throttle Slow Clock Ratio [50%]

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

Power Button Function [On/Off]

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

Restore On AC Power Loss [Last State]

When set to Power Off, the system goes into off state after an AC power loss.

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

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

Resume By Ring [Disabled]

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

Configuration options: [Disabled] [Enabled]



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

Resume On LAN [Disabled]

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

Configuration options: [Disabled] [Enabled]

Resume By PME# [Disabled]

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

Configuration options: [Disabled] [Enabled]

Power On By PS/2 Keyboard [Disabled]

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

Configuration options: [Disabled] [Enabled]

Power On By PS/2 Mouse [Disabled]

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

Resume On By RTC Alarm [Disabled]

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

Configuration options: [Disabled] [Enabled]



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

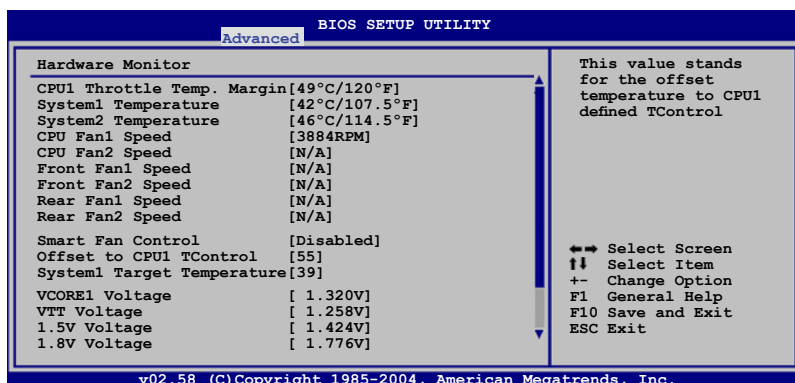
RTC Alarm Date (Days) [15]

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

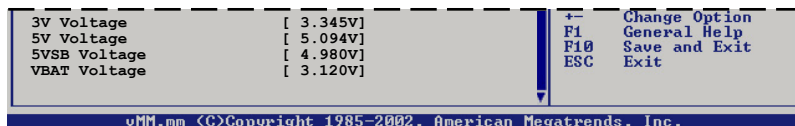
System Time [12:30:30]

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

5.4.8 Hardware Monitor



Use the arrow down key to display additional items.



When the Intel® Pentium® 4 and Pentium® D Series CPU, **CPU1 Temperature** item appears showing the CPU temperature currently detected; when the Intel® Core 2 Due Series CPU is installed, **CPU1 Throttle Temp Margin** appears.

CPU1Throttle Temperature [xxx°C/xxx°F]

System 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 Fan1/2 Speed [xxxxRPM] or [N/A]

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

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

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

Smart Fan Control [Disabled]

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]



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

Offset to CPU1 TControl [XXX] System1 Temperature [XXX]

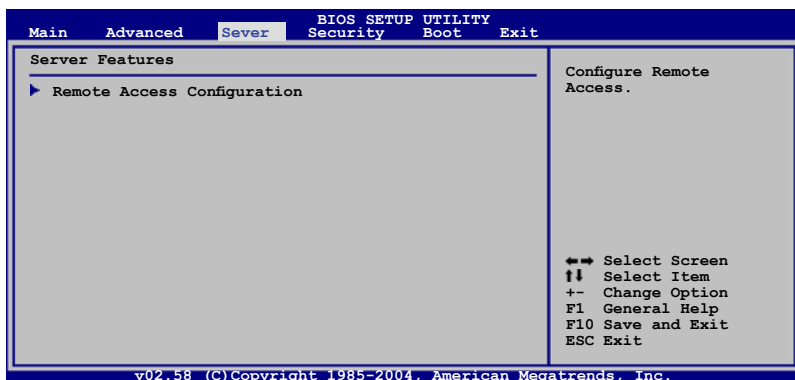
Displays the detected CPU and system threshold temperature when the Smart Fan Control is enabled.

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

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

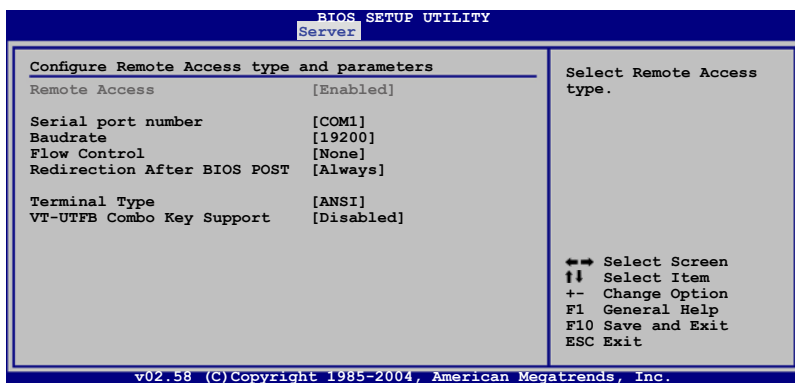
5.5 Server menu

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



Remote Access Configuration

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



Remote Access [Disabled]

Enables or disables the remote access feature.

Configuration options: [Disabled] [Enabled]



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

Serial port number [COM1]

Allows you to select serial port for console redirection.

Configuration options: [COM1] [COM2]

Baudrate [19200]

Selects the Baudrate for the Serial port.

Configuration options: [115200] [57600] [38400] [19200] [9600]

Flow Control [None]

Allows you to select the flow control for console redirection.

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

Redirection After BIOS POST [Always]

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

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

Terminal Type [ANSI]

Allows you to select the target terminal type.

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

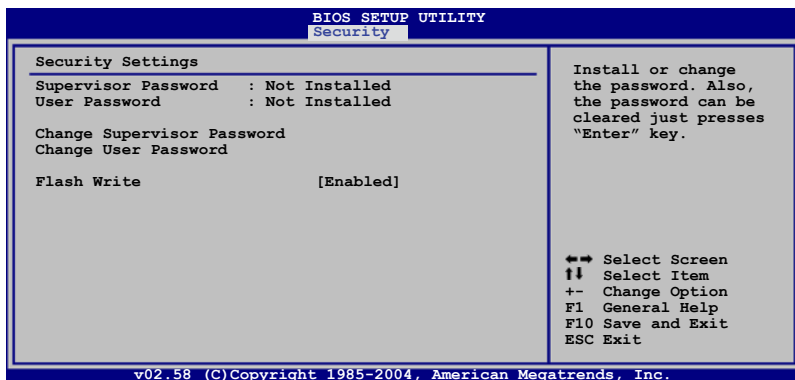
VT-UTF8 Combo Key Support [Disabled]

Enables or disables the VT-UTF8 combo key support for ANSI or VT100 terminals.

Configuration options: [Disabled] [Enabled]

5.6 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.

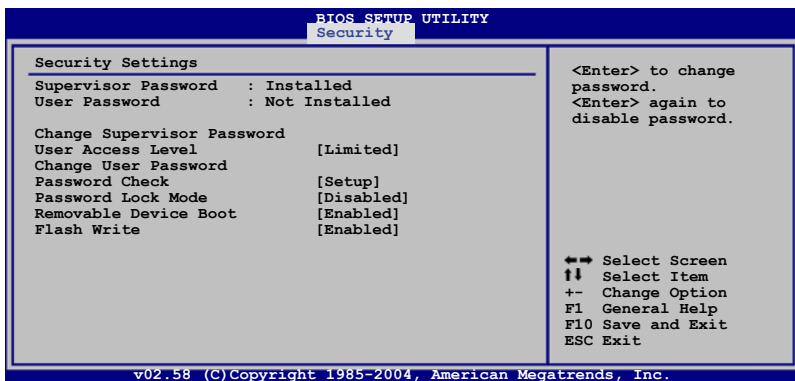
To change the supervisor password, follow the same steps as in setting a user password.

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 "4.2 Jumpers" for information on how to erase the RTC RAM.

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



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.

Flash Write [Enabled]

Allows you to enable or disable the Flash Write function. When set to Disabled the BIOS Flash Memory is protected. Configuration options: [Disabled] [Enabled]

Password Check [Setup]

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

Password Lock Mode [Enabled]

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

Removable Device Boot [Enabled]

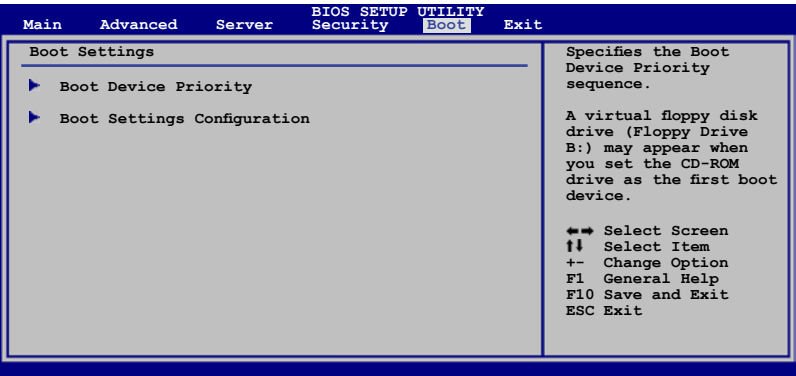
Allows you to enable or disable booting from a legacy floppy, USB floppy, or IDE optical drive. Configuration options: [Disabled] [Enabled]

Flash Write [Enabled]

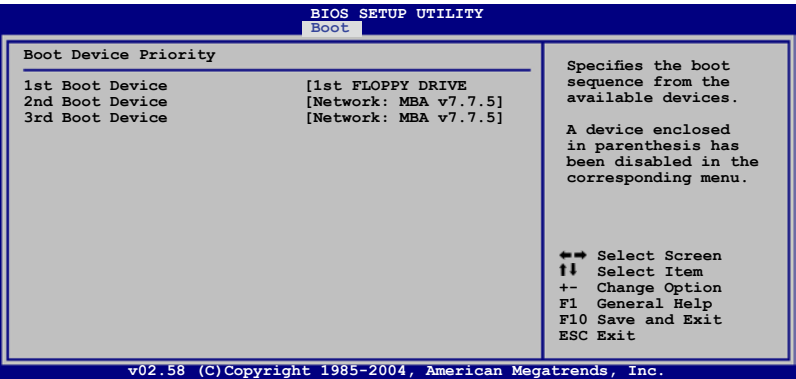
Set this item to [Disabled] to write-protect the BIOS flash memory. Configuration options: [Disabled] [Enabled]

5.7 Boot menu

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



5.7.1 Boot Device Priority



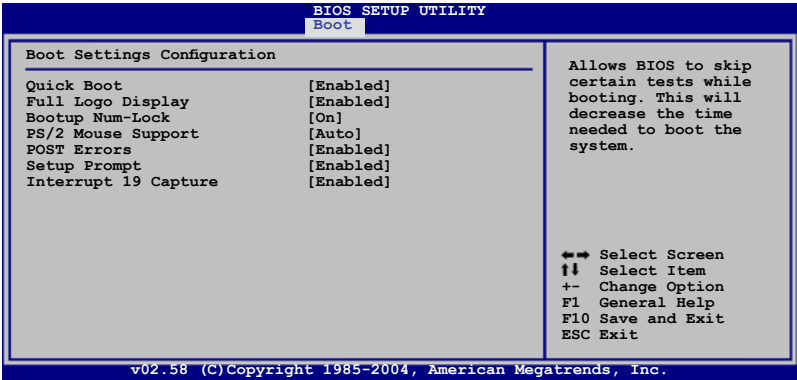
1st Boot Device [1st FLOPPY DRIVE]

2nd Boot Device [Network: MBA v7.7.5]

3rd Boot Device [Network: MBA v7.7.5]

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

5.7.2 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 Logo Display [Enabled]

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



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

Bootup Num-Lock [On]

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

Configuration options: [Off] [On]

PS/2 Mouse Support [Auto]

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

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

POST Errors [Enabled]

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

Setup Prompt [Enabled]

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

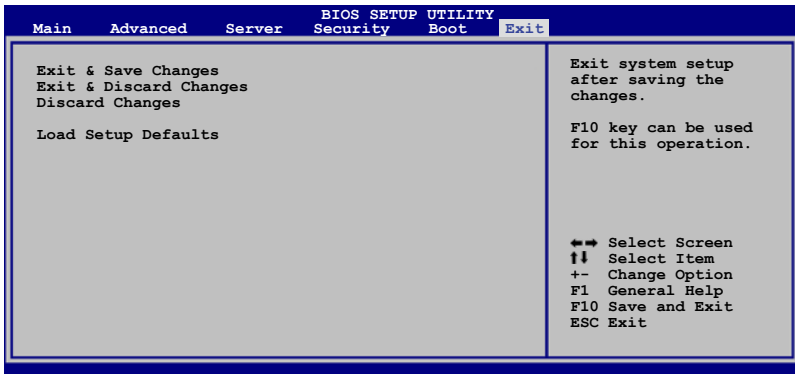
Interrupt 19 Capture [Enabled]

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

Configuration options: [Disabled] [Enabled]

5.8 Exit menu

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



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

Exit & Save Changes

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

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

Exit & Discard Changes

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

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

Discard Changes

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

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

Load Setup Defaults

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

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

Chapter 6

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



ASUS TS300-E4

RAID Configuration

6.1 Setting up RAID

For PA4 model, the Intel® ICH7R Southbridge chip comes with the LSI Logic Embedded SATA RAID Utility and the Intel® Matrix Storage Manager. These utilities support SATA hard disk drives and allow creation of RAID 0, RAID 1, RAID 5, RAID 10, configuration. For PX4 model, the onboard LSI 1068 controller provides RAID 0, RAID 1 and RAID 1E configuration.

6.1.1 RAID definitions

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

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

RAID 1-E (Enhanced RAID 1) has a striped layout with each stripe unit having a secondary (or alternate) copy stored on a different disk. You can use three or more hard disk drives for this configuration.

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

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



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

6.1.2 Installing hard disk drives

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

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

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

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

6.1.3 Setting the RAID item in BIOS

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

1. Enter the BIOS Setup during POST.
2. Go to the **Main Menu**, select **IDE Configuration**, then press <Enter>.
3. Set the **ATA/IDE Configuration** item to [Enhanced Mode], then press <Enter>.
4. Set the **Configure SATA As** item to [RAID].
5. Save your changes, then exit the BIOS Setup.



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

6.1.4 RAID configuration utility

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

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

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

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

6.2 LSI Logic Embedded SATA RAID Setup Utility (For PA4 model only)

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

To enter the LSI Logic Embedded SATA RAID Setup Utility:

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

```
LSI Logic Embedded SATA RAID BIOS Version 5.4.0509164/R
(c)2004 Copyright LSI Logic Corporation. All Rights Reserved.

LSI Logic Embedded SATA RAID Found at PCI Bus No:00 Dev No:1F
Scanning for Port 0 ... Responding. HDS722512VLS080 117800MB UDMA 5
Scanning for Port 1 ... Responding. HDS722512VLS080 117800MB UDMA 5

01 Logical drive(s) Configured.
Array# Mode Stripe Size No.Of Stripes DriveSize Status
00 Reliability 64KB(128 Sectors) 02 114376MB Online

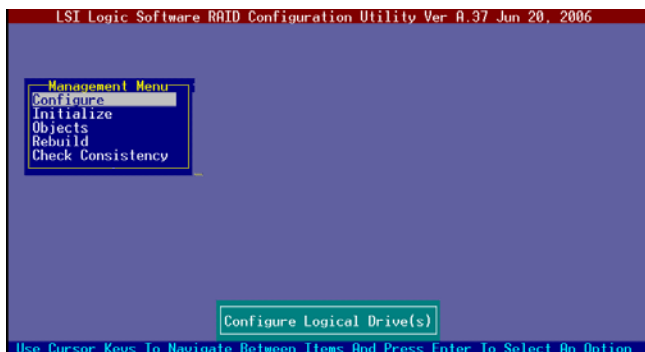
Press Ctrl-M to run LSI Logic Embedded SATA RAID Setup Utility.
```



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

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

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



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

6.2.1 Creating a RAID 0 or RAID 1 set

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

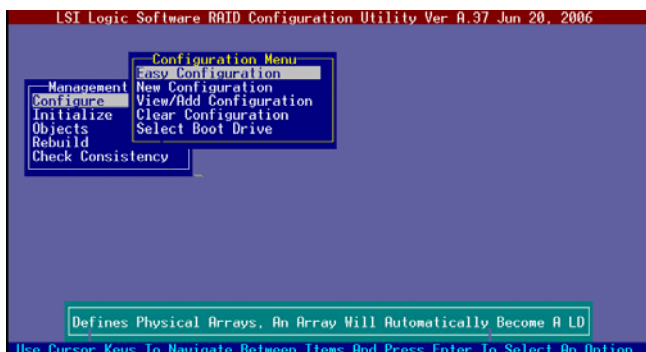
In **Easy Configuration**, the logical drive parameters are set automatically including the size and stripe size (RAID 1 only).

