P7F-C Series

P7F-C/SAS
P7F-C/4L

Motherboard

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Notices

Federal Communications Commission Statement

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

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

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

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

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

Canadian Department of Communications Statement

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

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

REACH

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

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.

- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.

- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.

- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.

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

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.

- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.

- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.

- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.

- Place the product on a stable surface.

- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

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

About this guide

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

How this guide is organized

This user guide contains the following parts:

- **Chapter 1: Product introduction**

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

- **Chapter 2: Hardware information**

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

- **Chapter 3: Powering up**

  This chapter describes the power up sequence and ways of shutting down the system.

- **Chapter 4: BIOS setup**

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

- **Chapter 5: RAID configuration**

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

- **Chapter 6: Driver installation**

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

- **Appendix: Reference information**

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

Where to find more information

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

1. **ASUS websites**

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

2. **Optional documentation**

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

Conventions used in this guide

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

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

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

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

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

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.
	Example: <Enter> means that you must press the Enter or Return key.
<Key1+Key2+Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).
	Example: <Ctrl+Alt+D>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.
	Example: At the DOS prompt, type the command line: `format A:/S`

P7F-C Series specifications summary

Model Name		P7F-C/SAS	P7F-C/4L
Processor / System Bus		1 * Socket LGA1156	
		Quad Core Intel Xeon 3400 series Server Processor Quad Core Intel Core i7-800 series Desktop Processor Quad Core Intel Core i5-700 series Desktop Processor Dual Core 32nm CPU design Ready	
		Dual Core/Quad Core	
Core Logic		Intel® 3420 PCH	
Form Factor		ATX, 12" * 9.6"	
ASUS Features	FAN speed control	V	V
	Rack Ready (Rack and Pedestal dual use)	V	V
	ASWM2.0	V	V
Memory	Total Slots	6/4 (RDIMM/UDIMM)	
	Capacity	Maximum up to 32GB (RDIMM) Maximum up to 16GB (UDIMM) Desktop Processor do not support RDIMM nor ECC UDIMM	
	Memory Type	DDR3 1066/1333 Unbuffered DIMM with ECC/ non ECC** DDR3 800/1066/1333 Reg DIMM	
	Memory Size	1 GB, 2GB, 4GB, 8GB (RDIMM) 1 GB, 2GB, 4GB (UDIMM)	
Expansion Slots (follow SSI Loacation #)	Total PCI/PCI-X/ PCI-E Slots	6	6
	Slot Loacation 1	1 * PCI 32bit/33 MHz	
	Slot Loacation 2	1 * PCI 32bit/33 MHz	
	Slot Loacation 3	1 * PCI 32bit/33 MHz	
	Slot Loacation 4	1 * PCI-E x16 (Gen2 x8 link)	
	Slot Loacation 5	1 * PCI 32bit/33 MHz	
	Slot Loacation 6	1 * PCI-E x16 (Gen2 x8 link)	
Storage	SATA Controller	Intel® 3420: 6* SATA2 300MB/s ports - Intel Matrix Storage utility supports software RAID 0, 1, 10 & 5(Windows) LSI MegaRAID driver supports software RAID 0, 1& 10(Windows & Linux) (P7F-C/4L only)	
	SAS Controller	LSI 1068E 8-port SAS controller: LSI® Integrated RAID 0, 1, 1E support	—
Networking	LAN	2 * Marvell® 8056 PCI-E GbE LAN	4 * Marvell® 8056 PCI-E GbE LAN
Graphic	VGA	XGI® Z9s DDR2 64MB	

P7F-C Series specifications summary

Onboard I/O Connectors	PSU Connector	24-pin ATX power connector + 8-pin ATX 12V power connector 24+4 pin power supply supported	
	USB Connectors	3 (support 5 USB port) (One for internal Type A USB connector)	
	Fan Header	5* 4pin	
	Chassis Intruder	1	1
	Serial Port Header	1	1
Rear I/O Connectors	External Serial Port	1	1
	External USB Port	2	2
	VGA Port	1	1
	RJ-45	2	4
	PS/2 KB/Mouse	1	1
Management Solution	Software	ASWM2.0	ASWM2.0
Monitoring	CPU Temperature	V	V
	FAN RPM	V	V
Environment		Operation temperature: 10☐—35☐ Non operation temperature: -40☐—70☐ Non operation humidity: 20%—90% (Non condensing)	

*Specifications are subject to change without notice.

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

Product introduction

1

Chapter summary

1

1.1   Welcome!

Thank you for buying an ASUS® P7F-C Series motherboard!

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

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

1.2   Package contents

Check your motherboard package for the following items.

		Standard Gift Box Pack	Standard Bulk Pack
		P7F-C Series	
Cables	SATA data cable	6	--
Accessories	IO shield	1	1
	Plate for LGA1156 (1U)	1	1
Application CD	Support CD	1	1
Documentation	User Guide	1	1
Packing Qty.		1pc per carton	10pcs per carton

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

1.3   Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the motherboard's serial number containing 13 characters **xxS2xxxxxxxxx** shown as the figure below. With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.

1.4   Special features

1.4.1   Product highlights

Intel® LGA1156 Xeon 3400 Processor Ready
This motherboard supports the latest Intel® Xeon 3400 processors in LGA1156 package, which has memory and PCI Express controller integrated to support 2-channel (6 DIMMs) DDR3 memory and 16 PCI Express 2.0 lanes, providing great graphics performance. Intel® Xeon 3400 processor is one of the most powerful and energy efficient CPU in the world.

Intel Turbo Boost

Intel® Turbo Boost opportunistically and automatically allows the processor to run faster than the marked frequency if the processor is operating below power, temperature and current limits. This technology increases performance of both multi-threaded and single-threaded workloads.

Intel Hyper Threading
The thread-level parallelism on each processor makes more efficient use of the processor resources, higher processing throughout and improved performance on today's multi-threaded software.

Intel® EM64T

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

DDR3 memory support

The P7F-C Series supports UDIMM and RDIMM DDR3 memory that features data transfer rates of 1333/1066 MHZ to meet the higher bandwidth requirements of server and workstation applications. The 2-channel DDR3 architecture boosts system performance, eliminating bottlenecks. Furthermore, the supply voltage for the memory is reduced from 1.8 V for DDR2 to just 1.5V for DDR3. This voltage reduction limits the power consumption and heat generation of DDR3 which makes it an ideal memory solution.

PCIe 2.0

This motherboard supports the latest PCIe 2.0 device for twice the current speed and bandwidth. This enhances system performance while still providing backward compatibility to PCIe 1.0 devices.

Marvell 88E8056 LAN Solution

The motherboard comes with dual/quad Gigabit LAN controllers and ports which provide a total solution for your networking needs. The onboard Marvell 88E8056 Gigabit LAN controllers use the PCI Express interface and could achieve network throughput close to Gigabit bandwidth.

Serial Attached SCSI (SAS) technology support
(P7F-C/SAS model only)

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

Enhanced Intel SpeedStep Technology (EIST)

The Enhanced Intel SpeedStep Technology (EIST) intelligently manages the CPU resources by automatically adjusting the CPU voltage and core frequency depending on the CPU loading and system speed or power requirement.

Serial ATA II technology

The motherboard supports the Serial ATA II 3 Gb/s technology through the Serial ATA interface and Intel 3420 chipset. The Serial ATA II specification provides twice the bandwidth of the current Serial ATA products with a host of new features, including Native Command Queuing (NCQ), Power Management (PM) Implementation Algorithm, and Hot Swap. Serial ATA allows thinner, more flexible cables with lower pin count and reduced voltage requirements.

USB 2.0 technology

The motherboard implements the Universal Serial Bus (USB) 2.0 specification, dramatically increasing the connection speed from the 12 Mbps bandwidth on USB 1.1 to a fast 480 Mbps on USB 2.0. USB 2.0 is backward compatible with USB 1.1.

Temperature, fan, and voltage monitoring

The CPU temperature is monitored to prevent overheating and damage. The system fan rotations per minute (RPM) is monitored for timely failure detection. The chip monitors the voltage levels to ensure stable supply of current for critical components.

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

Hardware information 2

Chapter summary

2

2.1 Before you proceed

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

⚠️
- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
- Hold components by the edges to avoid touching the ICs on them.
- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
- Before you install or remove any component, ensure that the power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

Onboard LED

1.   Standby Power LED

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

SB_PWR1

ON
Standy Power

OFF
Powered Off

P7F-C Series Onboard LED
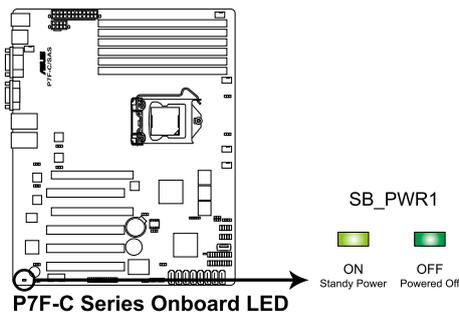
2.2 Motherboard overview

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

To optimize the motherboard features, we highly recommend that you install it in an ATX 1.1 compliant chassis.

> Ensure to unplug the chassis power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components!

2.2.1 Placement direction

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

2.2.2 Screw holes

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

> DO NOT overtighten the screws! Doing so can damage the motherboard.

Place this side towards the rear of the chassis
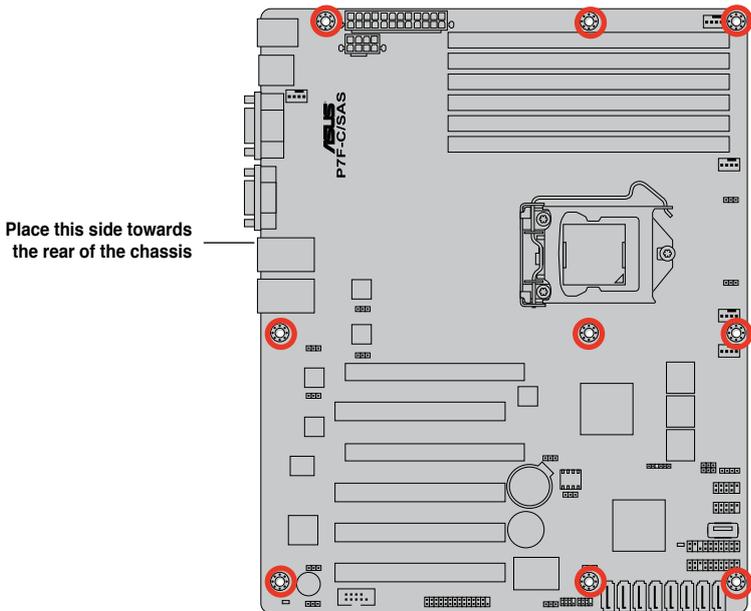
2.2.3 Motherboard layout

P7F-C/SAS
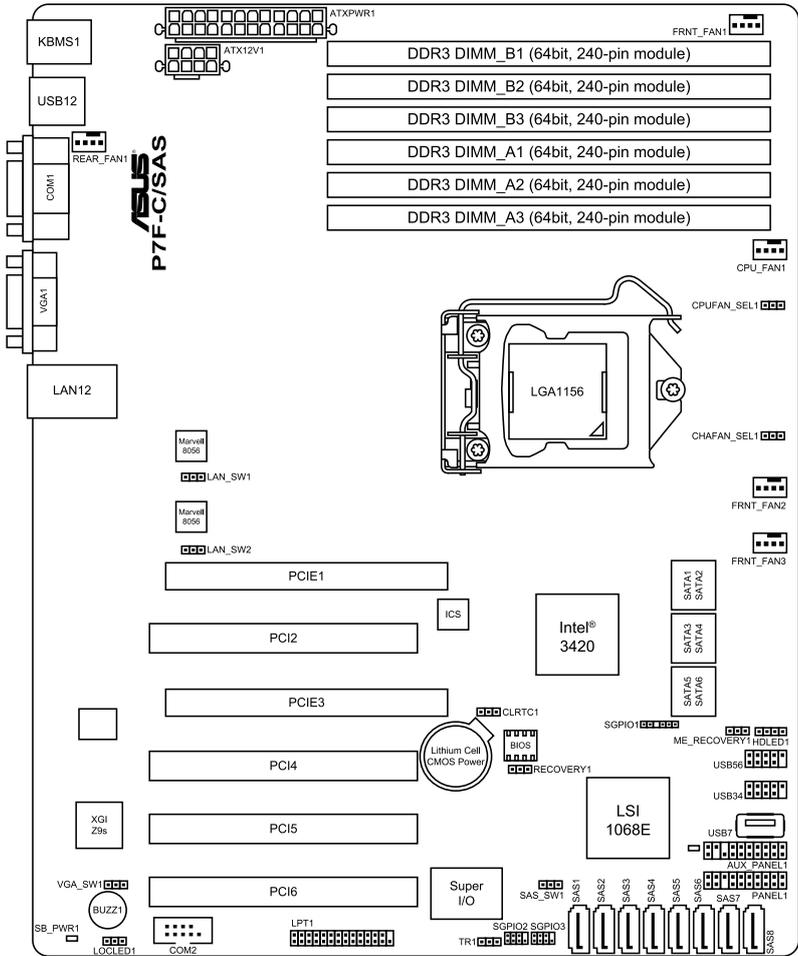
P7F-C/4L
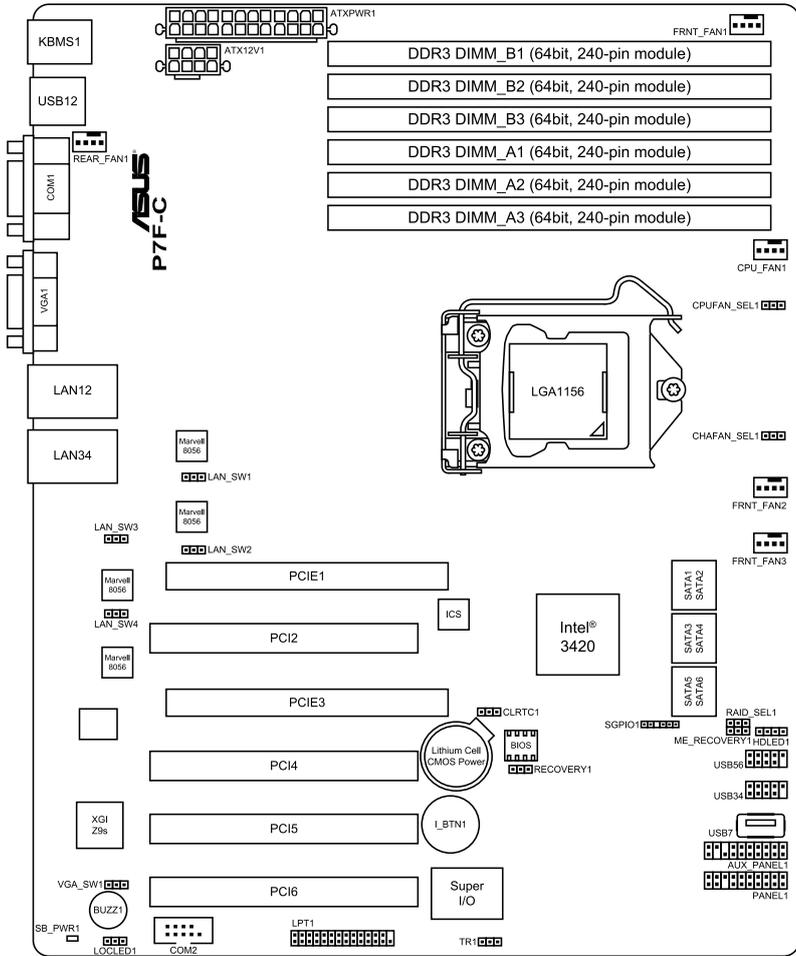
2.2.4   Layout contents

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11.	Parallel port connector (26-1 pin LPT1)	2-31
12.	System panel connector (20-1 pin PANEL1)	2-32
13.	Auxiliary panel connector (20-2 pin AUX_PANEL1)	2-33

2.3   Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1156 socket designed for the Intel® Xeon 3400 series Processors.

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

- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1156 socket.

- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/ incorrect removal of the PnP cap.

2.3.1   Installing the CPU

To install a CPU:

1.   Locate the CPU socket on the motherboard.
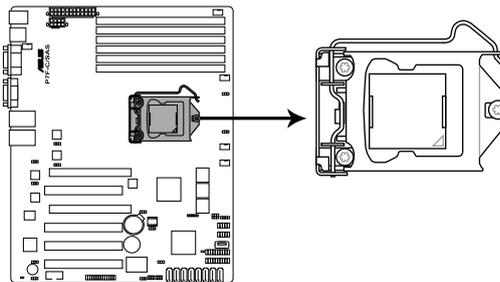
P7F-C Series CPU LGA1156

✎   Before installing the CPU, ensure that the socket box is facing toward you and the load lever is on your left.

2.   Press the load lever with your thumb (A), and then move it to the right (B) until it is released from the retention tab.
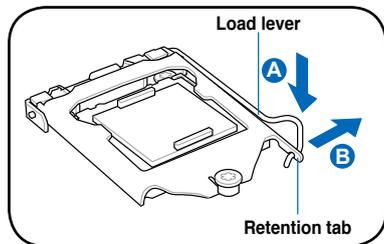
⚠️   To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

3. Lift the load lever in the direction of the arrow until the load plate is completely lifted.

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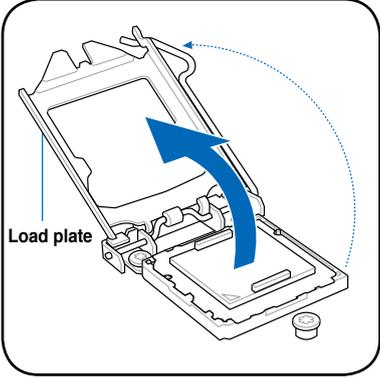
4. Remove the PnP cap from the CPU socket.

PnP cap

Cap tab
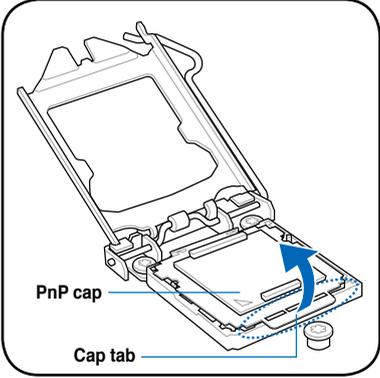
5. Position the CPU over the socket, ensuring that the gold triangle is on the bottom-left corner of the socket, and then fit the socket alignment keys into the CPU notches.

CPU notches

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

Gold triangle mark

Alignment keys
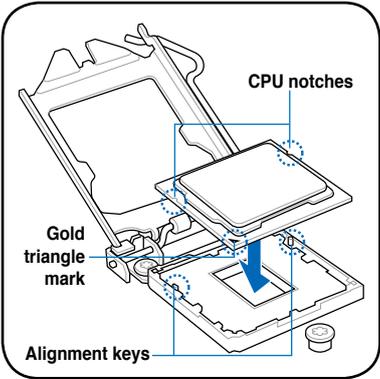
6. Apply some Thermal Interface
   Material to the exposed area of
   the CPU that the heatsink will be
   in contact with, ensuring that it is
   spread in an even thin layer.

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

   The Thermal Interface Material is
   toxic and inedible. DO NOT eat it.
   If it gets into your eyes or touches
   your skin, wash it off immediately,
   and seek professional medical
   help.
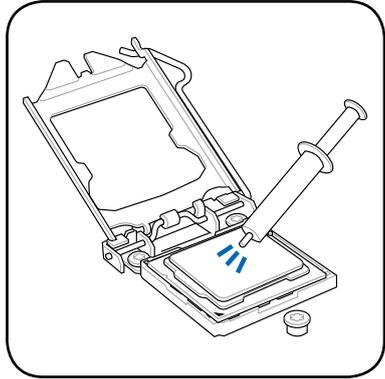
7. Close the load plate (A), and then
   push down the load lever (B),
   ensuring that the front edge of the
   load plate slides under the retention
   knob (C).
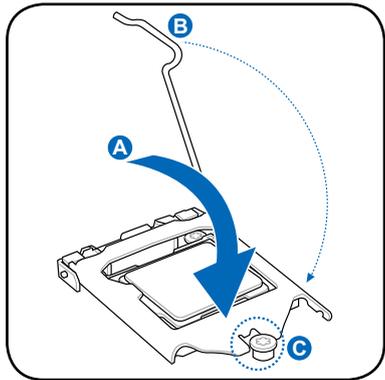
8. Insert the load lever under the
   retention tab.
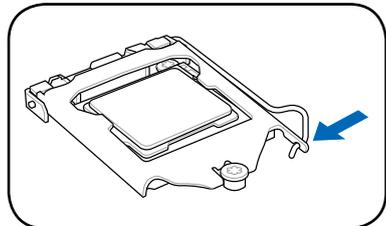
2.3.2   Installing the CPU heatsink and fan

The Intel® LGA1156 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

- • When you buy a boxed Intel® processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, ensure that you use only Intel®-certified multi-directional heatsink and fan.

- • Your Intel® LGA1156 heatsink and fan assembly comes in a push-pin design and requires no tool to install.

- • Use an LGA1156-compatible CPU heatsink and fan assembly only. The LGA1156 socket is incompatible with the LGA775 and LGA1366 sockets in size and dimension.

If you purchased a separate CPU heatsink and fan assembly, ensure that the Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.

Ensure that you have installed the motherboard to the chassis before you install the CPU fan and heatsink assembly.

To install the CPU heatsink and fan:

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

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.
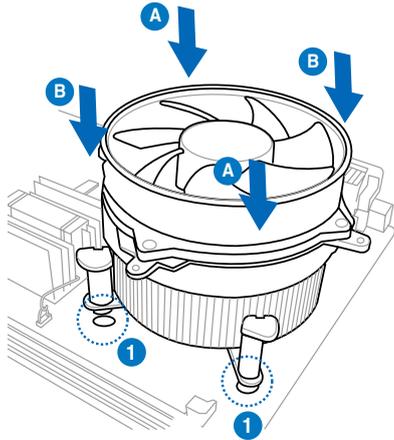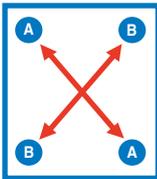
Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

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

P7F-C Series FAN connectors

A FRNT_FAN1

PWM Control
FAN Speed
FAN Power
GND

B REAR_FAN1

PWM Control
FAN Speed
FAN Power
GND

C CPU_FAN1

PWM Control
FAN Speed
FAN Power
GND

D FRNT_FAN2

PWM Control
FAN Speed
FAN Power
GND

E FRNT_FAN3

PWM Control
FAN Speed
FAN Power
GND
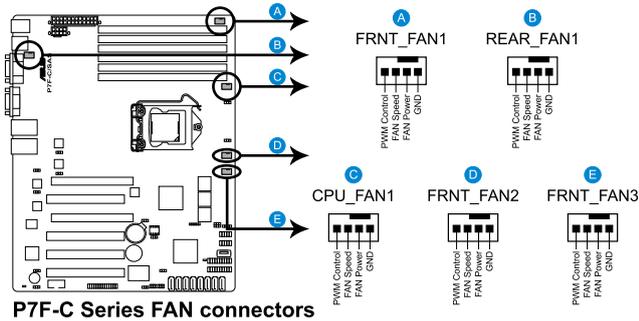
DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

2.3.3 Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

1. Disconnect the CPU fan cable from the connector on the motherboard.

2. Rotate each fastener counterclockwise.

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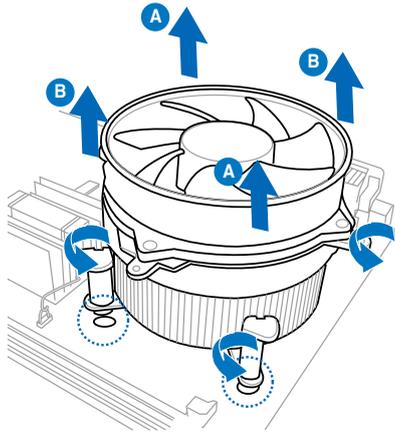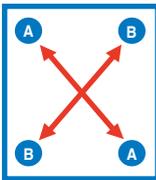
4. Carefully remove the heatsink and fan assembly from the motherboard.

