

KFSN4-DRE ***Series***

KFSN4-DRE/SAS

KFSN4-DRE/2S

KFSN4-DRE

ASUS[®]

Motherboard

E3335

First Edition V1

August 2007

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Notices

Federal Communications Commission Statement

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

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

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

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



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

Canadian Department of Communications Statement

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

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

Safety information

Electrical safety

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

Operation safety

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



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**

KFSN4-DRE Series specifications summary

Model Name		KFSN4-DRE	KFSN4-DRE/2S	KFSN4-DRE/SAS
Processor / System Bus		2 * socket 1207		
		AMD Opteron™ 2000 series processor (Barcelona Support)		
		Quad Core / Dual Core		
		HyperTransport™ Technology 1.0, 1GHz 512KB L2 cache/Per core, 2MB L3		
Core Logic		nVIDIA nForce Professional 2200		
Form Factor		SSI EEB 3.61 Footprint Compliant, 12" x 13"		
ASUS Features	Smart Fan	Smart Fan II		
	Rack Ready (Rack and Pedestal dual use)	V	V	V
	Rack Optimized (Dedicated for Rack)	V	V	V
	ASWM2.0	V	V	V
Memory	Total Slots	16 (2-channel per CPU)		
	Capacity	Maximum up to 64GB		
	Memory Type	DDR2 533/667 Reg. ECC		
	Memory Size	512 MB, 1 GB, 2GB, 4GB		
Expansion Slots (follow SSI Location #)	Total PCI/PCI-X/PCI-E Slots	1	2	1
	Slot Location 5	--	1 * PCI-E x16 (x8 link)	--
	Slot Location 6	1 * PCI-E x16 (x16 link)	1 * PCI-E x16 (x8 link)	1 * PCI-E x16 (x8 link)
	Additional Slot 1	1* SO-DIMM socket for optional ASMB3-SOL		
Storage	IDE Controller	nVIDIA® nForce 2200 Professional: Dual Channel Bus Master IDE support UltraATA 100 / 133		
	SATA Controller	nVIDIA® nForce 2200 Professional: 4 * SATA Ports, RAID 0, 1, 10, 5, JBOD (Windows)		
	SAS Controller	--	--	LSI 1064E PCI-E 4-port SAS controller: 4 x SAS Ports, LSI® Integrated RAID 0, 1, 1E support
Networking	LAN	2 * Broadcom® BCM5721 PCI-E GbE LAN		
Graphic	VGA	XGI® Z9s VGA Controller / 32MB DDR2 VRAM		

(continued on the next page)

KFSN4-DRE Series specifications summary

Onboard I/O Connectors	Floppy Connector	1	1	1
	PSU Connector	24-pin ATX power connector + 8-pin ATX 12V power connector		
	Management Connector	1* SO-DIMM socket for optional ASMB3-SOL		
	USB Connectors	1 (support 2 USB ports)		
	Fan Header	10 * 4pin		
	SMBus	2	2	2
	Chassis Intruder	1	1	1
	Front LAN LED	2	2	2
	Serial Port Header	1	1	1
	Rear I/O Connectors	External Serial Port	1	1
External USB Port		2	2	2
VGA Port		1	1	1
RJ-45		2	2	2
PS/2 KB/Mouse		1	1	1
Management Solution	Software	ASWM2.0		
	Out of Band Remote Management	Optional (ASMB3-SOL)		
Monitoring	CPU Temperature	V	V	V
	FAN RPM	V	V	V
	EMI			
	US (FCC, CFR47 Part 15, Class B)	V	V	V
	Europe (CE, EN55022 & EN55024)	V	V	V
Environment		Operation temperature: 10°C ~ 35°C Non operation temperature: -40°C ~ 70°C Non operation humidity: 20% ~ 90% (Non condensing)		

*Specifications are subject to change without notice.

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

1 Product introduction

Chapter summary

1

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1.1 Welcome!

Thank you for buying an ASUS® KFSN4-DRE 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.

		KFSN4-DRE/2S Retail Pack (with heatsink)	KFSN4-DRE/2S Retail Pack (without heatsink)	KFSN4-DRE/SAS Retail Pack (with heatsink)	KFSN4-DRE/SAS Retail Pack (without heatsink)	KFSN4-DRE Series Bulk Pack
Cables	SATA signal cable	4	4	4	4	--
	SATA power cable	2	2	2	2	--
	SAS cable (4 ports SATA to 4*29 pin SAS)	--	--	1	1	--
	3-in-1 cable set	1	1	1	1	--
Accessories	I/O shield	1	1	1	1	1
	1U copper passive heatsink	2	--	2	--	--
Application CD	Support CD	1	1	1	1	1
Documentation	User Guide	1	1	1	1	1
Packing Qty		3pcs per Carton	3pcs per Carton	3pcs per Carton	3pcs 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 12 characters **xxM0Axxxxxxx** 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

Latest processor technology

The motherboard comes with dual 1207-pin surface mount Land Grid Array (LGA) sockets coded Socket F, designed for AMD Opteron™ 2000 series processors. The motherboard with the new socket supports registered DDR2-667/533 memory, delivering advanced performance and ensuring reliable data protection.

AMD Quad-Core Architecture

The motherboard supports AMD quad/dual-core processors with discrete L2 cache structure for each core and shared L3 cache to meet demands for more powerful computing.

PCI Express™ interface

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

HyperTransport™ Technology

HyperTransport™ Technology is a high-speed, low latency, point-to-point link designed to increase the communication speed between integrated circuits in computers, networking and telecommunications equipment up to 48 times faster than other existing technologies.

DDR2 memory support

The motherboard supports DDR2 memory which features data transfer rates of 667 MHz or 533 MHz to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The dual-channel DDR2 architecture doubles the bandwidth of your system memory to boost system performance, eliminating bottlenecks with peak bandwidth of up to 10.7 GB/s.

Serial Attached SCSI (SAS) technology support (KFSN4-DRE/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.

Serial ATA 3Gb/s technology



The motherboard supports the next-generation Serial ATA 3Gb/s technology through the Serial ATA interfaces and the NVIDIA® nForce4® PRO chipset. The SATA 3Gb/s specification provides twice the bandwidth of the current Serial ATA products. Additionally, Serial ATA allows thinner, more flexible cables with lower pin count, and reduced voltage requirement.

Dual Gigabit LAN solution



The motherboard comes with dual Gigabit LAN controllers to provide comprehensive solution for your networking operation. The integrated network controllers use the PCI Express segment to provide higher data bandwidth for your wired or wireless Internet, LAN, and file sharing 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 by the ASIC (Winbond W83793G) to prevent overheating and damage. The system fan rotations per minute (RPM) is monitored for timely failure detection. The ASIC monitors the voltage levels to ensure stable supply of current for critical components.

1.4.2 Innovative ASUS features

CrashFree BIOS 2



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

ASUS Smart Fan technology



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

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

Hardware information



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2.1 Before you proceed

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

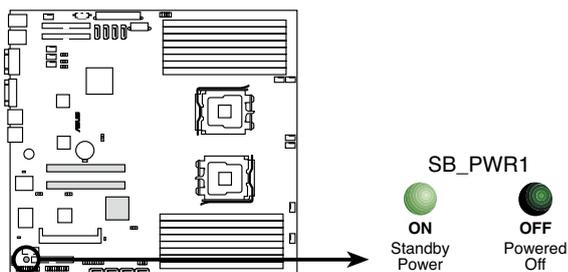


- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
- Hold components by the edges to avoid touching the ICs on them.
- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
- Before you install or remove any component, ensure that the 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

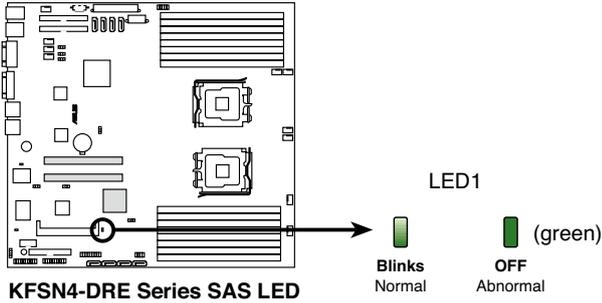
The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration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



KFSN4-DRE Series Standby power LED

2. SAS LED (for KFSN4-DRE/SAS only)

The green heartbeat LED blinks per second to indicate that the LSI 1064E chipset is working normally.

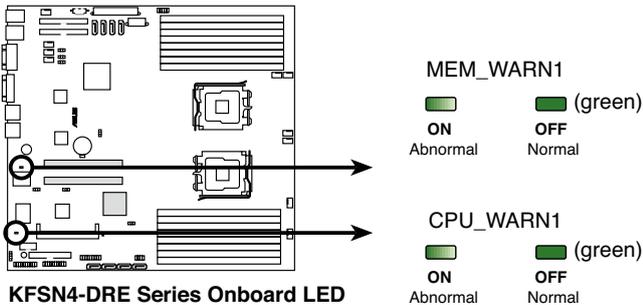


3. CPU warning LED (CPU_WARN1)

The CPU warning LED lights up to indicate that a processor is not installed or the processor is not installed properly in CPU 1 socket.

4. Memory warning LED (MEM_WARN1)

The memory warning LED lights up to indicate that there is no power in the memory DIMMs.



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 SSI CEB 1.1 compliant chassis.



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

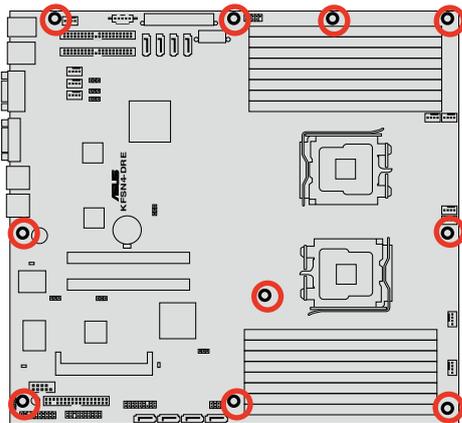
2.2.2 Screw holes

Place ten (10) 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



2.2.5 Layout contents

Slots/Socket		Page
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3.	VGA Graphics controller setting (3-pin VGA_EN1)	2-20
4.	Fan control setting (3-pin FAN_SEL1)	2-21
5.	Onboard storage setting (3-pin SAS_EN1) <i>(KFSN4-DRE/SAS model only)</i>	2-21
6.	Force BIOS recovery setting (3-pin RECOVERY1)	2-22

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2.	RJ-45 port for iKVM	2-23
3.	PS/2 keyboard port (purple)	2-23
4.	USB 2.0 ports 1 and 2	2-23
5.	Serial (COM1) port	2-23
6.	Video Graphics Adapter port	2-23
7.	LAN 1 (RJ-45) port	2-23
8.	LAN 2 (RJ-45) port	2-23

Internal connectors		Page
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2.	IDE connectors (40-1 pin PRI_IDE1, SEC_IDE1)	2-24
3.	Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4)	2-25
4.	Hard disk activity LED connector (4-pin HDLED1)	2-26
5.	USB connectors (10-1 pin USB34)	2-26
6.	Front and rear fan connectors (4-pin FRNT_FAN1/2/3/4, REAR_FAN1/2/3/4/5/6)	2-27
7.	Serial port connectors (10-1 pin COM2)	2-27
8.	ATX power connectors (24-pin ATXPWR1, 8-pin ATX12V1)	2-28
9.	Power supply SMBus connector (5-pin PSUSMB1)	2-28
10.	SAS connectors (<i>KFSN4-DRE/SAS model only</i>)	2-29
11.	SAS LSI1064E ports LED connector (18-1 pin SASLED1) (<i>KFSN4-DRE/SAS model only</i>)	2-30
12.	Serial General Purpose Input/Output connector (6-pin SGPIO1)	2-30
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14.	System panel connector (20-1 pin PANEL1)	2-32

2.3 Central Processing Unit (CPU)

The motherboard comes with dual surface mount Socket F designed for the AMD® Opteron® 2000 series CPU in the Land Grid Array (LGA) package.

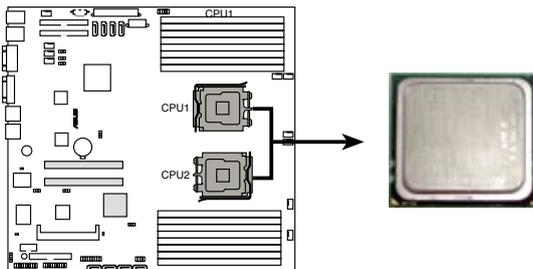


- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS shoulders the repair cost only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the Socket 1207.
- 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.

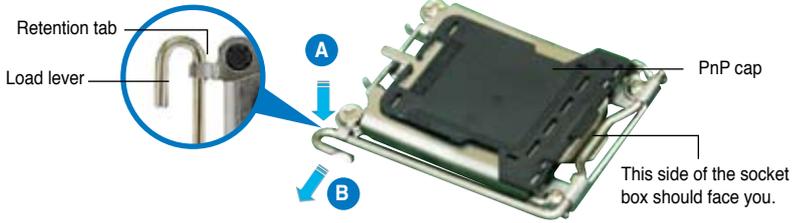


KFSN4-DRE Series CPU Socket 1207



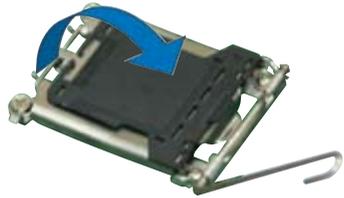
Before installing the CPU, make sure that the socket box is facing toward you and the load lever is on your left.

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

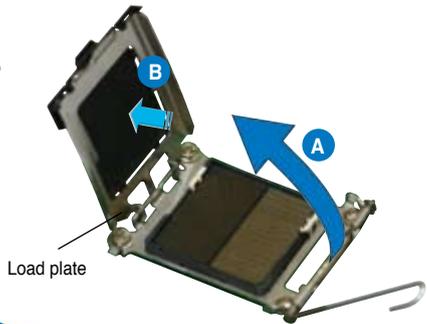


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

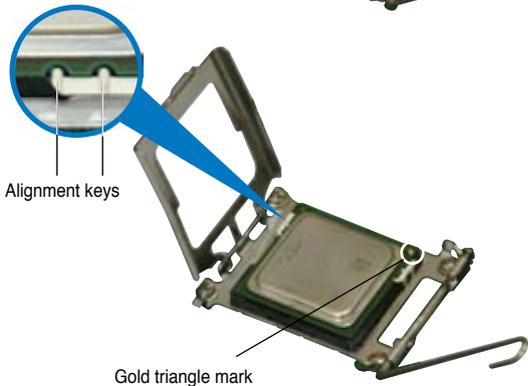
3. Lift the load lever in the direction of the arrow to a 135° angle.



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



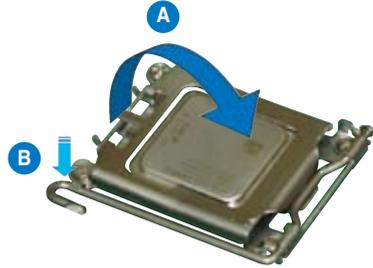
5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-right corner of the socket. The socket alignment keys should fit into the CPU notches.





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!

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



2.3.2 Installing the heatsink

The AMD Opteron™ 2000 series processors require a specially designed heatsink to ensure optimum thermal condition and performance.



Make sure that you use only qualified heatsink assembly.

Follow these steps to install the CPU heatsink.

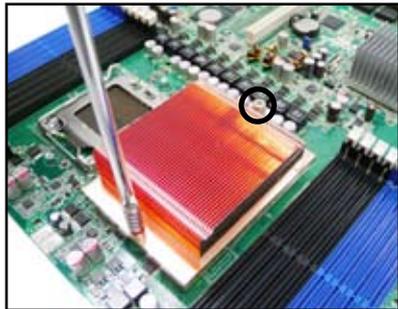
1. Place the heatsink on top of the installed CPU, making sure that the screw holes are matched with the heatsink standoffs.



2. Secure the heatsink with two screws.



Make sure that the heatsink is not skewed or tilted otherwise, the CPU will overheat.



3. If you installed a second processor, repeat steps 1-2 to install the second heatsink.



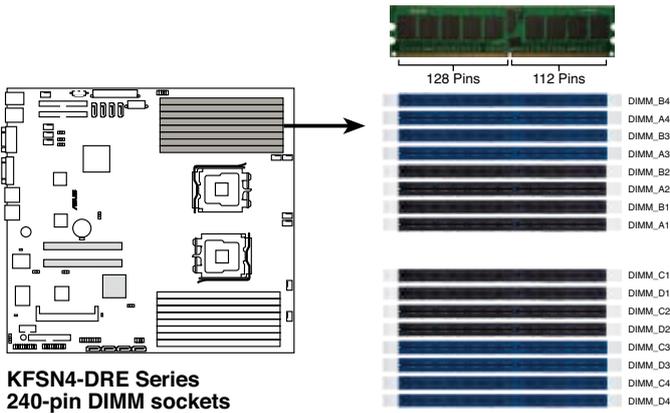
2.4 System memory

2.4.1 Overview

The motherboard comes with sixteen (16) Double Data Rate 2 (DDR2) Dual Inline Memory Modules (DIMM) sockets.