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

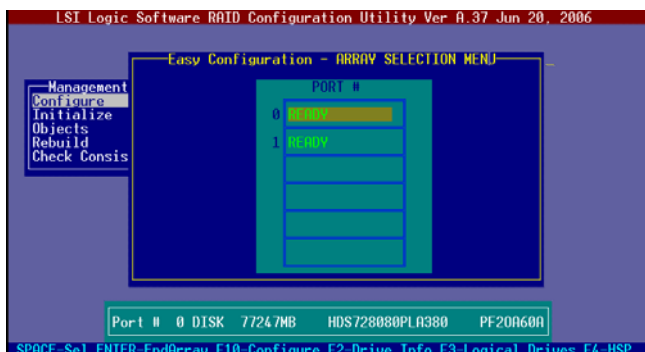
Using Easy Configuration

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

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

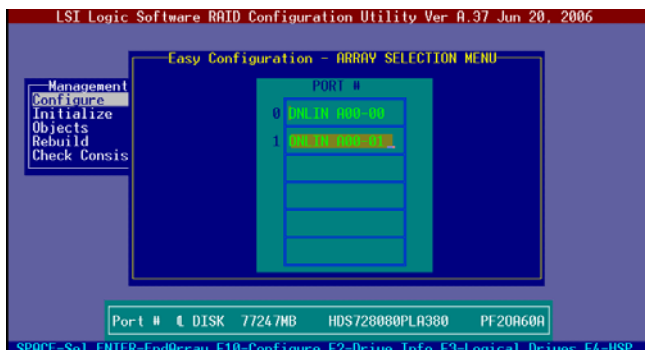


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drives you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

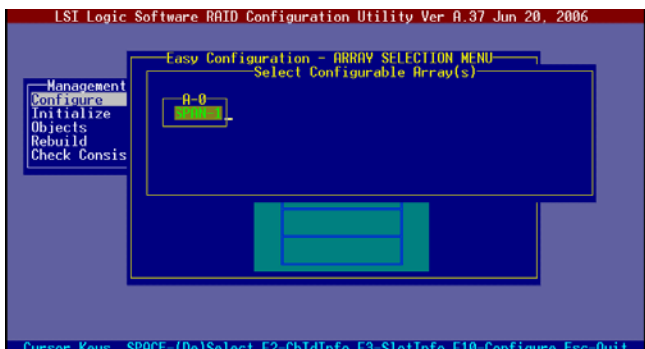


The information of the selected hard disk drive displays at the bottom of the screen.

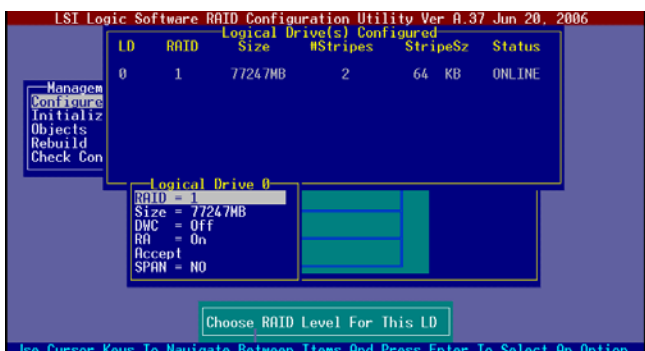
4. Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.



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



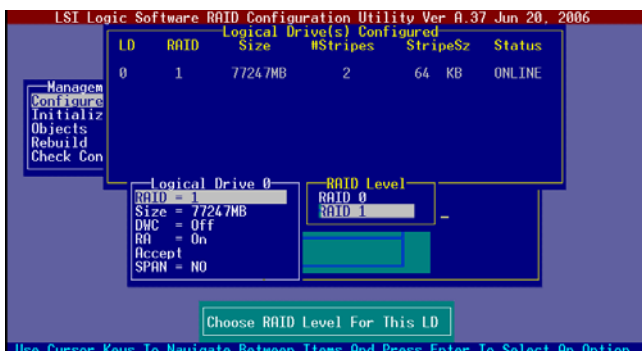
Press <F10> again, the logical drive information appears including a Logical Drive menu that allows you to change the logical drive parameters.



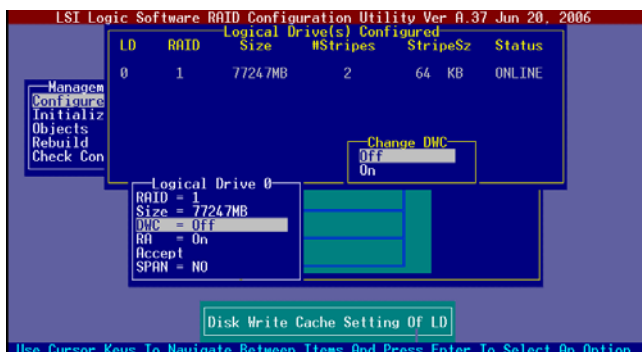
6. Select **RAID** from the **Logical Drive** menu, then press <Enter>.
7. Select the RAID level from the menu, then press <Enter>.



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

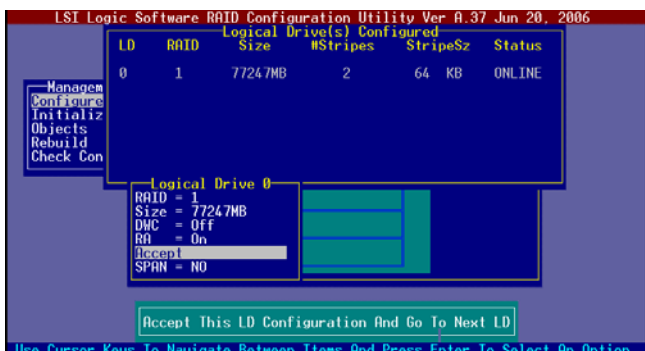


8. When creating a **RAID 1** set, select **Stripe Size** from the **Logical Drive** menu, then press <Enter>.
- When creating a **RAID 0** set, proceed to step 10.
9. Key-in the stripe size, then press <Enter>.

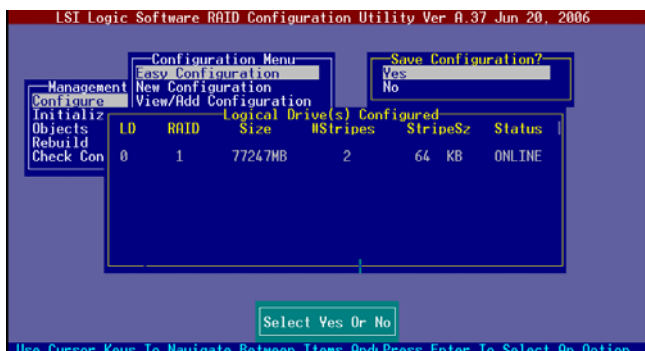


For server systems, we recommend that you use a lower array block size. For multimedia computer systems used mainly for audio and video editing, we recommend a higher array block size for optimum performance.

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



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



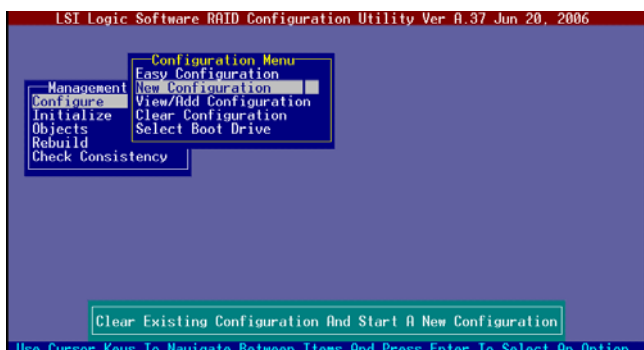
Using New Configuration



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

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

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



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



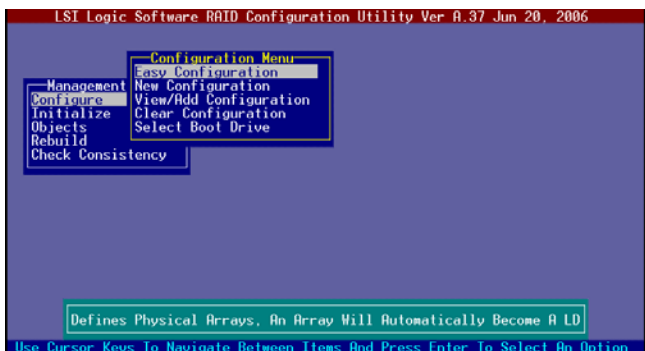
6. Follow steps 8 to 13 of the previous section to create the RAID set.

6.2.2 Creating a RAID 10 set

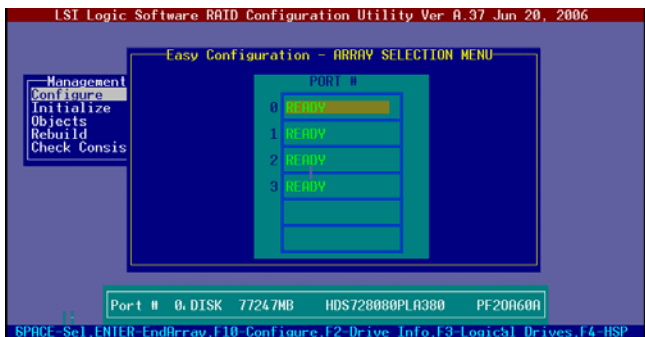
You can create a RAID 10 set using four identical hard disk drives.

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>.

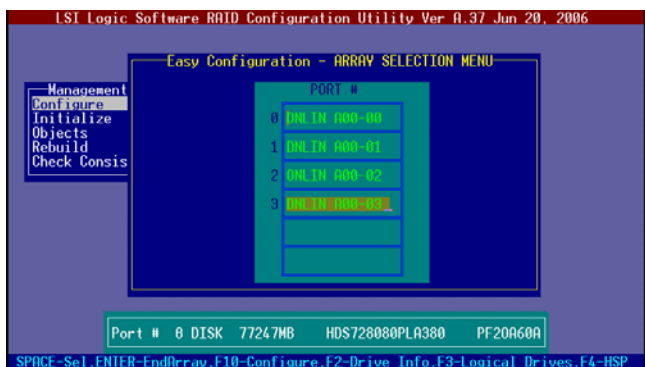


3. The ARRAY SELECTION MENU displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from READY to ONLIN A[X]-[Y], where X is the array number, and Y is the drive number.

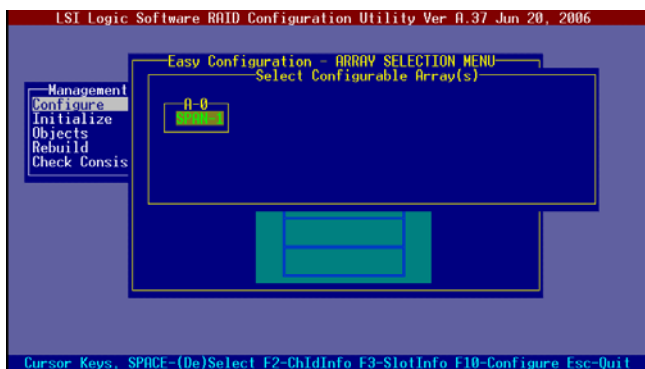


The information of the selected hard disk drive displays at the bottom of the screen.

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>.

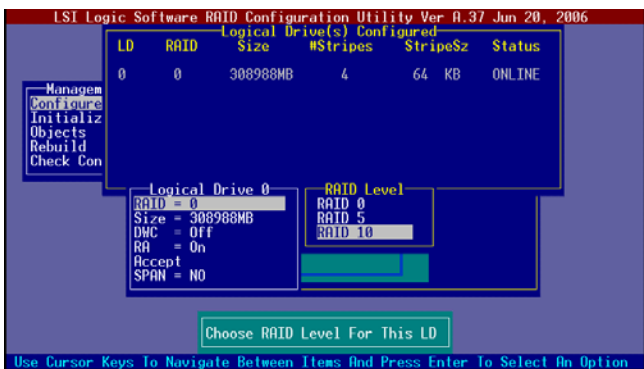


Press <F10> again, the logical drive information appears including a Logical Drive menu that allows you to change the logical drive parameters.

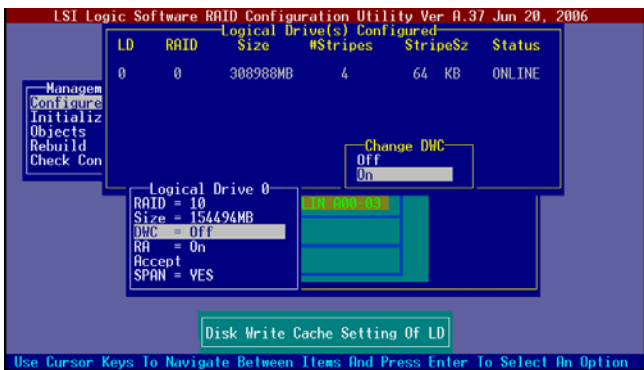
6. Select RAID from the Logical Drive menu, then press <Enter>.
7. Select RAID 10 from the menu, then press <Enter>.



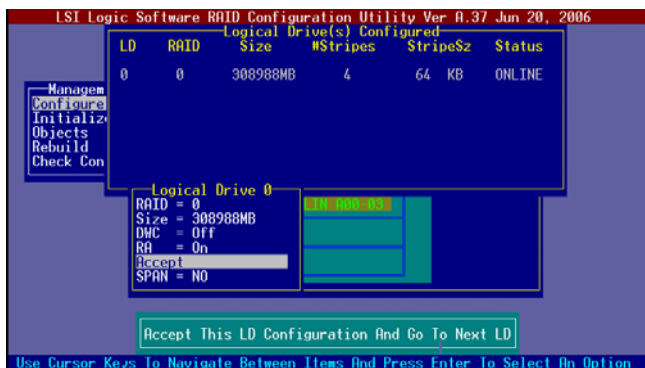
You need at least four identical hard disk drives when creating a RAID 10 set.



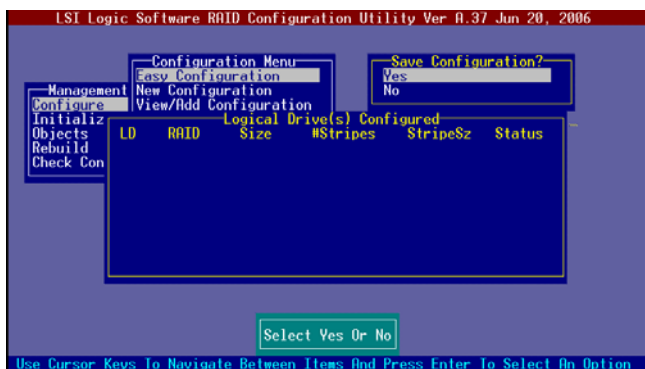
8. Select DMC from the Logical Drive menu, then press <Enter>.
9. Select On to enable the Disk Write Cache setting, then press <Enter>.



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



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



6.2.3 Adding or viewing a RAID configuration

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

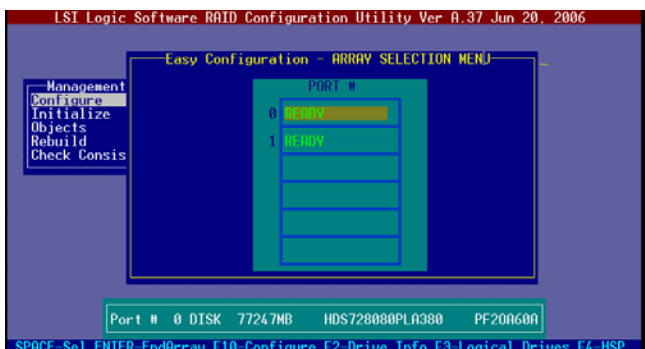
Adding a new RAID configuration

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>.