2.3.4   Installing the CPU heatsink in rack

The Intel® 1156 processors require a specially designed heatsink to ensure optimum thermal condition and performance.

> • Ensure that you use qualified heatsink assembly only.
> • Ensure that you have applied the thermal interface material to the top of the CPU before installing the heatsink.

1.   Peel off the sticker on the heatsink metal plate and affix the plate to the back of the motherboard, matching the standoffs to the heatsink screw holes.

2.   Use a Phillips screwdriver to tighten the four heatsink screws in a diagonal sequence.
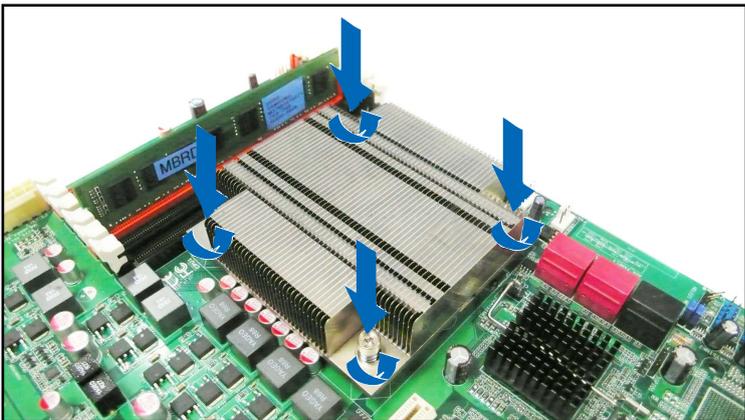
> Ensure that the heatsink is not skewed or tilted, otherwise the CPU will overheat.

2.4 System memory

2.4.1 Overview

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

A DDR3 module has the same physical dimensions as a DDR2 DIMM but is notched differently to prevent installation on a DDR2 DIMM socket. DDR3 modules are developed for better performance with less power consumption.

The figure illustrates the location of the DDR3 DIMM sockets:
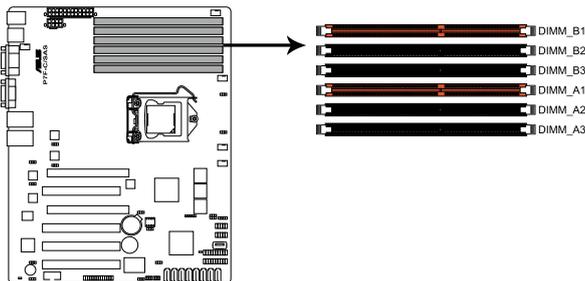
P7F-C Series 240-pin DDR3 DIMM sockets

2.4.2 Memory Configurations

You may install 1 GB, 2 GB, 4 GB, 8 GB Registerd, or 1 GB, 2 GB, 4 GB Unbuffered with ECC/Non-ECC DDR3 DIMMs into the DIMM sockets using the memory configurations in this section.

RDIMM*				
DIMM Slot Per Channel	DIMM Populated per Channel	DIMM Type	Speed	Rank per DIMM
3	1	Registered DDR3 ECC	1333	Single Rank, Dual Rank
3	1	Registered DDR3 ECC	1066	Quad Rank
3	2	Registered DDR3 ECC	1333	Single Rank, Dual Rank
3	2	Registered DDR3 ECC	800**	Quad Rank
3	3	Registered DDR3 ECC	800**	Single Rank, Dual Rank
UDIMM				
DIMM Slot Per Channel	DIMM Populated per Channel	DIMM Type	Speed	Rank per DIMM
2	1	Unbuffered DDR3	1333	Single Rank, Dual Rank
2	2	Unbuffered DDR3	1333	Single Rank, Dual Rank
*Support Low Voltage DIMMs; **Down from 1066 or 1333 MHz DIMM				

- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor. DO NOT combine RDIMM and UDIMM.

- The motherboard supports x8 DRAM Only and x4 & x16 DRAM are not supported

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. Press the retaining clips outward to unlock a DIMM socket.

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.

DDR3 DIMM notch

Unlocked retaining clip
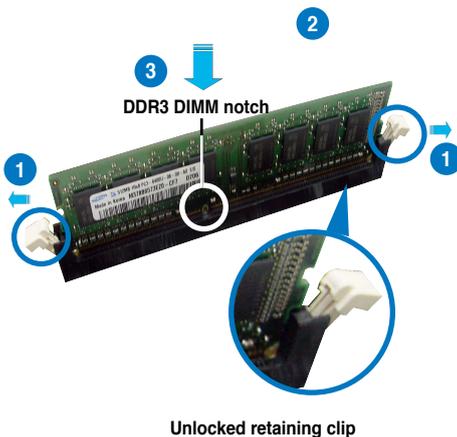
> ✎ • A DDR3 DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.
>
> • The DDR3 DIMM sockets do not support DDR and DDR2 DIMMs. DO NOT install DDR or DDR2 DIMMs to the DDR3 DIMM sockets.

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.

DDR3 DIMM notch
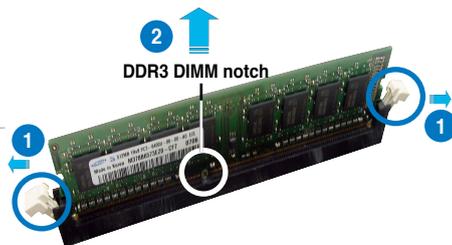
2. Remove the DIMM from the socket.

2.5 Expansion slots

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

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

2.5.1 Installing an expansion card

To install an expansion card:

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

2.5.2 Configuring an expansion card

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

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

✎ When using PCI cards on shared slots, ensure that the drivers support "Share IRQ" or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable.

2.5.3   Interrupt assignments

Standard Interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	--
6	14	Floppy Disk Controller
7*	15	--
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when used
10*	5	IRQ Holder for PCI Steering
11*	6	IRQ Holder for PCI Steering
12*	7	PS/2 Compatible Mouse Port
13	8	Numeric Data Processor
14*	9	Primary IDE Channel
15*	10	Secondary IDE Channel

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

2.5.4   PCI Express x16 slots (x8 link)

The onboard PCI Express x16 slots provide x8 link to CPU. These slots support VGA cards and various server class high performance add-on cards.

2.5.5   PCI slots

The PCI slot supports cards such as a LAN card, USB card, and other cards that comply with PCI 2.3 specifications.
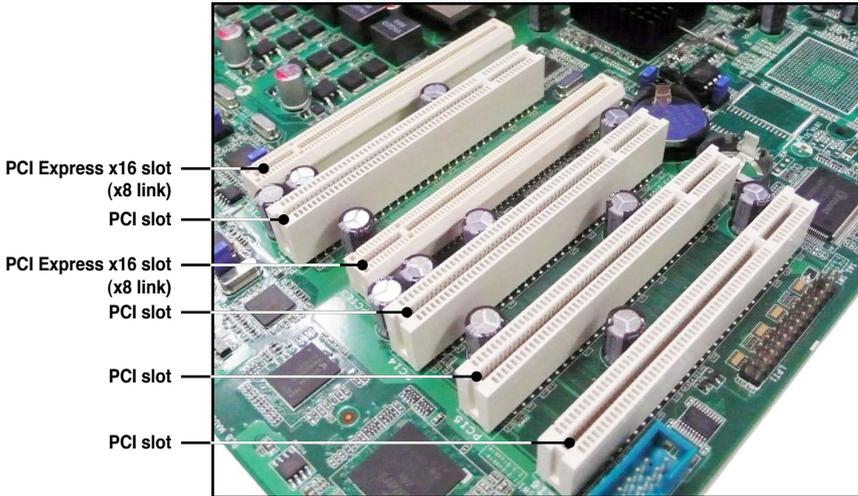
2.5.6   Installing i Button

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

1.   Locate the I Button slot on the motherboard.

2.   Snap the I Button in place.

2.5.7   Connect Thermal sensor cable

Follow the steps below to connect the thermal sensor cable to the connector on your motherboard.

1.   Locate the TR1 connector on the motherboard.
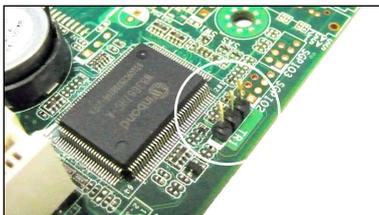
2.   Connect the thermal sensor cable to the connector.
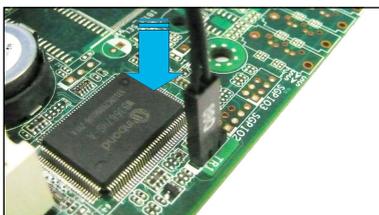
3.   Place the other end of the thermal sensor cable to the device you would like to monitor temperature.

2.6 Jumpers

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

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

    To erase the RTC RAM:

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

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

    > ✎ If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.
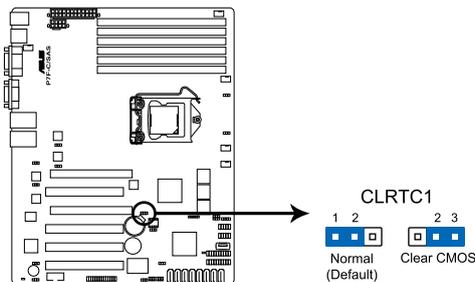
P7F-C Series Clear RTC RAM

2. VGA controller setting (3-pin VGA_SW1)

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

VGA_SW1

1 2   2 3

Enable   Disable
(Default)

P7F-C Series VGA setting
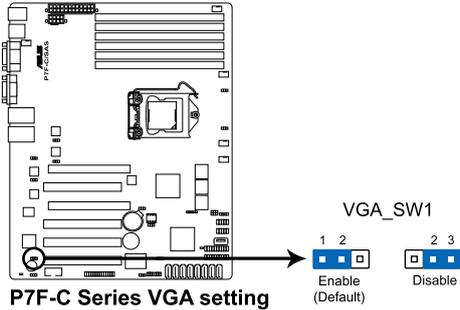
3. CPU Fan and Chassis Fan control setting (3-pin CPUFAN_SEL1, CHAFAN_SEL1)

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

Ⓐ CPUFAN_SEL1

1 2   2 3

4-pin FAN   3-pin FAN
(Default)

Ⓑ CHAFAN_SEL1

1 2   2 3

4-pin FAN   3-pin FAN
(Default)

P7F-C Series FAN setting
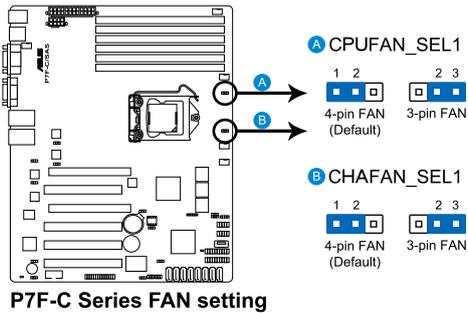
• If you use a 4-pin fan but set the jumper to pin 2-3, the fan you installed may not work.

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

4.   **LAN controller setting (3-pin LAN_SW1, LAN_SW2)
      (LAN_SW3, LAN_SW4 *P7F-C/4L model only*)**

      These jumpers allow you to enable or disable the onboard Marvell® 88E8056
      Gigabit LAN controllers. Set to pins 1–2 to activate the Gigabit LAN feature.

P7F-C Series LAN setting
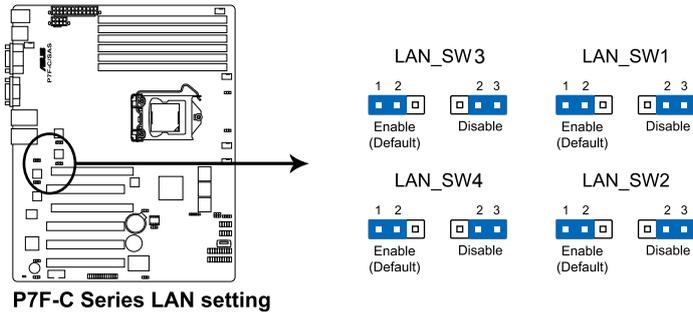
5.   **RAID configuration utility selection (3-pin RAID_SEL1)
      (*P7F-C/4L model only*)**

      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.

P7F-C Series RAID setting
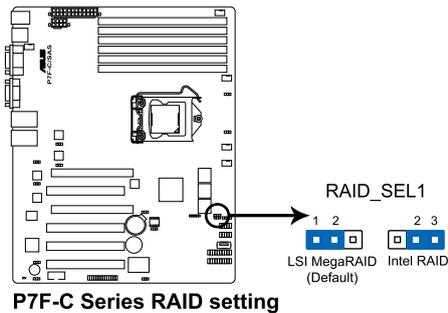
6.   **Onboard storage setting (3-pin SAS_SW1)** *(P7F-C/SAS model only)*

This jumper allows you to enable or disable the onboard LSI1068E SAS controller. Set the jumper to pins 1–2 to enable the SAS function (default).

SAS_SW1

1 2   2 3

Enable   Disable
(Default)
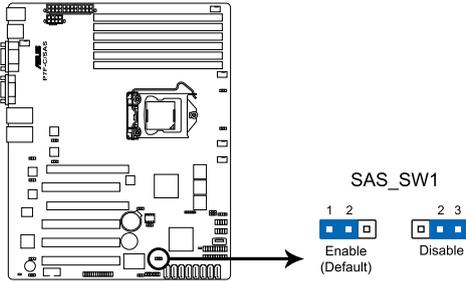
P7F-C Series SAS_SW setting

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

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

To update the BIOS:

1.   Set the jumper to pins 2–3.

2.   Insert the USB flash that contains the original or latest BIOS and turn on the system to recover or update the BIOS.

3.   Shut down the system.

4.   Set the jumper back to pins 1–2.

5.   Turn on the system.

RECOVERY1

1 2   2 3

Normal   BIOS Recovery
(Default)
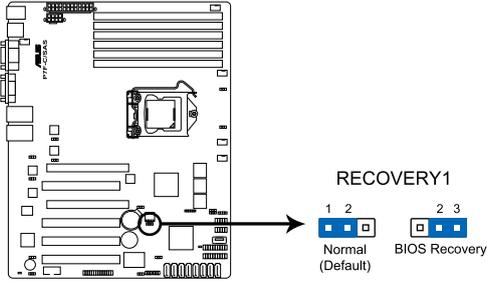
P7F-C Series BIOS recovery setting

2.7 Connectors

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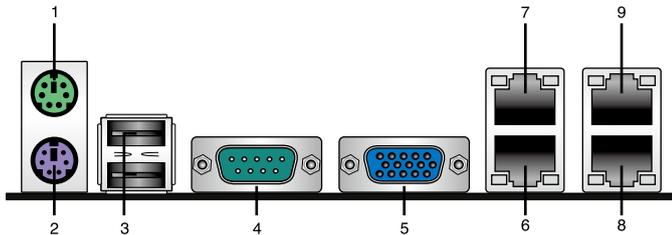
1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.

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

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

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

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

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

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

8. **LAN 3 (RJ-45) port.** *(P7F-C/4L model only)* This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

9. **LAN 4 (RJ-45) port.** *(P7F-C/4L model only)* This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

LAN port LED indications

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

ACT/LINK SPEED
LED   LED

LAN port
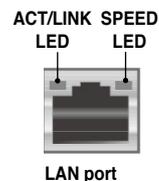
2.7.2   Internal connectors

**1.   Serial ATA connectors
(7-pin SATA1, SATA2, SATA3, SATA4; RED)
(7-pin SATA5, SATA6; Black)**

Supported by the Intel® 3420 chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 3Gb/s of data transfer rate.

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

P7F-C Series SATA connectors
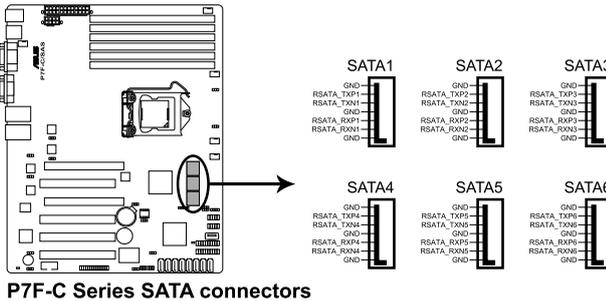
> •   The actual data transfer rate depends on the speed of Serial ATA hard disks installed.
>
> •   The SATA connectors do not support SATA cables with latch.

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

This LED connector is for the storage add-on card cable connected to the SATA or SAS add-on card. The read or write activities of any device connected to the SATA or SAS add-on card causes the front panel LED to light up.
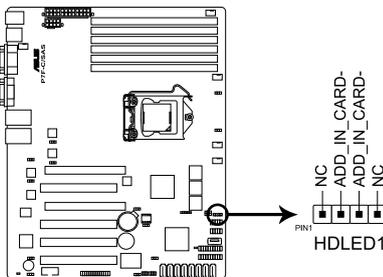
P7F-C Series Storage card activity LED connector

3. **SAS connectors**
   (7-pin SAS1, SAS2, SAS3, SAS4; Red)
   (7-pin SAS5, SAS6, SAS7, SAS8; Blue) *(P7F-C/SAS model only)*

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

   P7F-C Series SAS connectors
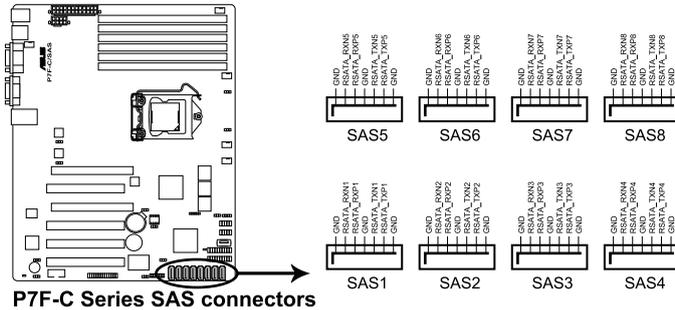
4. **USB connector (10-1 pin USB34, USB56; A-Type USB7)**

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

   P7F-C Series USB 2.0 connectors
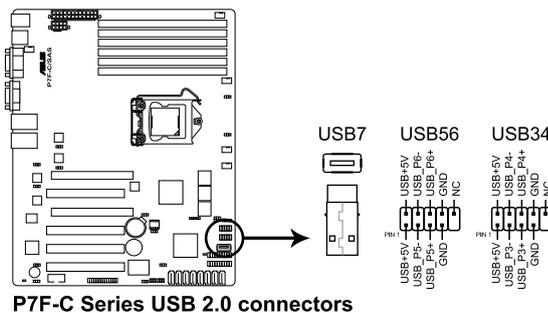
5.   Serial General Purpose Input/Output connector (6-1 pin SGPIO1)

This connector is used for the SGPIO peripherals for the LSI MegaRAID and Intel Matrix RAID SATA LED.
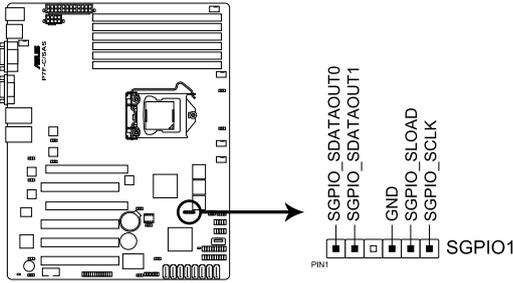
P7F-C Series SGPIO connector

6.   Serial General Purpose Input/Output connectors (8-1 pin SGPIO2/3)
(P7F-C/SAS model only)

These connector is used for the SAS chip SGPIO interface that controls the LED pattern generation, device information and general purpose data.
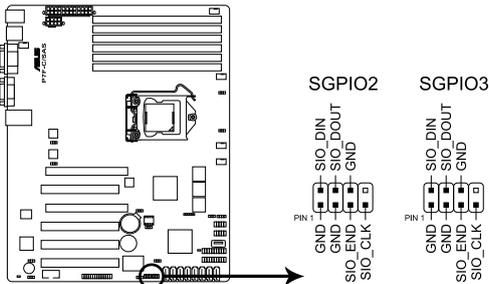
P7F-C Series SGPIO2/3 connectors

7. 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.

COM2

PIN 1
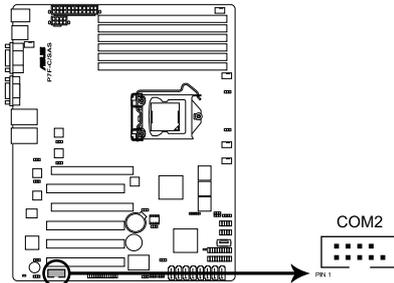
P7F-C Series Serial port connector

8. CPU, front and rear fan connectors (4-pin CPU_FAN1, FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, REAR_FAN1)

The fan connectors support cooling fans of 350 mA–740 mA (8.88 W max.) or a total of 1.75 A–3.7 A (44.4 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.

⚠

- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.

- These are not jumpers! DO NOT place jumper caps on the fan connectors!

- All fans feature the ASUS Fan Speed Control technology.

FRNT_FAN1   REAR_FAN1

PWM Control
FAN Speed
FAN Power
GND

CPU_FAN1   FRNT_FAN2   FRNT_FAN3

PWM Control
FAN Speed
FAN Power
GND
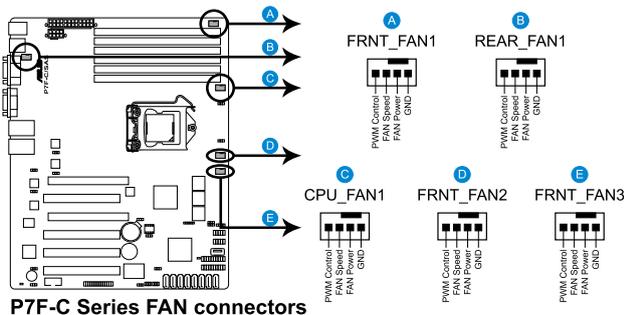
P7F-C Series FAN connectors

9.   **ATX power connectors**
     (24-pin EATXPWR1, 8-pin EATX12V1)

     These connectors are for an 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 24+8-pin power plugs; otherwise, the system will not boot up.

     •   Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.

     •   This motherboard supports ATX2.0 PSU or later version.

     •   Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system.
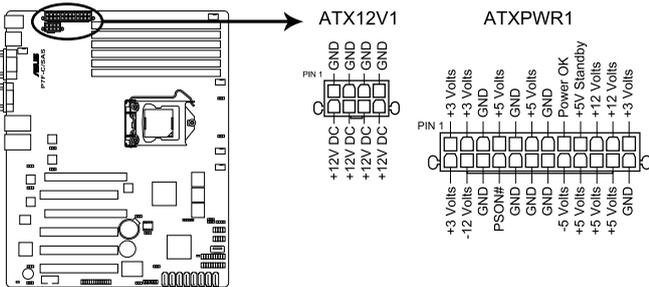
P7F-C Series ATX power connectors

10. Thermal sensor cable connectors (3-pin TR1)

This connector is for temperature monitoring. Connect the thermal sensor cable to this connector and place the other end to the device, which you want to monitor temperature.

P7F-C Series Thermal sensor cable connector

11. Parallel port connector (26-1 pin LPT1)

This connector is for a parallel port. Connect the parallel port module cable to this connector, then install the module to a slot opening at the back of the system chassis.

P7F-C Series Parallel port connector

12. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.