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

The figure illustrates the location of the DDR2 DIMM sockets:



2.4.2 Memory Configurations

You may install 256 MB, 512 MB, 1 GB, 2, or 4 GB registered ECC DDR2 DIMMs into the DIMM sockets using the memory configurations in this section.



- For dual-channel configuration, the total size of memory module(s) installed per channel must be the same for better performance.
 Single CPU:
 DIMM_A1=DIMM_A2=DIMM_B1=DIMM_B2
 Dual CPU:
 DIMM_A1=DIMM_A2=DIMM_B1=DIMM_B2=
 DIMM_C1=DIMM_C2 =DIMM_D1=DIMM_D2
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

Memory population table

		A1	B1	A2	B2	A3	B3	A4	B4
CPU1	SingleChannel							.	
	Dual Channel				
			
	
		C1	D1	C2	D2	C3	D3	C4	D4
CPU2	Single Channel							.	
	Dual Channel				
			
	

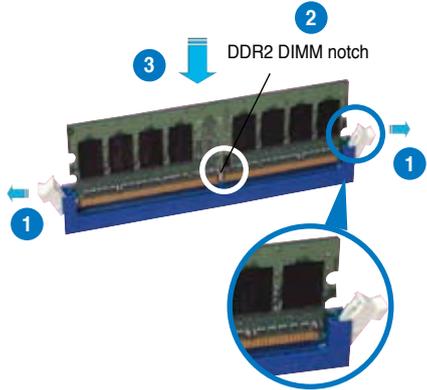
2.4.3 Installing a DIMM



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

To install a DIMM:

1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



Unlocked retaining clip



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

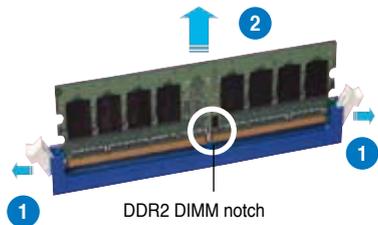
2.4.4 Removing a DIMM

To remove a DIMM:

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



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



2. Remove the DIMM from the socket.

2.5 Expansion slots

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



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

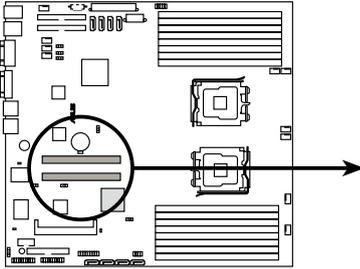
Standard interrupt assignments

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

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

2.5.4 PCI Express x16 slot (x8 link or x16 link)

This motherboard supports PCI Express x16 cards that comply with the PCI Express specifications. The diagram shows the location of the PCI Express x16 slot.



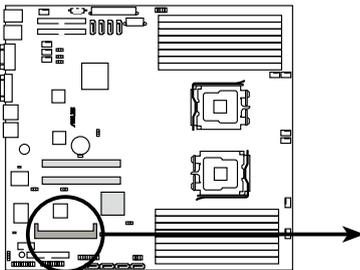
KFSN4-DRE Series PCI Express slot



The number of PCIe slot differs by model. The KFSN4-DRE/SAS comes with one PCIe x 16 slot (x 8link); the KFSN4-DRE/2S comes with two PCIe x 16 slot (x 8link); the KFSN4-DRE comes with one PCIe x 16 slot (x 16link).

2.5.5 BMC socket

The BMC socket socket on the motherboard supports an ASUS® Server Management Board 3 Series (ASMB3).



KFSN4-DRE Series BMC SOCKET

2.6 Jumpers

1. Clear RTC RAM (CLRTC1)

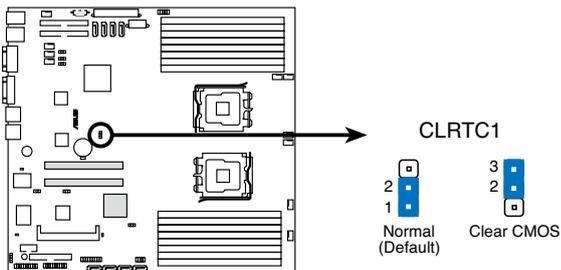
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

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



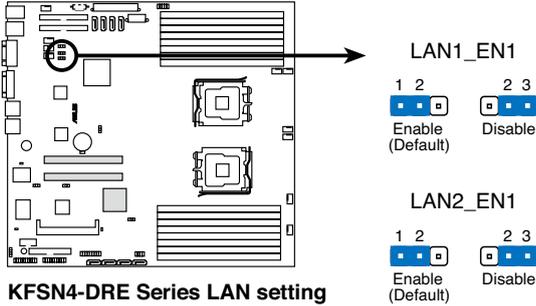
Except when clearing the RTC RAM, NEVER remove the cap on CLRTC1 jumper default position. Removing the cap will cause system boot failure!



KFSN4-DRE Series Clear RTC RAM

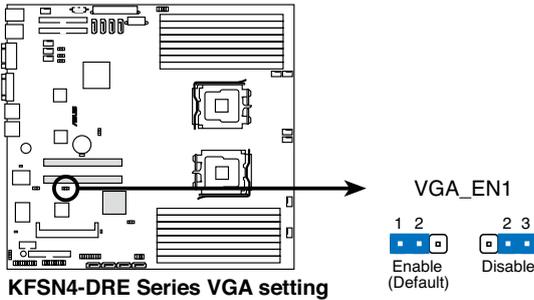
2. Gigabit LAN1 controller setting (3-pin LAN1_EN1, LAN2_EN1)

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



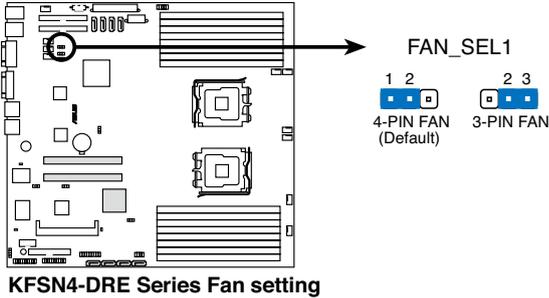
3. VGA Graphics controller setting (3-pin VGA_EN1)

This jumper allows you to enable or disable the onboard ATI ES1000 video graphics controller. Set to pins 1-2 to enable the video graphics controller.



4. Fan control setting (3-pin FAN_SEL1)

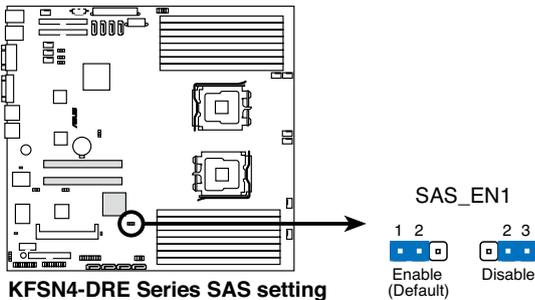
This jumper allows you to switch for fan pin selection. Set to pins 1-2 for 4-pin fans or pins 2-3 for 3-pin fans.



- 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.

5. Onboard storage setting (3-pin SAS_EN1) (KFSN4-DRE/SAS model only)

This jumper allows you to enable or disable the onboard LSI1064E SAS controller. Set the jumper to pins 1-2 to enable the SAS function (default).

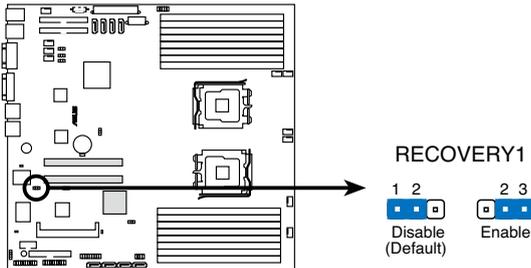


6. Force BIOS recovery setting (3-pin RECOVERY1)

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

To update the BIOS:

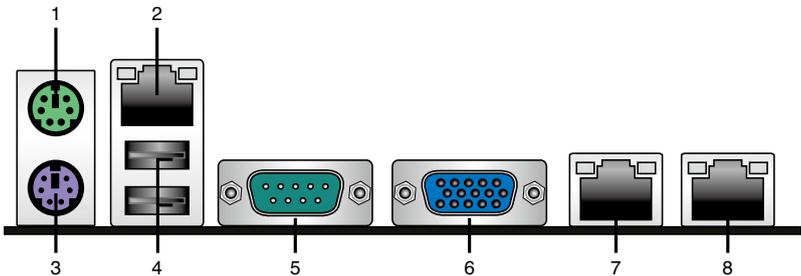
1. Prepare a floppy disk that contains the latest BIOS for the motherboard and the AFUDOS utility. Make sure you download the correct BIOS for your motherboard model.
2. Set the jumper to pins 2-3.
3. Insert the floppy disk then turn on the system to update the BIOS.
4. Shut down the system.
5. Set the jumper back to pins 1-2.
6. Turn on the system.



KFSN4-DRE Series BIOS recovery setting

2.7 Connectors

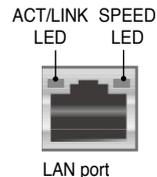
2.7.1 Rear panel connectors



1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **RJ-45 port for iKVM.** This RJ-45 port functions only when you install ASMB3/iKVM management card.
3. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.
4. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
5. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.
6. **Video Graphics Adapter port.** This port is for a VGA monitor or other VGA-compatible devices.
7. **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.
8. **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.

LAN port LED indications

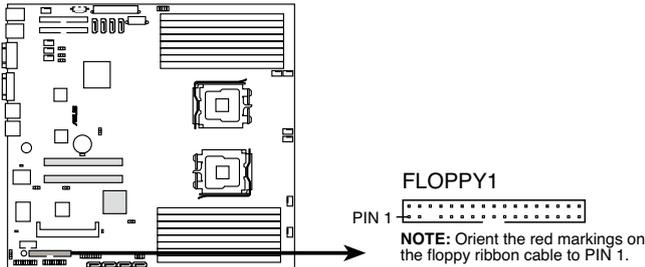
Activity/Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
ORANGE	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



2.7.2 Internal connectors

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

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



KFSN4-DRE Series Floppy disk drive connector

2. IDE connectors (40-1 pin PRI_IDE1, SEC_IDE1)

The onboard IDE connectors are for Ultra DMA 133/100/66 signal cables. There are three connectors on each Ultra DMA 133/100/66 signal cable: blue, black, and gray. Connect the blue connector to the motherboard's IDE connector, then select one of the following modes to configure your device(s).

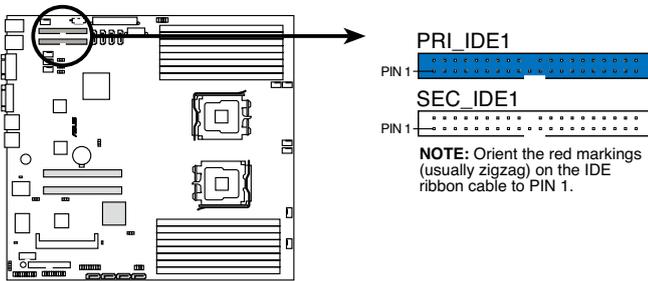
	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
	Slave	Slave	



- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra DMA 133/100/66 IDE devices.



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

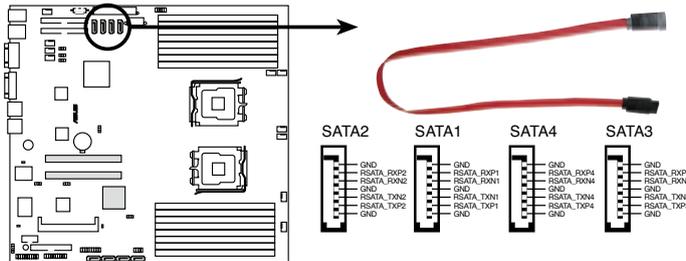


KFSN4-DRE Series IDE connector

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

Supported by the NVIDIA® nForce4™ 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 1+0, RAID 5, or JBOD configuration.



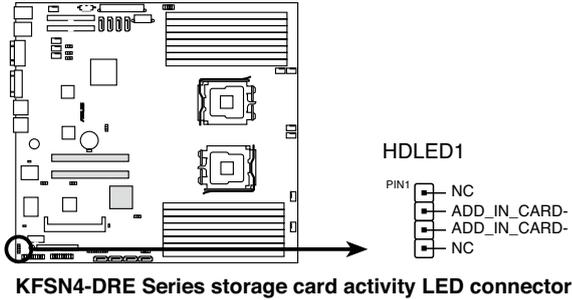
KFSN4-DRE Series SATA connectors



The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

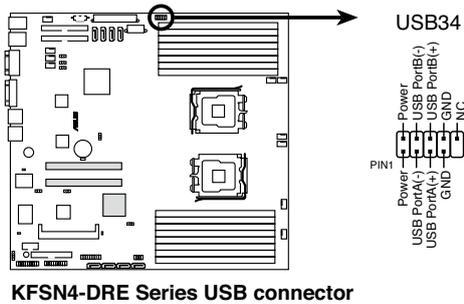
4. Hard disk activity LED connector (4-pin HDLED1)

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



5. USB connector (10-1 pin USB34)

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

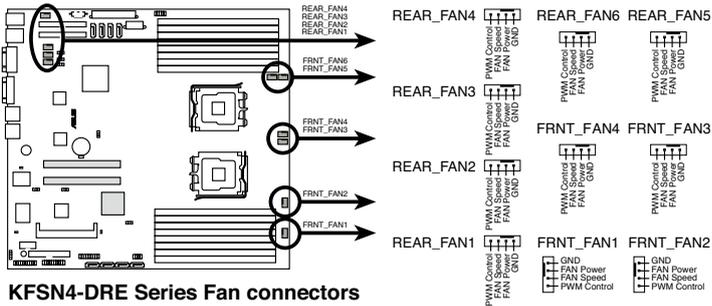


6. Front and rear fan connectors (3-pin FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, FRNT_FAN4, REAR_FAN1, REAR_FAN2, REAR_FAN3, REAR_FAN4, REAR_FAN5, REAR_FAN6)

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

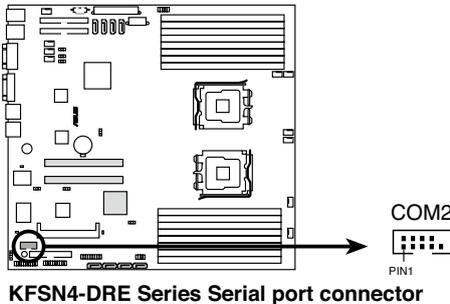


- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fans feature the ASUS Smart Fan technology.



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.

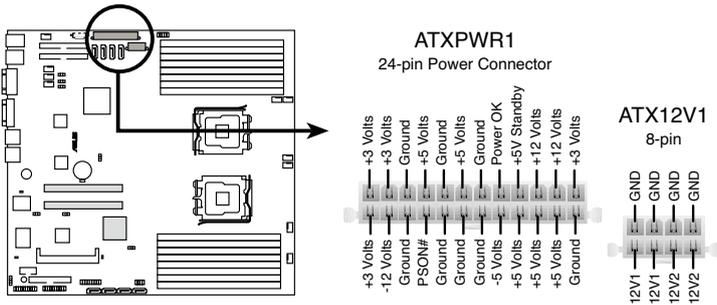


8. ATX power connectors (24-pin ATXPWR1, 8-pin ATX12V1)

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.



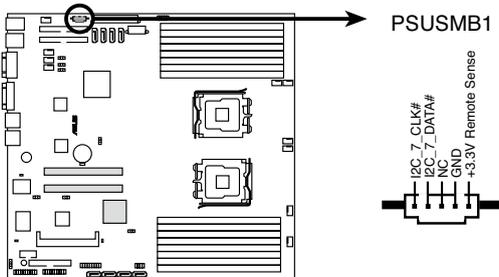
- DO NOT forget to connect the 8-pin ATX +12 V power plug; otherwise, the system will not boot.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- Make sure that your power supply unit (PSU) can provide at least the minimum power required by your system. See the table below for details.



KFSN4-DRE Series ATX power connectors

9. Power Supply SMBus connector (5-pin PSUSMB1)

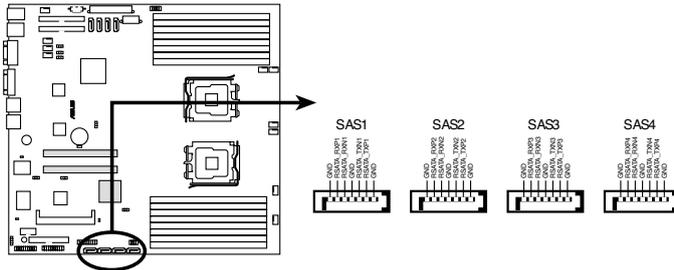
This connector allows you to connect SMBus (System Management Bus) to the power supply unit to read PSU information. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.