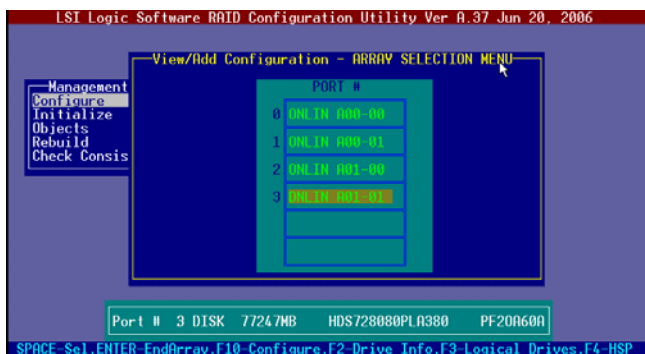


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

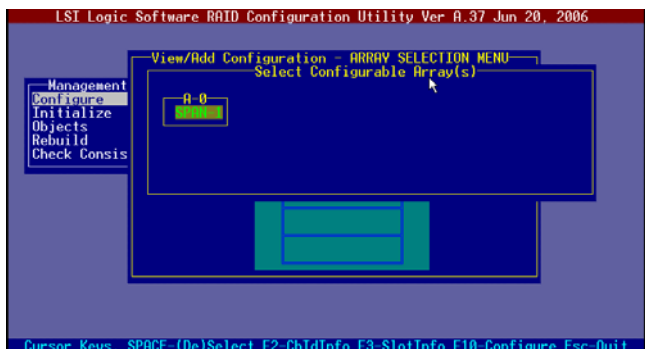


The information of the selected hard disk drive displays at the bottom of the screen.

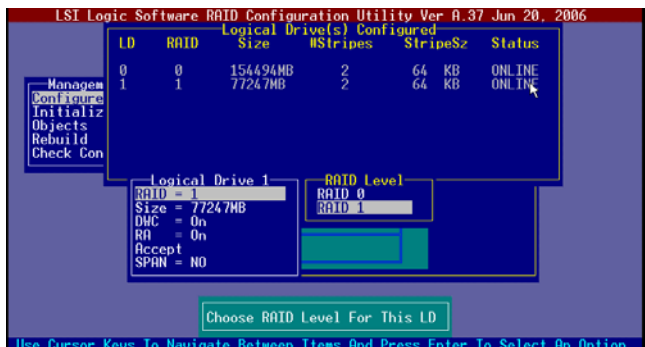
4. Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.



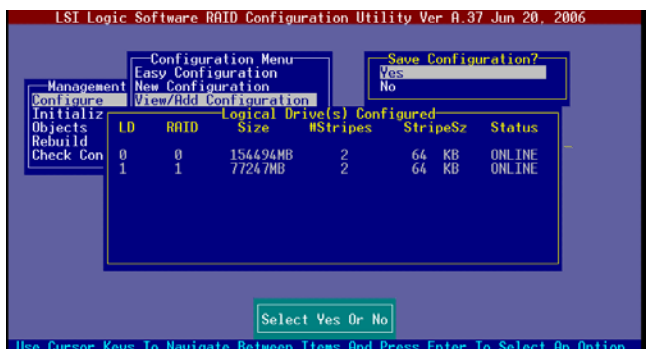
5. Press <F10>, select the configurable array, then press <SpaceBar>.



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 13 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.

After creating the RAID set(s), you must initialize the logical drivers. See 6.2.4 .

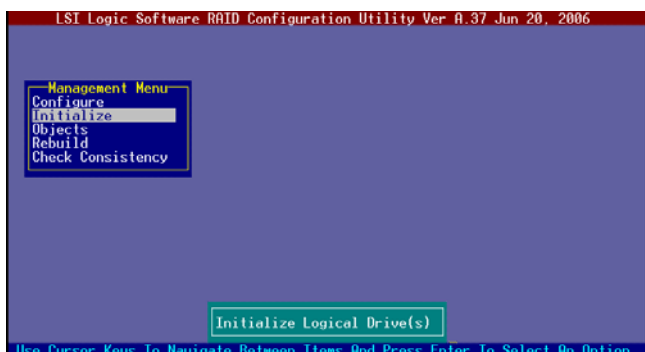
6.2.4 Initializing the logical drives

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**.

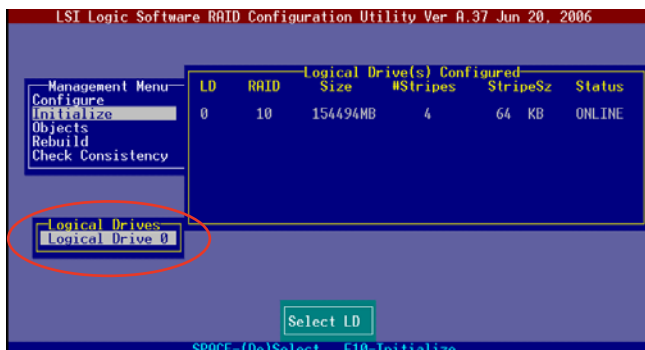
Using the Initialize command

To initialize the logical drive using the Initialize command:

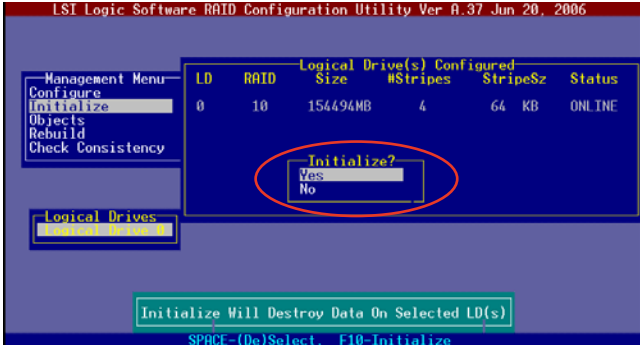
1. From the **Management Menu**, highlight **Initialize**, then press <Enter>.



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

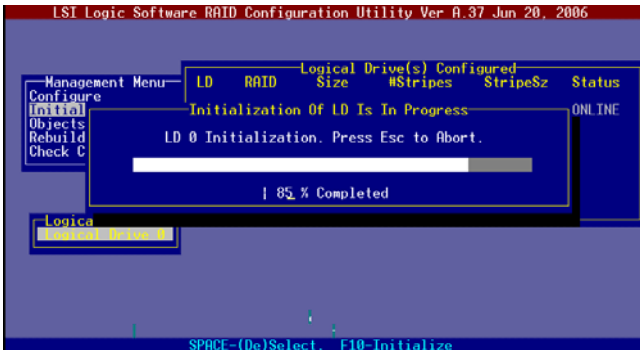


- When prompted, use the arrow keys to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.

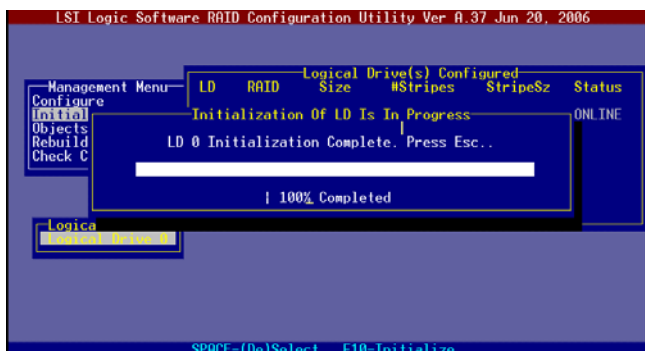


Initializing a logical drive(s) erases all data on the drive.

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



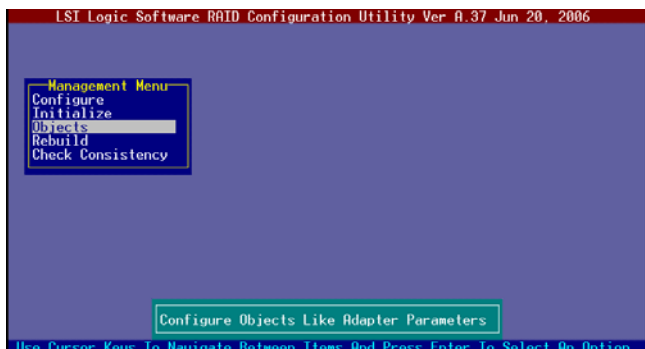
- When initialization is completed, press <Esc>.



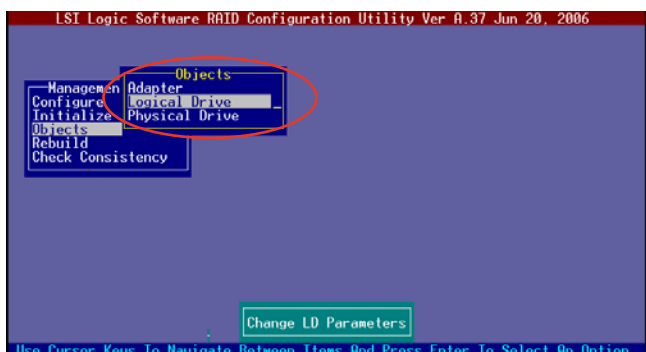
Using the Objects command

To initialize the logical drives using the Objects command:

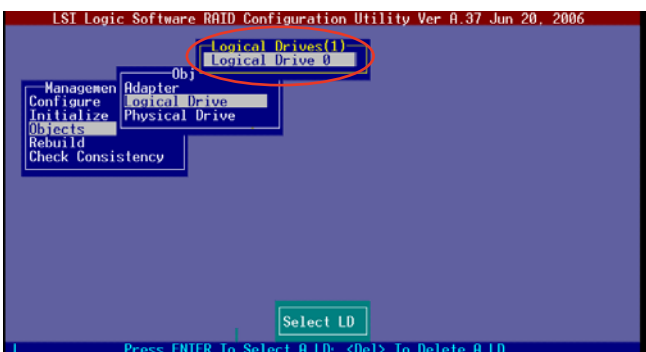
- From the **Management Menu**, highlight **Objects**, then press <Enter>.



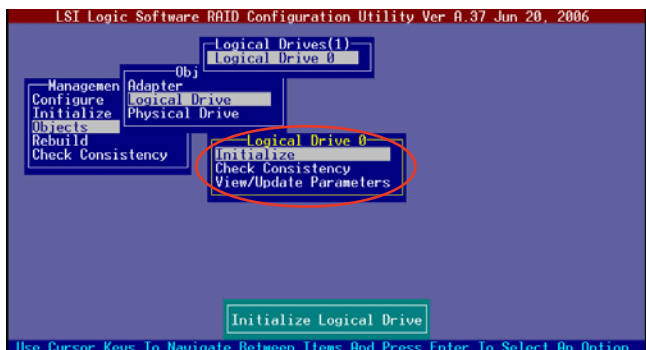
2. Select **Logical Drive** from the **Objects** sub-menu, then press <Enter>.



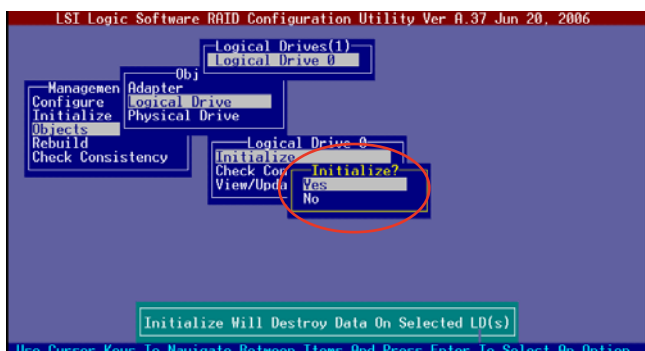
3. Select the logical drive to initialize from the **Logical Drives** sub-menu, then press <Enter>.



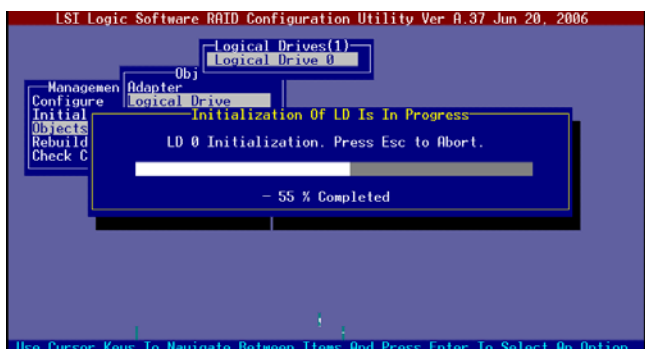
4. Select **Initialize** from the pop-up menu, then press <Enter> to start initialization.



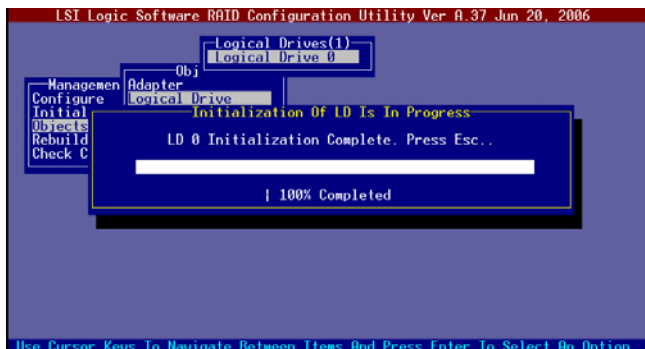
5. When prompted, use the arrow keys to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.



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



7. When initialization is completed, press <Esc>.

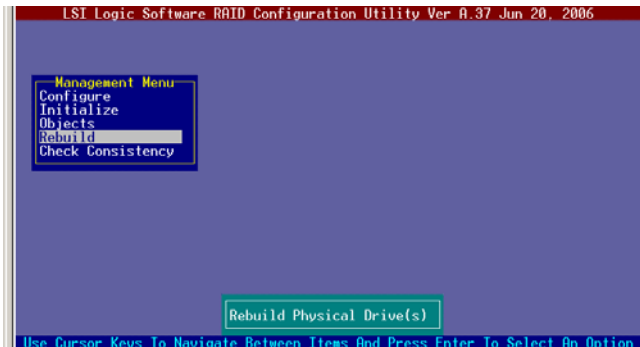


6.2.5 Rebuilding failed drives

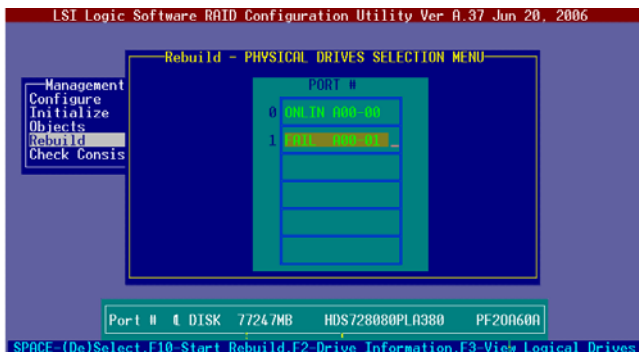
You can manually rebuild failed hard disk drives using the Rebuild command in the Management Menu.

To rebuild a failed hard disk drive:

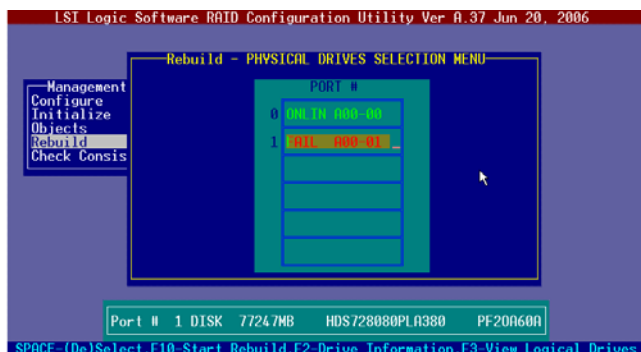
1. From the **Management Menu**, highlight **Rebuild**, then press <Enter>.



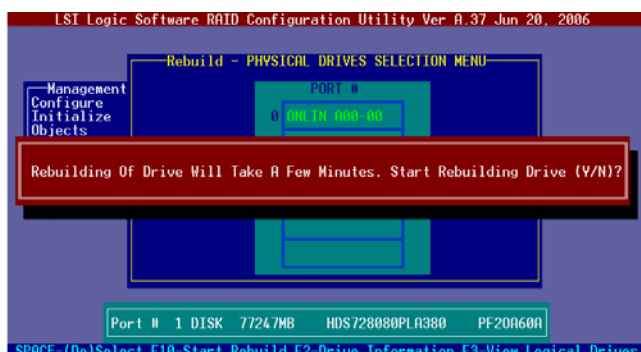
2. The **PHYSICAL DRIVES SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive you want to rebuild, then press <SpaceBar>.