P7F-C Series System panel connector
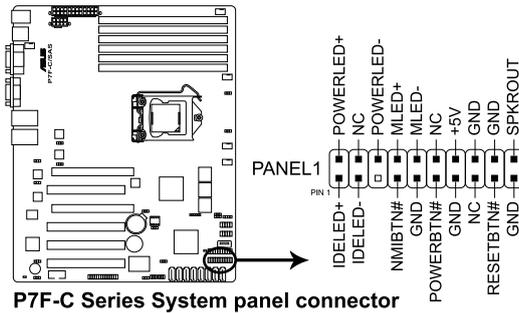
1. **System power LED (3-pin PLED)**
   This 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

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

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

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

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

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

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.
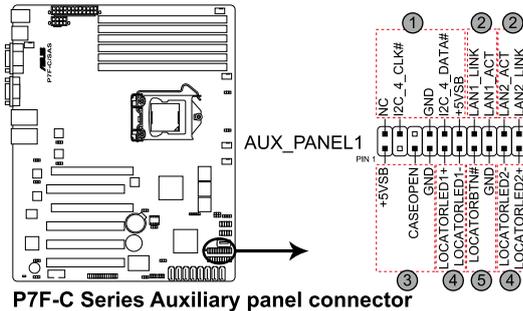
P7F-C Series Auxiliary panel connector

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

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

3. **Chassis intrusion (4-1 pin CHASSIS)**
   These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to these leads to record a chassis intrusion event. The default setting is short CASEOPEN and GND pin by jumper cap to disable the function.

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

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

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

Powering up 3

Chapter summary

3

3.1 Starting up for the first time

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

2. Be sure that all switches are off.

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

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

5. Turn on the devices in the following order:

    a. Monitor

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

    c. System power

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

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

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

3.2 Powering off the computer

3.2.1 Using the OS shut down function

If you are using Windows® 2003 Server:

1. Click the **Start** button then click **Shut Down**.

2. Select **Shut Down** from the **What do you want the computer to do?** list box.

3. Select **Shutdown Event Tracker**.

4. Ensure that the **Planned** check box is checked.

5. Select shutdown option from the list box.

6. If necessary, key in comments.

7. Click **OK**.

3.2.2 Using the dual function power switch

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

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

BIOS setup *4*

Chapter summary

4

4.1 Managing and updating your BIOS

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

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

Refer to the corresponding sections for details on these utilities.

> Save a copy of the original motherboard BIOS file to a bootable USB flash disk drive in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the BUPDATER utility.

4.1.1 ASUS EZ Flash 2 utility

The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use a DOS-based utility.

> Before you start using this utility, download the latest BIOS from the ASUS website at www.asus.com.

To update the BIOS using EZ Flash 2

1. Insert the USB flash disk that contains the latest BIOS file to the USB port.
2. Enter the BIOS setup program. Go to the **Tools** menu to select **EZ Flash 2** and press <Enter> to enable it.
    Or, press <Alt> + <F2> during the POST to enable EZ Flash 2.

```
            ASUSTek EZ Flash 2 BIOS ROM Utility V3.34
  FLASH TYPE: MXIC 25L1605A
  ┌──── Current ROM ────┐        ┌──── Update ROM ────┐
  │ BOARD: P7F-C Series │        │ BOARD: P7F C SAS   │
  │ VER: 0104           │        │ VER: 0201          │
  │ DATE: 10/23/2009    │        │ DATE: 11/13/2009   │
  └─────────────────────┘        └────────────────────┘
  PATH: A:\
  ┌─────────┐  ┌──────────────────────────────────────┐
  │ A:      │  │                                      │
  │         │  │                                      │
  │         │  │                                      │
  │         │  │                                      │
  │         │  │                                      │
  │         │  │                                      │
  └─────────┘  └──────────────────────────────────────┘
  ┌─ Note ────────────────────────────────────────────┐
  │  [Enter] Select or Load   [Tab] Switch   [V] Drive Info │
  │  [Up/Down/Home/End] Move  [B] Backup     [Esc] Exit    │
  └────────────────────────────────────────────────────┘
```
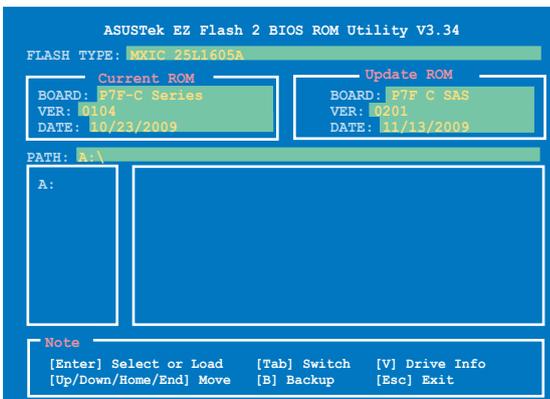
3. Press <Tab> to switch between drives until the correct BIOS file is found. When found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.

> • This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
>
> • DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

> Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. See section **4.9 Exit Menu** for details.

4.1.2   BUPDATER utility

> The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

The BUPDATER utility allows you to update the BIOS file in DOS environment using a bootable USB flash disk drive with the updated BIOS file.

Updating the BIOS file

To update the BIOS file using the BUPDATER utility:

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

2. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at support.asus.com to the bootable USB flash disk drive you created earlier.

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

    BUPDATER /i[filename].ROM

    where [filename] is the latest or the original BIOS file on the bootable USB flash disk drive, then press <Enter>.

```
A:\>BUPDATER /i[file name].ROM
```

4.   The utility verifies the file, then starts updating the BIOS file.
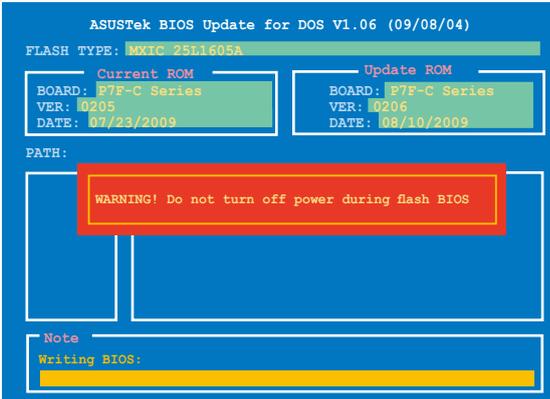
```
          ASUSTek BIOS Update for DOS V1.06 (09/08/04)
FLASH TYPE: MXIC 25L1605A
          Current ROM                    Update ROM
 BOARD: P7F-C Series            BOARD: P7F-C Series
 VER: 0205                      VER: 0206
 DATE: 07/23/2009               DATE: 08/10/2009

PATH:

          WARNING! Do not turn off power during flash BIOS

  Note
  Writing BIOS:
```

> 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.

```
The BIOS update is finished! Please restart your system.

C:\>
```
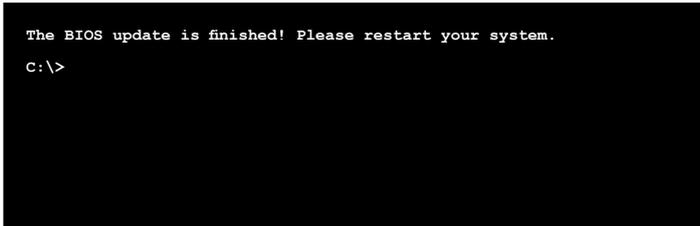
4.1.3   ASUS CrashFree BIOS 3 utility

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

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

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1.   Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.

2.   The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.

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

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

4.2   BIOS setup program

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

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

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

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

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

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

•   The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section **4.9 Exit Menu**.

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

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

4.2.1   BIOS menu screen

Menu items   Menu bar   Configuration fields   General help

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

   System Time                 [13:44:30]              Use [ENTER], [TAB]
   System Date                 [Wed, 11/25/2009]       or [SHIFT-TAB] to
                                                       select a field.

 ▶ SATA 1            :   [ST3160812AS]                 Use [+] or [-] to
 ▶ SATA 2            :   [Not Detected]                configure system Date.
 ▶ SATA 3            :   [Not Detected]
 ▶ SATA 4            :   [Not Detected]
 ▶ SATA 5            :   [Not Detected]
 ▶ SATA 6            :   [Not Detected]
                                                       ←→    Select Screen
                                                       ↑↓    Select Item
 ▶ Storage Configuration                               +-    Change Field
 ▶ System Information                                  Tab   Select Field
                                                       F1    General Help
                                                       F10   Save and Exit
                                                       ESC   Exit

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```

Sub-menu items   Navigation keys

4.2.2   Menu bar

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

Main   For changing the basic system configuration

Advanced   For changing the advanced system settings

Server   For changing the advanced server settings

Power   For changing the advanced power management (APM)
                   configuration

Boot   For changing the system boot configuration

Tools   For configuring options for special functions

Exit   For selecting the exit options and loading default
                   settings

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

4.2.3   Navigation keys

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

The navigation keys differ from one screen to another.

4.2.4   Menu items

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

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

Main menu items

4.2.5   Sub-menu items

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

4.2.6   Configuration fields

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

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

4.2.7   Pop-up window

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

4.2.8   Scroll bar

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

Pop-up window

Scroll bar

4.2.9   General help

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

4.3 Main menu

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

Refer to section **4.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.

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

   System Time                  [13:44:30]              Use [ENTER], [TAB]
   System Date                  [Wed, 11/25/2009]       or [SHIFT-TAB] to
                                                         select a field.

 ▶ SATA 1                   :   [ST3160812AS]            Use [+] or [-] to
 ▶ SATA 2                   :   [Not Detected]           configure system Date.
 ▶ SATA 3                   :   [Not Detected]
 ▶ SATA 4                   :   [Not Detected]
 ▶ SATA 5                   :   [Not Detected]
 ▶ SATA 6                   :   [Not Detected]
                                                         ←→   Select Screen
                                                         ↑↓   Select Item
 ▶ Storage Configuration                                 +-   Change Field
 ▶ System Information                                     Tab  Select Field
                                                         F1   General Help
                                                         F10  Save and Exit
                                                         ESC  Exit

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```

4.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

4.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

4.3.3   SATA1—6

While entering Setup, the BIOS automatically detects the presence of IDE/SATA devices. There is a separate submenu for each IDE/SATA device. Select a device item then press <Enter> to display the SATA device information.

```
                         BIOS SETUP UTILITY
   Main

   SATA1                                        Select the type
                                                of device connected
   Device    :Hard Disk                         to the system.
   Vendor    :xxxxxxxxx
   Size      :xx.xGB
   LBA Mode  :Supported
   Block Mode:16Sectors
   PIO Mode  :4
   Async DMA :MultiWord DMA-2
   Ultra DMA :Ultra DMA-6
   S.M.A.R.T.:Supported

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

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```

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

Type [Auto]

Allows you to select the type of device connected to the system.
Configuration options: [Not Installed] [Auto] [CDROM] [ARMD]

LBA/Large Mode [Auto]

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

Block (Multi-Sector Transfer) M [Auto]

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

PIO Mode [Auto]

Allows you to select the data transfer mode.
Configuration options: [Auto] [0] [1] [2] [3] [4]

DMA Mode [Auto]

Sets the DMA mode.
Configuration options: [Auto] [SWDMA0] [SWDMA1] [SWDMA2] [MWDMA0]
[MWDMA1] [MWDMA2] [UDMA0] [UDMA1] [UDMA2] [UDMA3] [UDMA4] [UDMA5]

SMART Monitoring [Auto]

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

32Bit Data Transfer [Enabled]

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

4.3.4   Storage Configuration

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

```
                            BIOS SETUP UTILITY
   Main

 Storage Configuration                                      Options

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




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

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```
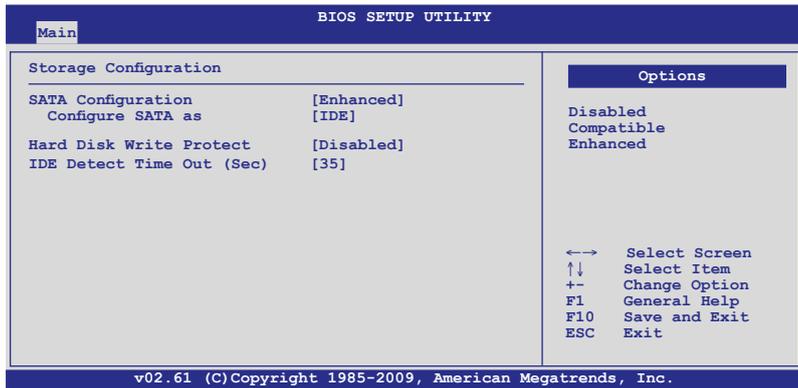
SATA Configuration [Enhanced]

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

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

- • If you want to use the Serial ATA hard disk drives as Parallel ATA physical
    storage devices, keep the default setting [IDE].

- • If you want the Serial ATA hard disk drives to use the Advanced Host
    Controller Interface (AHCI), set this item to [AHCI]. The AHCI allows
    the onboard storage driver to enable advanced Serial ATA features that
    increases storage performance on random workloads by allowing the drive
    to internally optimize the order of commands.

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

Hard Disk Write Protect [Disabled]

Disables or enables device write protection. This will be effective only if the device
is accessed through BIOS.
Configuration option: [Disabled] [Enabled]

IDE Detect Time Out (Sec) [35]

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

4.3.5   AHCI Configuration

This menu is the section for AHCI configuration. It appears only when you set the
item **Configure SATA as** from the sub-menu of **SATA Configuration** to [AHCI].

```
                              BIOS SETUP UTILITY
    Main

   AHCI Settings                                         Some SATA CD/DVD in
   _____     AHCI mode need to
                                                         wait ready longer.
   _____

  ▶ SATA Port1 [Not Detected]
  ▶ SATA Port2 [Not Detected]
  ▶ SATA Port3 [Not Detected]
  ▶ SATA Port4 [Not Detected]
  ▶ SATA Port5 [Not Detected]
  ▶ SATA Port6 [Not Detected]
```
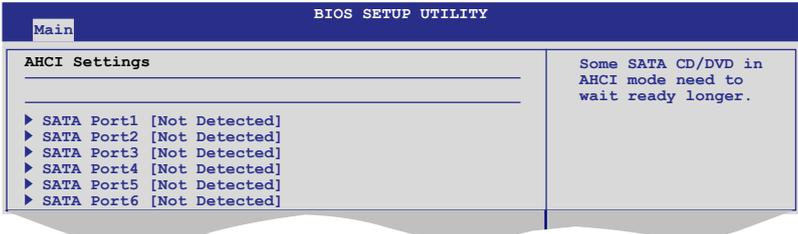
SATA Port1–6 [XXXX]

Displays the status of auto-detection of SATA devices.

```
                              BIOS SETUP UTILITY
    Main

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

   SATA Port1                    [Auto]
   SMART Monitoring              [Enabled]
```
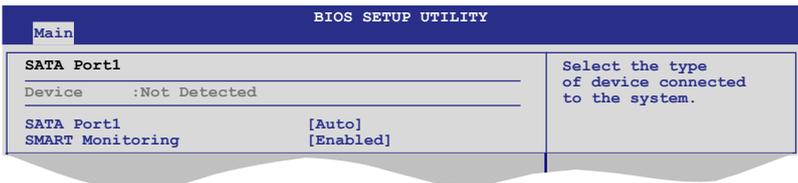
SATA Port1 [Auto]
Allows you to select the type of device connected to the system.
Configuration options: [Auto] [Not Installed]

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

4.3.6 System Information

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

```
                          BIOS SETUP UTILITY
    Main

    BIOS Information
    BIOS Version     :0201
    BIOS Build Date  :11/13/09

    Processor
    Type        :Intel(R) Xeon(R) CPU       X3440 @
                 2.53GHz
    Speed       :2533MHz

    System Memory
    Usable Size  : 2040MB
                                                ←→   Select Screen
                                                ↑↓   Select Item
    ▶ System Memory Information                 Enter Go to Sub Screen
                                                F1   General Help
                                                F10  Save and Exit
                                                ESC  Exit

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```
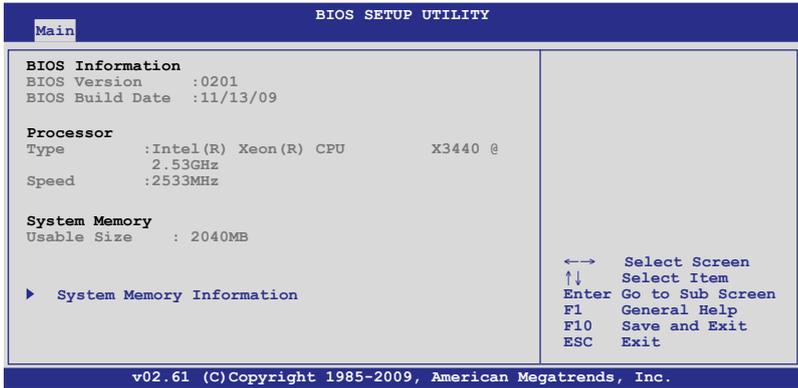
BIOS Information

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

Displays the auto-detected system memory.

System Memory Information

Displays system memory information.

```
                          BIOS SETUP UTILITY
    Main

    System Memory Information

    Speed    DDR3 1333


    DIMM_A1     20484 MB, 2R, 1333
    DIMM_A2        N/A
    DIMM_A3        N/A
    DIMM_B1        N/A
    DIMM_B2        N/A
    DIMM_B3        N/A
```
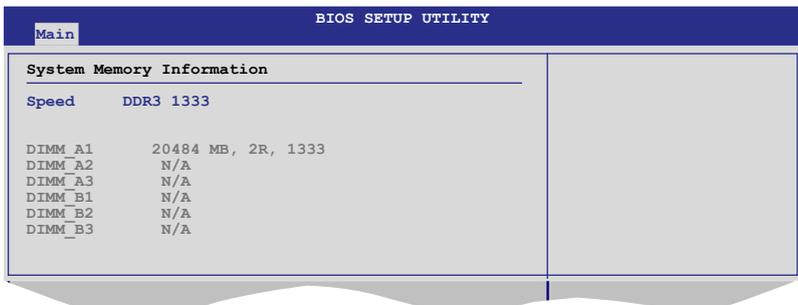
4.4   Advanced menu

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

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

```
                         BIOS SETUP UTILITY
   Main     Advanced     Server    Power     Boot     Tools     Exit
────────────────────────────────────────────────────────────────────────
                                                 Configure CPU.

  ▶  CPU Configuration
  ▶  Chipset
  ▶  Onboard Device Configuration
  ▶  USB Configuration
  ▶  PCIPnP
  ▶  ACPI Configuration
  ▶  Event Log Configuration

   Intel VT-d                    [Disabled]     ←→   Select Screen
   SR-IOV Supported              [Disabled]     ↑↓   Select Item
                                                Enter Go to Sub Screen
                                                F1   General Help
                                                F10  Save and Exit
                                                ESC  Exit

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

4.4.1   CPU Configuration

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

```
                         BIOS SETUP UTILITY
          Advanced
────────────────────────────────────────────────────────────────────────
  Configure advanced CPU settings
  Module Version:01.04                            This should be enabled
  ───────────────────────────────────            in order to enable or
  Manufacturer:Intel                              disable the "Enchanced
  Brand String:Intel(R) Xeon(R) CPU      X3440    Halt State".
  Frequency   :2.53GHz
  BCLK Speed  :133MHz
  Cache L1    :128 KB
  Cache L2    :1024 KB
  Cache L3    :8192 KB
  Ratio Status:Unlocked (Min:09, Max:21)
  Ratio Actual Value  :21
  CPUID       :20651

  C1E Support                   [Enabled]         ←→   Select Screen
  Hardware Prefetcher           [Enabled]         ↑↓   Select Item
  Adjacent Cache Line Prefetch  [Enabled]         +-   Change Option
  Max CPUID Value Limit         [Disabled]        F1   General Help
  Intel(R) Virtualization Tech  [Enabled]         F10  Save and Exit
  CPU TM Function               [Enabled]         ESC  Exit
────────────────────────────────────────────────────────────────────────
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```

Scroll down for more items.

```
                            BIOS SETUP UTILITY
      Advanced

  Execute-Disable Bit Capability [Enabled]          Sets the ratio between
  Intel(R) HT Technology         [Enabled]          CPU Core Clock and the
  Active Processor Cores         [All]              FSB Frequency.
  A20M                           [Disabled]         Note:If an invalid
  Intel(R) SpeedStep(TM) Tech    [Enabled]          ratio is set in CMOS
  Intel(R) TurboMode Tech        [Enabled]          then actual and
  Intel(R) C-STATE Tech          [Enabled]          setpoint values may
  C3 State                       [ACPI C2]          differ.
  C6 State                       [Enabled]
  C State package limit setting  [Auto]
  C1 Auto Demotion               [Enabled]
  C3 Auto Demotion               [Enabled]          ←—→   Select Screen
                                                    ↑↓    Select Item
                                                    +-    Change Option
                                                    F1    General Help
                                                    F10   Save and Exit
                                                    ESC   Exit

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```

C1E Support [Enabled]

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

Hardware Prefetcher [Enabled]

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

Adjacent Cache Line Prefetch [Enabled]

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

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

Intel(R) Virtualization Tech [Enabled]

The Intel® Virtualization Technology allows a hardware platform to run multiple
operating systems separately and simultaneously, enabling one system to virtually
function as several systems. Configuration options: [Disabled] [Enabled]

CPU TM Function [Enabled]

This function enables the overheated CPU to throttle the clock speed to cool down.
Configuration options: [Disabled] [Enabled]

Execute-Disable Bit Capability [Enabled]

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

Intel(R) HT Technology [Enabled]

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

Active Processor Cores [All]

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

A20M [Disabled]

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

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

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

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

Intel(R) C-STATE Tech [Enabled]

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

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

C3 State [ACPI C2]

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

C6 State [Enabled]

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

C State package limit setting [Auto]

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

C1 Auto Demotion [Enabled]

When this item is enabled, the CPU will conditionally demote C3/C6/C7 requests to C1 based on the uncore auto-demote information.
Configuration options: [Disabled] [Enabled]

C3 Auto Demotion [Enabled]

When this item is enabled, the CPU will conditionally demote C6/C7 requests to C3 based on the uncore auto-demote information.
Configuration options: [Disabled] [Enabled]

4.4.2   Chipset

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

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

  ►   Uncore Configuration


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

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```

Uncore Configuration

```
                          BIOS SETUP UTILITY
         Advanced
  Uncore Configuration                              ▲  ENABLE: Allow
  IMC : Lynnfield                                      remapping of
                                                       overlapped PCI memory
  Memory Remap Feature            [Enabled]            above the total
    PCI MMIO Allocation: 4GB To 3072MB                 physical memory.
  DRAM Frequency                  [Auto]
  Configure DRAM Timing by SPD    [Enabled]            DISABLE: Do not allow
  DRAM Margin Ranks               [Disabled]           remapping of memory.
  MRC Serial Debug Message Level  [Disabled]

  Memory ECC Function             [Enabled]
  Double Rate Refresh             [Auto]            ←→    Select Screen
  Page Policy                     [Closed]          ↑↓    Select Item
  Adaptive Page                   [Disabled]        +-    Change Option
  Data Scramble                   [Enabled]         F1    General Help
  Memory Thermal Throttling       [Disabled]     ▼  F10   Save and Exit
                                                    ESC   Exit

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```

Memory Remap Feature [Enabled]

Setting this item to [Enabled] allows you to remapp the overlapped PCI memory
above the total physical memory. Configuration options: [Disabled] [Enabled]

DRAM Frequency [Auto]

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

> Refer to the memory AVL on ASUS website at www.asus.com.

Configure DRAM Timing by SPD [Enabled]

Configuration options: [Enabled] [Disabled]

> The ofllowing 10 items appear when you set Configure DRAM Timing by SPD to [Disabled].

DRAM tCL [7]
Configuration options: [3]—[15]

DRAM tRAS [20]
Configuration options: [9]—[63]

DRAM tRP [7]
Configuration options: [3]—[15]

DRAM tRCD [7]
Configuration options: [3]—[15]

DRAM tWR [8]
Configuration options: [3]—[31]

DRAM tRFC [59]
Configuration options: [15]—[255]

DRAM tWTR [4]
Configuration options: [4]—[31]

DRAM tRRD [4]
Configuration options: [4]—[15]

DRAM tRTP [4]
Configuration options: [4]—[15]

DRAM tFAW [20]
Configuration options: [15]—[63]

DRAM Margin Ranks [Disabled]

Configuration options: [Enabled] [Disabled]

MRC Serial Debug Message Level [Disabled]

Configuration options: [Disabled] [Minimum] [Maximum] [Test]

Memory ECC Function [Enabled]

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

Double Rate Refresh [Auto]

Allows you to enable or disable Double Rate Refresh.
Configuration options: [Auto] [Disabled]

Page Poilcy [Closed]

Configuration options: [Closed] [Open]

Adaptive Page [Disabled]

Configuration options: [Disabled] [Enabled]

Data Scramble [Disabled]

Configuration options: [Disabled] [Enabled]

Memory Thermal Throttling [Disabled]

Setting this item to [CLTT] to Closed Loop Thermal Throttling and [OLTT] to Open Loop Thermal Throttling. Configuration options: [CLTT] [OLTT] [Disabled] [Auto]

4.4.3   Onboard Devices Configuration

The Onboard Devices Configuration menu items allow you to change the advanced settings for onboard devices.

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

```
                          BIOS SETUP UTILITY
        Advanced

  Onboard Devices Configuration                      ┌──────────────────────┐
                                                     │      Options          │
  OnBoard LAN1 Boot ROM       [PXE]                  │  Enabled              │
  OnBoard LAN2 Boot ROM       [PXE]                  │  Disabled             │
  OnBoard LAN3 Boot ROM       [PXE]
  OnBoard LAN4 Boot ROM       [PXE]
  LSI 1068E Boot ROM          [Enabled]
  Serial Port1 Address        [3F8/IRQ4]
  Serial Port2 Address        [2F8/IRQ3]
  Parellel Port Address       [378]
  Parellel Port Mode          [Normal]
  Interrupt 19 Capture        [Enabled]              ←→   Select Screen
                                                     ↑↓   Select Item
                                                     +-   Change Option
                                                     F1   General Help
                                                     F10  Save and Exit
                                                     ESC  Exit

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```

Onboard LAN1/2/3/4 Boot ROM [PXE]

Allows you to configure the onboard LAN1/2/3/4 boot mode.
Configuration: [Disabled] [PXE]

Onboard LAN3/4 Boot ROM are available only for **P7F-C/4L** model.