KFSN4-DRE Series Power supply SMBus connector

10. SAS connectors (KFSN4-DRE/SAS model only)

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



KFSN4-DRE Series SAS connectors

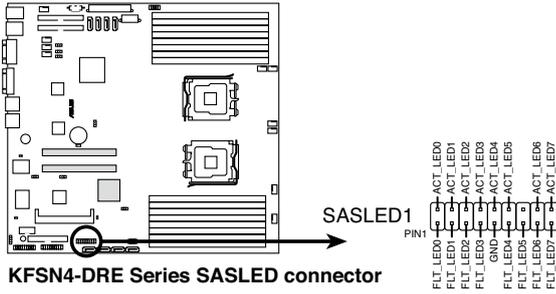
To connect the SAS cable:

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



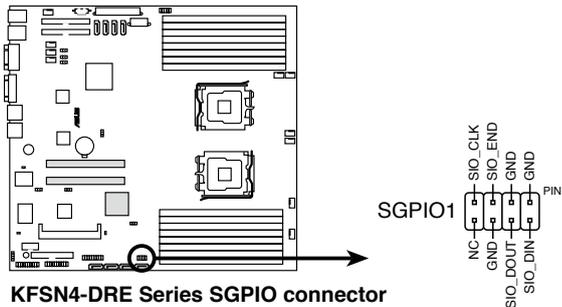
**11. SAS LSI1064E ports LED connector (18-1 pin SASLED1)
(KFSN4-DRE/SAS model only)**

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



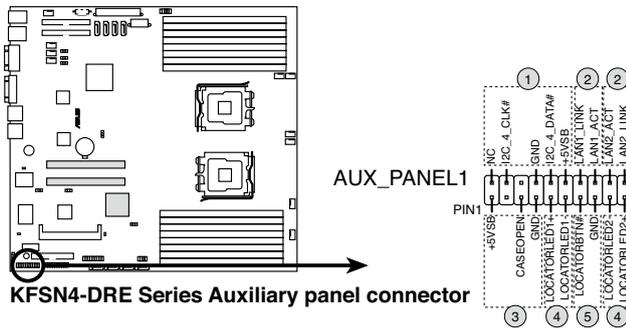
12. Serial General Purpose Input/Output connector (6-pin SGPIO1)

This connector is used for the SGPIO peripherals for the LSI MegaRAID SATA LED.



13. Auxiliary panel connector (20-2 pin AUX_PANEL1)

This connector supports several server system functions.



KFSN4-DRE Series Auxiliary panel connector

1. Front Panel SMBus (6-1 pin)

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

2. LAN1 link activity LED (2-pin LAN1_LINKACTLED)

This 2-pin connector is for the LAN1 Activity LED. Connect the LAN1 Activity LED cable to this connector. This LED blinks during a network activity and is always lit when linked.

3. LAN2 link activity LED (2-pin LAN2_LINKACTLED)

This 2-pin connector is for the LAN2 Activity LED. Connect the LAN2 Activity LED cable to this connector. This LED blinks during a network activity and lights up when linked.

4. Chassis Intrusion connector (3-pin CASEOPEN)

This lead is for a chassis with an intrusion detection feature. This requires an external detection mechanism such as a chassis intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to this lead to record a chassis intrusion event.

5. Locator LED 1 (2-pin LOCATORLED1)

This 2-pin connector is for the Locator LED 1. Connect the Locator LED 1 cable to this connector. This LED lights up when the Locator button is pressed.

6. Locator Button/Switch (2-pin LOCATORBTN)

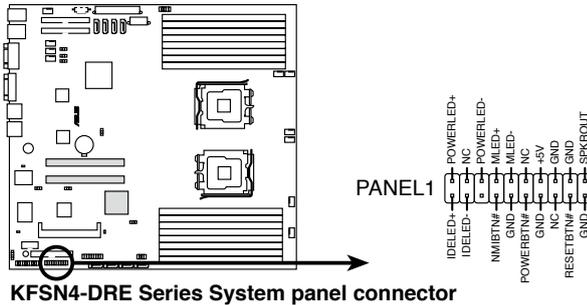
This connector is for the locator button. This button queries the state of the system locator.

7. Locator LED 2 (2-pin LOCATORLED2)

This 2-pin connector is for the Locator LED 2. Connect the Locator LED 2 cable to this connector.

14. System panel connector (20-1 pin PANEL1)

This connector supports several chassis-mounted functions.



The system panel connector is color-coded for easy connection. Refer to the connector description below for details.

- **System power LED (Green 3-pin POWERLED)**

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

- **Hard disk drive activity (Red 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.

If an optional SCSI or SATA add-in card is installed, the read or write activities of any device connected to the SCSI or SATA add-in card causes this LED to light up.

- **System warning speaker (Orange 4-pin SPKROUT)**

This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **Power/Soft-off button (Yellow 2-pin POWERBTN)**

This connector is for the system power button. Pressing the power button turns the system ON or puts the system in SLEEP or SOFT-OFF mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **Reset button (Blue 2-pin RESETBTN)**

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

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

Powering up **3**

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

3.1 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Be sure that all switches are off.
3. Connect the power cord to the power connector at the back of the system chassis.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. Turn on the devices in the following order:
 - a. Monitor
 - b. External SCSI devices (starting with the last device on the chain)
 - c. System power
6. After applying power, the system power LED on the system front panel case lights up. For systems with ATX power supplies, the system LED lights up when you press the ATX power button. If your monitor complies with “green” standards or if it has a “power standby” feature, the monitor LED may light up or switch between orange and green after the system LED turns on.

The system then runs the power-on self-test 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 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® 2000/2003 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. Make sure 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**

4.1	Managing and updating your BIOS	4-1
4.2	BIOS setup program	4-5
4.3	Main menu	4-8
4.4	Advanced menu	4-13
4.5	Server menu	4-27
4.6	Security menu	4-29
4.7	Boot menu	4-31
4.8	Exit menu	4-33

4.1 Managing and updating your BIOS

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

1. **ASUS AFUDOS** (Updates the BIOS using a bootable floppy disk)
2. **ASUS CrashFree BIOS 2** (Updates the BIOS using a bootable floppy disk or the motherboard support CD when the BIOS file fails or gets corrupted.)

Refer to the corresponding sections for details on these utilities.



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

4.1.1 Creating a bootable floppy disk

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

DOS environment

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

Windows® XP environment

- a. Insert a 1.44 MB floppy disk to the floppy disk drive.
- b. Click **Start** from the Windows® desktop, then select **My Computer**.
- c. Select the 3½ Floppy Drive icon.
- d. Click **File** from the menu, then select **Format**. A **Format 3½ Floppy Disk** window appears.
- e. Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.

Windows® 2000 environment

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

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

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

4.1.2 AFUDOS utility

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

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:



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

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

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

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

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

Main filename Extension name

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

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

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

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

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



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

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

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

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

```
A:\>afudos /iKFSN4DRE.ROM
```

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

```
A:\>afudos /iKFSN4DRE.ROM
AMI Firmware Update Utility - Version 1.19 (ASUS V2.07 (03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

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

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



DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

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

```
A:\>afudos /iKFSN4DRE.ROM
AMI Firmware Update Utility - Version 1.19 (ASUS V2.07 (03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

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

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

Please restart your computer

A:\>
```

4.1.3 ASUS CrashFree BIOS 2 utility

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



- Prepare the motherboard support CD or the floppy disk containing the updated motherboard BIOS before using this utility.
- Make sure that you rename the original or updated BIOS file in the floppy disk to KFSN4DRE.ROM.

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

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



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

3. The utility displays the following message and automatically checks the floppy disk for the original or updated BIOS file.

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

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