- 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.

6.2.6 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.

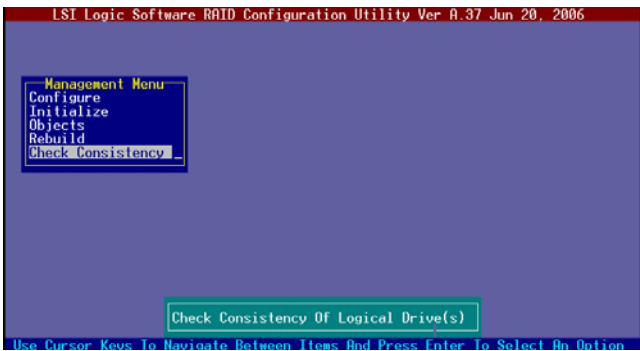


The Check Consistency command is available only for logical drives included in a RAID 1 set.

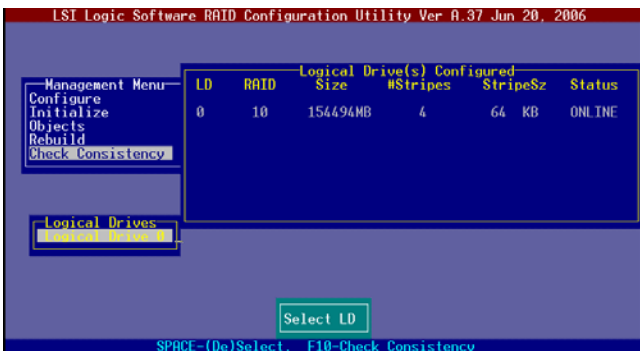
Using the Check Consistency

To check data consistency using the Check Consistency command:

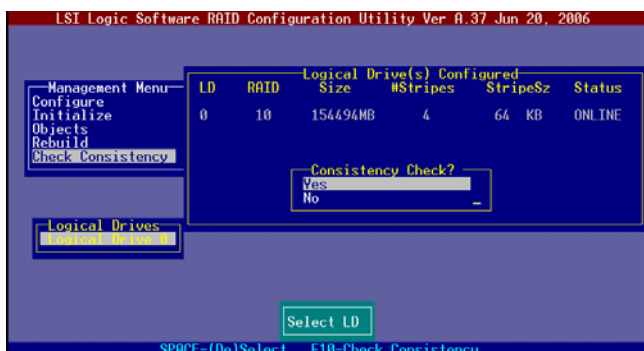
1. From the **Management Menu**, select **Check Consistency**, then press <Enter>.



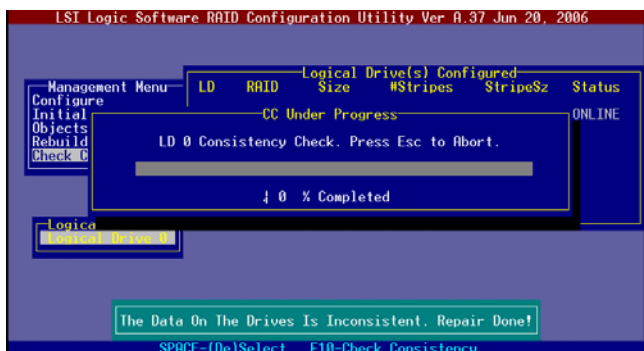
2. The screen displays the available RAID set(s) and prompts you to select the logical drive to check. Press the <Spacebar> to select the logical drive from the **Logical Drive** selection, then press <F10>.



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



A progress bar appears on screen.



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

Using the Objects command

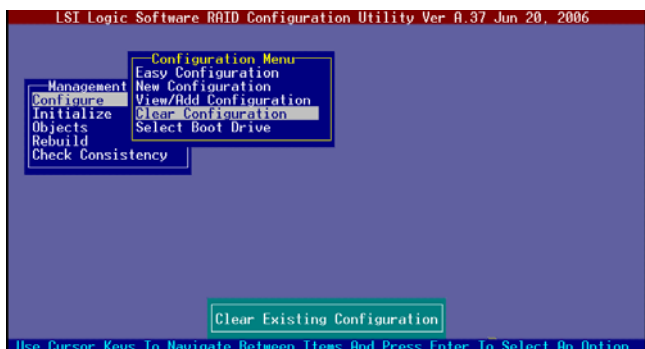
To check data consistency using the Objects command:

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

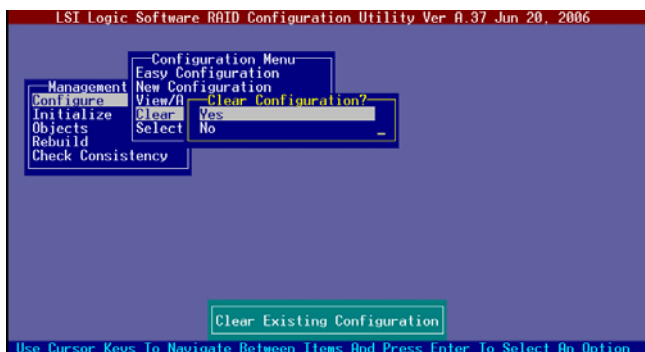
6.2.7 Deleting a RAID configuration

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.

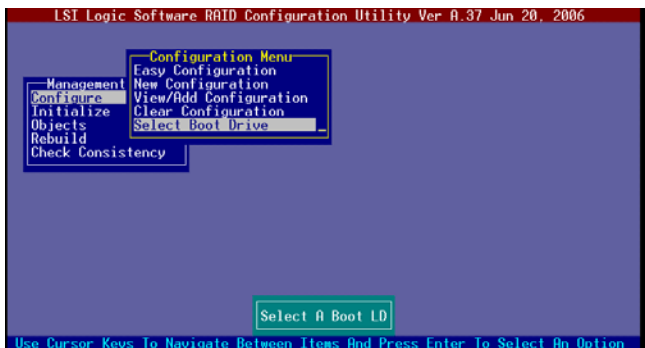
3. Press any key to continue.

6.2.8 Selecting the boot drive from a RAID set

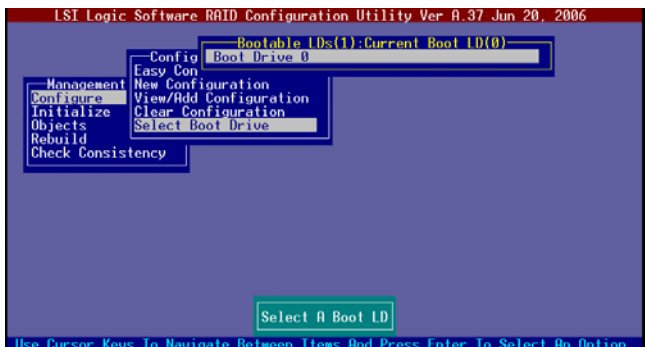
You must have created a new RAID configuration before you can select the boot drive from a RAID set. Refer to the Creating a RAID set: Using New Configuration section for details.

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.

6.2.9 Enabling the WriteCache

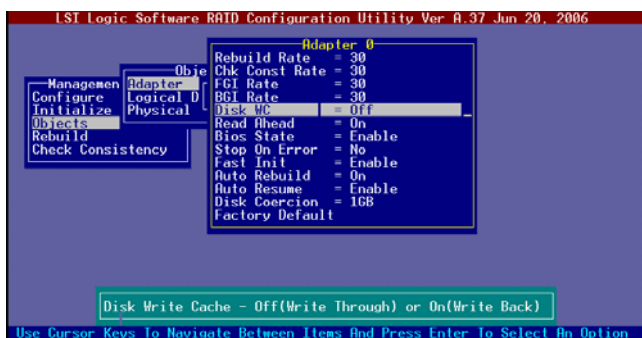
You may enable the RAID controller's **WriteCache** option to improve the data transmission performance.



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.

6.3 Intel® Matrix Storage Manager Option ROM Utility (For PA4 model only)

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.XXGB   Non-RAID Disk
1      XXXXXXXXXXXX      XXXXXXXX      XX.XXGB   Non-RAID Disk
2      XXXXXXXXXXXX      XXXXXXXX      XX.XXGB   Non-RAID Disk
3      XXXXXXXXXXXX      XXXXXXXX      XX.XXGB   Non-RAID Disk

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

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



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

6.3.1 Creating a RAID 0 set (Stripe)

To create a RAID 0 set:

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

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

[ CREATE ARRAY MENU ]

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

Create Volume

[ DISK/VOLUME INFORMATION ]

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

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

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

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

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

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

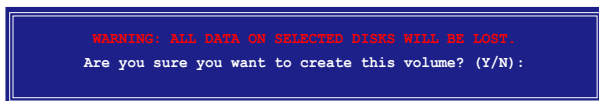
5. Use the up/down arrow key to highlight a drive, then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.

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



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

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

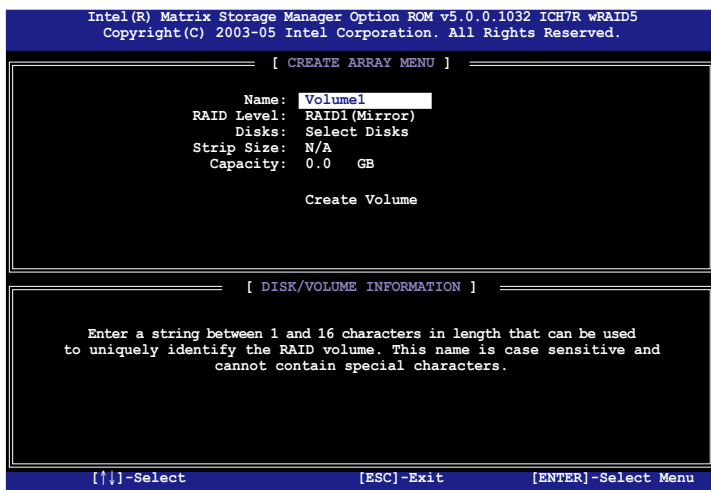


9. Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the **Create Array** menu.

6.3.2 Creating a RAID 1 set (Mirror)

To create a RAID 1 set:

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

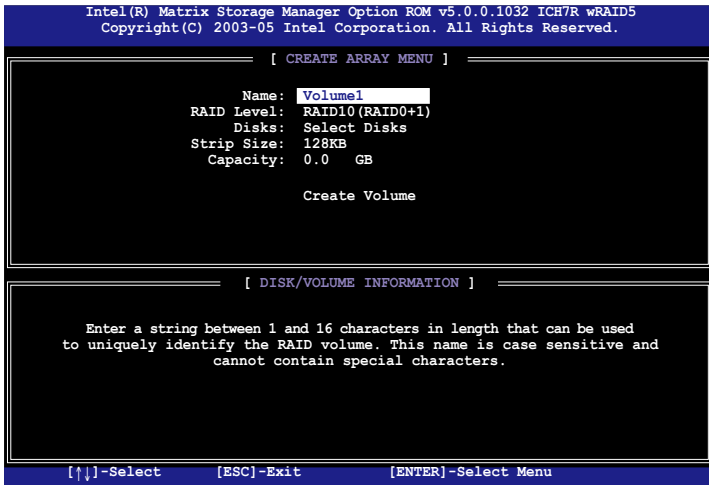


2. Enter a name for the RAID 1 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select **RAID 1 (Mirror)**, then press <Enter>.
4. Follow steps 4 to 5 and 7 to 9 of the previous section to create the RAID 1 set.

6.3.3 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 “6.3.1 Creating a RAID 0 set (striped)” to create the RAID 10 set.

6.3.4 Creating a RAID 5 set (Parity)

To create a RAID 5 set:

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

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

[ CREATE ARRAY MENU ]

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

Create Volume

[ DISK/VOLUME INFORMATION ]

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

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

2. Enter a name for the RAID 10 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select RAID 5, then press <Enter>.
4. Follow steps 4 to 9 of section “6.3.1 Creating a RAID 0 set (striped)” to create the RAID 5 set.

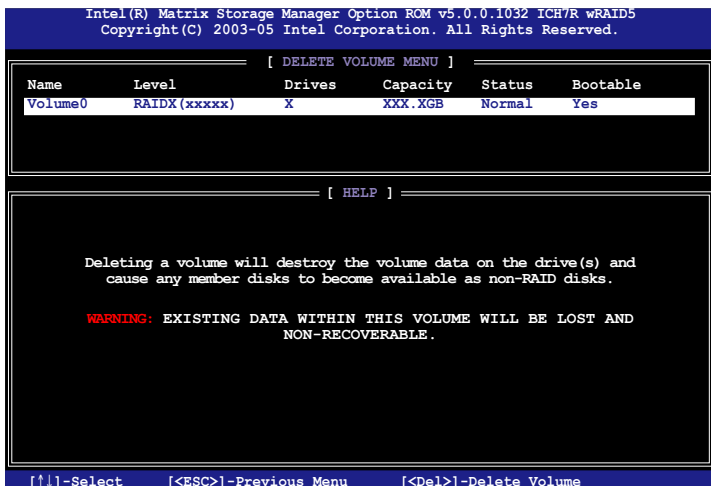
6.3.5 Deleting a RAID set



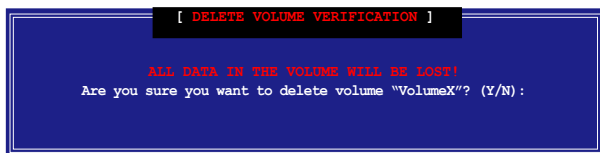
Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

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.

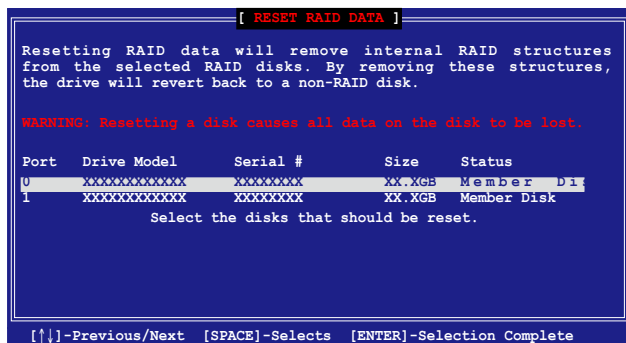
6.3.6 Resetting disks to Non-RAID



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.



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.

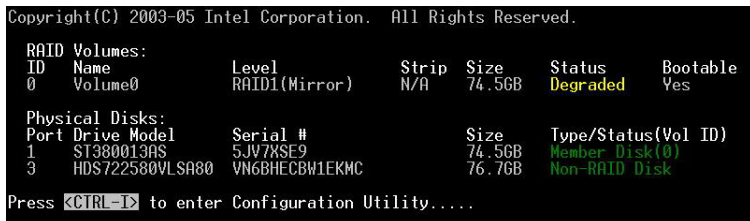
6.4 Rebuilding the RAID



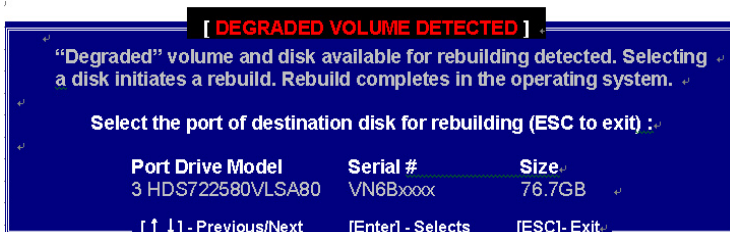
This option is only for the RAID 1, RAID 5 and RAID 10 level.

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:

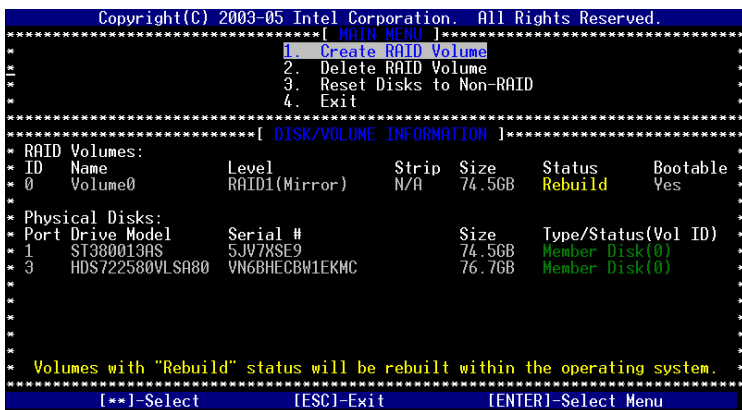


2. Press <Ctrl-I> to enter the Intel Matrix Storage Manager RAID configuration utility after POST.
3. If there is available Non-RAID SATA Hard Disk, the utility will prompt the windows for rebuilding the RAID. Press <Enter> to select the port of destination disk for rebuilding or press <ESC> to exit



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        5JV7KSE9     74.5GB Member Disk(0)
3     HDS722580VLSA80  VN6BHECBW1EKMC 76.7GB Non-RAID Disk

Press <CTRL-I> 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.