LSI 1068E Boot ROM [Enabled]
Allows you to configure the onboard LSI 1068E boot mode.
Configuration: [Enabled] [Disabled]

LSI 1068E Boot ROM is available only for **P7F-C/SAS** model.

Serial Port1 Address [3F8/IRQ4]

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

Serial Port2 Address [2F8/IRQ3]

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

Parallel Port Address [378]

Allows you to select the Parallel Port base address.
Configuration options: [Disabled] [378] [278] [3BC]

Parallel Port Mode [Normal]

Allows you to select the Parallel Port mode.
Configuration options: [Normal] [Bi-Directional] [ECP] [EPP] [ECP & EPP]

Interrupt 19 Capture [Enabled]

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

4.4.4 USB Configuration

```
                         BIOS SETUP UTILITY
     Advanced

   USB Configuration                               Options

   Module Version - 2.24.5-13.4
                                              Disabled
   USB Devices Enabled:                       Enabled
    2 Hubs

   USB Functions            [Enabled]
   Legacy USB Support       [Auto]
   BIOS EHCI Hand-off       [Enabled]


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

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```
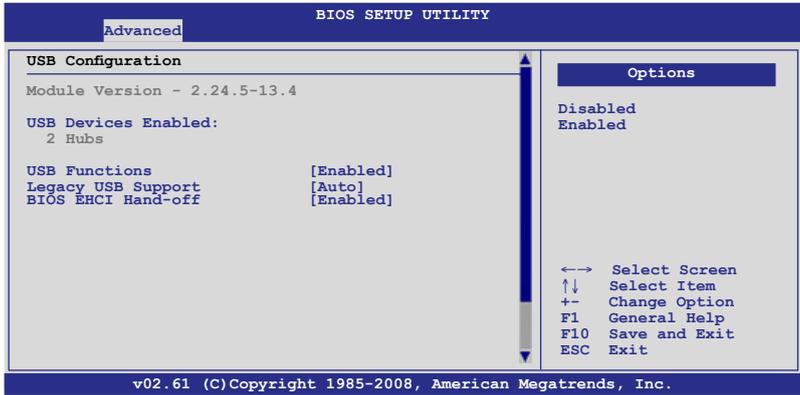
USB Functions [Enabled]

Allows you to enabled or disable the USB function.
Configuration options: [Disabled] [Enabled]

Legacy USB Support [Enabled]

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

BIOS EHCI Hand-Off [Enabled]

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

4.4.5   PCIPnP

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

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

```
                              BIOS SETUP UTILITY
        Advanced

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

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

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```

Plug And Play O/S [No]

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

PCI Option ROM Scan Order [Bus 0 First]

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

Onboard Option ROM Priority [Normal]

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

4.4.6 ACPI Configuration

```
                          BIOS SETUP UTILITY
         Advanced

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




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

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```

Advanced ACPI Configuration

```
                          BIOS SETUP UTILITY
         Advanced

  Advanced ACPI Configuration                          Include ACPI APIC
                                                       table pointer to RSDT
  ACPI APIC support            [Enabled]               pointer list.
  BIOS-->AML ACPI table        [Enabled]
  Headless mode                [Disabled]
```

ACPI APIC Support [Enabled]

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

BIOS-->AML ACPI table [Enabled]

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

Headless mode [Disabled]

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

Chipset ACPI Configuration

```
                              BIOS SETUP UTILITY
          Advanced

    South Bridge ACPI Configuration                         Options

    Energy Lake Feature          [Disabled]        Enabled
    APIC ACPI SCI IRQ            [Disabled]        Disabled
    High Performance Event Timer  [Enabled]
    HPET Memory Address          [FED00000h]
```

Energy Lake Feature [Disabled]

Allows you to enable or disable the Energy Lake feature.
Configuration options: [Enabled] [Disabled]

> We do not recommend you enable this feature.

APIC ACPI SCI IRQ [Disabled]

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

High Performance Event Timer [Enabled]

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

HPET Memory Address [FED00000h]

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

General WHEA Configuration

```
                              BIOS SETUP UTILITY
          Advanced

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

WHEA Support [Enabled]

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

4.4.7 Event Log Configuration

```
                              BIOS SETUP UTILITY
     Advanced

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

  View Event Log
  Mark all event as read
  Clear Event Log
```
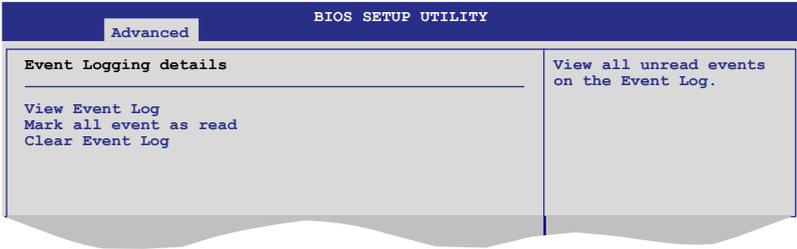
View Event Log
Press <Enter> to read all the unread event log.

Mark all events as read
Press <Enter> to mark all the events as read.

Clear Event Log
Press <Enter> to clear all events on the event log.

4.4.8 Intel VT-d Configuration [Disabled]

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

4.4.9 SR-IOV Supprted [Disabled]

Configuration options: [Disabled] [Enabled]

4.5   Server menu

```
                         BIOS SETUP UTILITY
   Main    Advanced    Server    Power    Boot    Tools    Exit
 ┌──────────────────────────────────────────────┬──────────────────────────┐
 │                                                │ Configure Remote         │
 │  ▶  Remote Access Configuration                │ Access.                  │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │                          │
 │                                                │ ←→   Select Screen       │
 │                                                │ ↑↓   Select Item         │
 │                                                │ +-   Change Option       │
 │                                                │ F1   General Help        │
 │                                                │ F10  Save and Exit       │
 │                                                │ ESC  Exit                │
 │                                                │                          │
 └──────────────────────────────────────────────┴──────────────────────────┘
        v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```
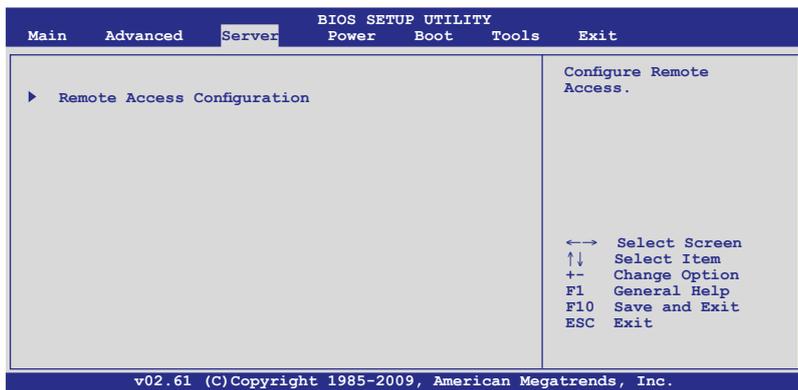
4.5.1   Remote Access Configuration

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

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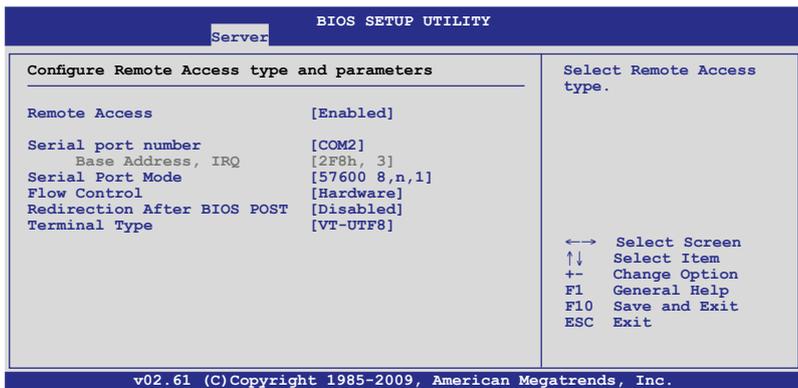
Remote Access [Enabled]

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

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

Serial port number [COM2]

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

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

Serial Port Mode [57600 8,n,1]

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

Flow Control [Hardware]

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

Redirection After BIOS POST [Disabled]

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

Terminal Type [VT-UTF8]

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

4.6 Power menu

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

 ►  APM Configuration                              Include ACPI APIC
 ►  Hardware Monitor                               table pointer to
                                                   RSDT pointer list.




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

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```

4.6.1 APM Configuration

```
                          BIOS SETUP UTILITY
                               Power

 APM Configuration                                <Enter> to select
                                                  whether or not to
 Restore on AC Power Loss      [Last State]       restart the system
 Power On By RTC Alarm         [Disabled]         after AC power loss.
 Power On By External Modems   [Disabled]
 Power On By PCI Devices       [Disabled]
 Power On By PCIE Devices      [Disabled]




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

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```

Restore on AC Power Loss [Last State]

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

Power On By RTC Alarm [Disabled]

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

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

RTC Alarm Date [15]

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

System Time [12:30:30]

Use the <ENTER>, <TAB> or <SHIFT-TAB> key to select a field. Use the <+> or <-> key to configure alarm time.

Power On By External Modems [Disabled]

[Disabled]   Disables to power up the computer when the external modem receives a call while the computer is in Soft-off mode.

[Enabled]   The computer could be powered up when the external modem receives a call while the computer is in Soft-off mode.

> 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.

Power On By PCI Devices [Disabled]

[Disabled]   Disables the PME to wake up from S5 by PCI devices.

[Enabled]   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.

Power On By PCIE Devices [Disabled]

Allows you to enable or disable the PCIE devices to generate a wake event.

[Disabled]   Disables the PCIE devices to generate a wake event.

[Enabled]   Enables the PCIE devices to generate a wake event.

4.6.2 Hardware Monitor

```
                        BIOS SETUP UTILITY
                          Power

   Hardware Monitor                                    CPU1 Temperature

   CPU Temperature(PECI)        [ 35°C/ 94°F]
   MB Temperature               [ 30°C/ 86°F]
   TR1 Temperature              [ N/A   ]
   CPU Fan1 Speed               [ 5357RPM]
   FRNT FAN1 Speed              [ N/A   ]
   FRNT FAN2 Speed              [ N/A   ]
   FRNT FAN3 Speed              [ N/A   ]
   REAR FAN1 Speed              [ N/A   ]
   FAN Speed Control            [Generic Mode]
   VCORE1                       [ 1.052 V]
   3.3V     Voltage             [ 3.246 V]
   5V       Voltage             [ 5.196 V]       ←→   Select Screen
   12V      Voltage             [12.000 V]       ↑↓   Select Item
   VBAT    Voltage              [ 3.126 V]       +-   Change Option
   3VSB     Voltage             [ 3.198 V]       F1   General Help
   1.5V ICH  Voltage            [ 1.504 V]       F10  Save and Exit
                                                 ESC  Exit

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```

CPU/MB/TR1 Temperature [xxxºC/xxxºF]

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

CPU Fan1; FRNT Fan1–3 Speed [xxxxRPM] or [Ignored] / [N/A]
REAR Fan1 Speed [xxxxRPM] or [Ignored] / [N/A]

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

Fan Speed Control [Generic Mode]

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

VCORE1, 3.3V Voltage, 5V Voltage, 12V Voltage, VBAT Voltage, 3VSB Voltage, 1.5V ICH Voltage

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

4.7   Boot menu

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

```
                         BIOS SETUP UTILITY
   Main     Advanced     Server     Power     Boot     Tools     Exit
  ┌──────────────────────────────────────────────┬──────────────────────────┐
  │  Boot Settings                                 │  Specifies the Boot       │
  │  ─────────────────────────────────            │  Device Priority          │
  │ ▶ Boot Device Priority                         │  sequence.                │
  │                                                │                           │
  │ ▶ Boot Settings Configuration                  │  A virtual floppy disk    │
  │ ▶ Security                                     │  drive (Floppy Drive B:   │
  │                                                │  ) may appear when you    │
  │                                                │  set the CD-ROM drive     │
  │                                                │  as the first boot        │
  │                                                │  device.                  │
  │                                                │                           │
  │                                                │  ←→    Select Screen      │
  │                                                │  ↑↓    Select Item        │
  │                                                │  Enter Go to Sub Screen   │
  │                                                │  F1    General Help       │
  │                                                │  F10   Save and Exit      │
  │                                                │  ESC   Exit               │
  └──────────────────────────────────────────────┴──────────────────────────┘
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```

4.7.1   Boot Device Priority

```
                         BIOS SETUP UTILITY
                              Boot
  ┌──────────────────────────────────────────────┬──────────────────────────┐
  │  Boot Device Priority                          │  Specifies the Boot       │
  │                                                │  Device Priority          │
  │  1st Boot Device        [Removable Dev.]       │  sequence.                │
  │  2nd Boot Device        [ATAPI CD-ROM]         │                           │
  │  3rd Boot Device        [Hard Drive]           │  A device enclosed        │
  │  4th Boot Device        [Network:B02 D00 Yu]   │  in parenthesis has       │
  │  5th Boot Device        [Network:B03 D00 Yu]   │  been disabled in the     │
  │  6th Boot Device        [Network:B04 D00 Yu]   │  corresponding type       │
  │  7th Boot Device        [Network:B05 D00 Yu]   │  menu.                    │
  │                                                │                           │
  │                                                │                           │
  │                                                │  ←→    Select Screen      │
  │                                                │  ↑↓    Select Item        │
  │                                                │  +-    Change Option      │
  │                                                │  F1    General Help       │
  │                                                │  F10   Save and Exit      │
  │                                                │  ESC   Exit               │
  └──────────────────────────────────────────────┴──────────────────────────┘
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```

1st—xxth Boot Device [XXXXXXX]

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

4.7.2   Hard Disk Drives; CDROM Drives

These two items appear only when you install more than two hard disk drives or optical drives to you system. These items allows you to specify the boot priority sequence of the hard disk drives or the optical drives.

4.7.3 Boot Settings Configuration

```
                          BIOS SETUP UTILITY
                              Boot

   Boot Settings Configuration                        Allows BIOS to skip
                                                      certain tests while
   Quick Boot                    [Enabled]            booting. This will
   Full Screen Logo              [Enabled]            decrease the time
   AddOn ROM Display Mode        [Force BIOS]         needed to boot the
   Bootup Num-Lock               [On]                 system.
   Wait For 'F1' If Error        [Enabled]
   Hit 'DEL' Message Display     [Enabled]



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

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```

Quick Boot [Enabled]

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

Full Screen Logo [Enabled]

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

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

AddOn ROM Display Mode [Force BIOS]

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

Bootup Num-Lock [On]

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

Wait For 'F1' If Error [Enabled]

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

Hit 'DEL' Message Display [Enabled]

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

4.7.4 Security

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

```
                        BIOS SETUP UTILITY
                                    Boot

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

    Change Supervisor Password
    Change User Password


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

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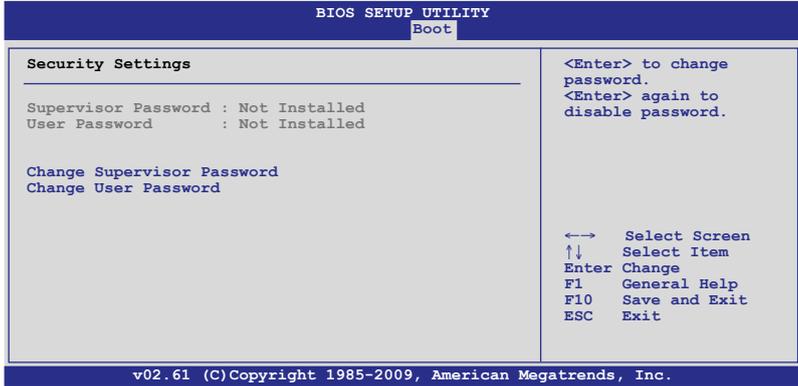
Change Supervisor Password

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

To set a Supervisor Password:

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

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

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

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

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

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

```
                        BIOS SETUP UTILITY
                              Boot

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

User Access Level [Full Access]

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

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

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

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

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

Password Check [Setup]

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

4.8 Tools menu

The Tools menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.

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

                                                Press ENTER to run
  ASUS EZ Flash 2                               the utility to select
                                                and update BIOS.
                                                This uitlity supports
                                                1. FAT 12/16/32 (r/w)
                                                2. NTFS (read only)
                                                3. CD-DISC (read only)




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

          v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```
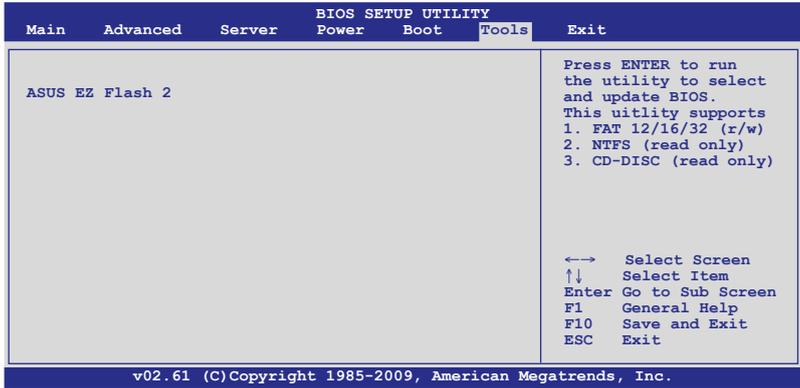
4.8.1 ASUS EZ Flash 2

Allows you to run ASUS EZ Flash 2. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice. Check section **4.1.1 ASUS EZ Flash 2 utility** for details.

4.9   Exit menu

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

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

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

  Load Setup Defaults



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

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

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

Exit & Save Changes

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

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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

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

RAID configuration

Chapter summary

5

5.1   Setting up RAID

The motherboard supports the following SATA RAID solutions:

•   **Intel Matrix Storage Manager** with RAID 0, RAID 1, RAID 10, and RAID 5 support (for Windows OS only).

•   **LSI1068E PCI-E SAS controller** *(P7F-C/SAS model only)* supports SAS disk drives and RAID0, RAID1, and RAID1E configuration.

•   **LSI MegaRAID software RAID Configuration Utility** *(P7F-C/4L model only)* with RAID 0, RAID 1, and RAID 10 support (for both Linux and Windows OS).

5.1.1   RAID definitions

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

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

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

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

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

•   Please refer to chapter 2 for how to select the RAID configuration utility. Move the jumper to choose between LSI MegaRAID and Intel® Matrix RAID.

5.1.2   Installing hard disk drives

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

To install the SATA hard disks for RAID configuration:

1.   Install the SATA hard disks into the drive bays following the instructions in the system user guide.
2.   Connect a SATA signal cable to the signal connector at the back of each drive and to the SATA connector on the motherboard.
3.   Connect a SATA power cable to the power connector on each drive.

5.1.3   Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set from SATA hard disk drives attached to the SATA connectors supported by Intel® 3420 chipset. To do this:

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

Refer to Chapter 4 for details on entering and navigating through the BIOS Setup.

5.1.4   RAID configuration utilities

Depending on the RAID connectors that you use, you can create a RAID set using the utilities embedded in each RAID controller. For example, use the **LSI Logic Embedded SATA RAID Setup Utility** or the **Intel® Matrix Storage Manager** if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the Intel® 3420 chipset.

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

5.2 Intel® Matrix Storage Manager Option ROM Utility

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

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

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

```
        Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 PCH-D wRAID5
            Copyright(C) 2003-09 Intel Corporation.  All Rights Reserved.

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

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

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




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

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

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

5.2.1   Creating a RAID set

To create a RAID set

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

```
       Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 PCH-D wRAID5
          Copyright(C) 2003-09 Intel Corporation.  All Rights Reserved.
   ═══════════════════════[ CREATE VOLUME MENU ]═══════════════════════

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

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



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




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

2.   Enter a name for the RAID set and press <Enter>.
3.   When the **RAID Level** item is selected, press the up/down arrow key to select
      a RAID level to create, and then press <Enter>.
4.   When the **Disks** item is selected, press <Enter> to select the hard disk drives
      you want to include in the RAID set. The **SELECT DISKS** screen appears.

```
   ═══════════════════════[ SELECT DISKS ]═══════════════════════
    Port Drive Model      Serial #        Size      Status
    0    ST3160812AS      9LS0HJA4       149.0GB    Non-RAID Disk
    1    ST3160812AS      9LS0F4HL       149.0GB    Non-RAID Disk
    2    ST3160812AS      3LS0JYL8       149.0GB    Non-RAID Disk
    3    ST3160812AS      9LS0BJ5H       149.0GB    Non-RAID Disk


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

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

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

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

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

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

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

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

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

5.2.2   Creating a Recovery set

To create a recovery set

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

```
     Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 PCH-D wRAID5
        Copyright(C) 2003-09 Intel Corporation.  All Rights Reserved.

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

                             =[ HELP ]=



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




        [↑↓]Change      [TAB]-Next    [ESC]-Previous Menu    [ENTER]-Select
```
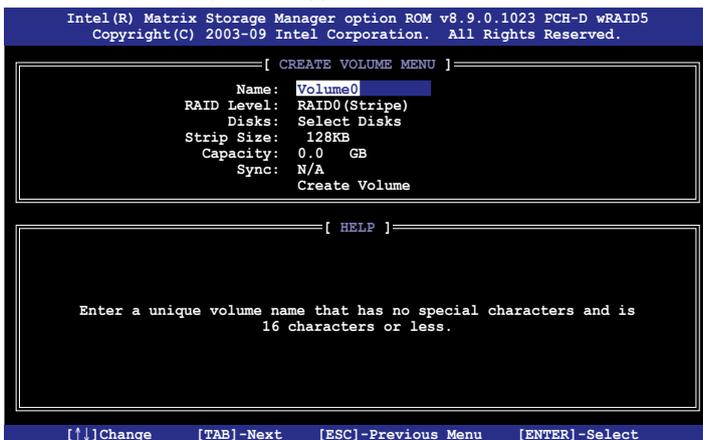
2.   Enter a name for the recovery set and press <Enter>.

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

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

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

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

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

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

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

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

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

5.2.3 Deleting a RAID set

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

To delete a RAID set

1.	From the utility main menu, select **2. Delete RAID Volume** and press <Enter>. The following screen appears.