```
Bad BIOS checksum. Starting BIOS recovery...  
Checking for floppy...  
Floppy found!  
Reading file "KFSN4DRE.ROM". Completed.  
Start flashing...
```



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

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

4.2 BIOS setup program

This motherboard supports a programmable Serial Peripheral Interface (SPI) 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 SPI chip.

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

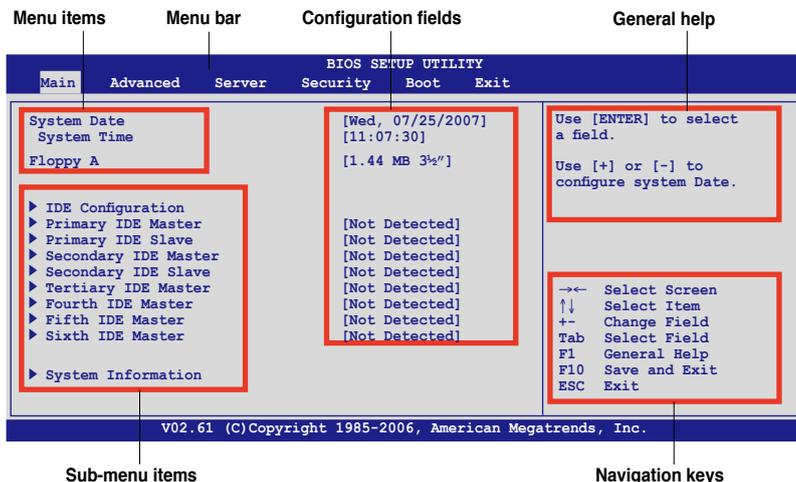
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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



-
- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section **4.8 Exit Menu**.
 - The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
 - Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.
-

4.2.1 BIOS menu screen



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 options
- Security** For changing the advanced system security options
- Boot** For changing the system boot configuration
- Exit** For selecting the exit options and loading default settings

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

4.2.3 Navigation keys

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



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

4.2.4 Menu items

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

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



Main menu items

4.2.5 Sub-menu items

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

4.2.6 Configuration fields

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

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

4.2.7 Pop-up window

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

4.2.8 Scroll bar

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



Pop-up window

Scroll bar

4.2.9 General help

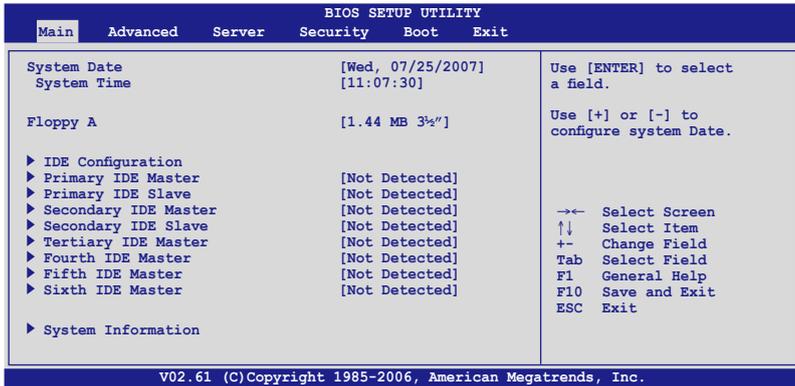
At the top right corner of the menu screen is a brief description of the selected item.

4.3 Main menu

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



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



4.3.1 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

4.3.2 System Time [xx:xx:xx]

Allows you to set the system time.

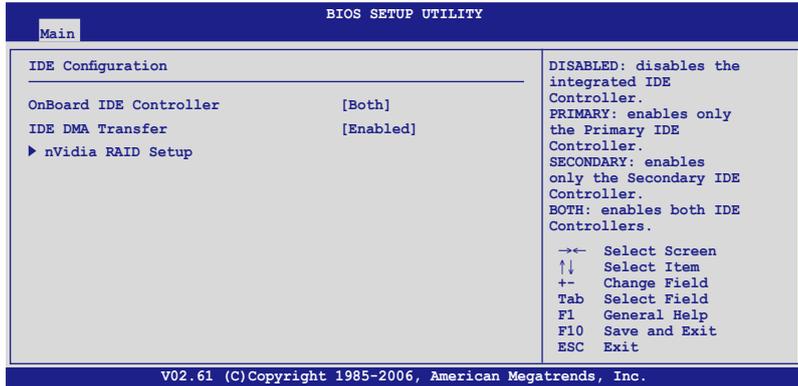
4.3.3 Floppy A [1.44 MB 3 1/2"]

Sets the type of floppy drive installed.

Configuration options: [Disabled] [360 KB 5 1/4"] [1.2 MB 5 1/4"] [720 KB 3 1/2"] [1.44 MB 3 1/2"] [2.88 MB 3 1/2"]

4.3.4 IDE Configuration

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



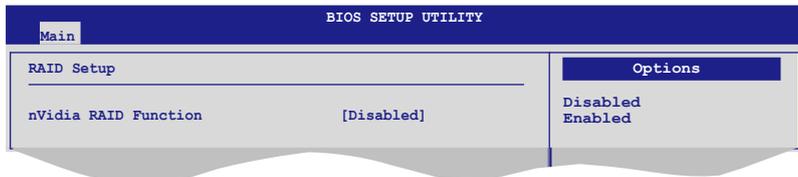
OnBoard IDE Controller [Both]

Enables or disables any or both the primary and/or secondary IDE controllers. Configuration options: [Disabled] [Primary] [Secondary] [Both]

IDE DMA Transfer [Enabled]

Enables or disables the BIOS to use PCI busmastering for reading/writing to IDE drives. Configuration options: [Disabled] [Enabled]

nVidia RAID Setup



nVidia RAID Function [Disabled]

Enables or disables the NVIDIA® RAID option ROM. Configuration options: [Disabled] [Enabled]



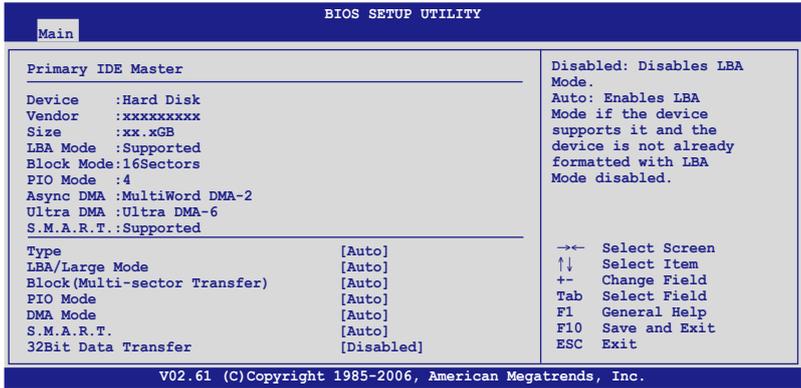
The following items appear when the **nVidia RAID Function** is set to [Enabled].

SATA1/2 Primary/Secondary Channel [Disabled]

Sets the SATA 1/2 Primary/Secondary channel as RAID. Configuration options: [Disabled] [Enabled]

4.3.5 Primary/Secondary IDE Master/Slave; Tertiary/Fourth/Fifth/Sixth IDE Master

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



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

Type [Auto]

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

Configuration options: [Not Installed] [Auto] [CD/DVD] [ARMD]

LBA/Large Mode [Auto]

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

Block (Multi-sector Transfer) [Auto]

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

Configuration options: [Disabled] [Auto]

PIO Mode [Auto]

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]

S.M.A.R.T. [Auto]

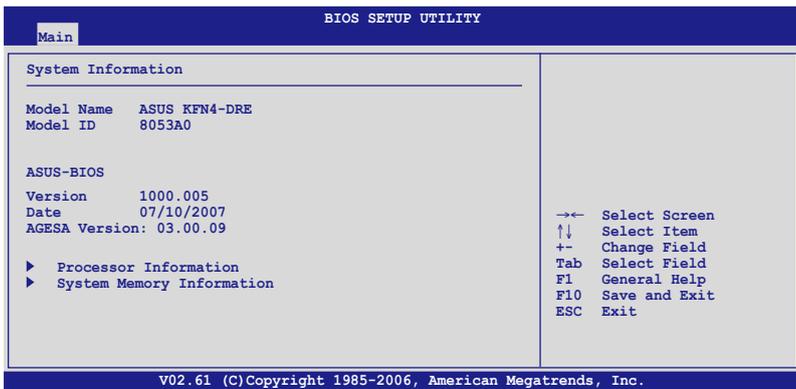
Sets the Smart Monitoring, Analysis, and Reporting Technology.
Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Disabled]

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

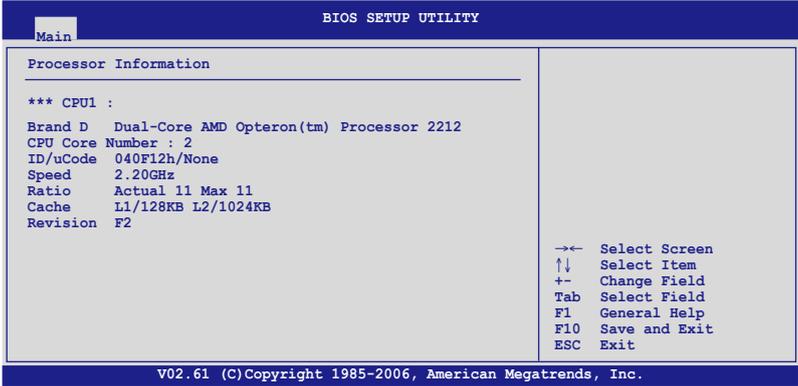
4.3.6 System Information

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



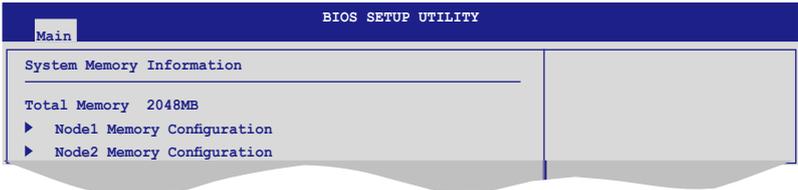
Processor

Displays the installed processor information.

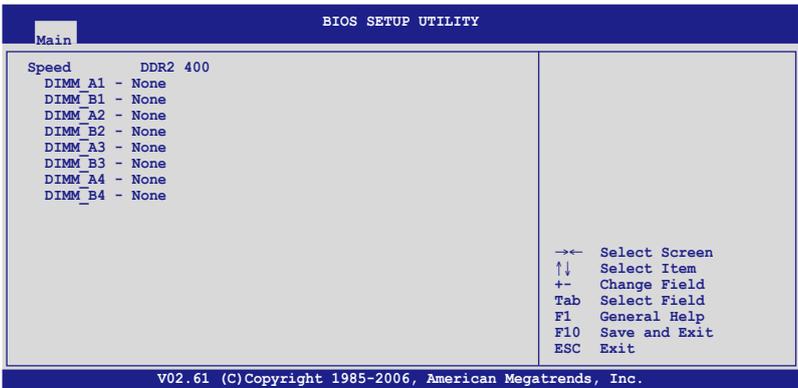


System Memory

Displays the installed system memory information.



Node1/2 Memory Configuration

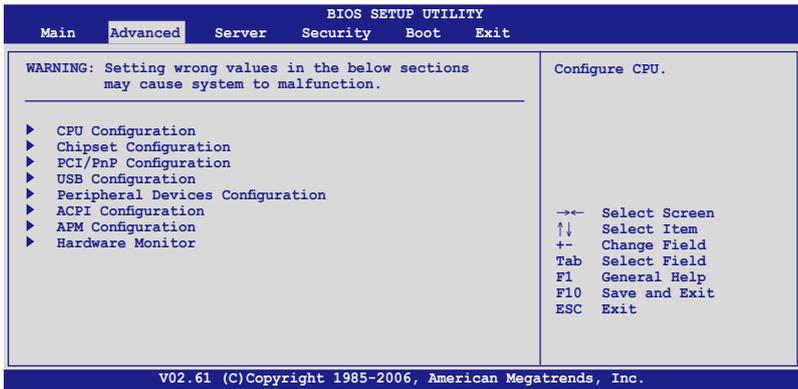


4.4 Advanced menu

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

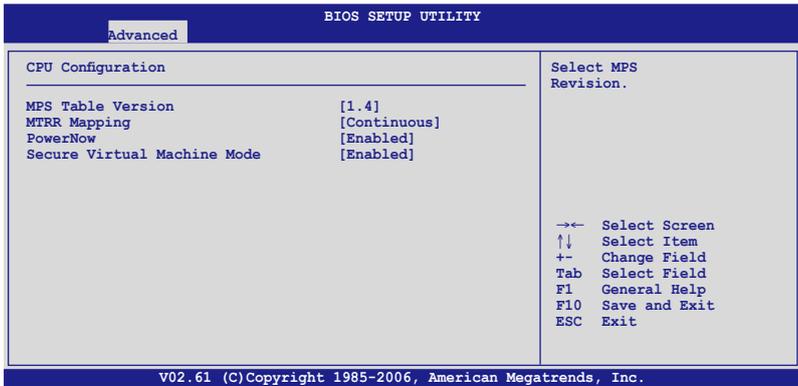


Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



4.4.1 CPU Configuration

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



MPS Table Version [1.4]

Sets the Multi-Processor System (MPS) table version.
Configuration options: [1.1] [1.4]

MTRR Mapping [Continuous]

Determines the method used for programming processor MTRRs when using more than 4GB of system memory. Configuration options: [Continuous] [Discrete]

PowerNow [Enabled]

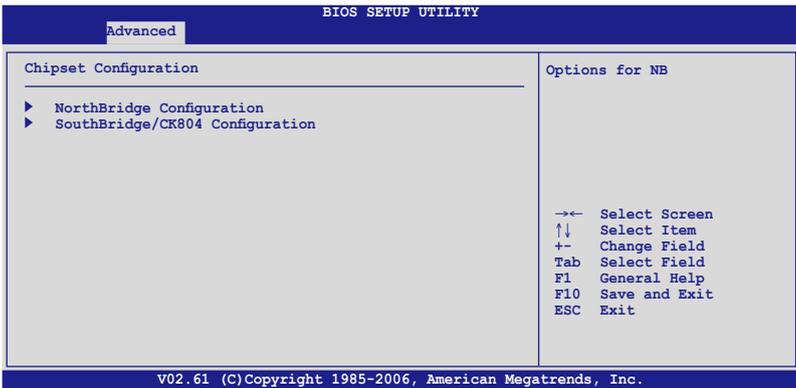
Enables or disables the generation of ACPI_PPC/_PSS/_PCT objects. Configuration options: [Enabled] [Disabled]

Secure Virtual Machine Mode [Enabled]

Enables or disables Secure Virtual Machine mode.

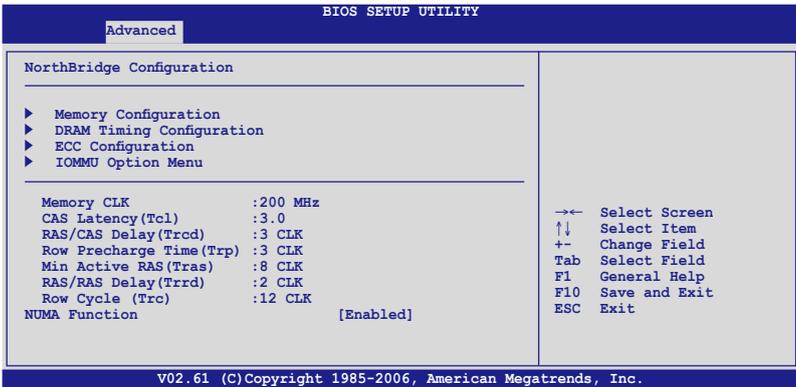
4.4.2 Chipset Configuration

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



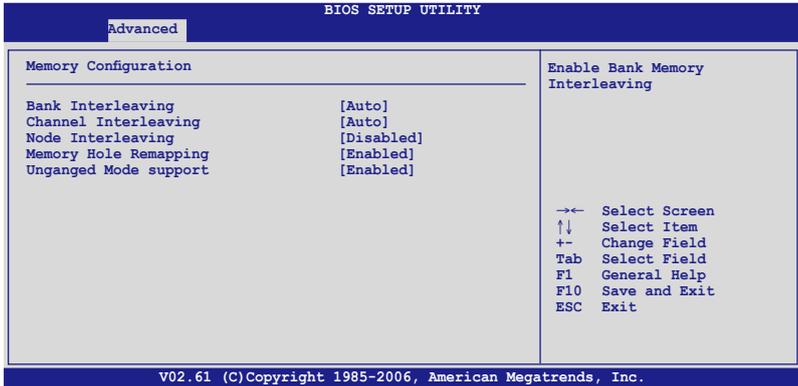
NorthBridge Configuration

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



Memory Configuration

The memory configuration menu allows you to change the memory settings.



Bank Interleaving [Auto]

Enables bank memory interleaving. Configuration options: [Disabled] [Auto]

Channel Interleaving [Disabled]

Enables channel memory interleaving.

Configuration options: [Disabled] [Auto] [Reserved] [Reserved] [Reserved]

Node Interleaving [Disabled]

Enables node interleaving.

Configuration options: [Disabled] [Enabled]

Memory Hole Remapping [Enabled]

Enables memory remapping around memory hole.

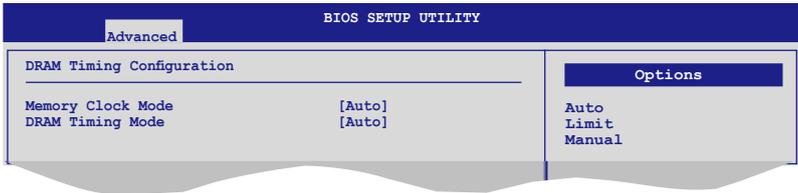
Configuration options: [Disabled] [Enabled]

Unganged Mode support [Enabled]

Enables or disables the force unganged mode.

Configuration options: [Disabled] [Enabled]

DRAM Timing Configuration



Memory Clock Mode [Auto]

Configuration options: [Auto] [Limit] [Manual]



The following item appears when **Memory Clock Mode** is set to [Limit] or [Manual].

Memclock Value [200 MHz]

Configuration options: [200 MHz] [266 MHz] [333 MHz] [400 MHz] [533 MHz]

DRAM Timing Mode [Auto]

Allows you to select the DRAM timing mode.

Configuration options: [Auto] [DCT 0] [DCT 1] [Both]



The following items appear when **DRAM Timing Mode** is set to [DCT 0], [DCT 1] or [Both].

CAS Latency (CL) [Auto]

Configuration options: [Auto] [3 CLK] [4 CLK] [5 CLK] [6 CLK]

TRCD [Auto]

Configuration options: [3 CLK] [4 CLK] [5 CLK] [6 CLK] [Auto]

TRP [Auto]

Configuration options: [3 CLK] [4 CLK] [5 CLK] [6 CLK] [Auto]

tRTP [Auto]

Configuration options: [2-4 CLK] [3-5 CLK] [Auto]

TRAS [Auto]

Configuration options: [Auto] [5 CLK] [6 CLK] [7 CLK] [8 CLK] [9 CLK] [10 CLK] [11 CLK] [12 CLK]~ [17 CLK] [18 CLK]

TRRD [Auto]

Configuration options: [Auto] [2 CLK] [3 CLK] [4 CLK] [5 CLK]

TRC [Auto]

Configuration options: [Auto] [12 CLK] [13 CLK] ~ [25 CLK] [26 CLK]

tWR [Auto]

Configuration options: [3 CLK] [4 CLK] [5 CLK] [6 CLK] [Auto]



The following items appear when **DRAM Timing Mode** is set to [DCT 0], or [Both].

tRWTTO [2 CLK]

Configuration options: [2 CLK] [3 CLK] [4 CLK] [5 CLK] [6 CLK] [7 CLK] [8 CLK] [9 CLK] [Auto]

tWRRD [0 CLK]

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



The following item appears when **DRAM Timing Mode** is set to [DCT 0], [DCT 1] or [Both].

tWTR [Auto]

Configuration options: [Auto] [1 CLK] [2 CLK] [3 CLK]



The following items appear when **DRAM Timing Mode** is set to [DCT 0], or [Both].

tWRWR [1 CLK]

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

tRDRD [2 CLK]

Configuration options: [2 CLK] [3 CLK] [4 CLK] [5 CLK] [Auto]



The following item appears when **DRAM Timing Mode** is set to [DCT 0], [DCT 1] or [Both].

tRFC0 [Auto]

Configuration options: [75ns] [105ns] [127.5ns] [195ns] [327.5ns] [Auto]

tRFC1 [Auto]

Configuration options: [75ns] [105ns] [127.5ns] [195ns] [327.5ns] [Auto]

tRFC2 [Auto]

Configuration options: [75ns] [105ns] [127.5ns] [195ns] [327.5ns] [Auto]

tRFC3 [Auto]

Configuration options: [75ns] [105ns] [127.5ns] [195ns] [327.5ns] [Auto]

ECC Configuration

BIOS SETUP UTILITY		
Advanced		
ECC Configuration	[Enabled]	Set GART size in systems without AGP, or disable altogether. Some OSes require valid GART for proper operation. If AGP is present, select appropriate option to ensure proper AGP operation.