4. 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        5JV7KSE9     74.5GB Member Disk(0)
3     HDS722580VLSA80  VN6BHECBW1EKMC 76.7GB Member Disk(0)

Volumes with "Rebuild" status will be rebuilt within the operating system.
*****[**]-Select      [ESC]-Exit      [ENTER]-Select Menu*****
```

5. 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.
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’.

6.5 Exiting the Intel® Matrix Storage Manager

To exit the utility:

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



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

6.6 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:

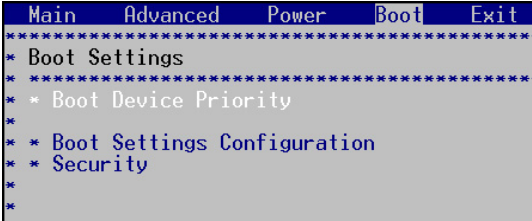
```
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

RAID Volumes:
ID   Name           Level           Strip  Size    Status    Bootable
0    Volume0         RAID0(Stripe)   128KB  50.0GB  Normal    Yes
1    Volume1         RAID0(Stripe)   128KB  99.1GB  Normal    Yes
2    Volume2         RAID1(Mirror)   N/A    30.0GB  Normal    Yes
3    Volume3         RAID0(Stripe)   128KB  89.1GB  Normal    Yes

Physical Disks:
Port Drive Model      Serial #           Size    Type/Status(Vol ID)
0    ST380013AS         5JVC5400           74.5GB  Member Disk(0,1)
1    ST380013AS         5JV7XSE9           74.5GB  Member Disk(0,1)
2    ST380013AS         5JVFZ56C           74.5GB  Member Disk(2,3)
3    HDS722580VLSA80    VN6BHECBW1EKMC     76.7GB  Member Disk(2,3)

Press <CTRL-I> to enter Configuration Utility...
```

- 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.



6.8 LSI Logic MPT Setup Utility (PX4 model only)

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

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

6.8.1 Integrated Mirroring

Overview

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

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

Creating Integrated Mirroring volumes



- You may use disks of different sized in IM and IME volumes; however, the size of the smallest disk determines the "logical" size of each member disk.
- Do not combine Serial ATA and SAS disks in one volume.
- The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

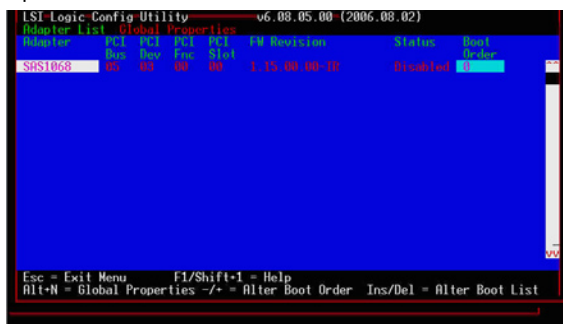
To create an IM volume:

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

```
LSI Logic Corp. MPT SAS BIOS
MPTBIOS-6.08.05.00 (2006.08.02)
Copyright 2000-2006 LSI Logic Corp.

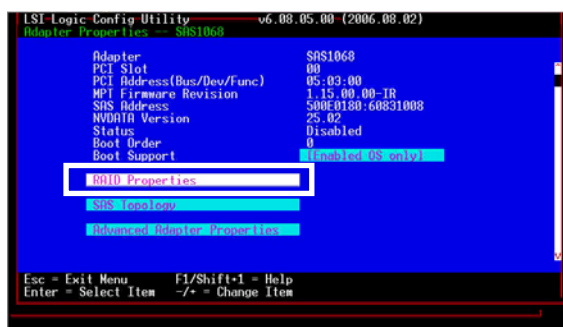
Adapter(s) disabled by user
Press Ctrl-C to start LSI Logic Configuration Utility...
```

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

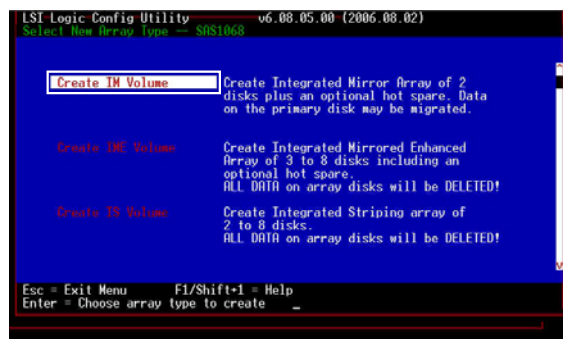


The numbers of the channel depend on the controller.

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

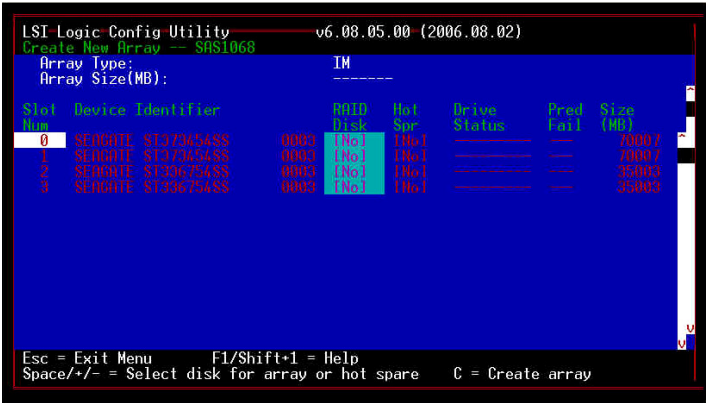


- The **Select New Array Type** screen appears. Use the arrow keys to select **Create IM Volume**, then press <Enter>.



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

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



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

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

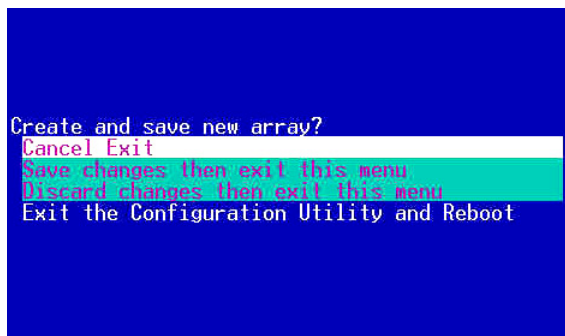
7. A confirmation screen appears.

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

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



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



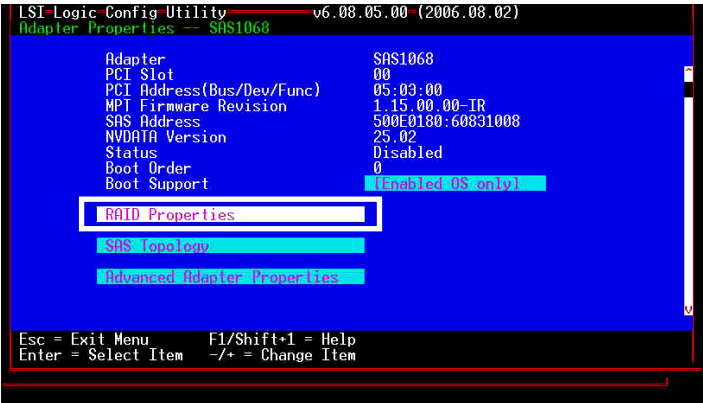
10. The utility creates the array.



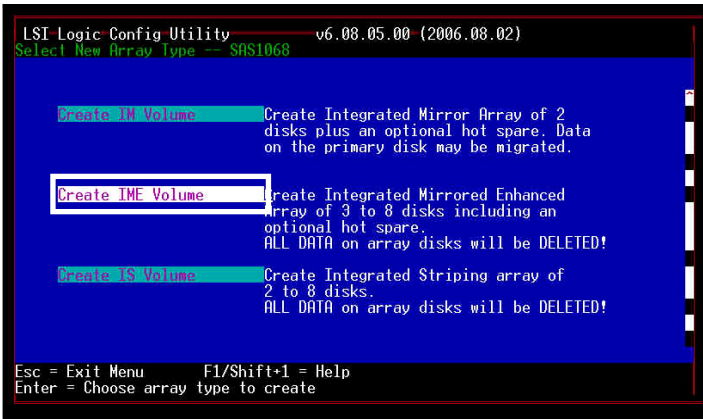
6.8.2 Integrated Mirroring Enhanced

To create an IME volume:

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



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



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

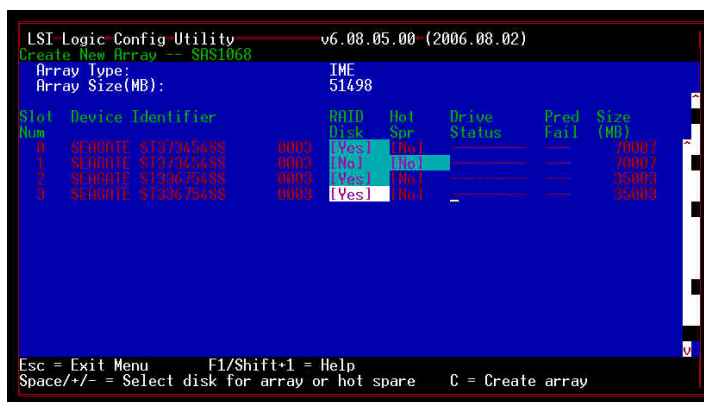
Integrated Mirroring Enhanced (IME) supports three to eight disks, or seven mirrored disks plus a hot spare disk. Use the arrow key to select a disk, then move the cursor to the RAID Disk column. To include this disk in the array, press <+>, <->, or <Space>.

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

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

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

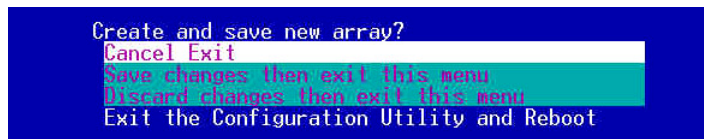
You may also specify the Hot Spare disk here. Select the disk, then move the cursor to the Hot Spr column, then press <+>, <->, or <Space>.



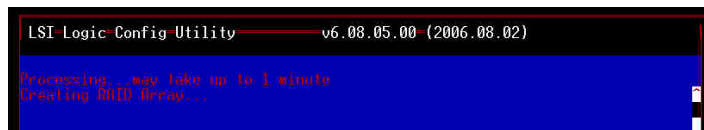
By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

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

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



6. The utility creates the array.



6.8.3 Integrated Striping (IS) volume

Overview

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

Creating Integrated Striping volumes



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

To create an IS volume:

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

```
LSI Logic Corp. MPT SAS BIOS
MPTBIOS-6.08.05.00 (2006.08.02)
Copyright 2000-2006 LSI Logic Corp.

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

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

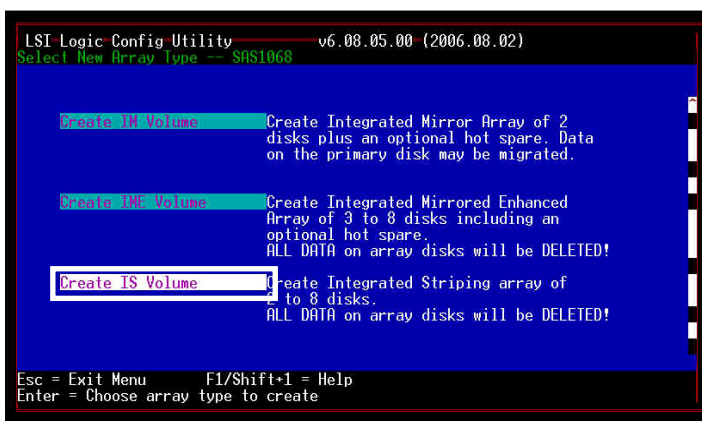
```
LSI Logic Config Utility v6.08.05.00 (2006.08.02)
Adapter Properties - SAS1068

Adapter          SAS1068
PCI Slot         00
PCI Address(Bus/Dev/Func) 05:03:00
MPT Firmware Revision 1.15.00.00-TR
SAS Address      500E0180:60831008
NVDATA Version   25.02
Status           Disabled
Boot Order       0
Boot Support     (Disabled OS only)

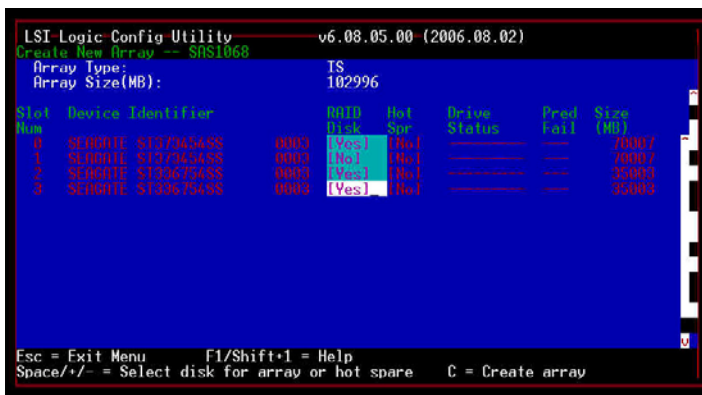
RAID Properties
SAS Topology
Advanced Adapter Properties

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

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



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

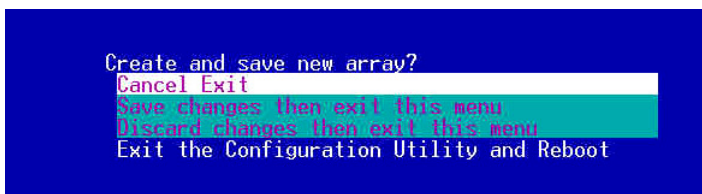




By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

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

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



9. The utility creates the array.



6.8.4 Managing Arrays

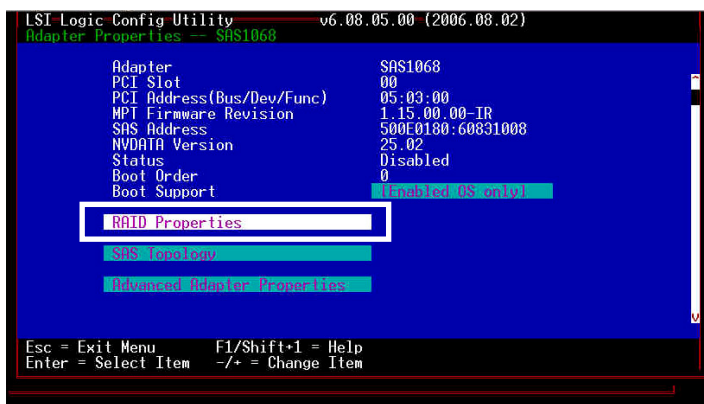
The LSI Logic MPT Setup Utility allows you to perform other tasks related to configuring and maintaining IM and IME volumes.

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

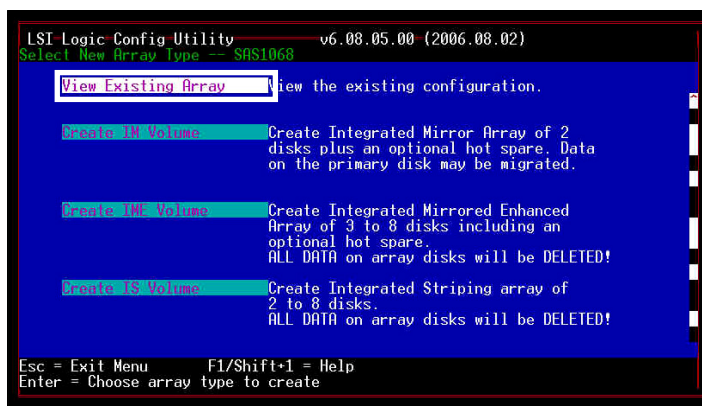
Viewing volume properties

To view volume properties:

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



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



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