```
        Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 PCH-D wRAID5
          Copyright(C) 2003-09 Intel Corporation.  All Rights Reserved.
        ══════════════════[ DELETE VOLUME MENU ]══════════════════
    Name        Level         Drives      Capacity     Status      Bootable
    Volume0     RAID0(Stripe)    2          298.0GB     Normal         Yes



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

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

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




        [↑↓]-Select          [ESC]-Previous Menu      [DEL]-Delete Volume
```
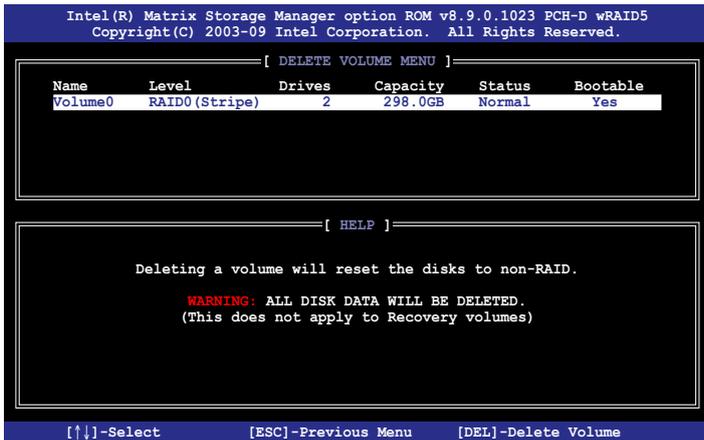
2.	Use the up/down arrow key to select the RAID set you want to delete, and then press <Del>. The following warning message appears.

```
            ═══════[ DELETE VOLUME VERIFICATION ]═══════

                    ALL DATA IN THE VOLUME WILL BE LOST!
                  (This does not apply to Recovery volumes)

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

3.	Press <Y> to delete the RAID set and return to the utility main menu, or press <N> to return to the **DELETE VOLUME** menu.

5.2.4 Resetting disks to Non-RAID

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

To reset a RAID set hard disk drive

1. From the utility main menu, select **3. Reset Disks to Non-RAID** and press <Enter>. The following screen appears.

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

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

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


              Select the disks that should be reset.

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

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

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

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

5.2.5 Recovery Volume Options

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

See section **5.3.2 Creating a Recovery set** to create a recovery set before continue.

To configure a recovery set

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

```
Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 PCH-D wRAID5
Copyright(C) 2003-09 Intel Corporation.  All Rights Reserved.

================[ RECOVERY VOLUME OPTIONS ]================
              1.   Enable Only Recovery Disk
              2.   Enable Only Master Disk




======================[ HELP ]======================

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




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

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

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



           Select a Recovery volume to do the operation.

           [↑↓]-Up/Down [SPACE]-Selects [ENTER]-Done
```
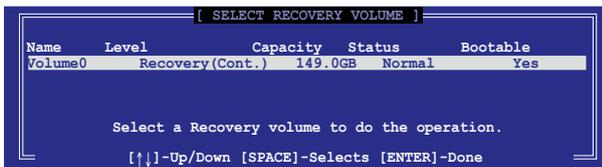
3. Use the up/down arrow key to select a drive, and then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection and return to the utility main menu.

5.2.6   Exiting the Intel® Matrix Storage Manager

To exit the utility

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

```
━━━━━━━━━━━━━━━[ CONFIRM EXIT ]━━━━━━━━━━━━━━━

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

```

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

5.2.7   Rebuilding the RAID

> This option is only for the RAID 1 set.

Rebuilding the RAID with other non-RAID disk

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

To rebuild the RAID with other non-RAID disk:

1.   At the prompt, press <Ctrl> + <I> to enter the Intel Matrix Storage Manager option ROM utility.

2.   If there is a non-RAID SATA Hard Disk available, the utility will prompt to rebuild the RAID. Press <Enter>, and then use up/down arrow keys to select the destination disk or press <ESC> to exit.

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

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




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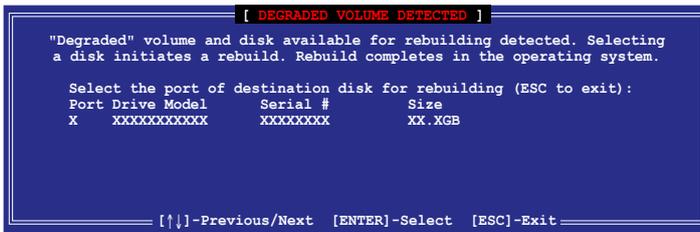
> Select a destination disk with the same size as the original hard disk.

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

```
  Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 PCH-D wRAID5
        Copyright(C) 2003-09 Intel Corporation.  All Rights Reserved.
 ═══════════════════════════[ MAIN MENU ]═══════════════════════════
          1. Create RAID Volume           3. Reset Disks to Non-RAID
          2. Delete RAID Volume           4. Recovery Volume Options
                              5. Exit

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


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



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

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

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

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

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

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

Rebuilding the RAID with a new hard disk

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

To rebuild the RAID with a new hard disk:

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

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

2. Reboot the system and then follow the steps in section **Rebuilding the RAID with other non-RAID disk** on page 5-32.

5.2.8   Setting the Boot array in the BIOS Setup Utility

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

To set the boot array in the BIOS:

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

1.   Reboot the system and press <Del> to enter the BIOS setup utility during POST.

2.   Go to the **Boot** menu and select the option **Boot Device Priority**.

3.   Use up/down arrow keys to select the boot priority and press <Enter>. See section **4.7.1 Boot Device Priority** for details.

4.   From the **Exit** menu, select **Exit & Save Changes**, then press <Enter>.

5.   When the confirmation window appears, select **OK**, then press <Enter>.

5.3   LSI Logic MPT Setup Utility
(P7F-C/SAS model only)

The LSI Logic MPT Setup Utility is an integrated RAID solution that allows you to allows you to create the following RAID set(s) from SAS hard disk drives supported by the LSI1068E SAS controller:

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

5.3.1   Integrated Mirroring

Overview

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

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

Creating Integrated Mirroring volumes

- You may use disks of different sized in IM and IME volumes; however, the size of the smallest disk determines the "logical" size of each member disk.
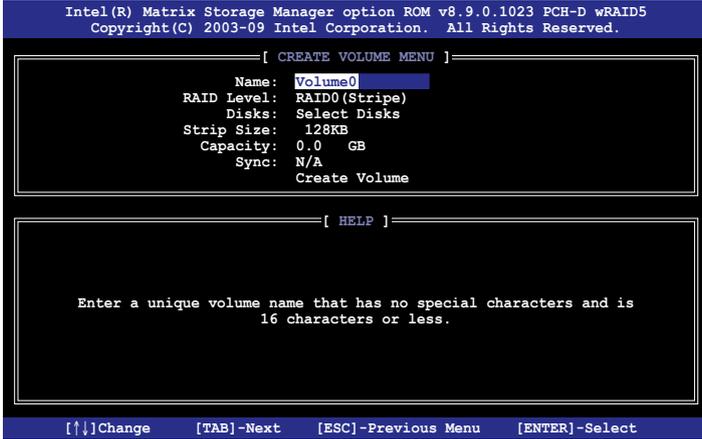
- DO NOT combine Serial ATA and SAS disk drives in one volume.

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

To create an IM volume:

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

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

```
LSI Logic Corp. MPT SAS BIOS
MPTBIOS-6.16.00.00 (2007.05.07)
Copyright 2000-2007 LSI Logic Corp.

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

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

```
LSI Logic Config Utility              v6.16.00.00 (2007.05.07)
Adapter List  Global Properties

Adapter      PCI   PCI   PCI   PCI   FW Revision        Status      Boot
             BUS   Dev   Fnc   Slot                                 Order
SAS1068E     04    03    00    00    1.22.01.00-IR      Enabled     0










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

The numbers of the channel depend on the controller.

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

```
LSI Logic Config Utility              v6.16.00.00 (2007.05.07)
Adapter Properties -- SAS1068E

        Adapter                       SAS1068E
        PCI Slot                      00
        PCI Address(Bus/Dev/Func)     04:00:00
        MPT Firmware Revision         1.22.01.00-IR
        SAS Address                   500E0101:23456712
        NVDATA Version                2B.00
        Status                        Enabled
        Boot Order                    0
        Boot Support                  (Enabled BIOS & OS)

        RAID Properties

        SAS Topology

        Advanced Adapter Properties

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

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

```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Select New Array Type -- SAS1068E

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

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

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

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

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

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

```
  LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
  Create New Array -- SAS1068E

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




Esc = Exit Menu   F1/Shift+1 = Help
SPACE/+/- = Select disk for array or hot spare   C = Create array
```
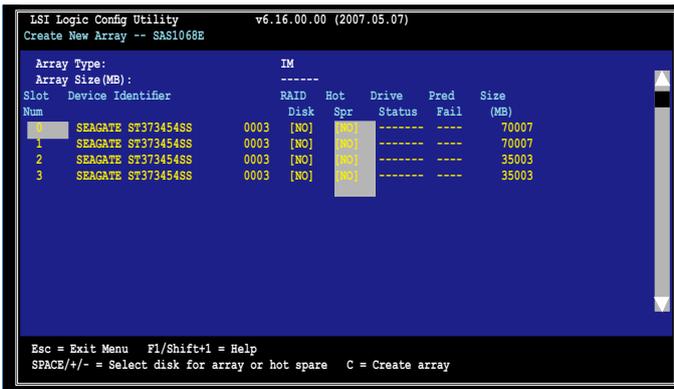
> By default, the RAID Disk field shows No before array creation. This field is
> grayed out under the following conditions:
>
> • The disk does not meet the minimum requirements for use in a RAID array.
>
> • The disk is not large enough to mirror existing data on the primary drive.
>
> • The disk has been selected as the Hot Spare for the RAID array.
>
> • The disk is already part of another array.

7.   A confirmation screen appears.

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

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

```
LSI Logic Config Utility              v6.16.00.00 (2007.05.07)
Create New Array Type -- SAS1068E


      M  - Keep existing data, migrate to an IM array.
           Synchronization of disk will occur.
      D  - Overwrite existing data, create a new IM array.
           ALL DATA on ALL disk in the array will be DELETED!!
           No Synchronization performed.







Esc = Exit Menu      F1/Shift+1 = Help
Space/+/- = Select disk for array or hot spare   C = Create array
```
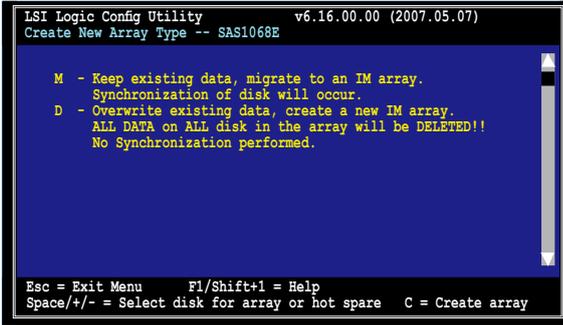
8.   Repeat steps 5 and 6 to add the second disk to the volume.

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

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

10.   The utility creates the array.
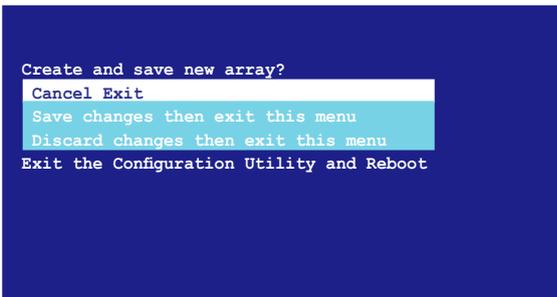
```
 LSI Logic Config Utility              v6.16.00.00 (2007.05.07)

 Processing...may take up 1 minute
 Creating RAID array
```
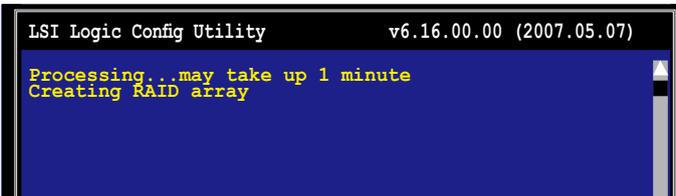
5.3.2 Integrated Mirroring Enhanced

To create an IME volume:

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

```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Adapter Properties -- SAS1068E

        Adapter                       SAS1068E
        PCI Slot                      00
        PCI Address(Bus/Dev/Func)     04:00:00
        MPT Firmware Revision         1.22.01.00-IR
        SAS Address                   500E0101:23456712
        NVDATA Version                2B.00
        Status                        Enabled
        Boot Order                    0
        Boot Support                  [Enabled BIOS & OS]

        RAID Properties

        SAS Topology

        Advanced Adapter Properties


Esc = Exit Menu      F1/Shift+1 = Help
Enter = Select Item  -/+ = Change Item
```
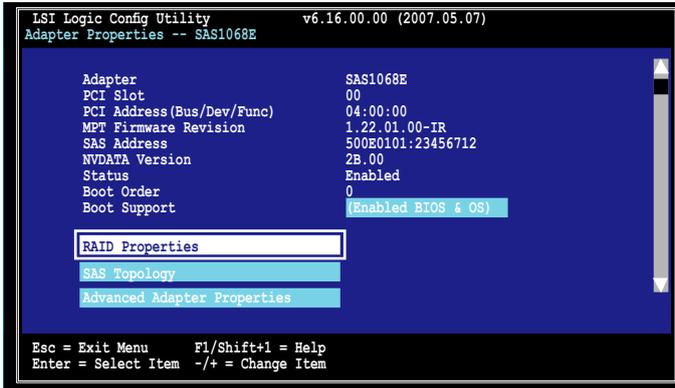
2. The **Select New Array Type** screen appears.
    Use the arrow keys to select **Create IME Volume**, then press <Enter>.

```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Select New Array Type -- SAS1068E

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

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

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


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

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 ten disks, or seven mirrored disks plus two hot spare disks. Use the arrow key to select a disk, then move the cursor to the RAID Disk column. To include this disk in the array, press <+>, <->, or <Space>.

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

```
 LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
 Create New Array -- SAS1068E

   Array Type:                       IME
   Array Size(MB):                   51498
 Slot   Device Identifier            RAID   Hot   Drive     Pred   Size
 Num                                 Disk   Spr   Status    Fail   (MB)
   0    SEAGATE ST373454SS     0003   [Yes]  [NO]  -------   ----      70007
   1    SEAGATE ST373454SS     0003   [NO]   [NO]  -------   ----      70007
   2    SEAGATE ST373454SS     0003   [Yes]  [NO]  -------   ----      35003
   3    SEAGATE ST373454SS     0003   [Yes]  [NO]  -------   ----      35003




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

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

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

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

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

• The disk is already part of another array.

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.

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

6. The utility creates the array.

```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)

Processing...may take up 1 minute
Creating RAID array
```

5.3.3 Integrated Striping (IS) volume

Overview

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

Creating Integrated Striping volumes

DO NOT combine Serial ATA and SAS disk drives in one volume.

To create an IS volume:

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

```
LSI Logic Corp. MPT SAS BIOS
MPTBIOS-6.16.00.00 (2007.05.07)
Copyright 2000-2007 LSI Logic Corp.

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

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

```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Adapter Properties -- SAS1068E

        Adapter                        SAS1068E
        PCI Slot                       00
        PCI Address(Bus/Dev/Func)      04:00:00
        MPT Firmware Revision          1.22.01.00-IR
        SAS Address                    500E0101:23456712
        NVDATA Version                 2B.00
        Status                         Enabled
        Boot Order                     0
        Boot Support                   (Enabled BIOS & OS)


        RAID Properties

        SAS Topology

        Advanced Adapter Properties

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

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

```
 LSI Logic Config Utility           v6.16.00.00 (2007.05.07)
 Select New Array Type -- SAS1068E


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


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


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


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

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

```
 LSI Logic Config Utility           v6.16.00.00 (2007.05.07)
 Create New Array -- SAS1068E

   Array Type:                     IS
   Array Size(MB):                 102996
 Slot   Device Identifier          RAID   Hot   Drive     Pred   Size
 Num                               Disk   Spr   Status    Fail   (MB)
    0    SEAGATE ST373454SS   0003  [Yes]  [NO]  -------   ----    70007
    1    SEAGATE ST373454SS   0003  [NO]   [NO]  -------   ----    70007
    2    SEAGATE ST373454SS   0003  [Yes]  [NO]  -------   ----    35003
    3    SEAGATE ST373454SS   0003  [Yes]  [NO]  -------   ----    35003




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

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

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

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

- The disk has been selected as the Hot Spare for the RAID array.
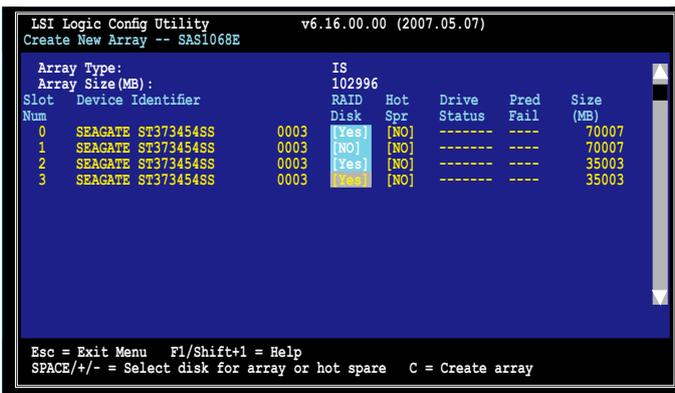
- The disk is already part of another array.

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

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

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

9.   The utility creates the array.
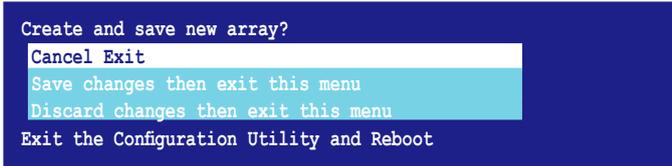
```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)

Processing...may take up 1 minute
Creating RAID array
```
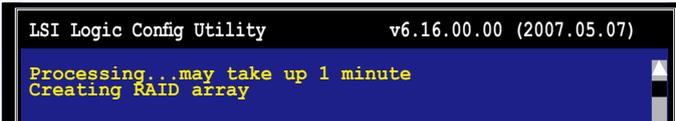
5.3.4   Managing Arrays

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**.

```
LSI Logic Config Utility           v6.16.00.00 (2007.05.07)
Adapter Properties -- SAS1068E

         Adapter                     SAS1068E
         PCI Slot                    00
         PCI Address(Bus/Dev/Func)   04:00:00
         MPT Firmware Revision       1.22.01.00-IR
         SAS Address                 500E0101:23456712
         NVDATA Version              2B.00
         Status                      Enabled
         Boot Order                  0
         Boot Support                (Enabled BIOS & OS)
         RAID Properties
         SAS Topology

         Advanced Adapter Properties


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

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

```
LSI Logic Config Utility           v6.16.00.00 (2007.05.07)
Select New Array Type -- SAS1068E

     View Existing Array        View the existing configuration.

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

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

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


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

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              v6.16.00.00 (2007.05.07)
View Array -- SAS1068E

      Array                   1 of 1
      Identifier              LSILOGICLogical Volume  3000
      Type                    IME
      Scan Order              0
      Size(MB)                51498
      Status                  Optimal


   Manage Array

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


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

Managing hot spares

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

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

To create a hot spare:

1. Follow steps 1—3 of the section **Viewing volume properties**.

2. From the **View Array** screen, select **Manage Array**, then press <Enter>.

```
 LSI Logic Config Utility              v6.16.00.00 (2007.05.07)
View Array -- SAS1068E

        Array                  1 of 1
        Identifier             LSILOGICLogical Volume  3000
        Type                   IME
        Scan Order             0
        Size(MB)               51498
        Status                 Optimal


     Manage Array

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


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

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

```
 LSI Logic Config Utility              v6.16.00.00 (2007.05.07)
Manage Array -- SAS1068E

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

     Manage Hot Spare

     Synnchronize Array

     Activate Array

     Delete Array


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

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

Press <C> to commit the changes.

```
 LSI Logic Config Utility               v6.16.00.00 (2007.05.07)
 Manage Hot Spare -- SAS1068E

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

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




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

Synchronizing the array

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

To synchronize the array:

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

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

```
 LSI Logic Config Utility               v6.16.00.00 (2007.05.07)
 Manage Array -- SAS1068E

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


      Manage Hot Spare

      Synnchronize Array

      Activate Array

      Delete Array


 Esc = Exit Menu          F1/Shift+1 = Help
 Enter = Select Item
```
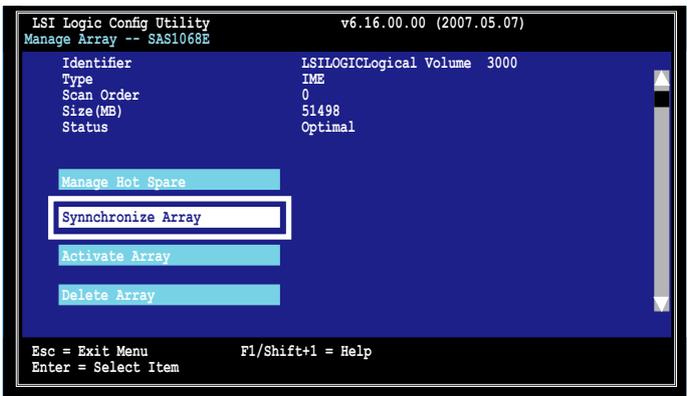
3.   Press <Y> to begin the synchronization, or <N> to cancel.

Activating an array

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

To activate the array:

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

```
  LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
  Manage Array -- SAS1068E
        Identifier            LSILOGICLogical Volume  3000
        Type                  IME
        Scan Order            0
        Size(MB)              51498
        Status                Optimal

        Manage Hot Spare

        Synnchronize Array

        Activate Array

        Delete Array


  Esc = Exit Menu        F1/Shift+1 = Help
  Enter = Select Item
```
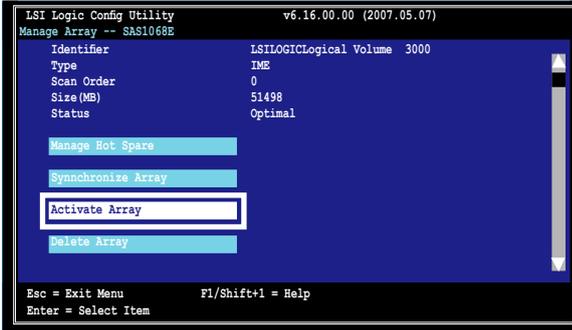
2. Press <Y> to activate, or <N> to cancel.

Deleting an array

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

To delete an array:

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

```
  LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
  Manage Array -- SAS1068E
        Identifier            LSILOGICLogical Volume  3000
        Type                  IM
        Scan Order            0
        Size(MB)              34332
        Status                Optimal

        Manage Hot Spare

        Synnchronize Array

        Activate Array

        Delete Array


  Esc = Exit Menu        F1/Shift+1 = Help
  Enter = Select Item
```
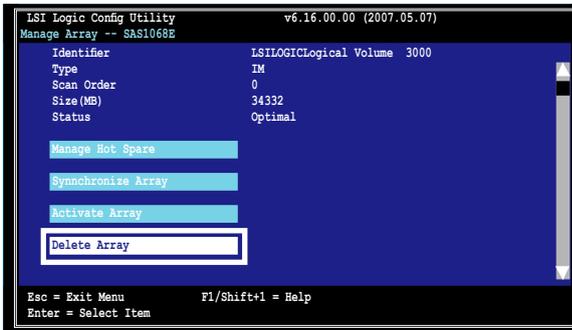
2. Press <Y> to delete, or <N> to cancel.