ECC Configuration [Enabled]

Allows you to enable or disable ECC configuration.

Configuration options: [Enabled] [Disabled]

IOMMU Option Menu

BIOS SETUP UTILITY		
Advanced		
IOMMU Mode	[Disabled]	Set GART size in systems without AGP, or disable altogether. Some OSes require valid GART for proper operation. If AGP is present, select appropriate option to ensure proper AGP operation.

IOMMU Mode [Disabled]

Allows you to set GART size in systems without AGP, or disable altogether. Some operating systems require valid GART for proper operation. If AGP is present, select appropriate option to ensure proper AGP operation.

Configuration options: [AGP Present] [Disabled] [32MB] [64MB] [128MB] [256MB] [512MB] [1GB]

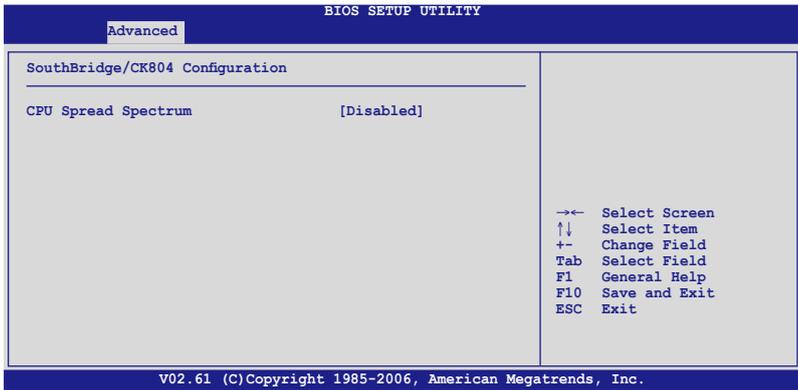
NUMA Function [Enabled]

Enables or disables the building of ACPI SRAT Table.

Configuration options: [Enabled] [Disabled]

SouthBridge/CK804 Configuration

The SouthBridge/CK804 Configuration menu allows you to change the Southbridge settings.



CPU Spread Spectrum [Disabled]

Sets or disables the processor clock spread spectrum.

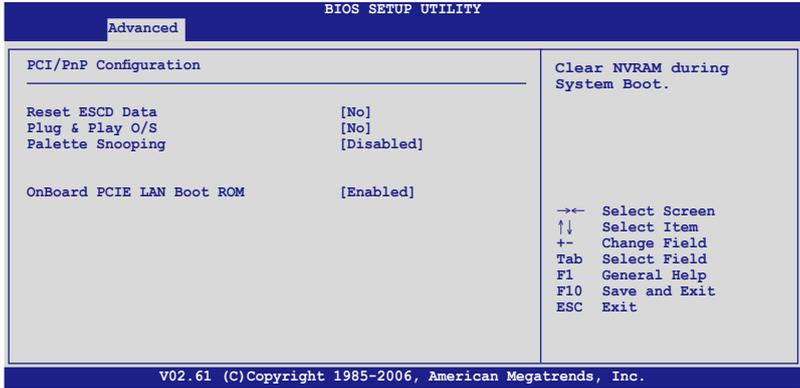
Configuration options: [Disabled] [Center Spread] [Down Spread]

4.4.3 PCI PnP

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



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



Reset ESCD Data [No]

Clears the non-volatile RAM (NVRAM) during boot.

Configuration options: [No] [Yes]

Plug And Play O/S [No]

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

Configuration options: [No] [Yes]

Palette Snooping [Disabled]

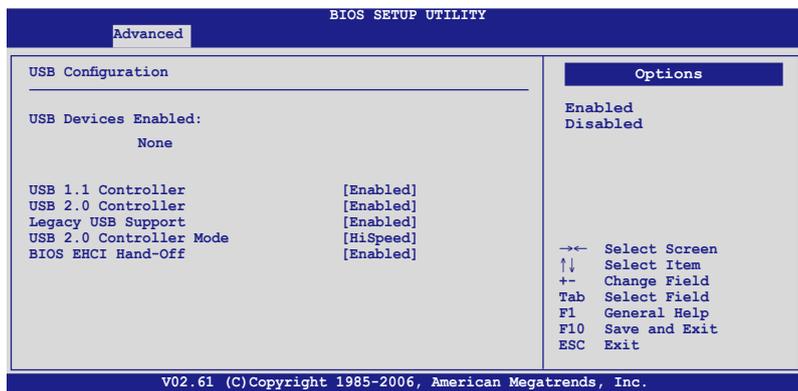
When set to [Enabled], the palette snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

OnBoard PCIE LAN Boot ROM [Enabled]

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

4.4.4 USB Configuration

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



The **USB Devices Enabled** item shows the auto-detected values. If no USB device is detected, the item shows None.

USB 1.1 Controller [Enabled]

Enables or disables the USB 1.1 controller support.

Configuration options: [Enabled] [Disabled]

USB 2.0 Controller [Enabled]

Enables or disables the USB 2.0 controller support.

Configuration options: [Enabled] [Disabled]

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]



The following items appear when you set **Legacy SUB Support** to [Enabled] or [Auto]

USB 2.0 Controller Mode [HiSpeed]

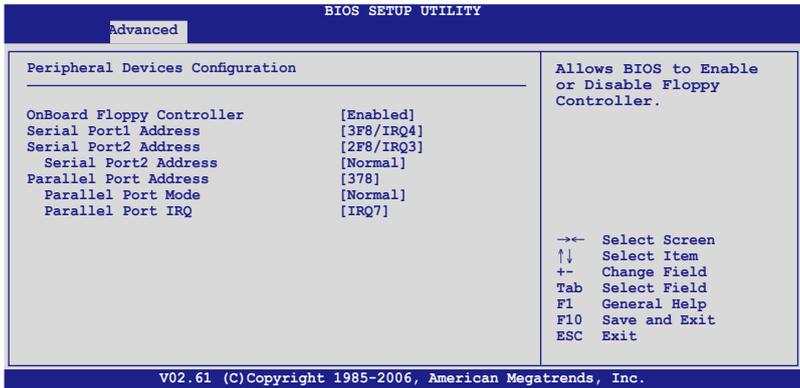
Allows you to set the USB 2.0 controller mode to HiSpeed (480 Mbps) or FullSpeed (12 Mbps). Configuration options: [FullSpeed] [HiSpeed]

BIOS EHCI Hand-Off [Enabled]

Enables or disables the BIOS EHCI hand-off support.

Configuration options: [Disabled] [Enabled]

4.4.5 Peripheral Devices Configuration



OnBoard Floppy Controller [Enabled]

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

Serial Port1 Address [3F8/IRQ4]

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

Serial Port2 Address [2F8/IRQ3]

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

Serial Port 2 Mode [Normal]

Sets the serial port 2 mode.
Configuration options: [Normal] [IrDA] [ASK IR]

Parallel Port Address [378]

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



The following items appear when the Parallel Port Address is not set to [Disabled].

Parallel Port Mode [Normal]

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



The following item appears when you set **Parallel Port Mode** to [ECP] or [ECP & EPP]

ECP Mode DMA Channel [DMA3]

This item allows you to set the Parallel Port ECP DMA.
Configuration options: [DMA0] [DMA1] [DMA3]



The following item appears when you set **Parallel Port Mode** to [ECP & EPP].

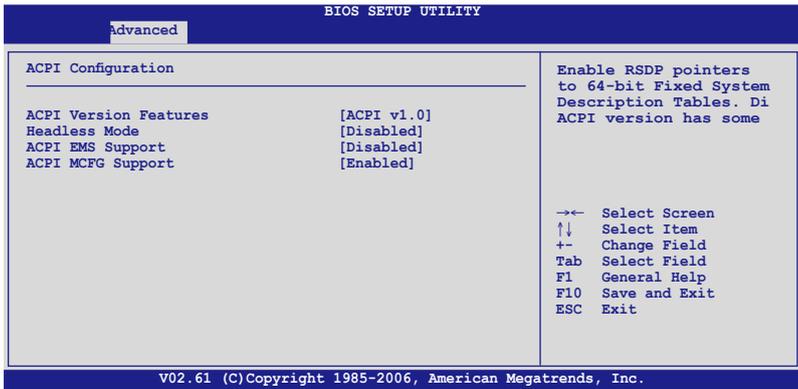
EPP Version [1.9]

Allows selection of the Parallel Port EPP version. Configuration options: [1.9] [1.7]

Parallel Port IRQ [IRQ7]

Allows you to select the Parallel Port IRQ.
Configuration options: [IRQ5] [IRQ7]

4.4.6 ACPI Configuration



ACPI Version Features [ACPI v1.0]

Configuration options: [ACPI v1.0] [ACPI v2.0] [ACPI v3.0]

Headless Mode [Disabled]

Enables or disables the headless operation mode in ACPI.
Configuration options: [Disabled] [Enabled]

ACPI EMS Support [Disabled]

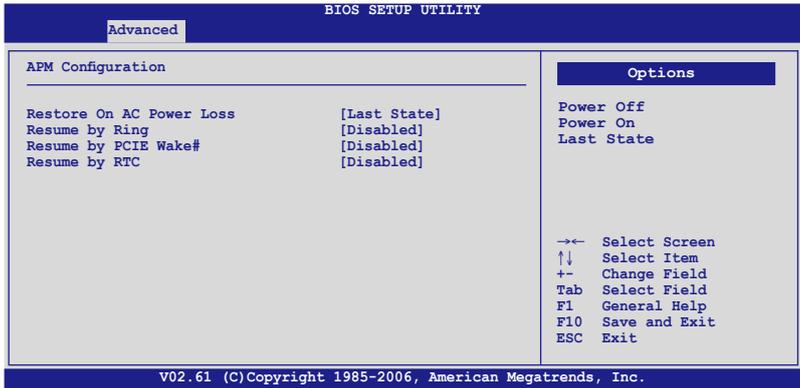
Enables or disables the ACPI EMS support.
Configuration options: [Disabled] [Enabled]

ACPI MCFG Support [Enabled]

Enables or disables the ACPI MCFG support.
Configuration options: [Disabled] [Enabled]

4.4.7 APM Configuration

This sub-menu allows you to change Advanced Power Management (APM) features. Select an item then press <Enter> to display the configuration options.



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]

Resume By Ring [Disabled]

When set to [Enabled], the system will generate a wake event when the external modem receives a call while the computer is in Soft-off mode.

Configuration options: [Disabled] [Enabled]

Resume By PCIE Wake# [Disabled]

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

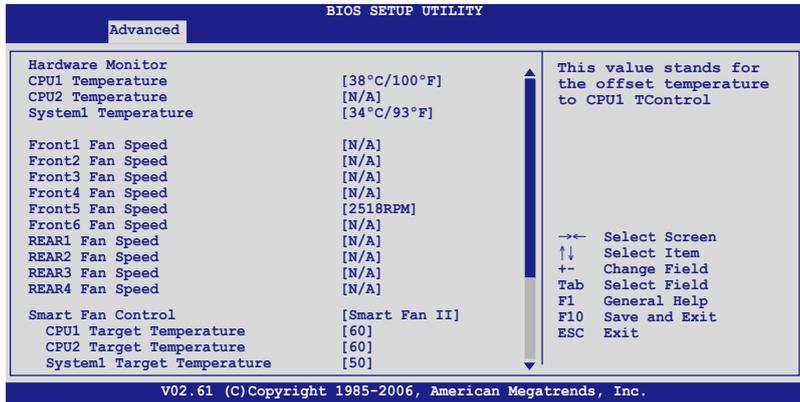
Configuration options: [Disabled] [Enabled]

Resume by RTC [Disabled]

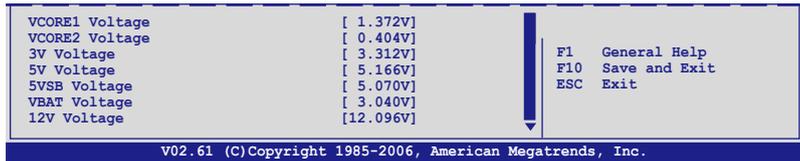
Allows you to enable or disable RTC to generate a wake event. When this item is set to [Enabled], the items RTC Alarm Date, RTC Alarm Hour, RTC Alarm Minute, and RTC Alarm Second appear with set values.

Configuration options: [Disabled] [Enabled]

4.4.8 Hardware Monitor



Scroll down for more items.



CPU1/CPU2 Temperature [xxx°C/xxx°F]

System1 Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the motherboard and CPU temperatures. Select [Ignored] if you do not wish to display the detected temperatures. The CPU2 Temperature shows N/A if no processor is installed in CPU2 socket.

Front1/2/3/4/5/6 Fan Speed [xxxxRPM] or [N/A]

Rear1/2/3/4 Fan Speed [xxxxRPM] or [N/A]

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

Smart Fan Control [Smart Fan II]

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

Configuration options: [Disabled] [Smart Fan] [Smart Fan II]



The following items appear when you enable the Smart Fan Control feature.

CPU1/CPU2 Target Temperature [60]

Allows you to set the CPU target temperature.

Configuration options: [40] [45] [50] [55] [60] [65] [70] [75] [80] [85]

System1 Target Temperature [50]

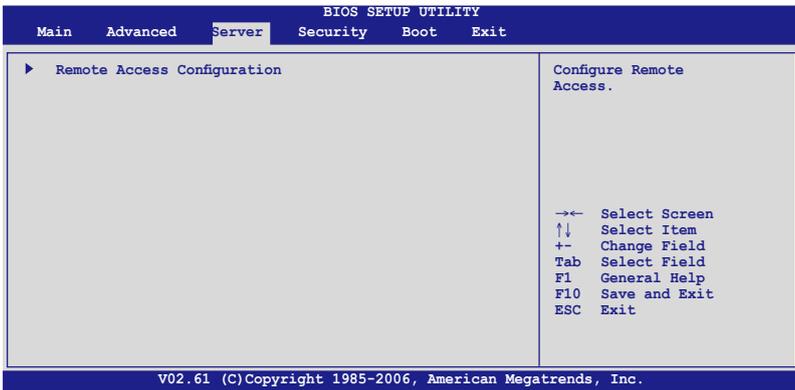
Allows you to set the system target temperature.

Configuration options: [40] [45] [50] [55] [60] [65] [70] [75] [80] [85]

**VCORE1 Voltage, VCORE2 Voltage, 3V Voltage, 5V Voltage,
5VSB Voltage, VBAT Voltage, 12V Voltage**

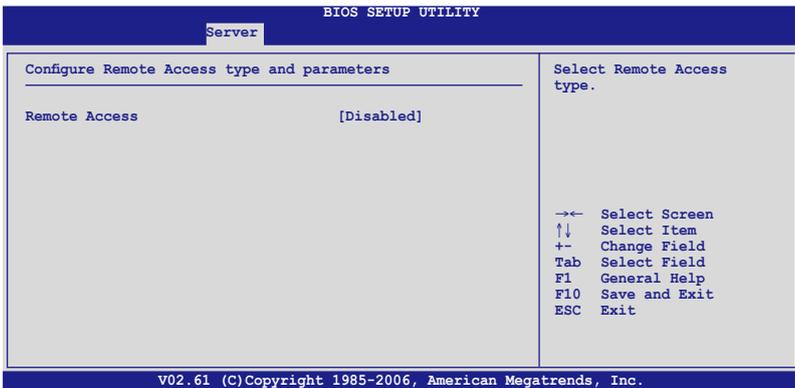
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. The VCORE2 item shows N/A if no processor is installed in CPU2 socket.

4.5 Server menu



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.



Remote Access [Disabled]

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 [COM1]

Selects the serial port for console redirection.

Configuration options: [COM1] [COM2]

Baudrate [57600]

Sets the baudrate. Configuration options: [115200] [57600] [38400] [19200] [9600]

Flow Control [None]

Allows you to select the flow control for console redirection.

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

Redirection After BIOS POST [Always]

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

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

Terminal Type [ANSI]

Allows you to select the target terminal type.

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

VT-UTF8 Combo Key Support [Disabled]

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

Configuration options: [Disabled] [Enabled]

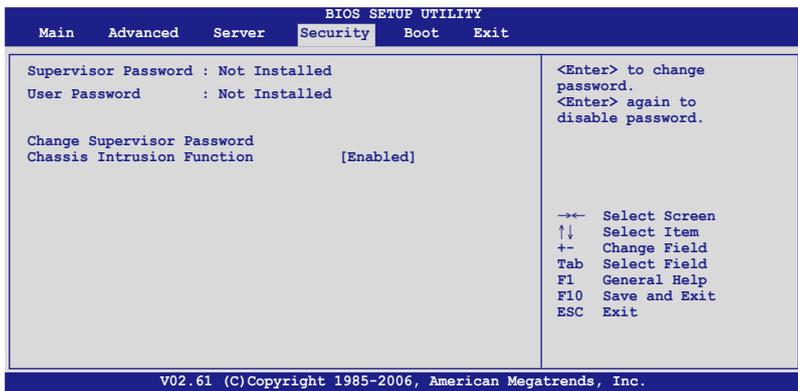
Media Type [Serial]

Allows you to select the media for console redirection.

Configuration options: [Serial] [LAN] [Serial + LAN]

4.6 Security

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



Change Supervisor Password

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

To set a Supervisor Password:

1. Select the **Change Supervisor Password** item 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.

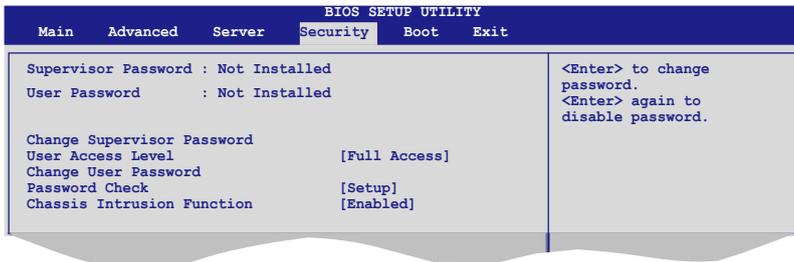
To change the supervisor password, follow the same steps as in setting a user password.

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.



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]

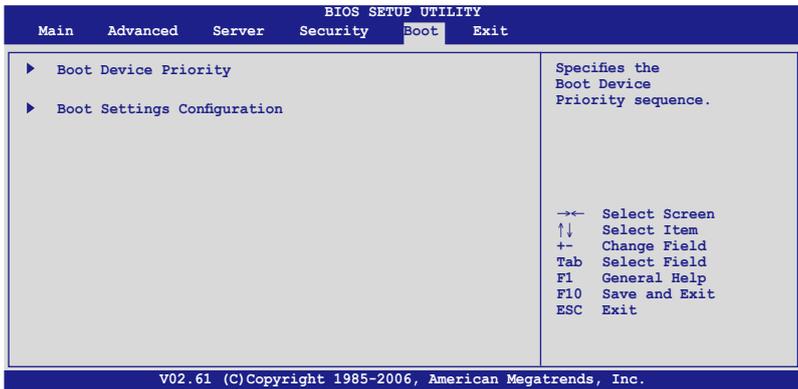
When set to [Setup], BIOS checks for user password when accessing the Setup utility. When set to [Always], BIOS checks for user password both when accessing Setup and booting the system. Configuration options: [Setup] [Always]

Chassis Intrusion Function [Enabled]

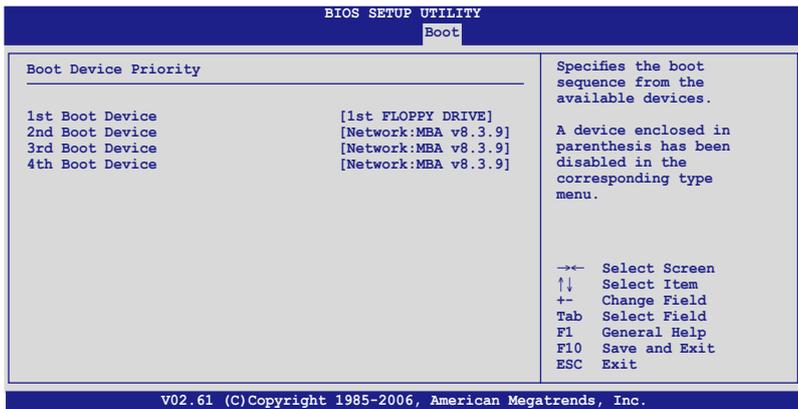
Enables or disables the chassis intrusion function. Configuration options: [Disabled] [Enabled]