```
LSI Logic Config Utility          v6.08.05.00 (2006.08.02)
View Array --- SAS1068
  Array              1 of 1
  Identifier          LSI LOGIC Logical Volume 3000
  Type               LME
  Scan Order         0
  Size(MB)           51498
  Status             Optimal

  Manage Array

Slot Device Identifier      RAID Hot Drive Pred Size
#   #   #                 Disk Srv Status Fail (MB)
0   0 SEAGATE ST373454SS    0003 Yes No Ok      No  34331
2   2 SEAGATE ST336754SS    0003 Yes No Ok      No  34331
3   3 SEAGATE ST336754SS    0003 Yes No Ok      No  34331
                                     -

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

Managing hot spares

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



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

To create a hot spare:

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

```
LSI Logic Config Utility          v6.08.05.00 (2006.08.02)
View Array -- SAS1068
Array                            1 of 1
Identifier                       LSILOGICLogical Volume 3000
Type                             IME
Scan Order                       0
Size(MB)                         51498
Status                           Optimal

Manage Array

Slot Device Identifier          RAID Hot Drive Pred Size
Num  Name                      Disk Sp   Status Fail (MB)
0    SEAGATE ST373454SS         0003 Yes No   Ok   No   34331
2    SEAGATE ST336754SS         0003 Yes No   Ok   No   34331
3    SEAGATE ST336754SS         0003 Yes No   Ok   No   34331
-
```

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

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

```
LSI Logic Config Utility          v6.08.05.00 (2006.08.02)
Manage Array -- SAS1068

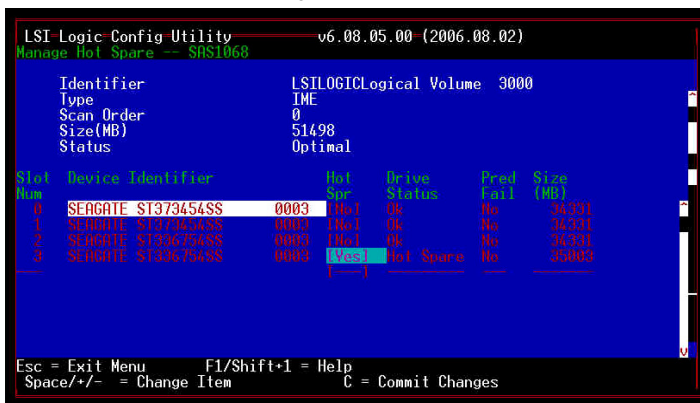
Identifier                       LSILOGICLogical Volume 3000
Type                             IME
Scan Order                       0
Size(MB)                         51498
Status                           Optimal

Manage Hot Spare
Synchronize Array
Activate Array
Delete Array
```

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

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

Press <C> to commit the changes.

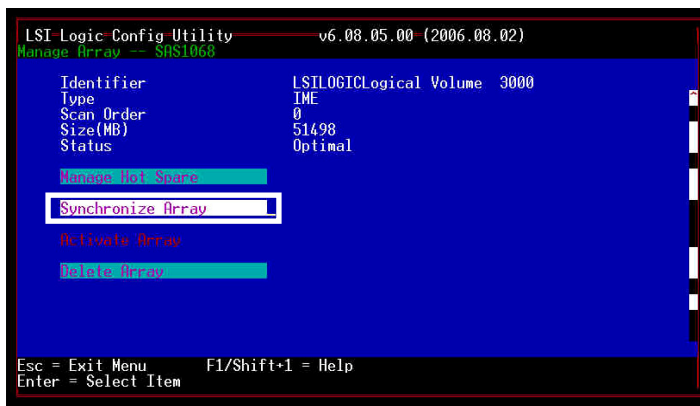


Synchronizing the array

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

To synchronize the array:

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



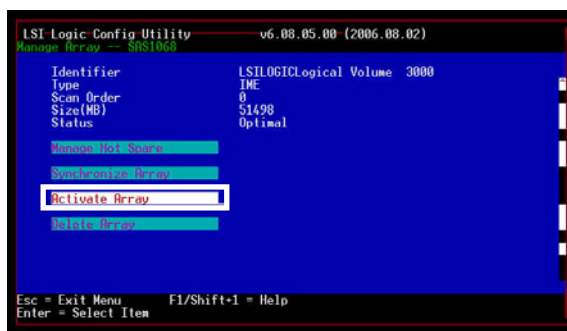
- Press <Y> to begin the synchronization, or <N> to cancel.

Activating an array

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

To activate the array:

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



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

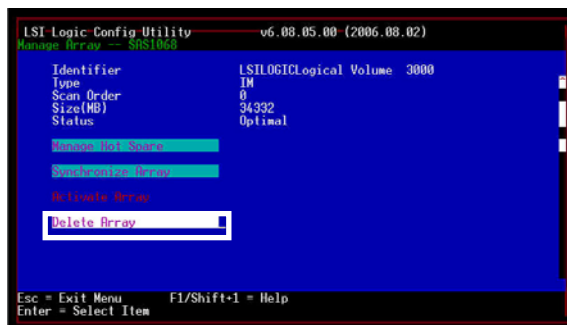
Deleting an array



- You cannot recover lost data if you delete an array. Make sure you back up important data before deleting an array.
- If you delete an IM (RAID 1) volume, the data is preserved on the primary disk.

To delete an array:

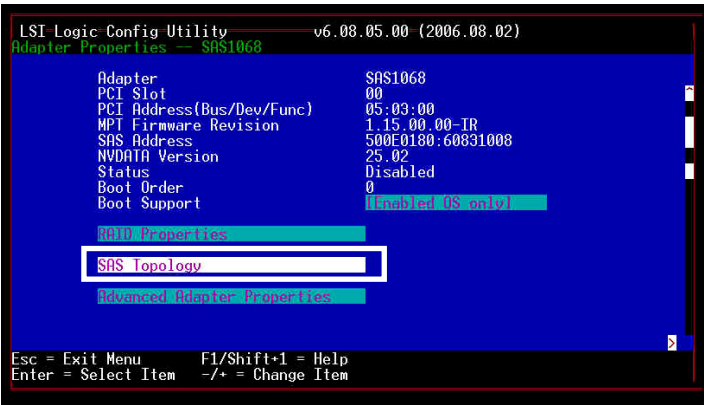
1. From the **Manage Array** screen, select **Delete Array**, then press <Enter>.



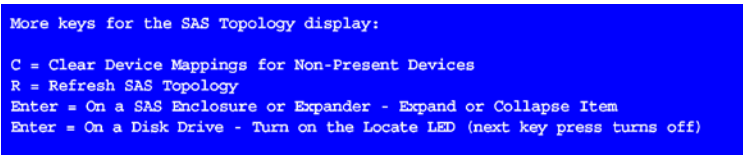
2. Press <Y> to delete, or <N> to cancel.

6.8.5 Viewing SAS topology

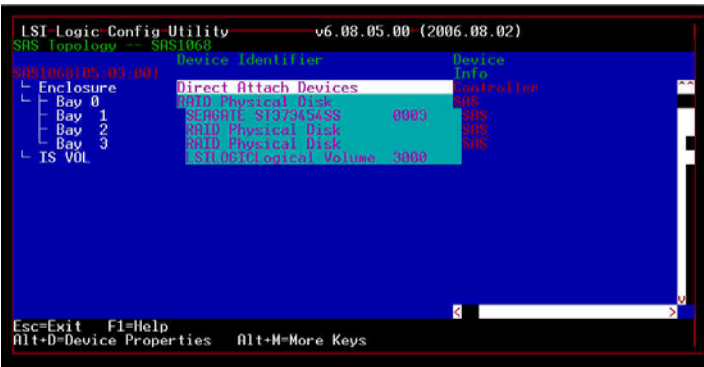
1. From the **Adapter Properties** screen, select **SAS Topology**.



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



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



Selecting a boot disk

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

Follow these steps to select a boot disk:

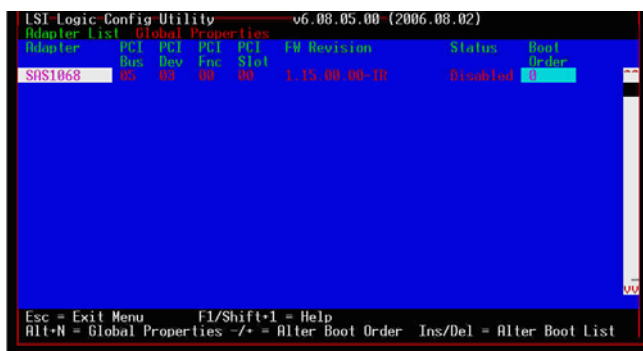
1. In the **SAS BIOS CU**, select an adapter from the **Adapter List**.
2. Select the **SAS Topology** option.

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

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



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



6.8.6 Global Properties

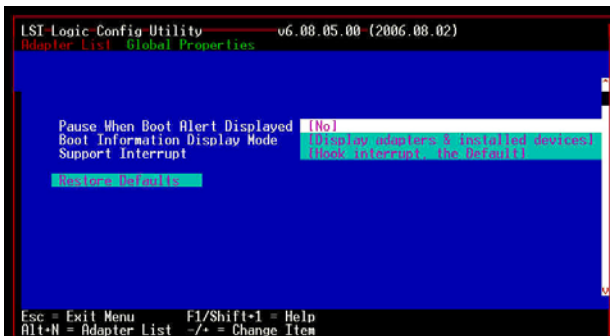
From the **Setup Utility** screen, press <Ctrl+C> to enter **LSI Logic Configuration**, then select **Global Properties**. The **Global Properties** menu allows you to change related settings.



Pause When Boot Alert Displayed

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

Configuration options: [Yes] [No]



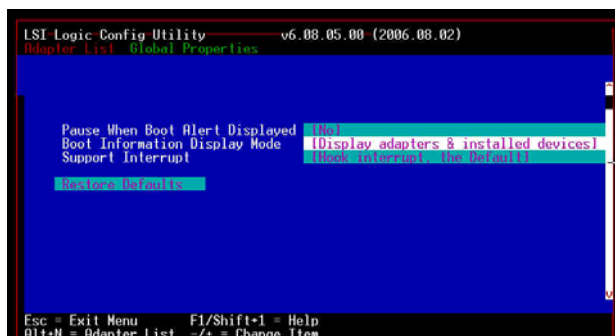
Boot Information Display Mode

Sets the disk information display mode.

Configuration options: [Display adapters & installed devices]

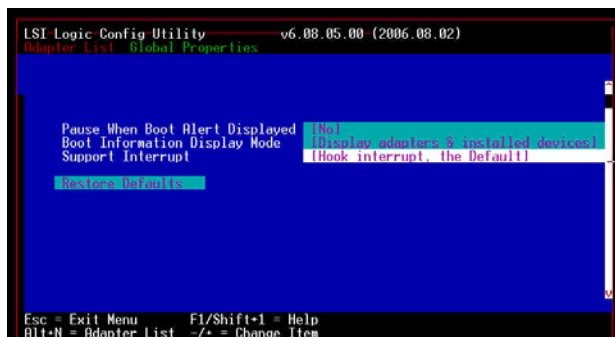
[Display minimal information] [Display adapters and all devices]

[Display adapters only]



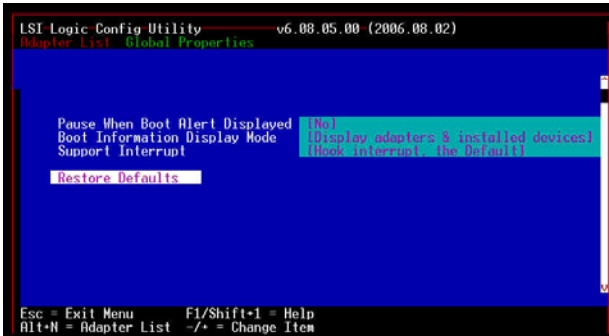
Support Interrupt

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



Restore Defaults

This option allows you to discard the selections you made and restore the system defaults.



Chapter 7

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



ASUS TS300-E4

Driver installation

7.1 RAID driver installation

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

7.1.1 Creating a RAID driver disk



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

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

Boot from CD-ROM (DOS)

To create a RAID driver disk in DOS environment:

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

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

The Makedisk menu appears.

For PA4 Model

```
A) FreeDOS command prompt  
B) Create Intel Matrix Storage Manager for Windows 32 bit Driver Disk  
C) Create Intel Matrix Storage Manager for Windows 64 bit Driver Disk  
D) Create LSI MegaRAID for Windows 32/64 bit Driver Disk  
E) Create LSI MegaRAID for RHEL4 UP2 32/64 bit Driver Disk  
F) Create LSI MegaRAID for RHEL3 UP6 32/64 bit Driver Disk  
G) Broadcom ASF Firmware Update  
H) Flash AMI BIOS for TS300-E4/PA4  
I) Write TS300-Ez4/PA4 FRU  
  
Please choose A TO I:
```

For PX4 Model

```
A) FreeDOS command prompt
B) Create LSI 1068 SAS for Win2K/Win2K3 32 bit Driver Disk
C) Create LSI 1068 SAS for RHEL AS4.0 UP2 64 bit Driver Disk
D) Create LSI 1068 SAS for RHEL AS4.0 UP2 32 bit Driver Disk
E) Create LSI 1068 SAS for RHEL AS3.0 UP6 64 bit Driver Disk
F) Create LSI 1068 SAS for RHEL AS3.0 UP6 32 bit Driver Disk
G) Broadcom ASF Firmware Update
H) Flash AMI BIOS for TS300-E4/PX4 system
I) Write TS300-E4/PX4 FRU

Please choose A TO I:
```

6. Place a blank, high-density floppy disk to the floppy disk drive, then select the type of RAID driver disk you want to create by typing the number before the option
7. Press <Enter>.
8. Follow screen instructions to create the driver disk.

Windows® 2000/2003 Server

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

1. Restart the system from the hard disk drive, then place the system/motherboard support CD in the optical drive.
2. Browse the contents of the support CD to locate the driver disk utility. The Windows 32-bit OS RAID driver disk for the Intel® Matrix Storage Manager is located in:

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

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

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

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

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

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

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

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

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

3. Insert a formatted high-density floppy disk to the floppy disk drive.
4. Follow screen instructions to complete the process.
5. After creating a RAID driver disk, eject the floppy disk, then write-protect it to prevent computer virus infection.

Red Hat® Enterprise Linux/SUSE Linux Enterprise Server:

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

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

For LSI Logic Embedded SATA RAID Driver:

`\Drivers\ICH7R LSI RAID\Driver\Makedisk`

For LSI1068 SAS RAID RAID Driver:

`\Drivers\ICH7R LSI 1068\Driver\Makedisk`

3. Eject the floppy disk.



For systems with other 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\`; For LSI1068 SAS RAID Driver: `\Drivers\LSI 1068\Drivers\Linux\`

7.1.2 Installing the RAID controller driver

Windows® 2000/2003 Server OS

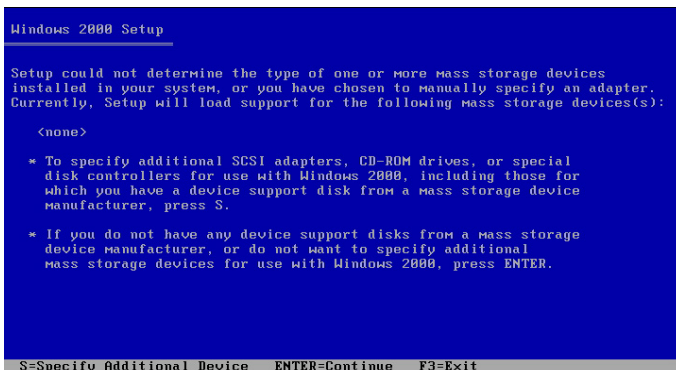
During Windows® 2000/2003 Server OS installation

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

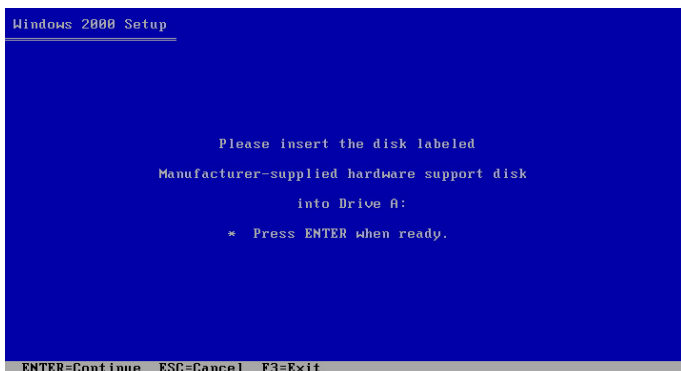
1. Boot the computer using the Windows® 2000/2003 Server installation CD. The **Windows® 2000/2003 Setup** starts.