5.3.5   Viewing SAS topology

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

```
 LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
 Adapter Properties -- SAS1068E

        Adapter                   SAS1068E
        PCI Slot                  00
        PCI Address(Bus/Dev/Func) 04:00:00
        MPT Firmware Revision     1.22.01.00-IR
        SAS Address               500E0101:23456712
        NVDATA Version            2B.00
        Status                    Enabled
        Boot Order                0
        Boot Support              (Enabled BIOS & OS)
        RAID Properties
        SAS Topology
        Advanced Adapter Properties


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

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

```
 More keys for the SAS Topology display:

 C = Clear Device Mappings for Non-Present Devices
 R = Refresh SAS Topology
 Enter = On a SAS Enclosure or Expander - Expand or Collapse Item
 Enter = On a Disk Drive - Turn on the Locate LED (next key press turns off)
```
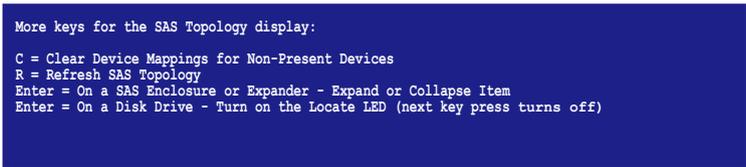
2.   Information about the volume and its member-disks are then displayed.

```
 LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
 SAS Topology -- SAS1068E

                    Device Identifier              Device
 SAS1068E(04:00:00)                                Info
  └ Controller      Direct Attach Devices          Controller
  └ IM VOL          LSILOGICLogical Volume 3000









 Esc=Exit   F1=Help
 Alt+D=Device Properties    Alt+N=More Keys
```
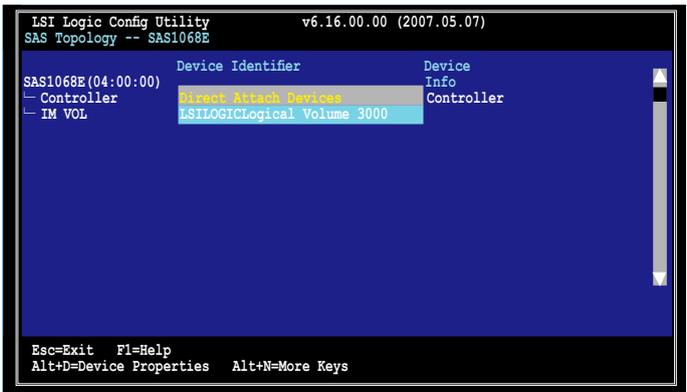
5.3.6   Global Properties

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

```
 LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
 Adapter List  Global Properties

 Adapter     PCI    PCI   PCI   PCI   FW Revision       Status      Boot
             BUS    Dev   Fnc   Slot                                Order
 SAS1068E    04     03    00    00    1.22.01.00-IR     Enabled     0
```

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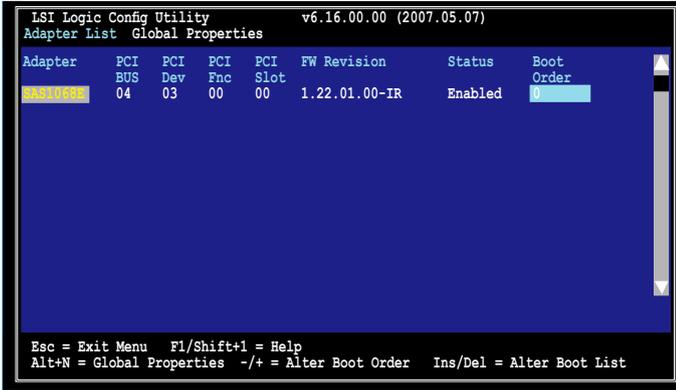
Pause When Boot Alert Displayed

Sets whether to pause or not when the boot alert displays.
Configuration options: [Yes] [No]

```
 LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
 Adapter List  Global Properties


    Pause When Boot Alert Displayed    [No]
    Boot Information Display Mode       [Display adapters & installed devices]
    Support Interrupt                   [Hook interrupt, the Default]

    Restore Defaults




 Esc = Exit Menu        F1/Shift+1 = Help
 Alt+N = Adapter List  -/+ = Change Item
```
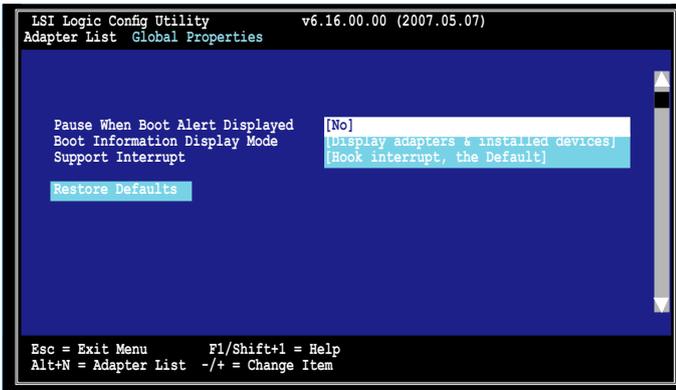
Boot Information Display Mode

Sets the disk information display mode.
Configuration options: [Display adapters & installed devices]
[Display adapters only] [Display adapters and all devices]
 [Display minimal information]

```
┌────────────────────────────────────────────────────────────────────┐
│ LSI Logic Config Utility            v6.16.00.00 (2007.05.07)         │
│ Adapter List  Global Properties                                      │
│                                                                   ▲  │
│                                                                   █  │
│     Pause When Boot Alert Displayed     [No]                         │
│     Boot Information Display Mode        [Display adapters & installed devices] │
│     Support Interrupt                    [Hook interrupt, the Default]│
│    Restore Defaults                                                  │
│                                                                      │
│                                                                      │
│                                                                      │
│                                                                   ▼  │
│ Esc = Exit Menu        F1/Shift+1 = Help                             │
│ Alt+N = Adapter List  -/+ = Change Item                              │
└────────────────────────────────────────────────────────────────────┘
```
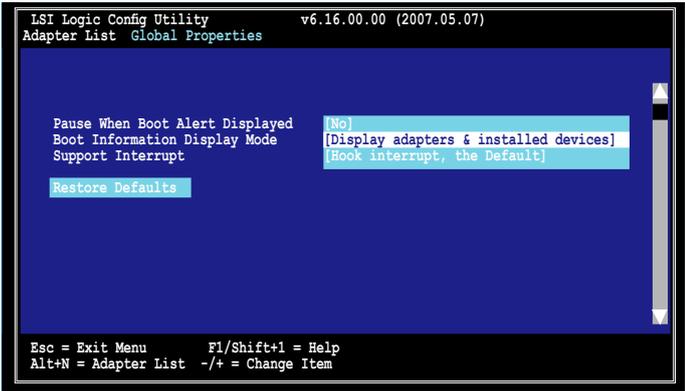
Support Interrupt

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

```
┌────────────────────────────────────────────────────────────────────┐
│ LSI Logic Config Utility            v6.16.00.00 (2007.05.07)         │
│ Adapter List  Global Properties                                      │
│                                                                   ▲  │
│                                                                   █  │
│     Pause When Boot Alert Displayed     [No]                         │
│     Boot Information Display Mode        [Display adapters & installed devices] │
│     Support Interrupt                    [Hook interrupt, the Default]│
│    Restore Defaults                                                  │
│                                                                      │
│                                                                      │
│                                                                      │
│                                                                   ▼  │
│ Esc = Exit Menu        F1/Shift+1 = Help                             │
│ Alt+N = Adapter List  -/+ = Change Item                              │
└────────────────────────────────────────────────────────────────────┘
```
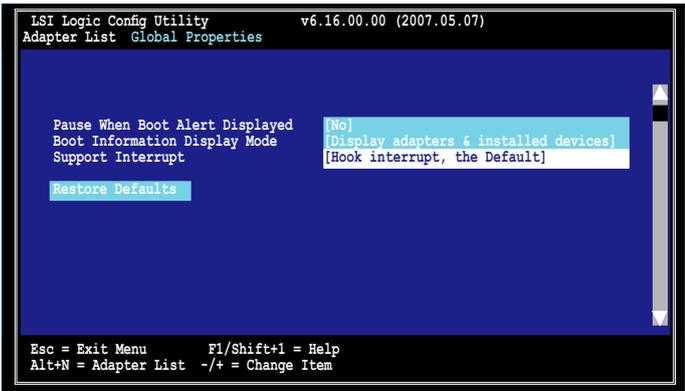
Restore Defaults

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

```
 LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
 Adapter List  Global Properties



       Pause When Boot Alert Displayed    [No]
       Boot Information Display Mode       [Display adapters & installed devices]
       Support Interrupt                  [Hook interrupt, the Default]

       Restore Defaults






 Esc = Exit Menu      F1/Shift+1 = Help
 Alt+N = Adapter List  -/+ = Change Item
```
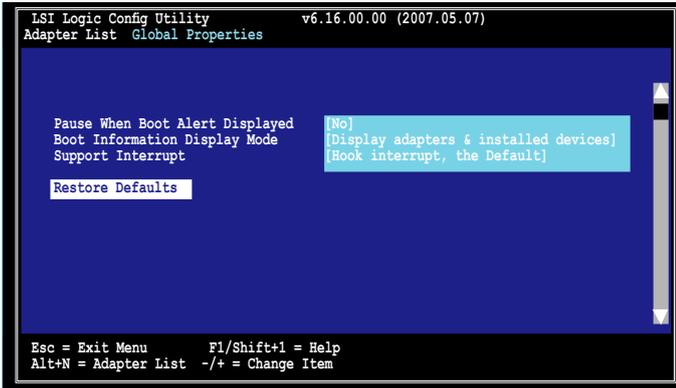
5.4   LSI Software RAID Configuration Utility *(P7F-C/4L model only)*

The LSI MegaRAID software RAID configuration utility allows you to create RAID 0, RAID 1, or RAID 10 set(s) from SATA hard disk drives connected to the SATA connectors supported by the motherboard southbridge chip.

To enter the LSI MegaRAID software RAID configuration utility

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

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

```
LSI MegaRAID Software RAID BIOS Version A.09 04300936R
LSI SATA RAID Found at PCI Bus No: Dev No:1F
Device present at Port 0        ST3160812AS        152114MB
Device present at Port 1        ST3160812AS        152114MB
Device present at Port 2        ST3160812AS        152114MB
Device present at Port 3        ST3160812AS        152114MB
Press Ctrl-M or Enter to run LSI Software RAID Setup Utility.
```

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

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

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

```
            LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                        BIOS Version    A.09.04300936R


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




                        ┌Configure VD(s)┐

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

Menu	Description
Configure	Allows you to create RAID 0, RAID 1 or RAID 10 set using the Easy Configuration or the New Configuration command. This menu also allows you to view, add, or clear RAID configurations or select the boot drive
Initialize	Allows you to initialize the virtual drives of a created RAID set
Objects	Allows you to initialize virtual drives or change the virtual drive parameters
Rebuild	Allows you to rebuild failed drives
Check Consistency	Allows you to check the data consistency of the virtual drives of a created RAID set

5.4.1   Creating a RAID set

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

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

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

Using Easy Configuration

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

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

```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                      BIOS Version   A.09.04300936R

                         ┌──Configuration Menu──┐
                         │ Easy Configuration    │
            ┌─Management──┤ New Configuration     │
            │ Configure   │ View/Add Configuration│
            │ Initialize  │ Clear Configuration   │
            │ Objects     │ Select Boot Drive     │
            │ Rebuild     └───────────────────────┘
            │ Check Consistency │
            └───────────────────┘




              ┌─────────────────────────────────────────────────────────┐
              │ Defines Physical Arrays. An Array Will Automatically Become A VD │
              └─────────────────────────────────────────────────────────┘
         Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```
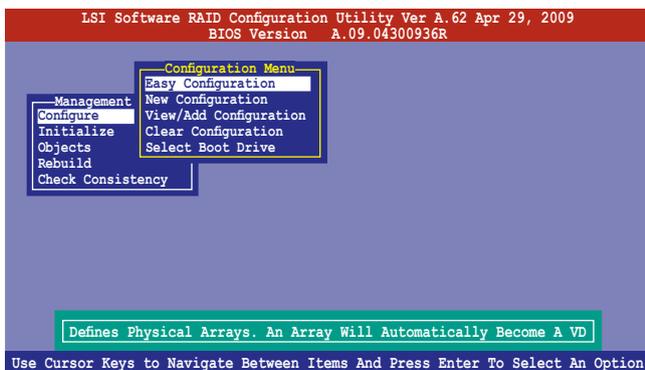
2. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Use the up/down arrow key to select the drives you want to include in the RAID set, and then press <Space>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

```
      LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                   BIOS Version   A.09.04300936R

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

                         3   READY



         ┌─────────────────────────────────────────────────┐
         │Port # 1 DISK   77247MB   HDS728080PLA380  PF20A60A│
         └─────────────────────────────────────────────────┘
   SPACE-Sel,ENTER-EndArray,F10-Configure,F2-Drive Info,F3-Virtual Drives,F4-HSP
```

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

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

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

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

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

```
      LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                   BIOS Version   A.09.04300936R

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




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

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

```
┌──────────────────────────────────────────────────────────────────┐
│      LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009 │
│              ──────────Virtual Drive(s) Configured──────────       │
│          LD    RAID    Size    #Stripes    StripSz    Status       │
│          0      1     77247MB     2         64 KB     ONLINE       │
│  ┌─Manager                                                         │
│  │Configure                                                        │
│  │Initializ                                                        │
│  │Objects                                                          │
│  │Rebuild                                                          │
│  │Check Cor                                                        │
│        ┌─────Virqual Drive 0─────┐                                 │
│        │RAID = 1                 │                                  │
│        │Size = 77247MB           │                                 │
│        │DWC  = Off               │                                 │
│        │RA   = On                │                                 │
│        │Accept                   │                                 │
│        │SPAN = NO                │                                 │
│        └─────────────────────────┘                                 │
│              ┌──────────────────────────────────┐                  │
│              │ Choose RAID Level For This VD     │                  │
│              └──────────────────────────────────┘                  │
│    Cursor Keys, SPACE-(De)Select F2-ChIdInfo F3-SlotInfo F10-Configure Esc-Quit │
└──────────────────────────────────────────────────────────────────┘
```
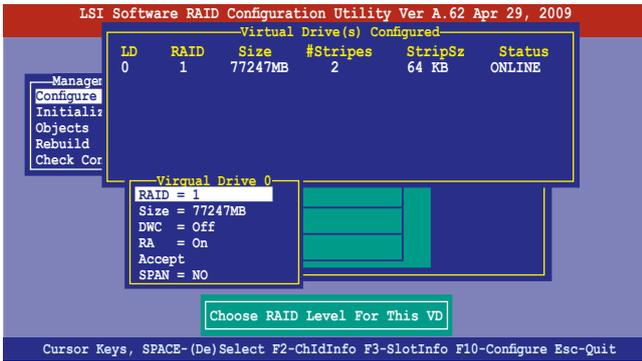
6. Select **RAID** from the **Virtual Drive** sub-menu, and then press <Enter>.

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

```
┌──────────────────────────────────────────────────────────────────┐
│      LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009 │
│              ──────────Virtual Drive(s) Configured──────────       │
│          LD    RAID    Size    #Stripes    StripSz    Status       │
│          0      1     77247MB     2         64 KB     ONLINE       │
│  ┌─Manager                                                         │
│  │Configure                                                        │
│  │Initializ                                                        │
│  │Objects                                                          │
│  │Rebuild                                                          │
│  │Check Cor                                                        │
│        ┌─────Virtual Drive 0─────┐  ┌──RAID Level──┐               │
│        │RAID = 1                 │  │ RAID 0        │               │
│        │Size = 77247MB           │  │ RAID 1        │               │
│        │DWC  = Off               │  └──────────────┘               │
│        │RA   = On                │                                  │
│        │Accept                   │                                  │
│        │SPAN = NO                │                                  │
│        └─────────────────────────┘                                 │
│              ┌──────────────────────────────────┐                  │
│              │ Choose RAID Level For This VD     │                  │
│              └──────────────────────────────────┘                  │
│    Cursor Keys, SPACE-(De)Select F2-ChIdInfo F3-SlotInfo F10-Configure Esc-Quit │
└──────────────────────────────────────────────────────────────────┘
```

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

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

9.   Select **On** to enable the **Disk Write Cache** setting, and then press <Enter>.

```
         LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                          Virtual Drive(s) Configured
         LD     RAID     Size      #Stripes     StripSz    Status
         0       1      77247MB        2          64 KB     ONLINE
      ┌─Manager
      │Configure
      │Initializ
      │Objects                           ┌─Change DWC─┐
      │Rebuild                           │Off         │
      │Check Cor                         │On          │
                  ┌─Virtual Drive 0─┐
                  │RAID = 1          │
                  │Size = 77247MB    │
                  │DWC  = Off         │
                  │RA   = On          │
                  │Accept            │
                  │SPAN = NO         │

                  ┌Disk Write Cache Setting Of VD┐

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

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

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

```
         LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                          Virtual Drive(s) Configured
         LD     RAID     Size      #Stripes     StripSz    Status
         0       1      77247MB        2          64 KB     ONLINE
      ┌─Manager
      │Configure
      │Initializ
      │Objects
      │Rebuild
      │Check Cor
                  ┌─Virtual Drive 0─┐
                  │RAID = 1          │
                  │Size = 77247MB    │
                  │DWC  = Off         │
                  │RA   = On          │
                  │Accept            │
                  │SPAN = NO         │

                  ┌Accept This VD Configuration And Go To Next VD┐

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

11. Follow step 2 to 10 to configure additional virtual drives.

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

```
LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                 BIOS Version   A.09.04300936R
            ┌─Configuration Menu─┐
            │Easy Configuration  │        ┌─Save Configuration?─┐
            │New Configuration   │        │Yes                  │
 ┌Management│View/Add Configuration       │No                   │
 │Configure │                             └─────────────────────┘
 │Initializ │      ┌─Virtual Drive(s) Configured─┐
 │Objects   │  LD    RAID    Size    #Stripes    StripSz    Status
 │Rebuild   │  0     1       77247MB  2          64 KB      ONLINE
 │Check Con │



                        ┌─────────────────┐
                        │Select Yes Or No │
                        └─────────────────┘
Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```

Using New Configuration

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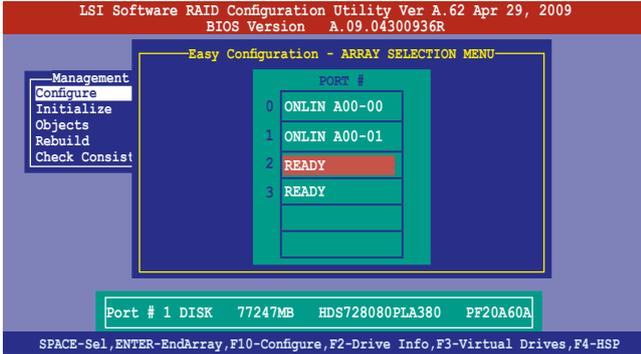
To create a RAID set using the **New Configuration** option

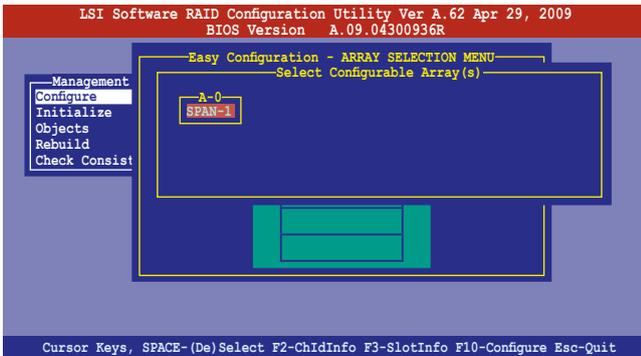1. From the **Management Menu**, select **Configure > New Configuration,** and then press <Enter>.

```
LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                 BIOS Version   A.09.04300936R
            ┌─Configuration Menu─┐
            │Easy Configuration  │
 ┌Management│New Configuration   │
 │Configure │View/Add Configuration
 │Initialize│Clear Configuration │
 │Objects   │Select Boot Drive   │
 │Rebuild   │
 │Check Consistency│



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

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

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

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

```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                          ─Virtual Drive(s) Configured─
              LD     RAID    Size    #Stripes    StripSz    Status
              0       1     77247MB      2        64 KB     ONLINE
      ─Manager
      Configure
      Initializ
      Objects
      Rebuild
      Check C ┌Enter VD Size (MB): 77247──────────────┐
              │   RAID = 1
              │   Size = 77247MB
              │   DWC  = Off
              │   RA   = On
              │   Accept
              │   SPAN = NO

                         ┌Enter VD Size (MB):──────┐

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

5. Follow step 8 to 12 of the previous section: **Using Easy Configuration** to create the RAID set.

5.4.2 Adding or viewing a RAID configuration

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

Adding a new RAID configuration

To add a new RAID configuration:

1. From the **Management Menu**, select **Configure > View/Add Configuration**, and then press <Enter>.
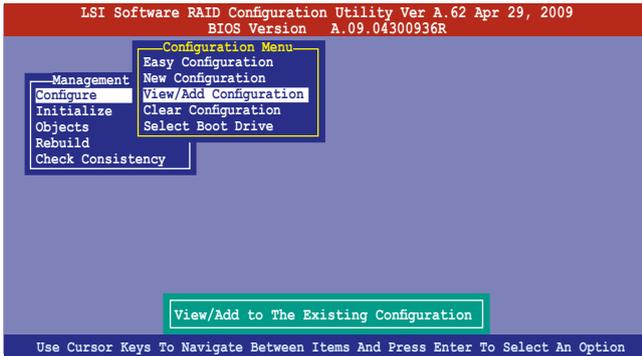
2. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <Space>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.
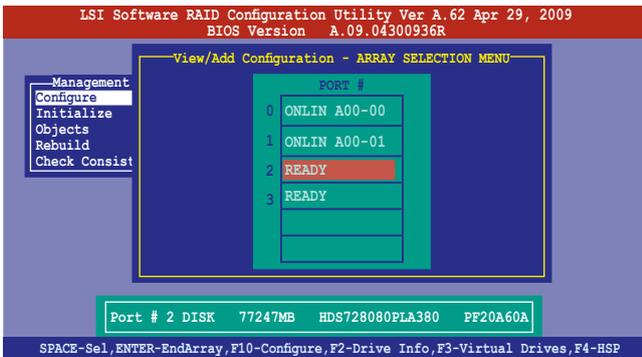
> The information of the selected hard disk drive displays at the bottom of the screen.

3. Follow step 3 to 12 of section **5.2.1 Creating a RAID set: Using Easy Configuration** to add a new RAID set.

5.4.3 Initializing the virtual drives

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

Using the Initialize command

To initialize the virtual drive using the Initialize command

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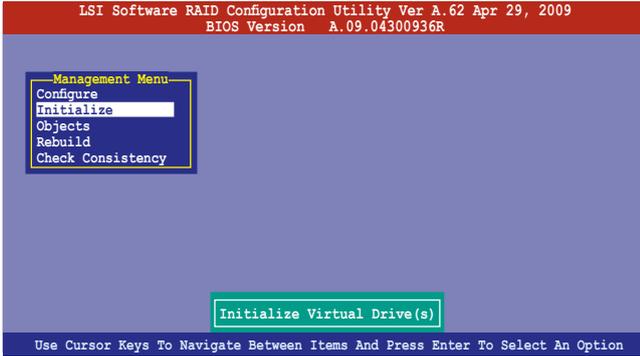
2. The screen displays the available RAID set(s) and prompts you to select the virtual drive to initialize. Use the arrow keys to select the virtual drive from the **Virtual Drive** selection, and then press <Space>.
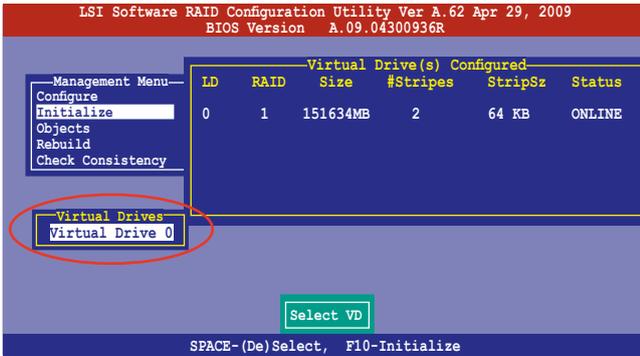
3. Press <F10> to start initialization. When prompted, select **Yes** from the **Initialize?** dialog box, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                    BIOS Version   A.09.04300936R

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

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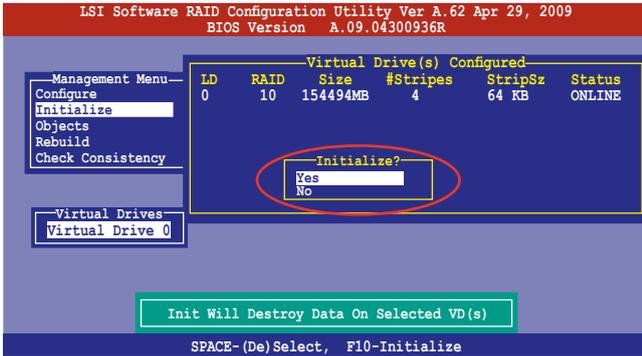
⚠️ Initializing a virtual drive erases all data on the drive.

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

```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                    BIOS Version   A.09.04300936R

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

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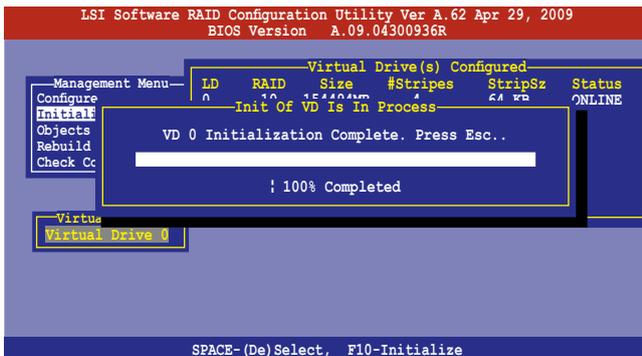
Using the Objects command

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

1. From the **Management Menu**, select **Objects > Virtual Drive**, and then press <Enter>.

```
          LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                       BIOS Version   A.09.04300936R

                            ─Objects─
     ─Management─    Adapter
     Configure       Virtual Drive
     Initialize      Physical Drive
     Objects
     Rebuild
     Check Consistency




                        Change VD Parameters

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

2. Select the virtual drive to initialize from the **Virtual Drives** sub-menu, and then press <Enter>.