4.7 Boot menu

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



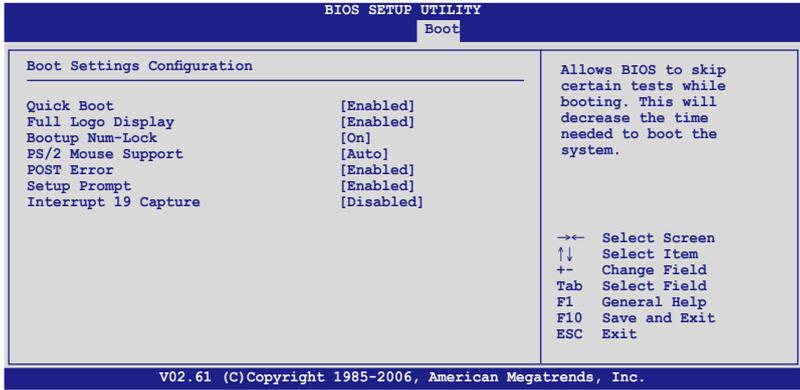
4.7.1 Boot Device Priority



1st ~ xxth Boot Device [1st FLOPPY DRIVE]

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 Boot Settings Configuration



Quick Boot [Enabled]

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

Configuration options: [Disabled] [Enabled]

Full Logo Display [Enabled]

Allows you to enable or disable the full screen logo display feature.

Configuration options: [Disabled] [Enabled]



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

Bootup Num-Lock [On]

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

Configuration options: [Off] [On]

PS/2 Mouse Support [Auto]

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

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

POST Error [Enabled]

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

Setup Prompt [Enabled]

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

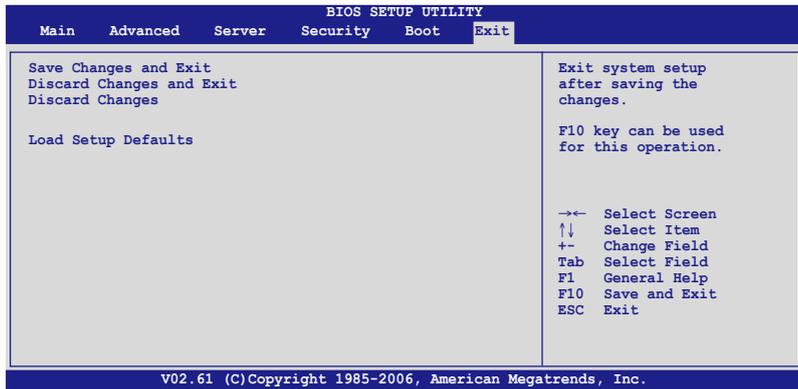
Interrupt 19 Capture [Disabled]

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

Configuration options: [Disabled] [Enabled]

4.8 Exit menu

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



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.

5 RAID configuration

5.1	Setting up RAID.....	5-1
5.2	NVIDIA® RAID configurations.....	5-3
5.3	LSI Logic MPT Setup Utility (<i>KFSN4-DRE/SAS model only</i>)....	5-9

5.1 Setting up RAID

The motherboard comes with the following RAID solutions:

KFSN4-DRE; KFSN4-DRE/2S model

- The NVIDIA® nForce Professional 2200 chipset comes with a built-in SATA RAID controller that allows you to configure RAID 0 and RAID 1 with SATA hard disk drives.

KFSN4-DRE/SAS model

- The NVIDIA® nForce Professional 2200 chipset comes with a built-in SATA RAID controller that allows you to configure RAID 0 and RAID 1 with SATA hard disk drives.
- LSI1064E PCI-E SAS controller supports SAS disk drives and RAID0, RAID1, and RAID1E configuration.

5.1.1 RAID definitions

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

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

RAID 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.



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

5.1.2 Installing hard disk drives

The motherboard supports Serial ATA 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 BIOS RAID items

After installing the hard disk drives, make sure to set the necessary RAID items in the BIOS before setting your RAID configuration.

To set the BIOS RAID items:

1. Enter the BIOS Setup during POST.
2. Go to the Main Menu, select IDE Configuration, then press <Enter>.
3. Set the RAID Option ROM item to [Enabled], then press <Enter>. The master and slave drive list appears.
4. Enable the drives you want to set as RAID.
5. Save your changes, then exit the BIOS Setup.



-
- Refer to Chapter 5 for details on entering and navigating through the BIOS Setup.
 - The RAID BIOS setup screens shown in this section are for reference only, and may not exactly match the items on your screen.
-

5.1.4 RAID configuration utilities

You can create a RAID set using the utility embedded in each RAID controller. For example, you can use the NVIDIA® RAID Utility if you installed SATA hard disk drives to the SATA connectors supported by the NVIDIA® nForce Professional 2200 chip. Refer to the succeeding sections for details on how to enter the RAID configuration utility.

For KFSN4-DRE/SAS model, you may use the **LSI1064E SAS Configuration Utility** if you installed SAS hard disk drives to the SAS connector(s) supported by the LSI1064E PCI-E SAS controller.

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

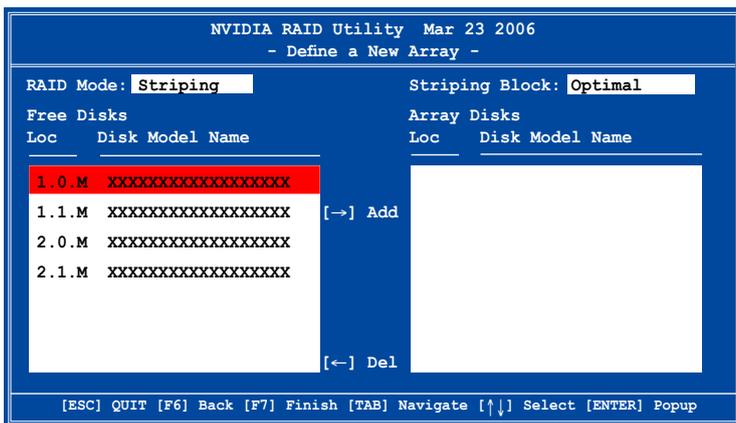
5.2 NVIDIA® RAID configurations

The motherboard includes a high performance SATA RAID controller integrated in the NVIDIA® nForce Professional 2200 chip. The RAID controller supports RAID 0 and RAID 1 using the four independent Serial ATA channels.

5.2.1 Entering the NVIDIA® RAID Utility

To enter the NVIDIA® RAID Utility:

1. Restart the computer.
2. During POST, press <F10> to display the utility main menu.



The SATA ports are called channels that are associated with adapters. The first digit in the Location field defines the adapter that the SATA port is associated with. The 2nd digit defines the channel. The **M** field, That are used to specify Master or Slave, is obsolete.

At the bottom section of the screen are the navigation keys. These keys allow you to move through and select menu options.

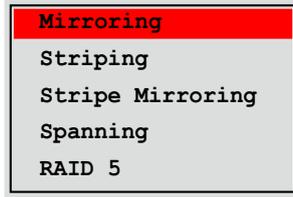


The navigation keys vary depending on the menu level or option.

5.2.2 Creating a RAID Volume

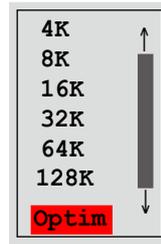
To create a RAID 0 set:

1. From the Define a New Array menu, select **RAID Mode**, then press <Enter>. A pop-up menu appears. Use the up or down arrow keys to select a RAID mode, then press <Enter>. You can select either **Mirroring**, **Striping**, **Spanning**, **Stripe Mirroring**, or **RAID 5**.



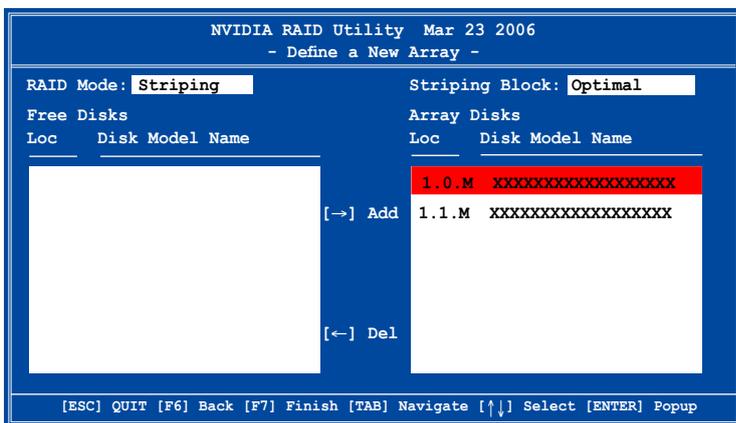
- The RAID mode is set to Mirroring by default.
- Not all RAID modes are supported on all platforms. (This server only has two HDDs that only supports RAID 0 and RAID 1 mode.)

2. Press <TAB> to select the **Striping Block** option, then press <Enter>. The following submenu appears: The available stripe size values range from 4KB to 128KB. The default stripe size is optimal (64KB). You must choose the stripe size value based on the projected drive usage. For low disk usage, select 4 KB/16 KB. For typical disk usage, select 64 KB. Select 128KB for performance disk usage.



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

3. Press <TAB> to move to the **Free Disks** section. Highlight the hard disk drives that you want to add in the RAID set, then press the right arrow key to select. The selected hard disk drives appear in the **Array Disks** section. Repeat the process until all desired hard disk drives are added.



4. Press <F7> to create the RAID set. A pop-up window appears.

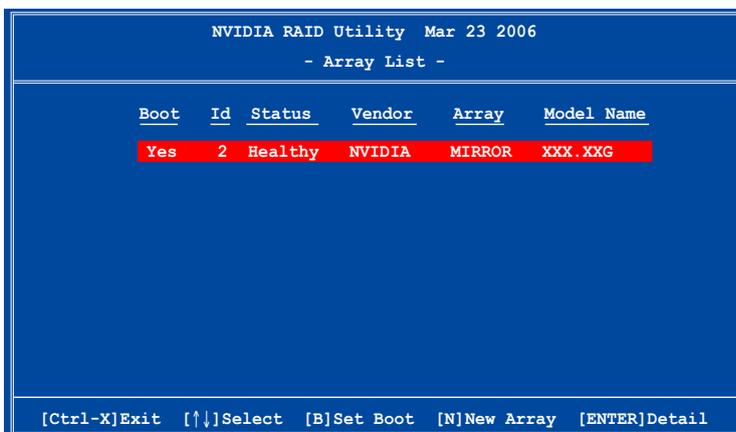


5. Press <Y> to delete all data from the hard disk drives, or <N> to continue creating the RAID set without deleting the data on the disks. The **Array List** windows appears.



You will lose all data on the drives if you clear the disk data!

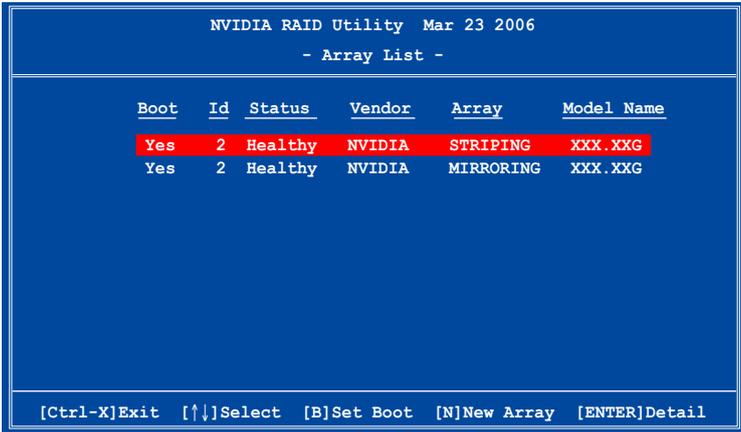
6. The utility displays the created RAID set. Press <Ctrl+X> to save your settings and exit the utility.



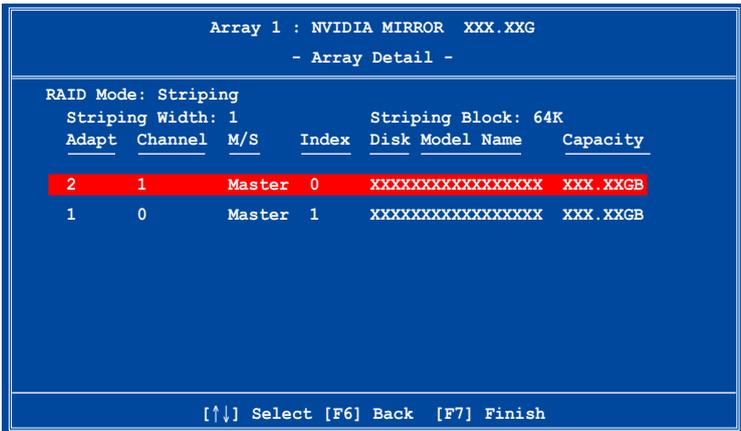
5.2.3 Rebuilding a RAID set

To rebuild a RAID set:

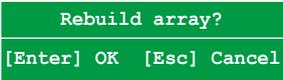
1. From the **Array List**, use the up or down arrow keys to select the RAID set you want to rebuild, then press <Enter>. The RAID set details appear.



2. Press <R>.
3. Use the up or down arrow keys to select a the RAID set you want to rebuild, then press <F7>. A confirmation message appears.



4. Press <Enter> to start rebuilding the array, or <Esc> to cancel. The Array List screen displays the RAID set after rebuilding.



5.2.4 Deleting a RAID array

To delete a RAID array:

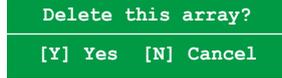
1. From the **Array List**, use the up or down arrow keys to select the RAID set you want to delete, then press <Enter>. The RAID set details appear.



<u>Boot</u>	<u>Id</u>	<u>Status</u>	<u>Vendor</u>	<u>Array</u>	<u>Model Name</u>
No	4	Healthy	NVIDIA	STRIPING	XXX.XXG
No	3	Healthy	NVIDIA	MIRRORING	XXX.XXG

[R] Rebuild [D] Delete [C] Clear Disk [ENTER] Return

2. When the array details appear, press <D> to delete the RAID set. A confirmation message appears.
3. Press <Y> to delete the array, or press <N> to cancel.



Delete this array?
[Y] Yes [N] Cancel



You will lose all data on the drives if you delete a disk array!

4. The **Define a New Array** menu appears when you press <Y>. Create a new RAID set following the instructions in the previous sections.

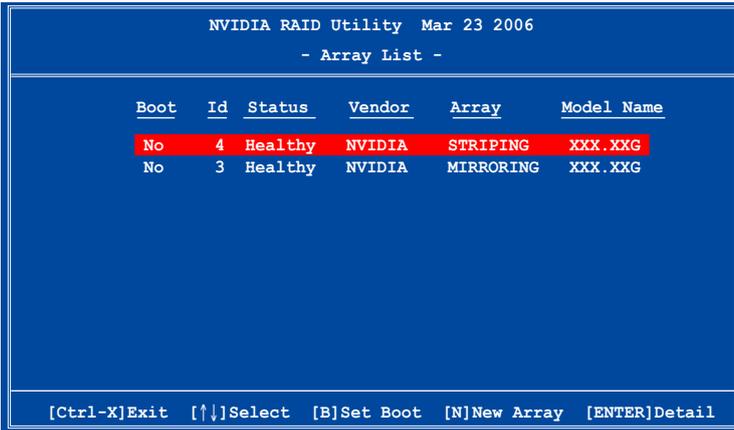
5.2.5 Clearing the disk data



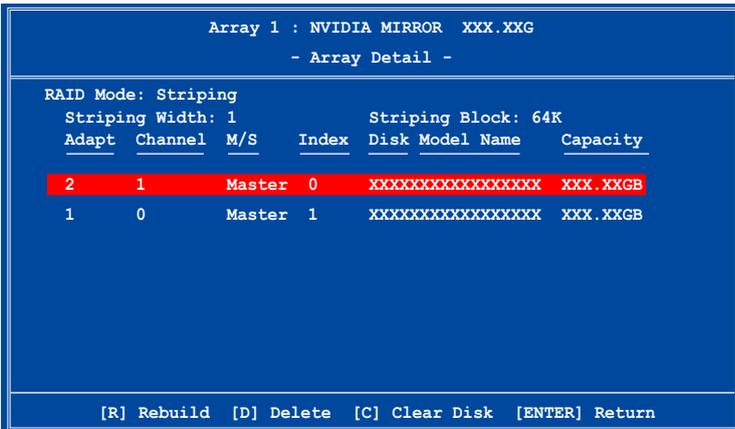
You will lose all data when you clear a disk!

To clear the disk data:

1. From the **Array List**, use the up or down arrow keys to select a RAID set, then press <Enter>. The RAID set details appear.



2. When the array details appear, select the hard disk drive you want to clear, then press <C>. A confirmation message appears.



3. Press <Y> to clear the disk data, or press <N> to cancel. Press <C> to clear disk. The following confirmation message appears.



5.3 LSI Logic MPT Setup Utility

(KFSN4-DRE/SAS model only)

The LSI Logic MPT Setup Utility is an integrated RAID solution that allows you to allow you to create the following RAID set(s) from SAS hard disk drives supported by the LSI1064E PCI-E 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..
```