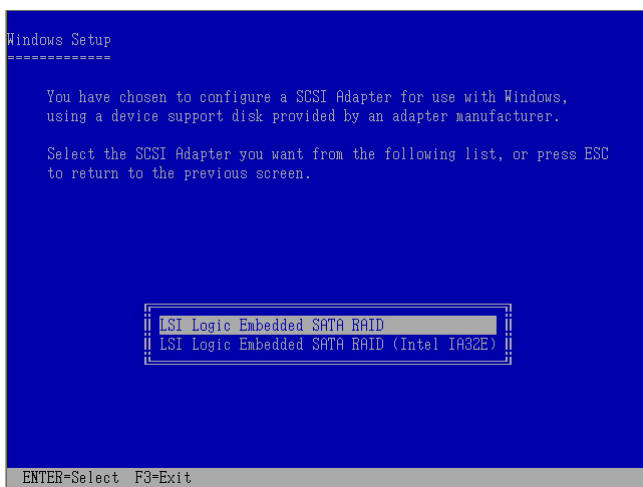
2. Press <F6> when the message "Press F6 if you need to install a third party SAS or RAID driver..." appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



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



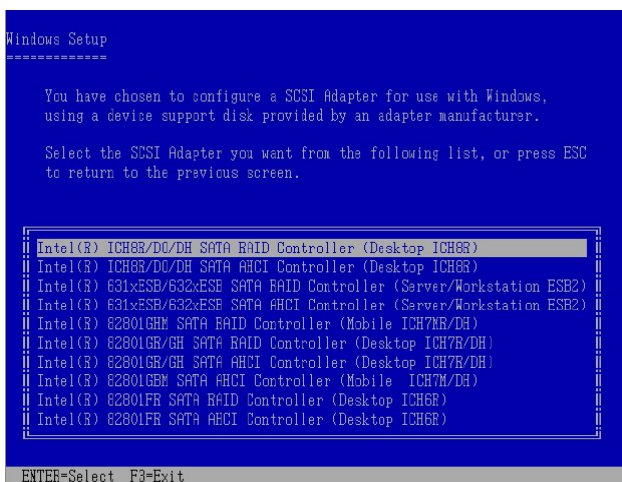
5. Select the RAID controller driver from the list, then press <Enter>.



- **LSI Logic Embedded SATA RAID: (For PA4 Model)**

Select "**LSI Logic Embedded SATA RAID**" for Windows 2000 or 32bit Windows 2003 Server OS from the list, then press <Enter>.

For 64bit Windows 2003 Server OS, select "**LSI Logic Embedded SATA RAID (Intel IA32E)**" item and then press <Enter>.



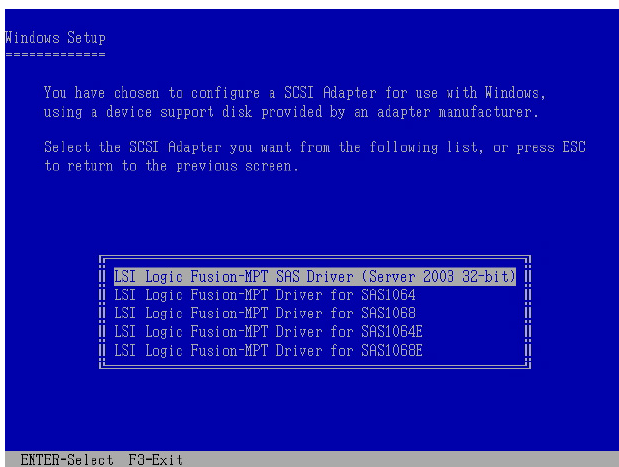
- **Intel Matrix Storage Manager: (For PX4 Model)**

Select “**Intel(R) 82801GR/GH SATA RAID Controller (Desktop ICH7RDH)**”

for Intel Matrix Storage RAID mode from the list, then press <Enter>.

- **Intel ICH7R AHCI Mode:**

If you select **SATA as AHCI** in the BIOS setup utility of IDE Configuration, install the Intel SATA AHCI Driver during windows setup. Then, select the “**Intel(R) 82801GR/GH SATA AHCI Controller (Desktop ICH7RDH)**” from the list. Refer to section “6.1.1 Creating a RAID driver disk” to create the Intel Matrix Storage Manager driver disk for Intel ICH7R ACHI Driver.



- **LSI1068 PCI-X SAS controller Driver (for PX4 Only):**

For Windows 2000, select “**LSI Logic Fusion-MPT Drivers for SAS 1068 (Windows 2000)**”.

For 32bit Windows 2003 , select “**LSI Logic Fusion-MPT Drivers for SAS 1068 (Windows 2003 32-bit)**”.

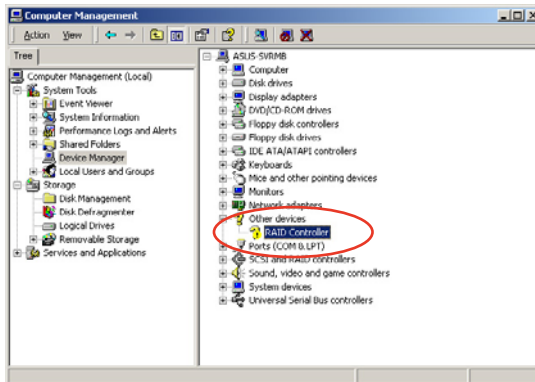
For 64bit Windows 2003 , select “**LSI Logic Fusion-MPT Drivers for SAS 1068 (Windows 2003 x64)**”

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

To an existing Windows® 2000/2003 Server OS

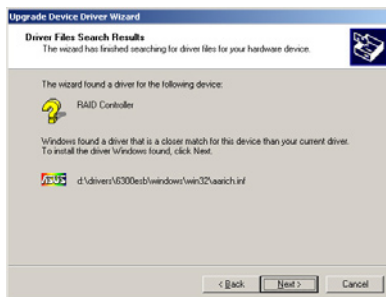
To install the RAID controller driver on an existing Windows® 2000/2003 Server OS:

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



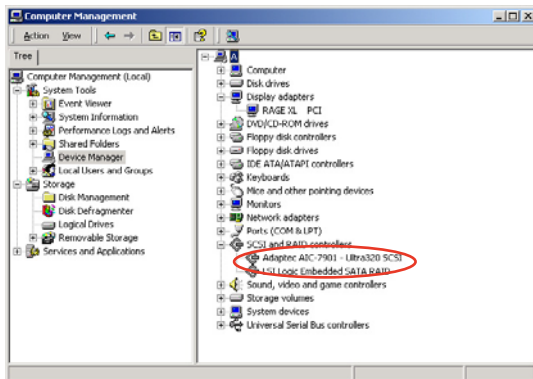
5. Right-click the **RAID controller** item, then select **Properties**.
6. Click the **Driver** tab, then click the **Update Driver** button.
7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.

8. Insert the RAID driver disk you created earlier to the floppy disk drive.
9. Select the option **"Search for a suitable driver for my device (recommended)"**, then click Next.
10. The wizard searches the RAID controller drivers. When found, click **Next** to install the drivers.
11. Click **Finish** after the driver installation is done.



To verify the RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **SAS and RAID controllers**. For example the **LSI Logic Embedded SATA RAID** or **LSI SAS1068 SAS Driver** items should appear.

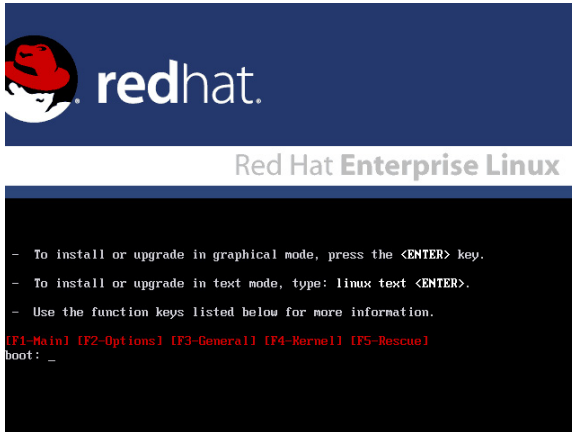


4. Right-click the **RAID controller driver** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

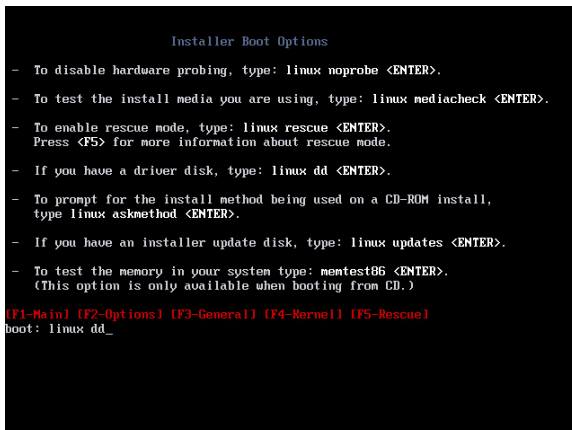
Red Hat® Enterprise

To install the Intel® LSI Logic Embedded SATA RAID controller driver or LSI1068 SAS controller driver when installing Red Hat® Enterprise operating system:

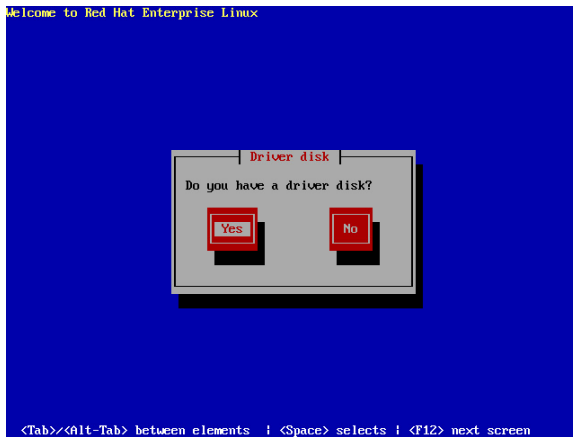
1. Boot the system from the Red Hat® Installation CD.



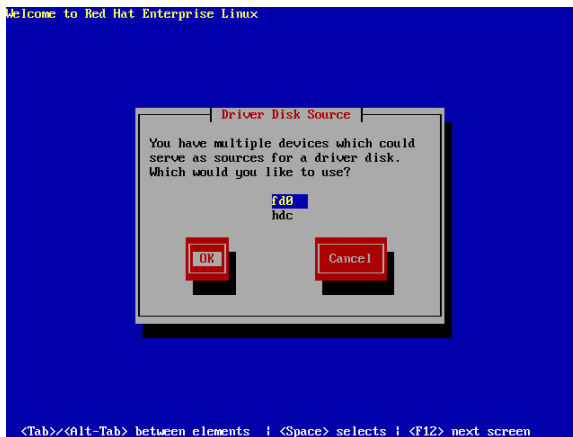
2. At the boot:, type `linux dd` , then press <Enter>.



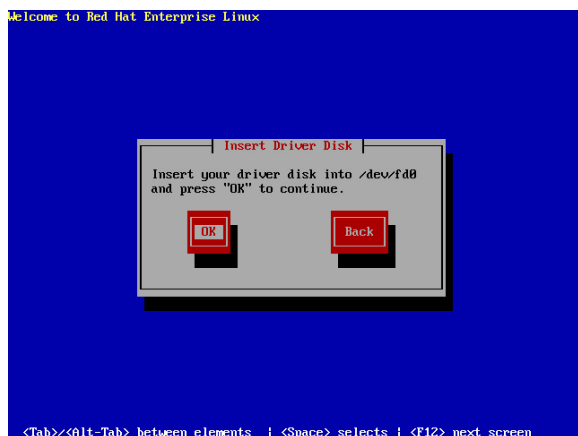
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>



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

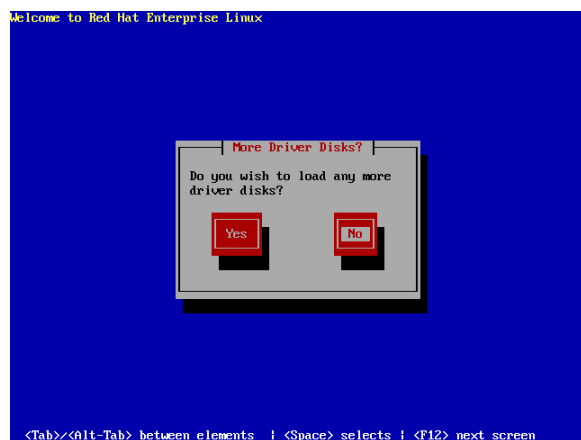


- When prompted, insert the Red Hat® Enterprise RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



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

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

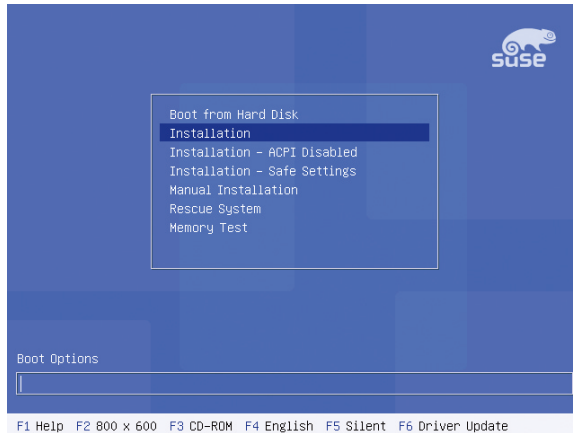


- Follow screen instructions to continue the OS installation.

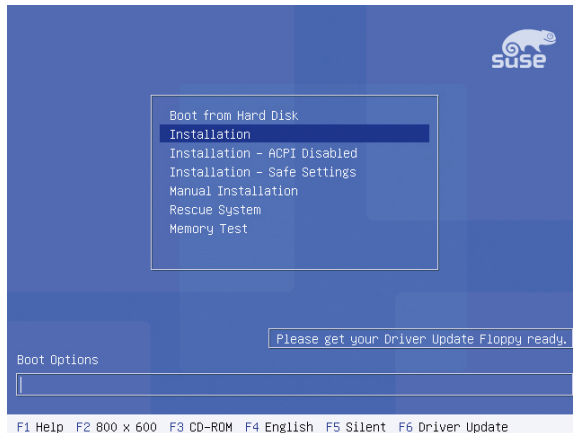
SuSE Linux

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

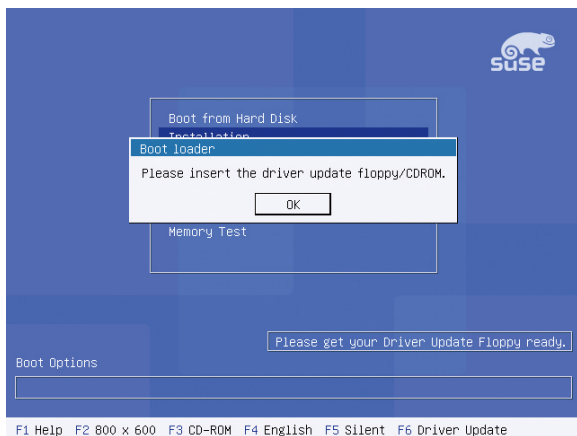
1. Boot the system from the SuSE Installation CD.
2. Select **Installation** from the **Boot Options** menu, then press <Enter>.



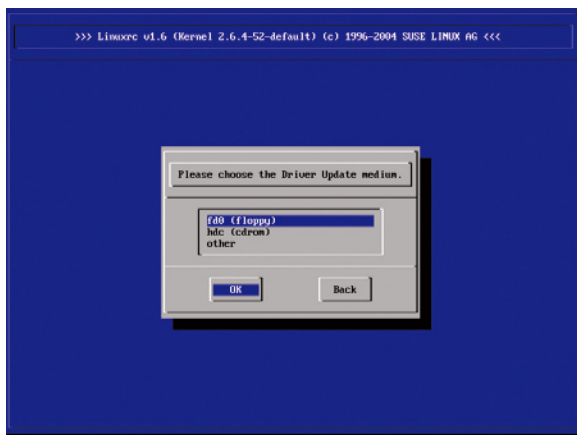
3. A message instructs you to prepare the RAID driver disk. Press <F6>.