```
          LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                       BIOS Version   A.09.04300936R
                       ──Vitual Drive(1)──
                         Virtual Drive 0
                            ─Obj
     ─Management─    Adapter
     Configure       Virtual Drive
     Initialize      Physical Drive
     Objects
     Rebuild
     Check Consistency




                           Select VD

        Press ENTER To Select A VD, <Del> To Delete A VD
```

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

```
┌────────────────────────────────────────────────────────────────────┐
│         LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009 │
│                    BIOS Version    A.09.04300936R                     │
│                           ┌─Vitual Drive(1)─┐                         │
│                           │Virtual Drive 0  │                         │
│                   ┌─Obj─┐ └─────────────────┘                         │
│     ┌─Management─┐│Adapter       │                                    │
│     │Configure   ││Virtual Drive │                                    │
│     │Initialize  ││Physical Drive│                                    │
│     │Objects     │└──────────────┘                                    │
│     │Rebuild     │       ┌─Vitual Drive(0)──────┐                     │
│     │Check Consistency   │Initialze             │                     │
│     └────────────┘       │Check Consistency     │                     │
│                          │View/Update Parameters │                    │
│                          └──────────────────────┘                     │
│                                                                       │
│                          ┌─────────────┐                              │
│                          │Initilize VD │                              │
│                          └─────────────┘                              │
│    Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option │
└────────────────────────────────────────────────────────────────────┘
```

4. When prompted, press the <Space> to select **Yes** from the **Initialize?** dialog box, and then press <Enter>.

```
┌────────────────────────────────────────────────────────────────────┐
│         LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009 │
│                    BIOS Version    A.09.04300936R                     │
│                           ┌─Vitual Drive(1)─┐                         │
│                           │Virtual Drive 0  │                         │
│                   ┌─Obj─┐ └─────────────────┘                         │
│     ┌─Management─┐│Adapter       │                                    │
│     │Configure   ││Virtual Drive │                                    │
│     │Initialize  ││Physical Drive│                                    │
│     │Objects     │└──────────────┘                                    │
│     │Rebuild     │       ┌─Vitual Drive(0)──┐                         │
│     │Check Consistency   │Initialze         │                         │
│     └────────────┘       │Check Con ┌─Initialize?─┐                   │
│                          │View/Upda │Yes          │                   │
│                          └──────────│No           │                   │
│                                     └─────────────┘                   │
│                                                                       │
│                  ┌────────────────────────────────────────────┐       │
│                  │Initilize Will Destroy Data On Selected VD(s)│       │
│                  └────────────────────────────────────────────┘       │
│    Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option │
└────────────────────────────────────────────────────────────────────┘
```
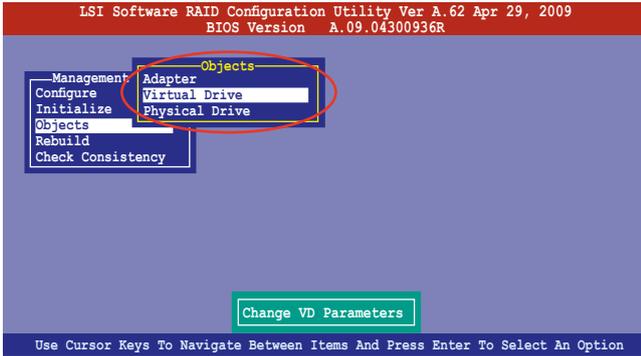
5. A progress bar appears on screen. If desired, press <Esc> to abort initialization. When initialization is completed, press <Esc>.
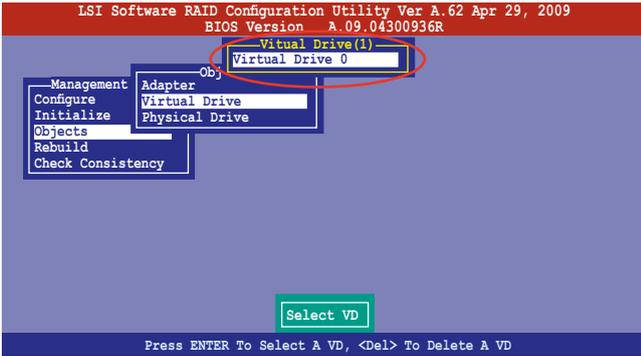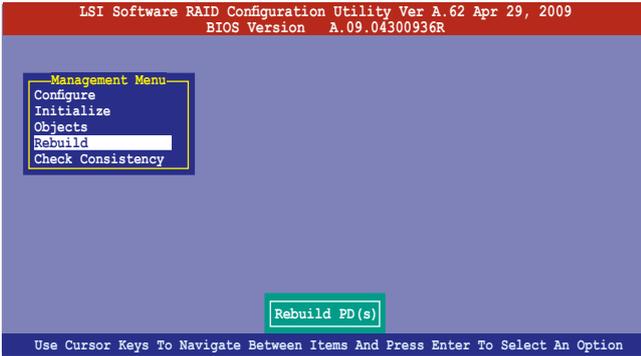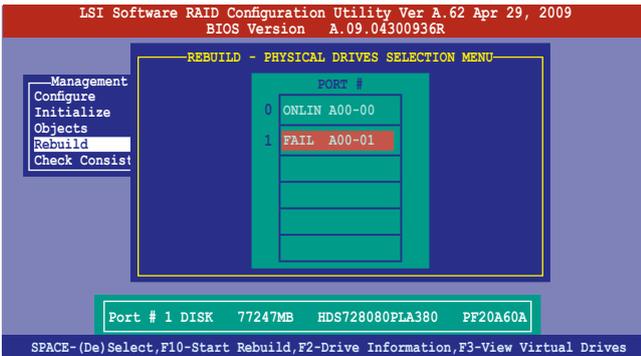
5.4.4 Rebuilding failed drives

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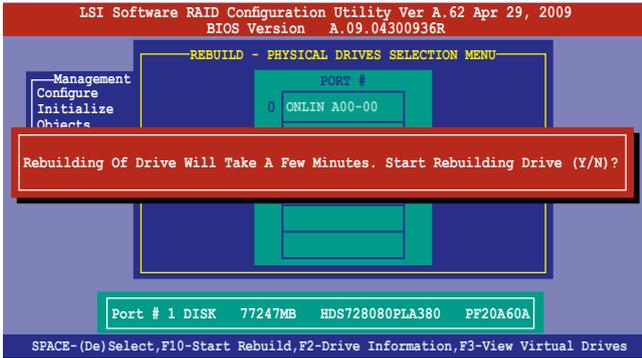
To rebuild a failed hard disk drive

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

```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                        BIOS Version   A.09.04300936R


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




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

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

```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                        BIOS Version   A.09.04300936R
                    ┌──REBUILD - PHYSICAL DRIVES SELECTION MENU──┐
    ┌──Management──┐ │               PORT #                       │
    │ Configure    │ │                                            │
    │ Initialize   │ │   0  ONLIN A00-00                          │
    │ Objects      │ │                                            │
    │ Rebuild      │ │   1  FAIL  A00-01                          │
    │ Check Consist│ │                                            │
    └──────────────┘ │                                            │
                     │                                            │
                     │                                            │
                     │                                            │
                     │                                            │
                     └────────────────────────────────────────────┘
                    ┌───────────────────────────────────────────┐
                    │ Port # 1 DISK   77247MB   HDS728080PLA380   PF20A60A│
                    └───────────────────────────────────────────┘
    SPACE-(De)Select,F10-Start Rebuild,F2-Drive Information,F3-View Virtual Drives
```

3. After selecting the drive to rebuild, press <F10>. When prompted, press <Y> to rebuild the drive.

```
      LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                    BIOS Version   A.09.04300936R

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



            Port # 1 DISK    77247MB   HDS728080PLA380   PF20A60A

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

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

5.4.5 Checking the drives for data consistency

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

> The **Check Consistency** command is available only for virtual drives included in a RAID 1 or RAID 10 set.

Using the Check Consistency Command

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

1. From the **Management Menu**, select **Check Consistency**, and then press <Enter>.
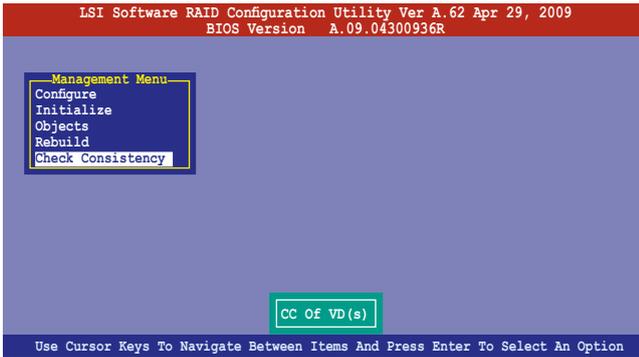
```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                        BIOS Version   A.09.04300936R


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






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

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

```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                        BIOS Version   A.09.04300936R
                        ┌─────Virtual Drive(s) Configured─────┐
        ┌─Management Menu─┐  LD    RAID    Size    #Stripes    StripSz    Status
        │ Configure       │  0     10    154494MB    4         64 KB      ONLINE
        │ Initialize      │
        │ Objects         │
        │ Rebuild         │
        │ Check Consistency│
        └─────────────────┘


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

                              ┌─────────────┐
                              │ Select VD   │
                              └─────────────┘
        ──────────────────────────────────────────────────────────────────
                 SPACE-(De)Select,   F10-Check Consistency
```
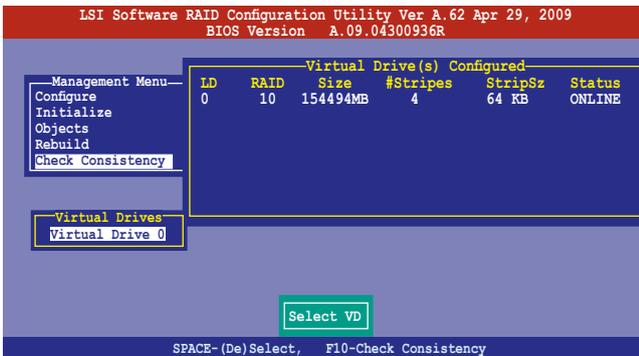
3. When prompted, use the arrow keys to select **Yes** from the **Consistency Check?** dialog box, and then press <Enter>.
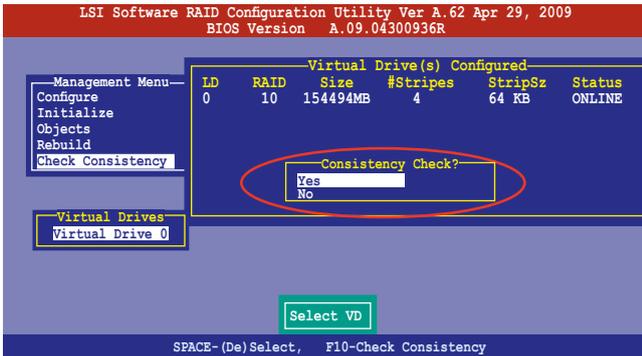
A progress bar appears on screen.
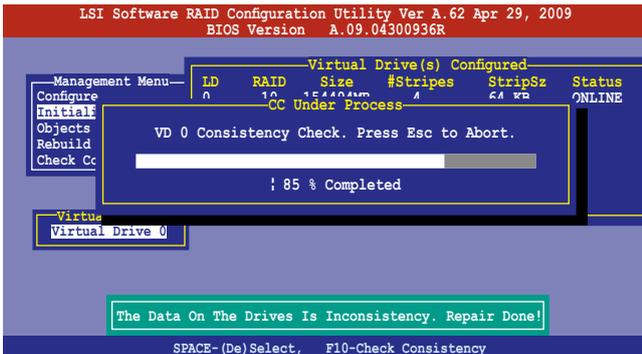
4. While checking the disk consistency, press <Esc> to display the following options.

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

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

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

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

Using the Objects command

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

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

5.4.6 Deleting a RAID configuration

To delete a RAID configuration

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

```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                      BIOS Version   A.09.04300936R
                   ┌──Configuration Menu──┐
                   │ Easy Configuration   │
        ┌Management│ New Configuration    │
        │Configure │ View/Add Configuration│
        │Initialize│ Clear Configuration  │
        │Objects   │ Select Boot Drive    │
        │Rebuild   └──────────────────────┘
        │Check Consistency│


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

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

```
        LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
                      BIOS Version   A.09.04300936R
                   ┌──Configuration Menu──┐
                   │ Easy Configuration   │
        ┌Management│ New Configuration    │
        │Configure │ View/A┌─Clear Configuration?─┐
        │Initialize│ Clear │ Yes                  │
        │Objects   │ Select│ No                   │
        │Rebuild   └───────└──────────────────────┘
        │Check Consistency│


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

The utility clears all the current array(s).

3. Press any key to continue.

5.4.7   Selecting the boot drive from a RAID set

You must have created a new RAID configuration before you can select the boot drive from a RAID set. See section **5.2.1 Creating a RAID set: Using New Configuration** for details.

To select the boot drive from a RAID set

1.   From the **Management Menu**, select **Configure** > **Select Boot Drive**, and then press <Enter>.
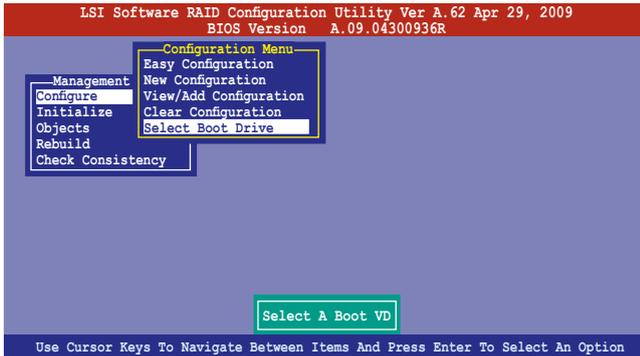
2.   When prompted, use the arrow keys to select the bootable virtual drive from the list, then press <Enter>.
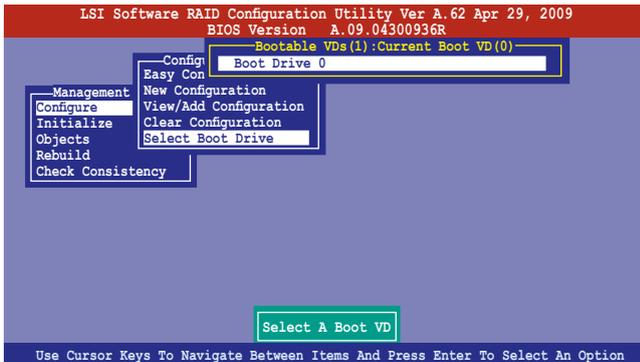
3.   The virtual drive is selected as boot drive. Press any key to continue.

5.4.8 Enabling WriteCache

You may manually enable the RAID controller's WriteCache option after creating a RAID set to improve the data transmission performance.

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

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

To enable WriteCache

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

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

```
LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
              BIOS Version   A.09.04300936R
                               Adapter 0
                          Rebuild Rate     = 30
                          Chk Const Rate = 30
        Management   Obje  FGI Rate         = 30
      Configure    Adapter  BGI Rate        = 30
      Initialize   Virtual Driv Disk WC     = Off
      Objects      Physical Dri Read Ahead  = On
      Rebuild                  Bios State    = Enable
      Check Consistency        Stop On Error = No
                               Fast Init     = Enable
                               Auto Rebuild  = On
                               Auto Resume   = Enable
                               Disk Coercion = 1GB
                               Factory Default


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

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

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

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

```
LSI Software RAID Configuration Utility Ver A.62 Apr 29, 2009
              BIOS Version   A.09.04300936R
                              Virtual Drive
                          RAID         = 0
                          Size         = 1428604MB
                          Stripe Size  = 64KB
        Management   Adapter   #Stripes  = 2
      Configure    Virtual D  State       = OPTIMAL
      Initialize   Physical   Spans       = 1
      Objects                 Disk WC     = On
      Rebuild                 Read Ahead  = On
      Check Consistency


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

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

5.   When finished, press any key to continue.

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

Driver installation

Chapter summary

6

6.1 RAID driver installation

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

6.1.1 Creating a RAID driver disk

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

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

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

To create a RAID driver disk in DOS environment

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

```
Create Driver Diskette Menu
PCH INTEL RAID Driver
PCH LSI RAID Driver
Marvell 88SE6145 SATA RAID Driver
Marvell 88SE6145 SATA Non-RAID Driver
LSI 1068E SAS Driver
Write DMI
FreeDOS command prompt
```
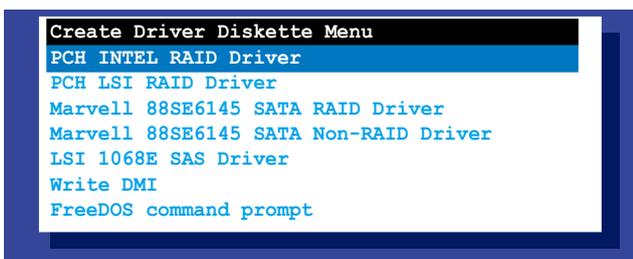
5. Use the arrow keys to select the type of RAID driver disk you want to create and press <Enter> to enter the sub-menu.

PCH INTEL RAID Driver

```
        PCH INTEL RAID Driver
Windows 32 bit(also support AHCI)
Windows 64 bit(also support AHCI)
Back
Exit
```

PCH LSI RAID Driver

```
        PCH LSI RAID Driver
   Windows XP 32 bit
   Windows XP 64 bit
   Windows Server 2003 32 bit
   Windows Server 2003 64 bit
   Windows Vista 32 bit
   Windows Vista 64 bit
   Windows Server 2008 32 bit
   Windows Server 2008 64 bit
   RHEL AS4 UP5 32/64 bit
   RHEL AS4 UP6 32/64 bit
   RHEL AS4 UP7 32/64 bit
   RHEL AS4 UP8 32/64 bit
   RHEL 5 32/64 bit
   RHEL 5 UP1 32/64 bit
   RHEL 5 UP2 32/64 bit
   RHEL 5 UP3 32/64 bit
   SLES 9 SP3 32 bit
   SLES 9 SP3 64 bit
   SLES 9 SP4 32 bit
   SLES 9 SP4 64 bit
   SLES 10 32 bit
   SLES 10 64 bit
 ▼
```

LSI 1068E SAS Driver

```
       LSI 1068E SAS Driver
   Windows XP 32 bit
   Windows XP 64 bit
   Windows Server 2003 32 bit
   Windows Server 2003 64 bit
   Windows Vista 32 bit
   Windows Vista 64 bit
   Windows Server 2008 32 bit
   Windows Server 2008 64 bit
   Windows 7 32 bit
   Windows 7 64 bit
   Windows Server 2008 R2 64 bit
   RHEL 3 UP6/UP8/UP9 32 bit
   RHEL 3 UP6/UP8/UP9 64 bit
   RHEL 4 32 bit
   RHEL 4 64 bit
   RHEL 4 UP1 32 bit
   RHEL 4 UP1 64 bit
   RHEL 4 UP2 32 bit
   RHEL 4 UP2 64 bit
   RHEL 4 UP3 32 bit
   RHEL 4 UP3 64 bit
   RHEL 4 UP4 32 bit
 ▼
```

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

To create a RAID driver disk in Windows® environment

1. Start Windows®.
2. Place the motherboard support DVD into the optical drive.
3. Go to the **Make Disk** menu, and then select the type of RAID driver disk you want to create.
4. Insert a floppy disk into the floppy disk drive.
5. Follow succeeding screen instructions to complete the process.

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

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

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

    For LSI MegaRAID Driver

    \Drivers\PCH LSI RAID\Driver\makedisk\Linux

3. Eject the floppy disk.

6.1.2   Installing the RAID controller driver

Windows® Server OS

During Windows® Server OS installation

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

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

```
Windows Setup




















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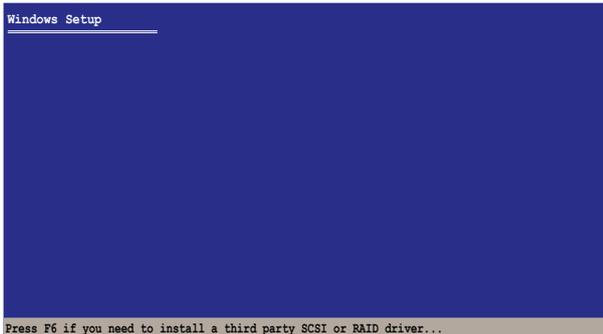
2.   Press <F6> when the message "Press F6 if you need to install a third party
      SCSI or RAID driver..." appears at the bottom of the screen.

3.   When prompted, press <S> to specify an additional device.