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

```

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

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



The numbers of the channel depend on the controller.

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

```

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

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

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

```

LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Select New Array Type -- SAS1064E
Create IM Volume  Create Integrated Mirror Array of 2
                  disks plus up to 2 optional hot spares.
                  Data on the primary disk may be migrated.
Create IMS Volume Create Integrated Mirrored Enhanced
                  Array of 3 to 10 disks including up
                  to 2 optional hot spares.
                  ALL DATA on array disks will be DELETED!
Create IS Volume  Create Integrated Striping array of
                  2 to 10 disks.
                  ALL DATA on array disks will be DELETED!
  
```

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

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

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

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

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

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

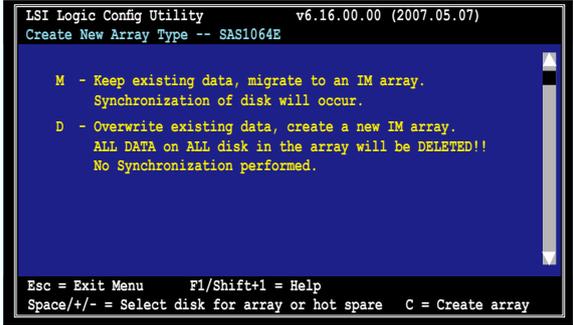
Esc = Exit Menu  F1/Shift+1 = Help
SPACE/+/- = Select disk for array or hot spare  C = Create array
```



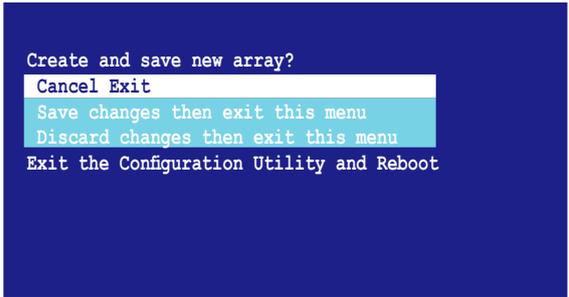
By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

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

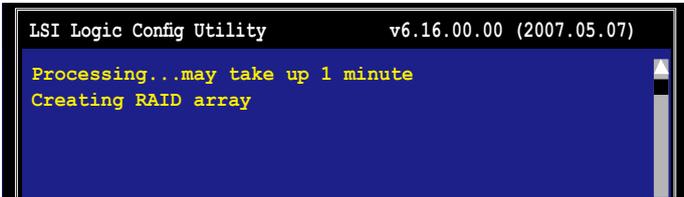
7. A confirmation screen appears.
 Press <M> to keep existing data on the first disk. If you choose this option, data on the first disk will be mirrored on the second disk that you will add to the volume later. Make sure the data you want to mirror is on the first disk.
 Press <D> to overwrite any data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



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



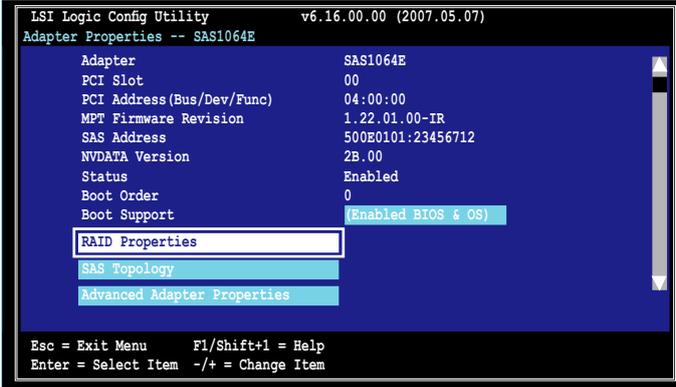
10. The utility creates the array.



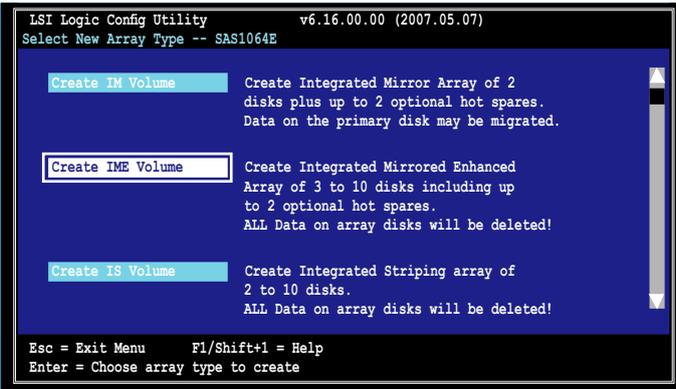
5.3.2 Integrated Mirroring Enhanced

To create an IME volume:

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



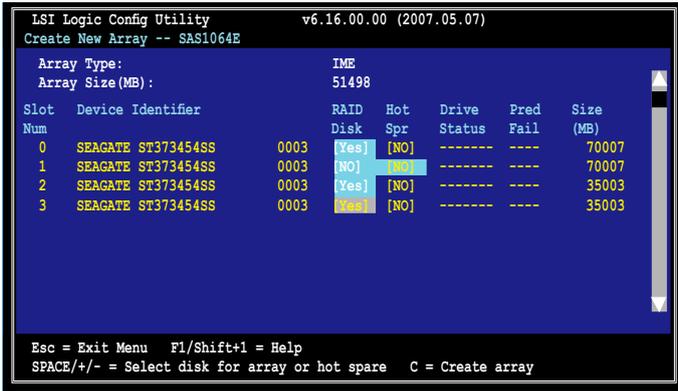
2. The **Select New Array Type** screen appears.
Use the arrow keys to select **Create IME Volume**, then press <Enter>.



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

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

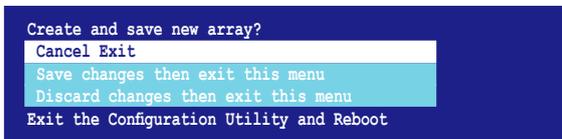
You may also specify the Hot Spare disk here. Select the disk, then move the cursor to the Hot Spr column, then press <+>, <->, or <Space>.



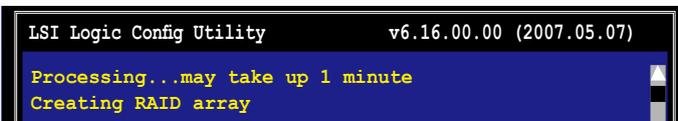
By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

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

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



- The utility creates the 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...
```

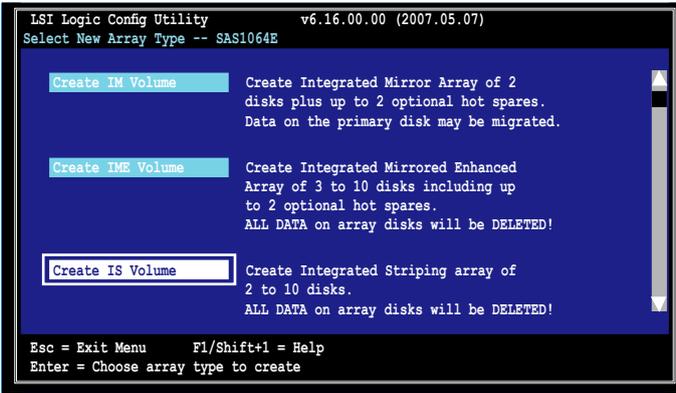
3. The **Adapter Properties** screen appears. Use the arrow keys to select **RAID Properties**, then press <Enter>.

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

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

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

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



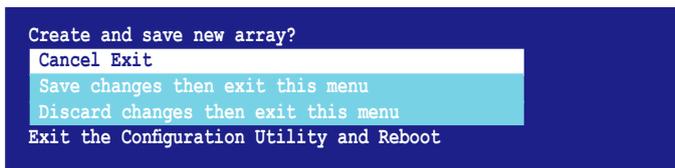
5. The **Create New Array** screen shows the disks you can add to make up the IS volume. Use the arrow key to select a disk, then move the cursor to the RAID Disk column. To include this disk in the array, press <+>, <->, or <Space>.



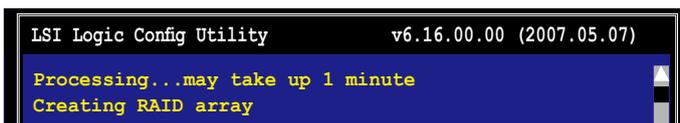
By default, the RAID Disk field shows No before array creation. This field is grayed out under the following conditions:

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

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



- The utility creates the array.



5.3.4 Managing Arrays

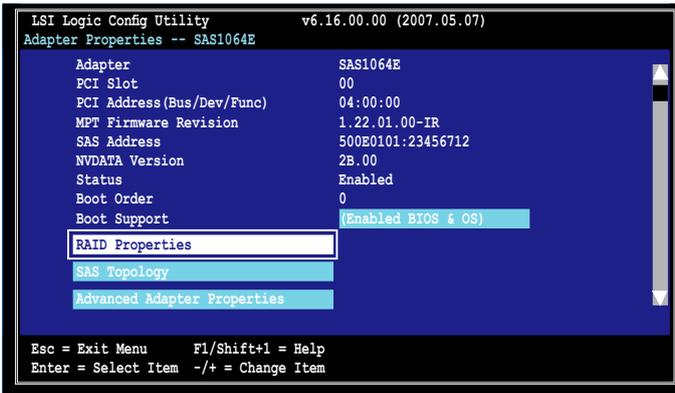
The LSI Logic MPT Setup Utility allows you to perform other tasks related to configuring and maintaining IM and IME volumes.

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

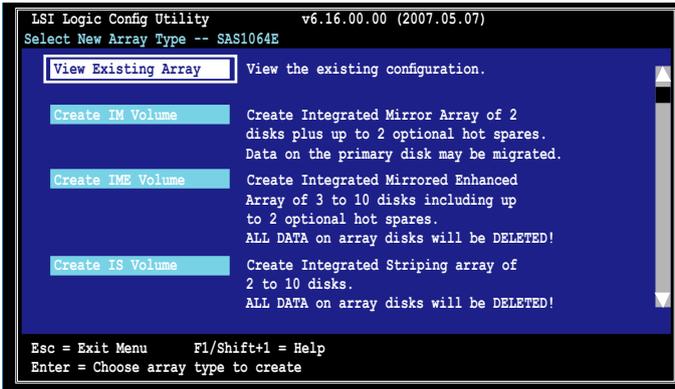
Viewing volume properties

To view volume properties:

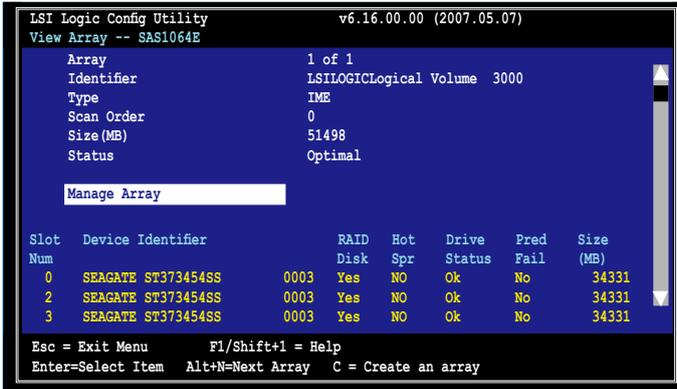
1. On the main menu, select **RAID Properties**.



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



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



Managing hot spares

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



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

To create a hot spare:

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

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

Manage Array

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

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

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

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

Manage Hot Spare
Synnchronize Array
Activate Array
Delete Array

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

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

Press <C> to commit the changes.

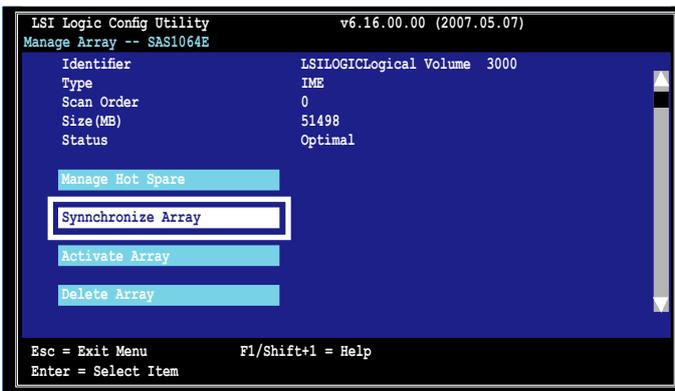


Synchronizing the array

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

To synchronize the array:

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



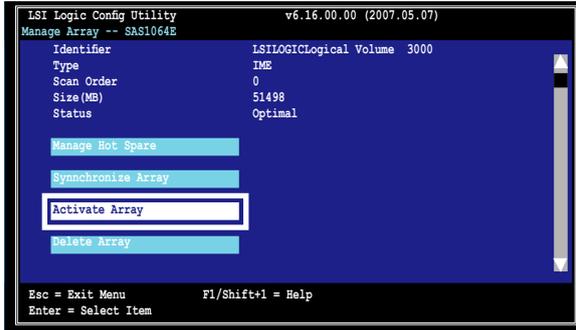
- Press <Y> to begin the synchronization, or <N> to cancel.

Activating an array

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

To activate the array:

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



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

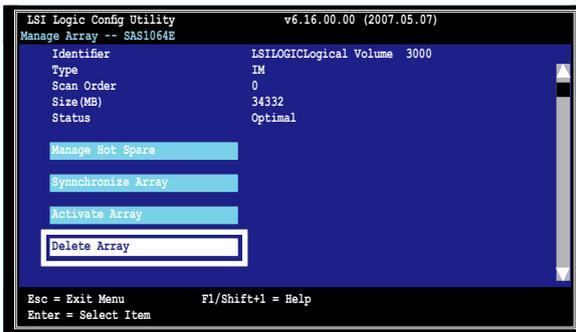
Deleting an array



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

To delete an array:

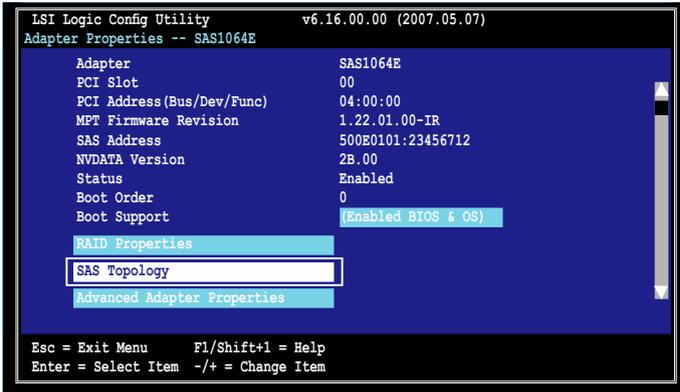
1. From the **Manage Array** screen, select **Delete Array**, then press <Enter>.



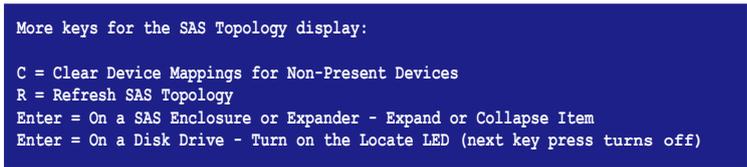
2. Press <Y> to delete, or <N> to cancel.

5.3.5 Viewing SAS topology

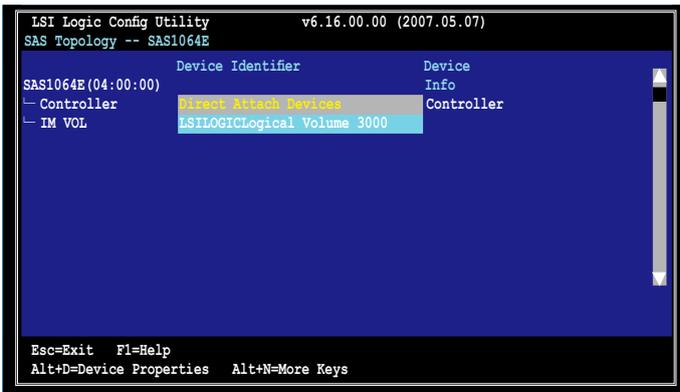
1. From the **Adapter Properties** screen, select **SAS Topology**.



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



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



Selecting a boot disk

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

Follow these steps to select a boot disk:

1. In the **LSI Logic Config Utility**, select an adapter from the **Adapter List**.
2. Select the **SAS Topology** option.

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

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



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

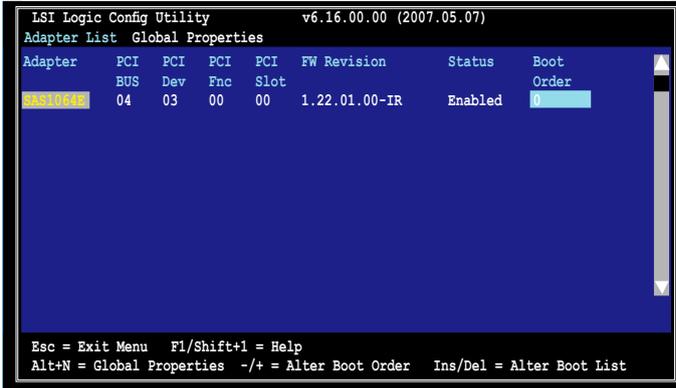
```
LSI Logic Config Utility          v6.16.00.00 (2007.05.07)
Adapter List  Global Properties
Adapter  PCI   PCI   PCI   PCI   FW Revision   Status   Boot
        BUS  Dev  Fnc  Slot
00000000 04   03   00   00   1.22.01.00-IR Enabled   0

```

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

5.5.6 Global Properties

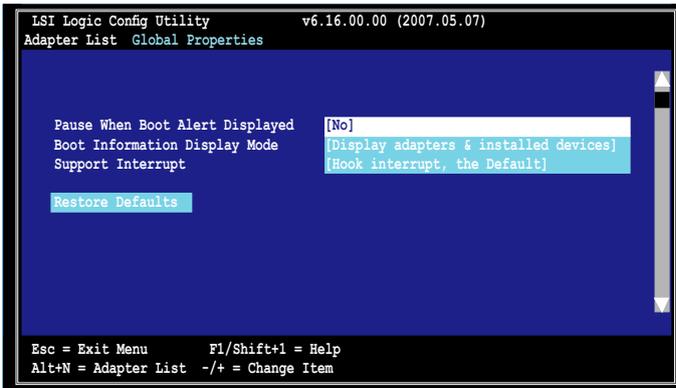
From the **Setup Utility** screen, press <Alt+N> to enter **LSI Logic Configuration**, then select **Global Properties**. The **Global Properties** menu allows you to change related settings.



Pause When Boot Alert Displayed

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

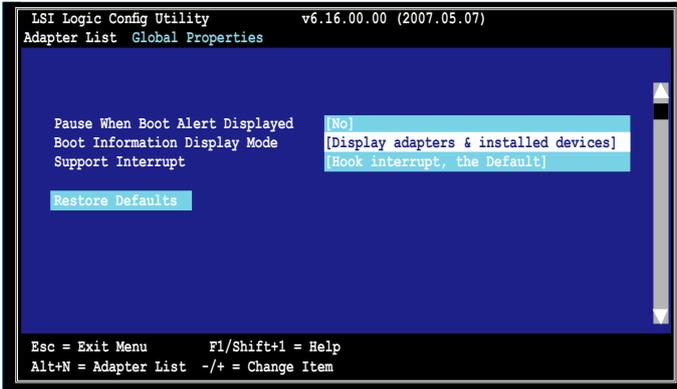
Configuration options: [Yes] [No]



Boot Information Display Mode

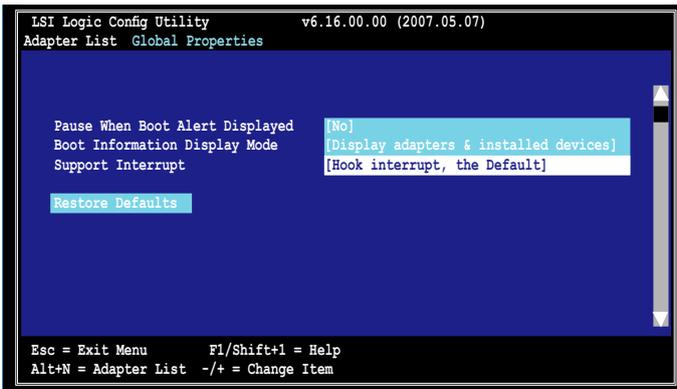
Sets the disk information display mode.