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



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



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

7.2 LAN driver installation

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

7.2.1 Windows® 2000/2003 Server

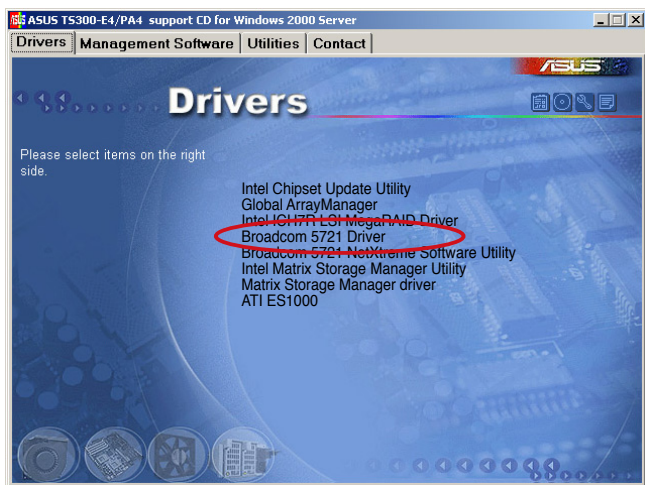
To install the Broadcom® Gigabit LAN controller driver on a Windows® 2000/2003 Server OS:

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

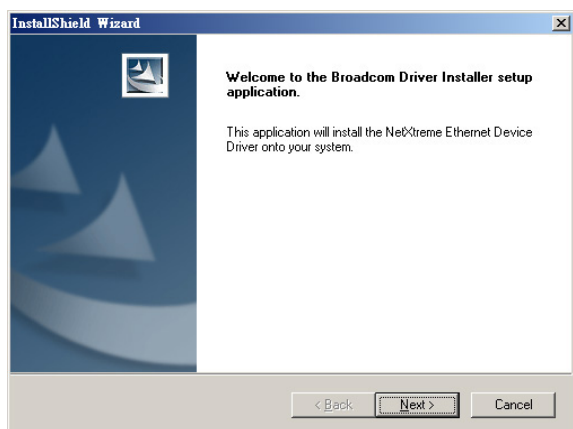


- Windows® automatically detects the LAN controllers and displays a **New Hardware Found** window. Click **Cancel** to close this window.
- If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the **ASSETUP.EXE**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

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



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



7.2.2 Red Hat® Enterprise Linux

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

Building the driver from the TAR file

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

To install the kernel development application:

1. Insert the Linux OS installation CD disk 1 to the optical drive.
2. Double click Application > System setting > Add/Remove application.
3. Select Kernel Development from the development tools.
4. Follow the instructions on the screen to finish installation.

To build the driver from the TAR file:

1. Create a directory and extract the TAR files:
`tar xvfz tg3-<version>.tar.gz`
2. Build the driver bcm5700.o as a loadable module for the running kernel:
`cd tg3-<version>/src`
`make`
3. Test the driver by loading it:
`insmod tg3.o`
4. Install the driver and man page:
`make install`
5. Refer to Red Hat distribution documentation to configure the network protocol and address.



The Broadcom LAN driver for Linux OS is located in \Drivers\BCM5721 LAN\B57BCMCD_SV_943\Linux\Driver.

7.3 VGA driver installation

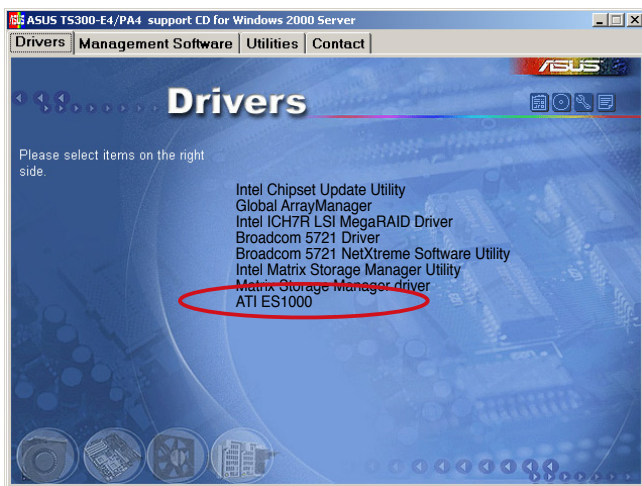
This section provides instructions on how to install the ATI® ES1000 Video Graphics Adapter (VGA) driver.

7.3.1 Windows 2000/Server 2003

You need to manually install the ATI® ES1000 VGA driver on a Windows 2000 / Server 2003 operating system. To install the ATI® ES1000 VGA driver:

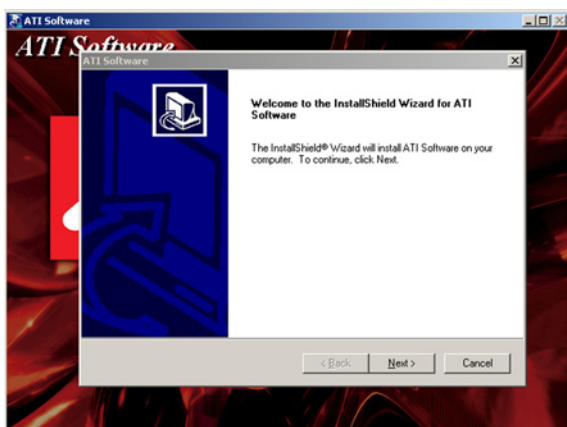
1. Restart the computer, then log on with Administrator privileges.
2. Insert the motherboard/system support CD to the optical drive. The support CD automatically displays the Drivers menu if Autorun is enabled in your computer.

The Drivers menu if Autorun is enabled in your computer.

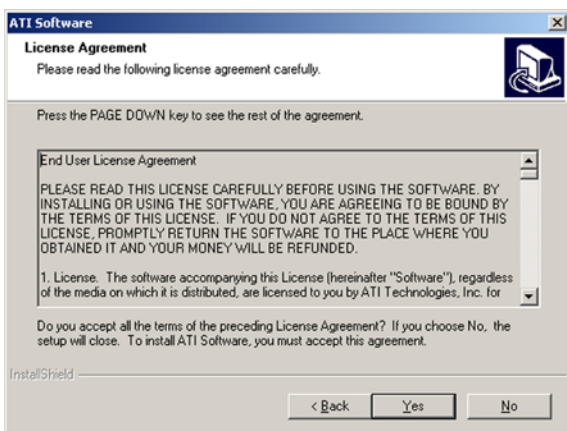


3. Click the item ATI ES1000 from the menu.

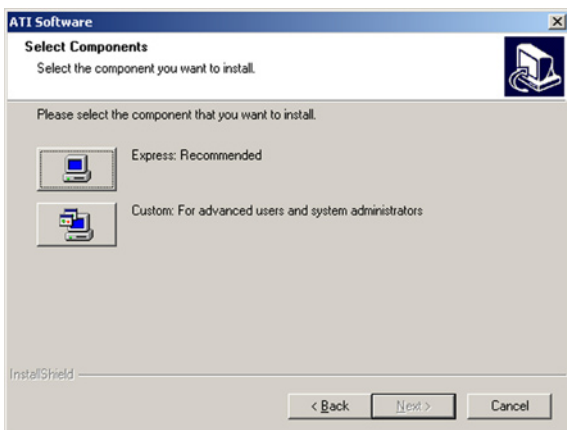
4. The ATI Software window appears. Follow the screen instructions to complete installation.



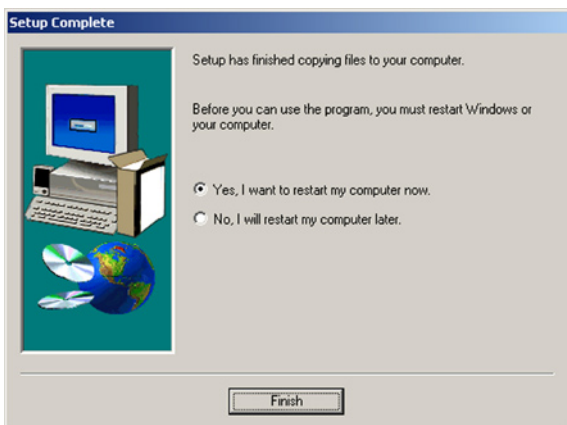
5. Select Yes to accept the terms of the License Agreement and continue the process.



6. Press the  button to activate quick installation.



7. After completing the installation, restart the computer.



7.4 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.

7.4.1 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.

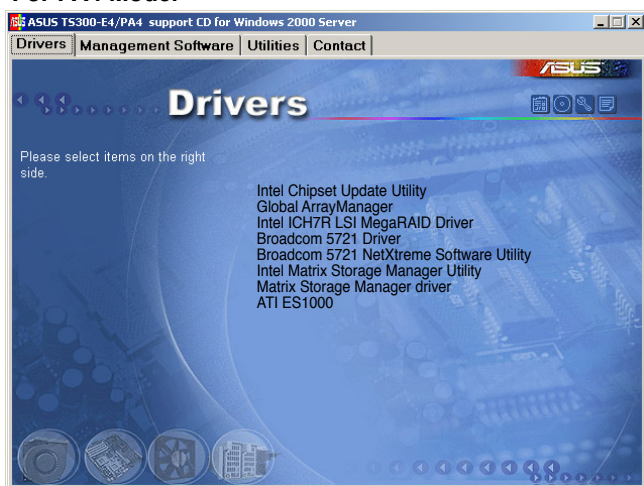
7.4.2 Drivers menu

The Drivers menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.

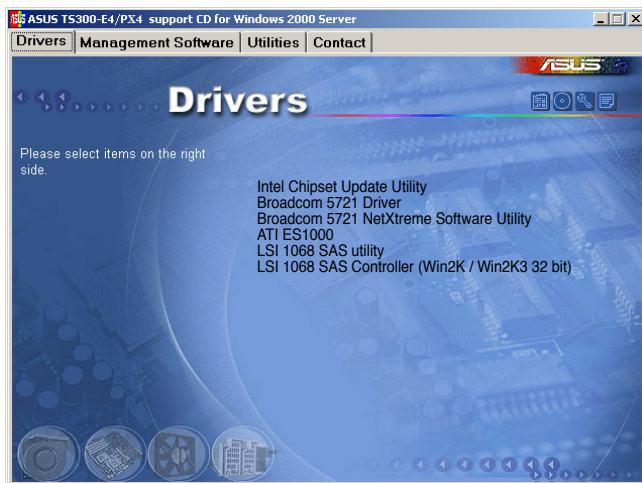


The screen display and driver options vary under different operating system versions.

For PA4 Model

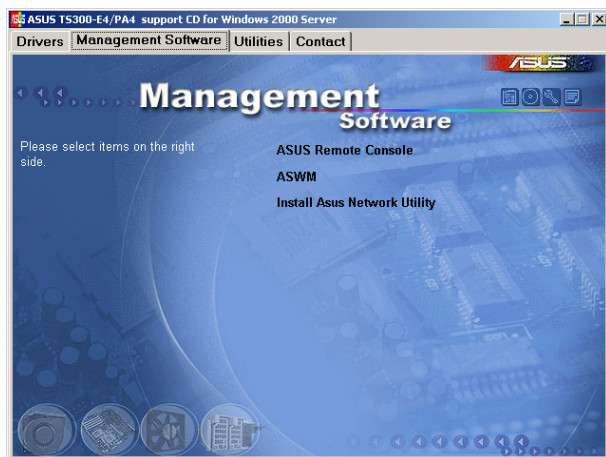


For PX4 Model



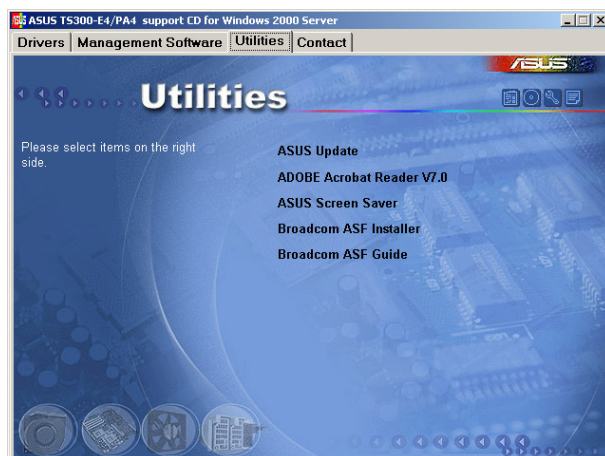
7.4.3 Management Software menu

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



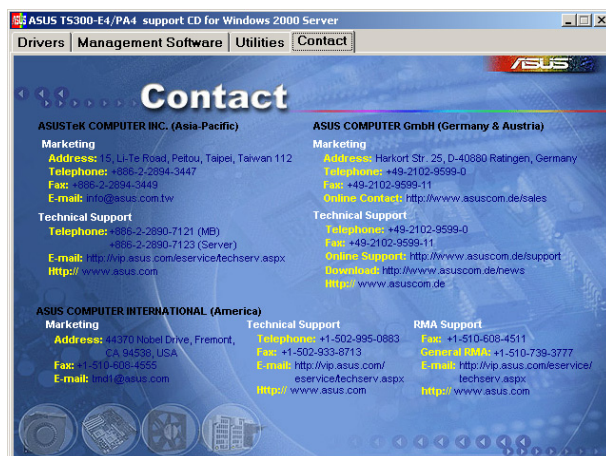
7.4.4 Utilities menu

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



7.4.5 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.



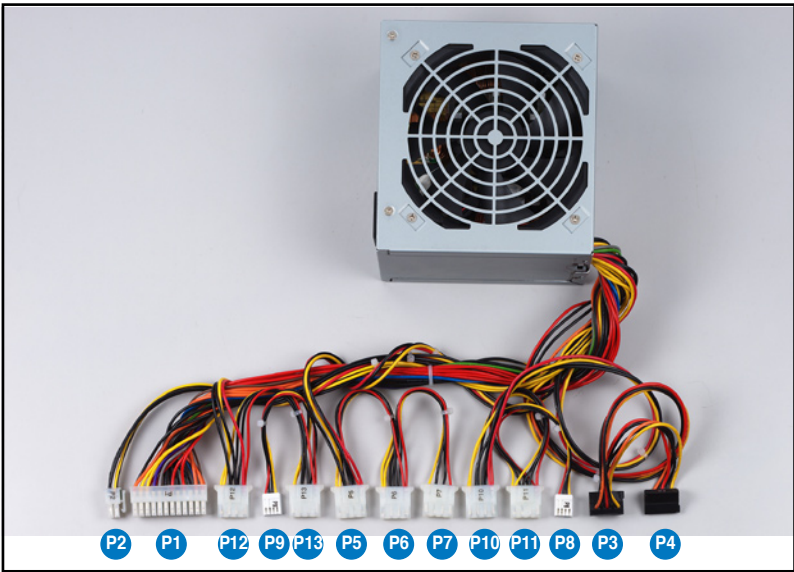
ASUS TS300-E4

Reference information

A.1 450 W single power supply

A.1.1 General description

The 450 W SSI-type single power supply with universal AC input includes PFC and ATX-compliant output cables and connectors. The power supply has 13 plugs labeled P1 to P13. Take note of the devices to which you should connect the plugs.



P2	Motherboard 4-pin +12V power connector
P1	Motherboard 24-pin ATX power connector
P12	Peripheral device (available); connect this to the SCSI/SATA backplane
P9	Floppy disk drive
P13	Peripheral device (available)
P5	Peripheral device (available)
P6	Peripheral device (available)
P7	Peripheral device (available); connect this to the SCSI/SATA backplane
P10	Peripheral device (available); optical drive
P11	Peripheral device (available)
P8	Peripheral device (available)
P3	Serial ATA device
P4	Serial ATA device

A.1.2 Specifications

Input Characteristics

Input Voltage Range

Normal Range 110 to 127 V ~ 10 A

Auto Range 200 to 240 V ~ 5 A

Input Frequency Range 50 Hz to 60 Hz

DC Output characteristics

Output Voltage	Max (A)
+3.33V	24
+5V	24
+12V	43
-12V	0.5
-5V	0.5
+5VSB	2.0

A.2 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. Make sure 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. Make sure that the DIMMs are properly installed on the sockets.

Problem	Action
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. Make sure 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. Make sure that the network cable is connected to the LAN port on the rear panel. 2. Make sure that you have installed the LAN drivers from the support CD.