```
Windows Setup


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

   <none>

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

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


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

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

```
Windows Setup




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




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

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

6. The Windows® Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.

7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

To an existing Windows® Server OS

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

1. Restart the computer, and 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, and then select **Properties** from the menu.

4. Click the **Hardware** tab, and 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, and 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 **Install the software automatically (Recommended)**, and 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, and then select **Properties** from the menu.

2. Click the **Hardware** tab, and then click the **Device Manager** button.

3. Click the "+" sign before the item **SCSI and RAID controllers**, and then the **Intel(R) ICH8R/ICH9R/ICH10R/DO/PCH SATA RAID Controller** item should appear.
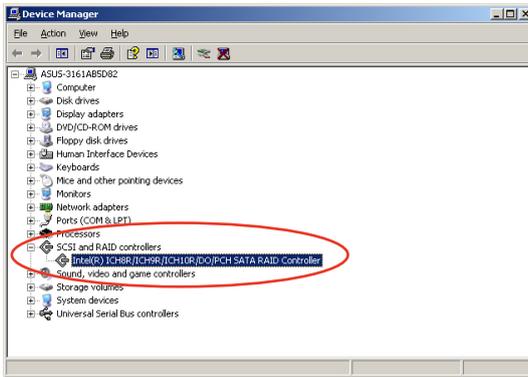
The screen differs based on the controller.

4. Right-click the **RAID controller** driver item, and then select **Properties** from the menu.

5. Click the **Driver** tab, and then click the **Driver Details** button to display the RAID controller drivers.

6. Click **OK** when finished.

Red Hat® Enterprise Linux OS 4.7/4.8

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

1.   Boot the system from the Red Hat® OS installation CD.
2.   At the **boot:**, type **linux dd nostorage**.
3.   Press <Enter>.

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

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

```
┤ Main Menu ├

Do you have a driver disk?

    Yes              No
```

5.   Press <Enter> to continue.

```
┤ Insert Driver Disk ├

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

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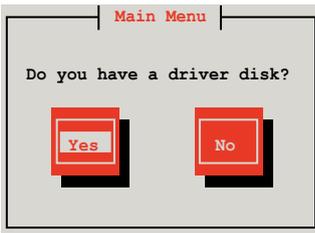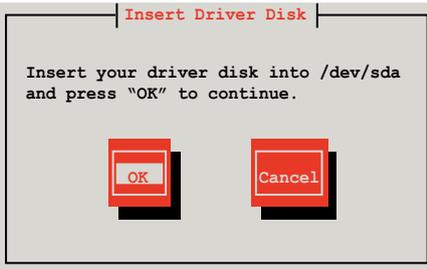
6.   Select **No** and press <Enter> to continue.

```
┤ More Driver Disks? ├

Do you wish to load any more
driver disks?

    Yes              No
```
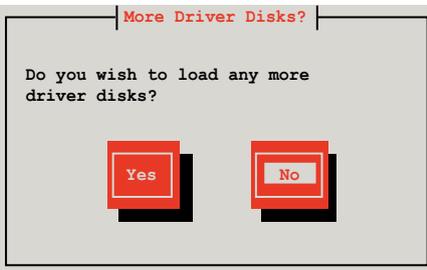
7.   Select your desired language and press <Enter> to continue.

```
┌───────────────┤ Choose a Language ├───────────────┐

  What language would you like to use
  during the installation process?
          Catalan
          Chinese(Simplified)              #
          Chinese(Traditional)
          Croatian
          Czech
          Danish
          Dutch
          English


                  ┌──────┐
                  │  OK  │
                  └──────┘

└────────────────────────────────────────────────────┘
```
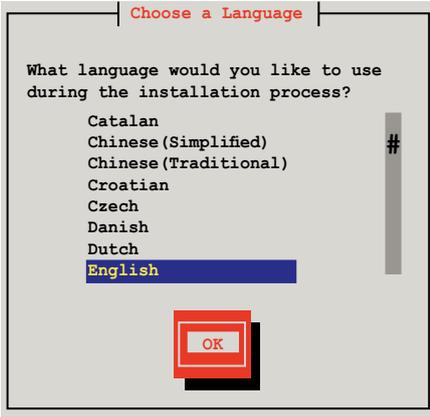
8.   Select your keyboard type and press <Enter> to continue.
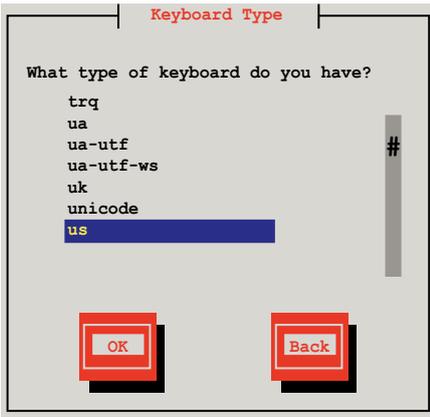
```
┌──────────────┤ Keyboard Type ├──────────────┐

  What type of keyboard do you have?
          trq
          ua
          ua-utf                   #
          ua-utf-ws
          uk
          unicode
          us


          ┌──────┐          ┌──────┐
          │  OK  │          │ Back │
          └──────┘          └──────┘

└──────────────────────────────────────────────┘
```

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

```
┤Installation Method├

What type of media contains the
packages to be installed?
          Local CDROM
          Hard drive
          NFS image
          FTP
          HTTP


      OK                Back
```

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

```
┤  No driver found  ├

      Unable to find any devices of the type
      needed for this installation type.

      Would you like to manually select your
      driver or use a driver disk?


   Select driver    Use a driver disk    Back
```
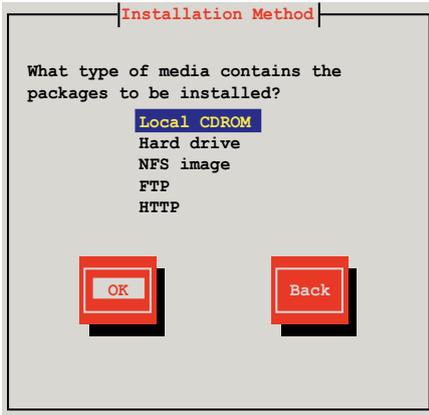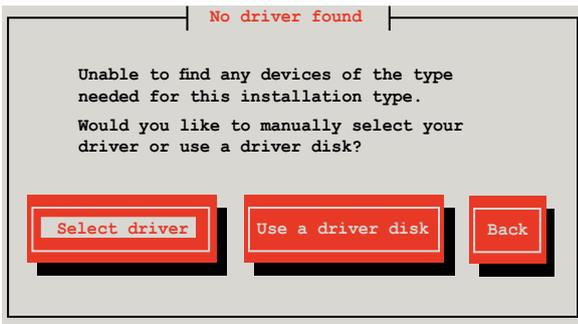
11. Scroll down to locate the driver and press <Enter> to continue.

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

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

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

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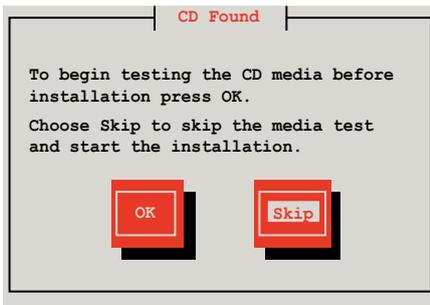
13. Select **Done** and press <Enter> to continue.

```
┤ Devices ├
The following devices have been found on your system.
  Intel Pro/1000 (e1000e)
  LSI megasr Driver ver 13.10.0708.2009 (megasr)
  USB Mass Storage driver for Linux (usb-storage)


      Done                        Add Device
```
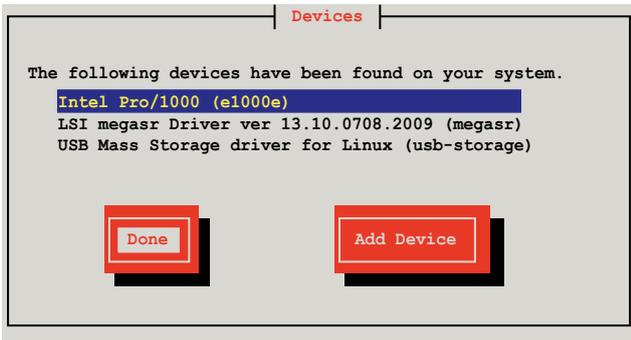
The displayed devices may vary with models and systems.

14. Follow the onscreen instructions to finish installing the RedHat operating system.
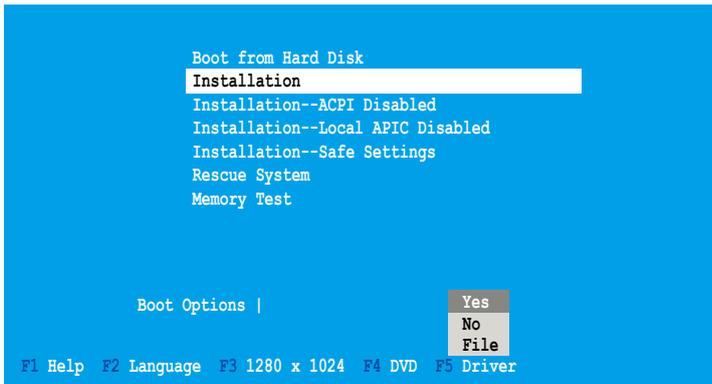
Red Hat® Enterprise Linux OS 5.0

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

1. Boot the system from the Red Hat® OS installation CD.

2. At the `boot:`, type `linux dd noprobe=ata[n]`. The number of ata varies with the hard disk drive number you have when building a RAID set. For example, if you want to build a RAID set with 6 hard disk drives, type command line: linux dd noprobe=ata1 noprobe=ata2 noprobe=ata3 noprobe=ata4 noprobe=ata5 noprobe=ata6.

3. Press <Enter>.

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

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

```
            ┤ Main Menu ├

    Do you have a driver disk?


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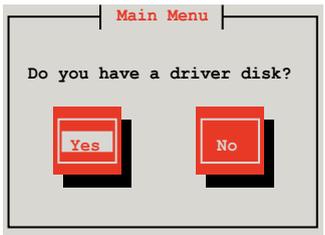
5. Select **fd0** using the <Tab> key when asked to select the driver disk source. Press <Tab> to move the cursor to **OK**, then press <Enter>.

```
        ┤ Driver Disk Source ├

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

                fd0
                scd0

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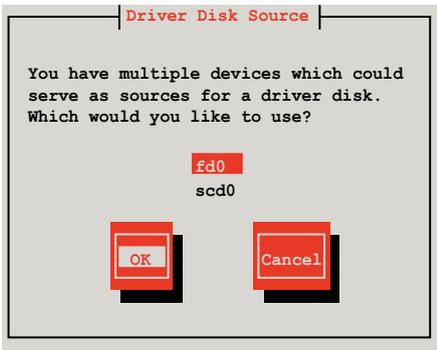
6. Insert the Red Hat® Enterprise RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.

```
┤ Insert Driver Disk ├

 Insert your driver disk into /dev/fd0
 and press "OK" to continue.


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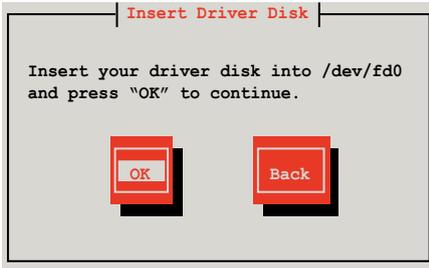
The drivers for the RAID card are installed to the system.

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

```
┤ More Driver Disks? ├

 Do you wish to load any more
 driver disks?


      Yes              No
```
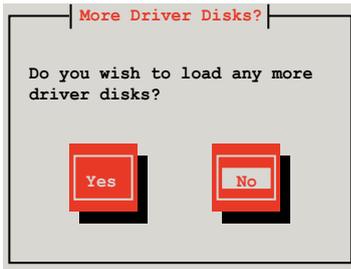
8. Follow the onscreen instructions to finish the OS installation.

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

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

cat /proc/partitions

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

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

SUSE Linux OS

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

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

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

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




            Boot Options |


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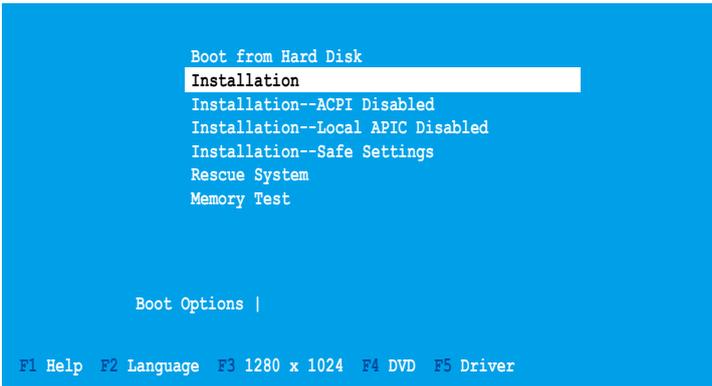
3. Press <F5>, then select **Yes** from the menu. Press <Enter>.

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




            Boot Options |                    Yes
                                              No
                                              File
 F1 Help  F2 Language  F3 1280 x 1024  F4 DVD  F5 Driver
```

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

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




        Boot Options |


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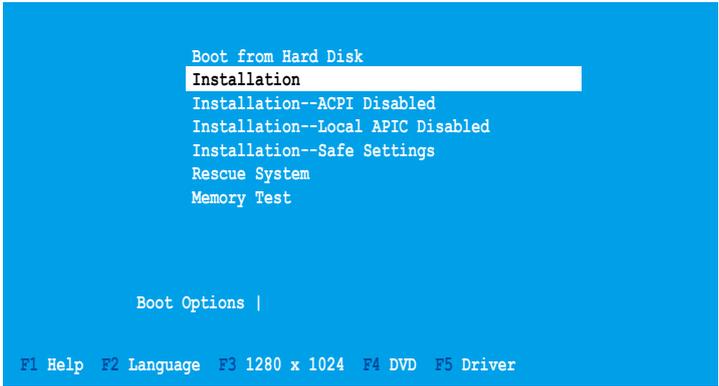
If you install SLES 10, type `brokenmodules=ahci` after **Boot Options** and press **Enter** to continue.

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

```
Please choose the Driver Update medium.

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

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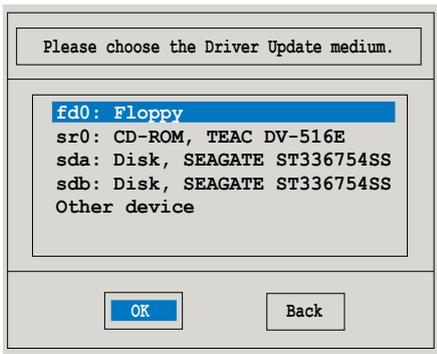
The drivers for the RAID controller are installed to the system.

6.2   Intel® chipset device installation

This section provides instructions on how to install the Plug and Play components for the Intel® chipset on the system.

You need to manually install the Intel® chipset software on a Windows Server operating system. To install the Intel® chipset device software:

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

2.   Insert the motherboard/system support DVD to the optical drive. The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

3.   Click the item **Intel Chipset Device Software** from the menu.

4.   The **Intel(R) Chipset Device Software** window appears. Click **Next** to start installation.

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

6. Read the **Readme File Information** and press **Next** to continue the installation.
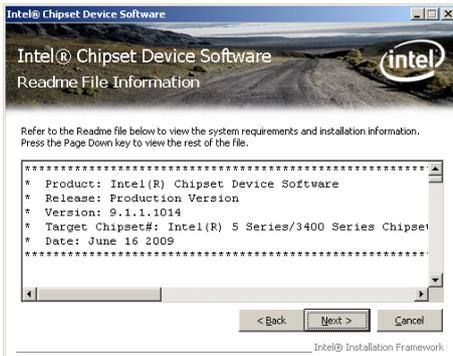
7. After completing the installation, click **Finish** to complete the setup process.

6.3 LAN driver installation

This section provides instructions on how to install the Marvell® Yukon Ethernet driver on a Windows® Server OS.

To install the LAN controller drivers

1. Restart the computer, and then log on with Administrator privileges.
2. Insert the motherboard/system support DVD to the optical drive. The DVD 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 DVD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the DVD.

---

3. Click the **Marvell Yukon Ethernet Driver** to begin installation.

4. Click **I accept the terms of the License Agreement** and click **Install** to continue.

5. **Marvell MiniPort Driver Setup** window appears, showing the installing process.
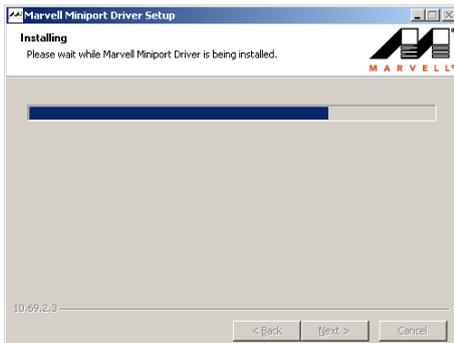
6. Click **Finish** to close the wizard.

6.4 VGA driver installation

This section provides instructions on how to install the XGI Volari Z9s Video Graphics Adapter (VGA) driver.

6.4.1 Windows® Server 2003

You need to manually install the XGI Volari Z9s VGA driver on a Windows® Server 2003 operating system. To install the XGI Volari Z9s 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. The **XGI VGA Package** window appears, preparing the setup.
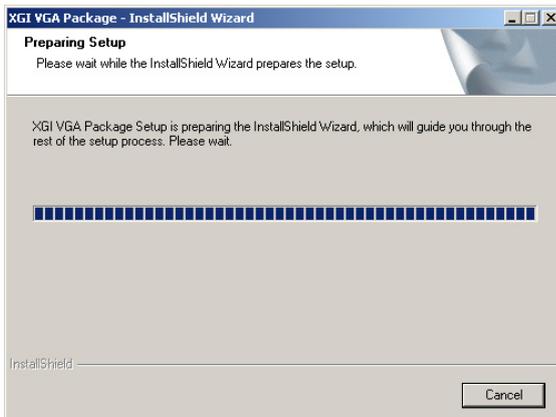
4. Click **Next** to start the installation.
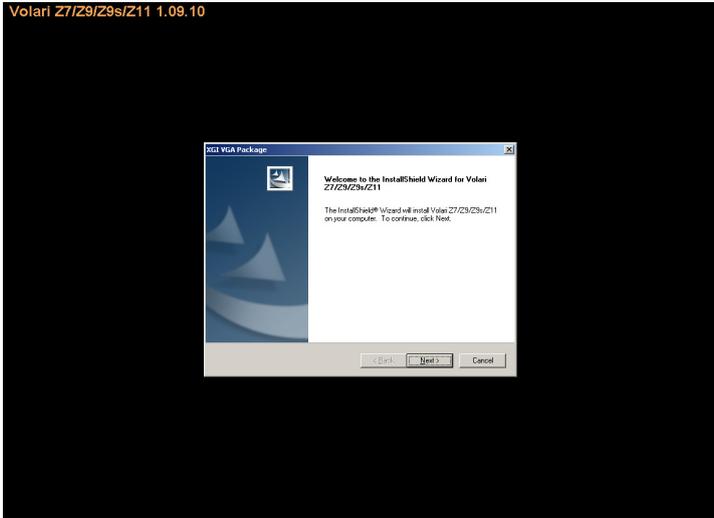
5. The system will update the VGA driver automatically.
6. When the installation completes, click **Finish** to restart your computer before using the program.
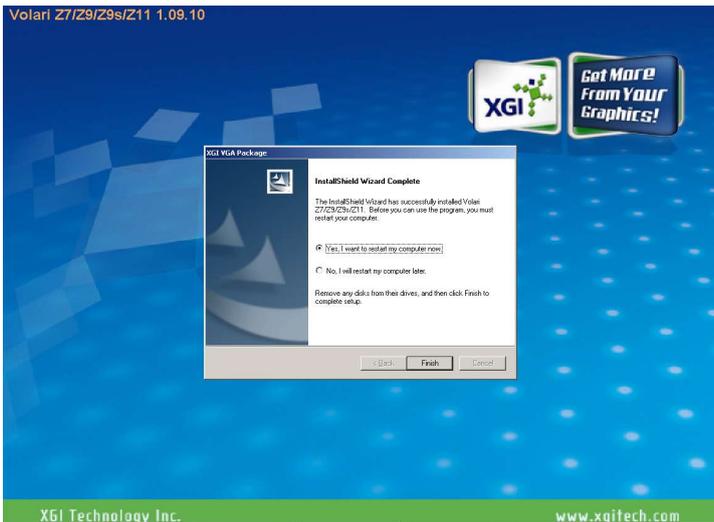
6.5 Management applications and utilities installation

The support DVD 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 DVD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for updates.

6.5.1 Running the support DVD

Place the support DVD to the optical drive. The DVD 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 DVD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the DVD.

6.5.2 Drivers menu

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

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

6.5.3   Utilities menu

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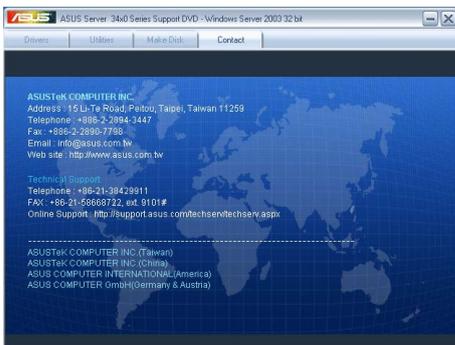
6.5.4   Make disk menu

The Make disk menu contains items to create the Intel Matrix Storage and LSI MegaRAID driver disks.

6.5.5   Contact information

Click the Contact tab to display the ASUS contact information. You can also find this information on the inside front cover of this user guide.

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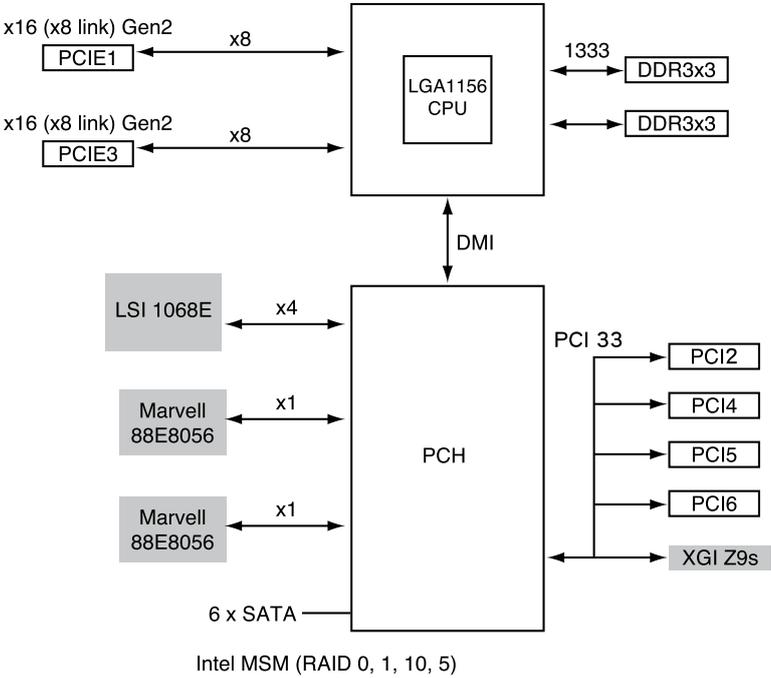
Reference information

Appendix summary

A

A.1   P7F-C/SAS Series block diagram

A.2 P7F-C/4L Series block diagram

x16 (x8 link) Gen2

PCIE1 — x8 → LGA1156 CPU

x16 (x8 link) Gen2

PCIE3 — x8 → LGA1156 CPU

1333 → DDR3x3

DDR3x3

DMI

Marvell 88E8056 — x1 → PCH

Marvell 88E8056 — x1 → PCH

Marvell 88E8056 — x1 → PCH

Marvell 88E8056 — x1 → PCH

PCH

6 x SATA

Intel MSM (RAID 0, 1, 10, 5)
LSI MegaRAID 0, 1, 10, 5(iBTN)

PCI 33

PCI2

PCI4

PCI5

PCI6

XGI Z9s