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



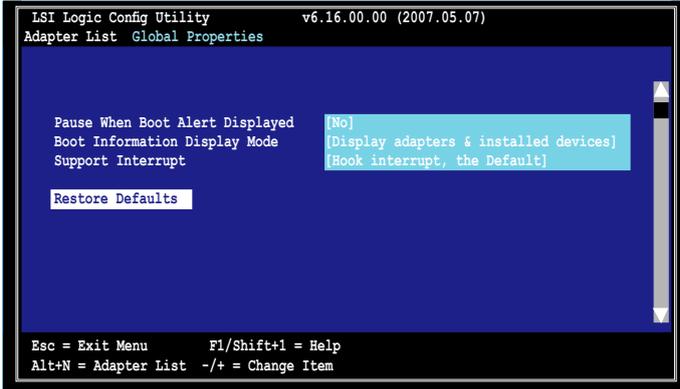
Support Interrupt

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



Restore Defaults

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



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

6 Driver installation

6.1	RAID driver installation	6-1
6.2	LAN driver installation.....	6-7
6.4	nVIDIA® driver installation.....	6-10
6.5	Management application and utilities installation	6-13

6.1 RAID driver installation

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

6.1.1 Creating a RAID driver disk



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

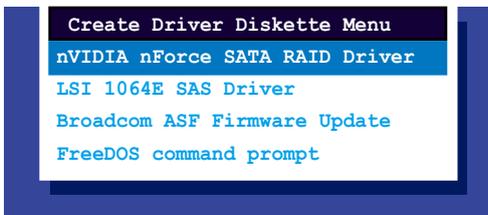
A floppy disk with the RAID driver is required when installing Windows® 2000/XP operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support CD) or in Windows® environment.

To create a RAID driver disk in DOS environment:

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

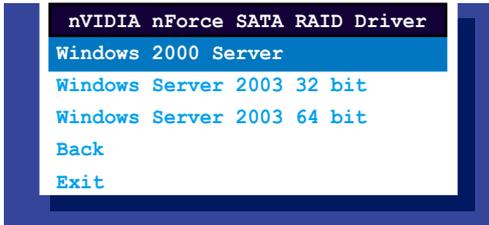
```
Loading FreeDOS FAT KERNEL GO!  
Press any key to boot from CDROM...
```

The Makedisk menu appears.

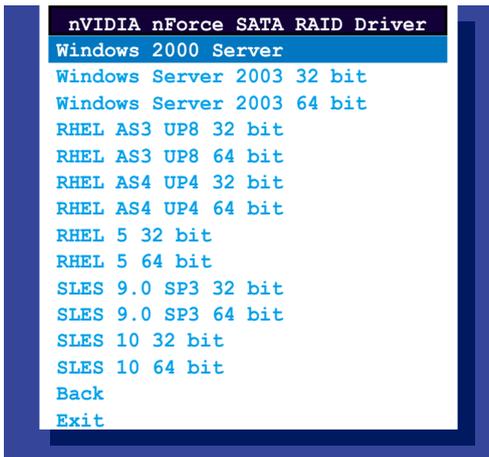


6. Use the arrow keys to select the type of RAID driver disk you want to create and press <Enter> to enter the sub-menu.

nVIDIA nForce SATA RAID Driver



LSI 1064E SAS Driver



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

To create a RAID driver disk in Windows®:

1. Place the motherboard support CD in the optical drive.
2. When the Drivers menu appears, click **nVIDIA nForce(TM) SATA RAID Driver** to create an nVIDIA nForce SATA RAID driver disk.



To install the RAID driver:

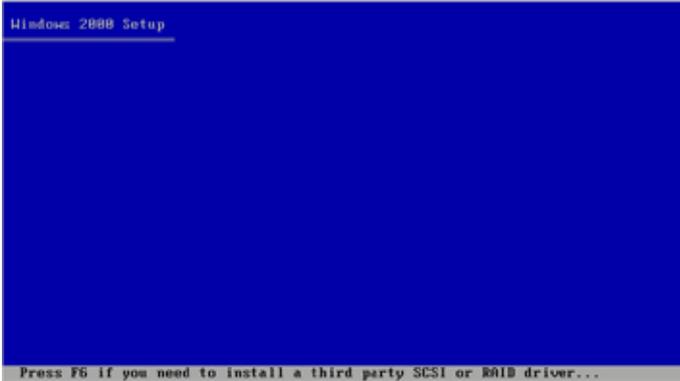
1. Install an operating system to the selected hard disk drive. During installation, the computer prompts you to press the <F6> if you are installing a third-party SCSI or RAID driver.
2. Press <F6>, then insert the RAID driver disk to the floppy disk drive.
3. Follow screen instructions to install the RAID drivers.

6.1.2 Installing the RAID controller driver

Windows® 2000/2003 Server OS

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

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



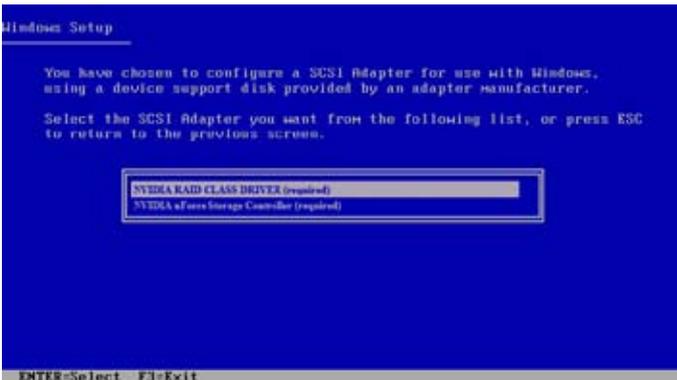
2. Press <F6> when the message “Press F6 if you need to install a third party SCSI or RAID driver...” appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



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



5. Select the NVIDIA RAID CLASS DRIVER (required), then press <Enter>.



6. Press <S> again at the Specigy Devices screen, then press <Enter>.

7. Select NVIDIA RAID CLASS DRIVER (required), then press <Enter>. The following windows appears listing both drivers.



8. Press <Enter> to continue with Windows® 2000/2003 installation.



DO NOT remove the floppy disk until the blue screen portion of Windows® 2000/2003 installation is completed.

6.2 LAN driver installation

This section provides instructions on how to install the Broadcom® Gigabit LAN controller drivers on a Windows® 2000/2003 OS.

To install the LAN controller drivers:

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



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

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



- Click **Next** when the InstallShield Wizard window appears.



- Toggle **I accept the terms in the license agreement** and click **Next** to continue.



- Click **Install** to start the installation.



- Click **Finish** to exit the wizard when the installation is completed.



6.3 nVIDIA® driver installation

This section provides the instructions on how to install the nVIDIA® Windows nForce drivers, including NVIDIA SMBus Driver, NVIDIA Ethernet Driver, NVIDIA MediaShield, and NVIDIA Audio Driver.

6.3.1 Windows 2000/Server 2003

To install the nVIDIA® drivers on a Windows® 2000/ Server 2003 OS:

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

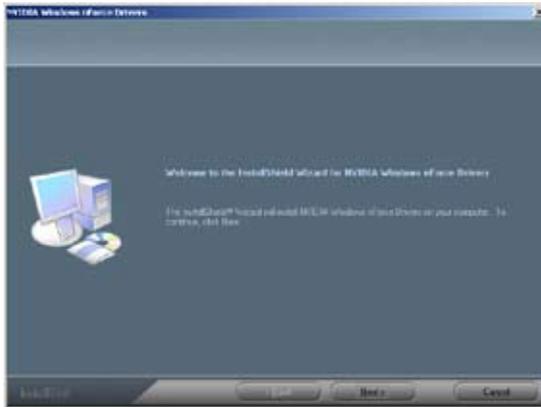


If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the CD.

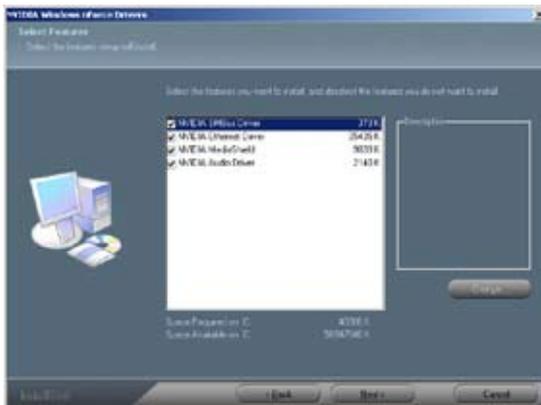
3. Click the **nVIDIA CK804 Professional** option.



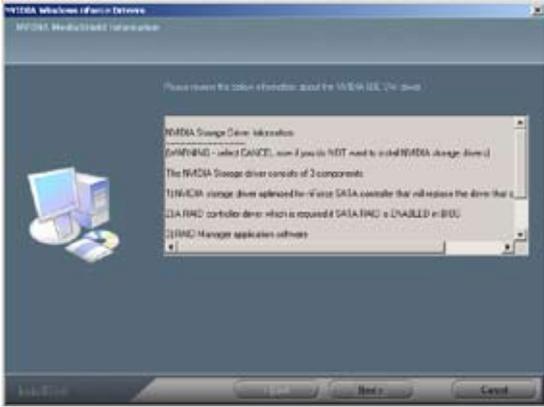
4. Click **Next** when the InstallShield Wizard window appears.



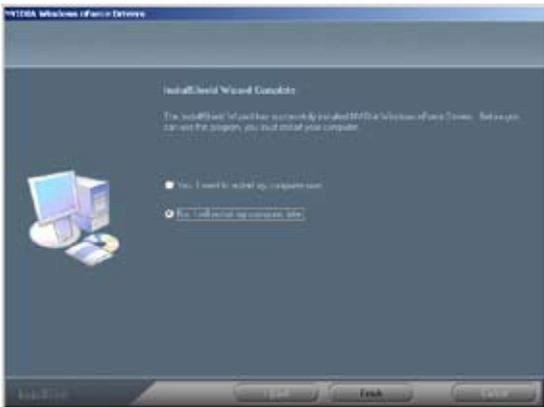
5. Check the box before the driver you want to install and click **Next** to continue.



6. Click **Next** to start the installation.



7. Click **Finish** to exit the wizard when the installation is completed.



6.4 Management applications and utilities installation

The support CD that came with the motherboard package contains the drivers, management applications, and utilities that you can install to avail all motherboard features.



The contents of the support CD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for updates.

6.4.1 Running the support CD

Place the support CD to the optical drive. The CD automatically displays the Drivers menu if Autorun is enabled in your computer.



If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the CD.

6.4.2 Drivers menu

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



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



6.4.3 Management Software menu

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



6.4.4 Utilities menu

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



6.4.5 Contact information

Click the Contact tab to display the ASUS contact information. You can also find this information on the inside front cover of this user guide.



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

Reference information

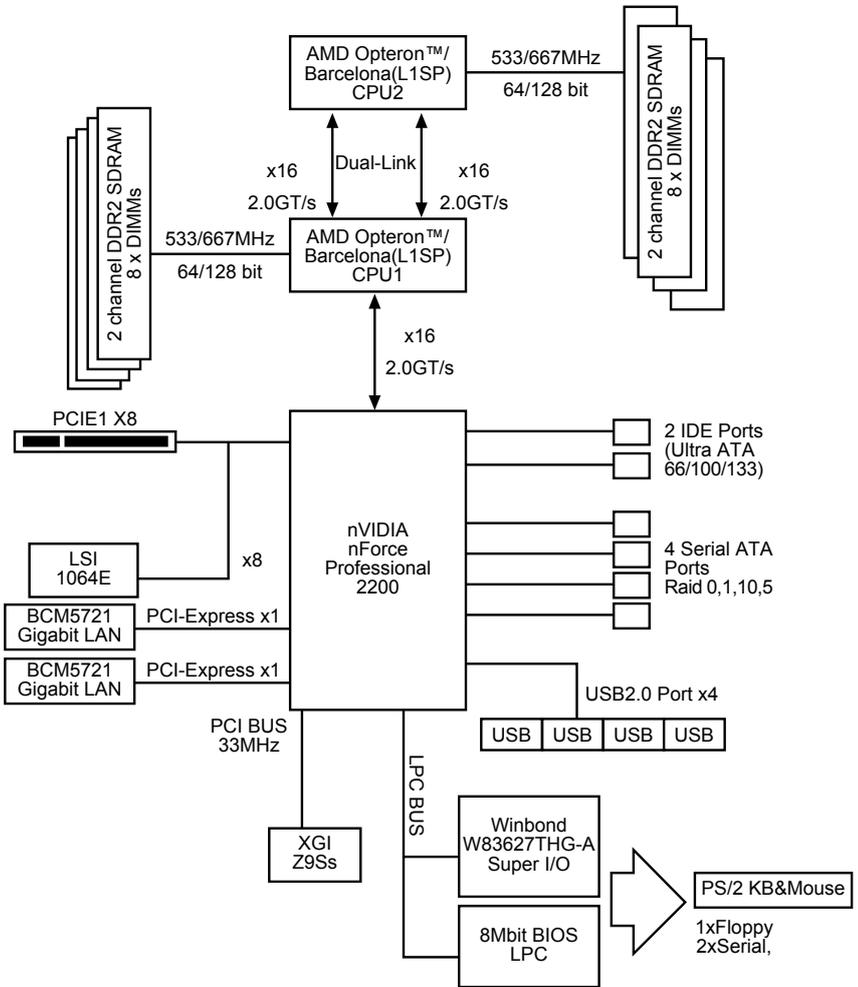


Appendix summary

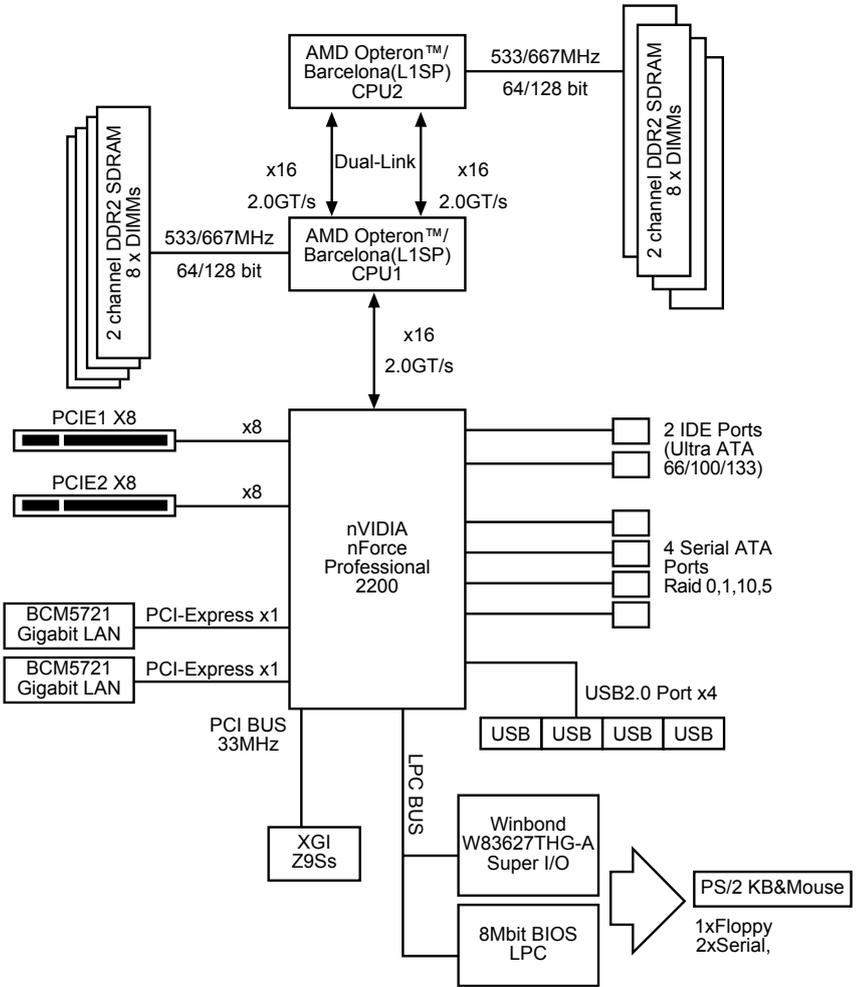


A.1	KFSN4-DRE/SAS model block diagram	A-1
A.2	KFSN4-DRE/2S model block diagram	A-2
A.3	KFSN4-DRE model block diagram.....	A-3

A.1 KFSN4-DRE/SAS model block diagram



A.2 KFSN4-DRE/2S model block diagram



A.3 KFSN4-DRE model block diagram

