

ASUS[®]

RS161-E4/PA2

1U Rackmount Server
User Guide



E2704

First Edition V1

August 2006

Copyright 2006© ASUSTeK COMPUTER INC. All Rights Reserved.

No part of this manual, including the products and software described in it, may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form or by any means, except documentation kept by the purchaser for backup purposes, without the express written permission of ASUSTeK COMPUTER INC. ("ASUS").

ASUS provides this manual "as is" without warranty of any kind, either express or implied, including but not limited to the implied warranties or conditions of merchantability or fitness for a particular purpose. In no event shall ASUS, its directors, officers, employees, or agents be liable for any indirect, special, incidental, or consequential damages (including damages for loss of profits, loss of business, loss of use or data, interruption of business and the like), even if ASUS has been advised of the possibility of such damages arising from any defect or error in this manual or product.

Specifications and information contained in this manual are furnished for informational use only, and are subject to change at any time without notice, and should not be construed as a commitment by ASUS. ASUS assumes no responsibility or liability for any errors or inaccuracies that may appear in this manual, including the products and software described in it.

Product warranty or service will not be extended if: (1) the product is repaired, modified or altered, unless such repair, modification or alteration is authorized in writing by ASUS; or (2) the serial number of the product is defaced or missing.

Products and corporate names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies, and are used only for identification or explanation and to the owners' benefit, without intent to infringe.

Contents

Notices	vii
Safety information	viii
About this guide.....	ix
Chapter 1: Product introduction	
1.1 System package contents	1-12
1.2 System specifications	1-13
1.3 Front panel features	1-14
1.4 Rear panel features.....	1-14
1.5 Internal features	1-15
1.6 LED information	1-16
1.6.1 Front panel LEDs.....	1-16
1.6.2 Rear panel LEDs	1-16
Chapter 2: Hardware setup	
2.1 Chassis cover	2-2
2.1.1 Removing the cover	2-2
2.1.2 Installing the cover.....	2-3
2.2 Motherboard overview	2-4
2.2.1 Placement direction	2-4
2.2.2 Screw holes.....	2-4
2.3 Central Processing Unit (CPU)	2-5
2.3.1 Installing the CPU	2-5
2.3.2 Installing the heatsink and fan-duct.....	2-8
2.4 System memory.....	2-9
2.4.1 Overview	2-9
2.4.2 Memory Configurations	2-10
2.4.3 Installing a DIMM.....	2-11
2.4.4 Removing a DIMM	2-11
2.5 Hard disk drives	2-12
2.6 Expansion slot.....	2-14
2.6.1 Installing an expansion card to the riser card bracket ...	2-14
2.6.2 Reinstalling the riser card bracket.....	2-15
2.6.3 Configuring an expansion card	2-16
2.7 Cable connections.....	2-17
2.8 SATA backplane cabling.....	2-18

Contents

- 2.9 Removable components..... 2-19
 - 2.9.1 System fans 2-19
 - 2.9.2 Device fan 2-20
 - 2.9.3 Device fan with dummy case 2-21
 - 2.9.4 Power supply module 2-22
 - 2.9.5 Optical drive..... 2-23
 - 2.9.6 Motherboard..... 2-25

Chapter 3: Installation options

- 3.1 Rackmount rail kit items 3-2
- 3.2 Rack rails assembly..... 3-2
- 3.3 Attaching the rails to the rack 3-3
- 3.4 Rackmounting the server..... 3-4

Chapter 4: Motherboard Info

- 4.1 Motherboard layout 4-2
 - 4.1.1 Layout Contents 4-3
- 4.2 Jumpers 4-4
- 4.3 Internal connectors..... 4-8

Chapter 5: BIOS Setup

- 5.1 Managing and updating your BIOS 5-2
 - 5.1.1 Creating a bootable floppy disk 5-2
 - 5.1.2 AFUDOS utility..... 5-3
 - 5.1.3 ASUS CrashFree BIOS 2 utility..... 5-6
 - 5.1.4 ASUS Update utility..... 5-8
- 5.2 BIOS setup program..... 5-11
 - 5.2.1 BIOS menu screen 5-12
 - 5.2.2 Menu bar 5-12
 - 5.2.3 Navigation keys..... 5-12
 - 5.2.4 Menu items..... 5-13
 - 5.2.5 Sub-menu items 5-13
 - 5.2.6 Configuration fields 5-13
 - 5.2.7 Pop-up window..... 5-13
 - 5.2.8 Scroll bar 5-13
 - 5.2.9 General help 5-13

Contents

5.3 Main menu.....	5-14
5.3.1 System Date [Day xx/xx/xxxx].....	5-14
5.3.2 System Time [xx:xx:xx].....	5-14
5.3.3 Floppy A [Disabled].....	5-14
5.3.4 IDE Configuration	5-15
5.3.5 Primary, Secondary, Tertiary, Fourth, Fifth, and Sixth IDE Master/Slave.....	5-17
5.3.6 System Information.....	5-18
5.4 Advanced menu	5-20
5.4.1 CPU Configuration	5-20
5.4.2 Chipset Configuration.....	5-21
5.4.3 PCI PnP	5-25
5.4.4 USB Configuration	5-26
5.4.5 Peripheral Devices Configuration.....	5-27
5.4.6 ACPI Configuration	5-28
5.4.7 APM Configuration.....	5-29
5.4.8 Hardware Monitor	5-30
5.4.9 Trusted Computing	5-31
5.4.10 ASUSLog Configuration.....	5-32
5.5 Server menu.....	5-33
5.5.1 Remote Access Configuration.....	5-33
5.6 Security menu.....	5-35
5.7 Boot menu	5-38
5.7.1 Boot Device Priority	5-38
5.7.2 Boot Settings Configuration.....	5-39
5.8 Exit menu.....	5-40

Chapterf 6: RAID Configuration

6.1 Setting up RAID	6-2
6.1.1 RAID definitions.....	6-2
6.1.2 Installing hard disk drives.....	6-2
6.1.3 RAID configuration utility	6-2
6.2 NVIDIA® RAID configurations.....	6-3
6.2.1 Setting the BIOS RAID items.....	6-3
6.2.2 Entering the NVIDIA® RAID Utility	6-4
6.2.3 Creating a RAID Volume.....	6-5

Contents

- 6.2.4 Rebuilding a RAID set 6-7
- 6.2.5 Deleting a RAID array 6-8
- 6.2.6 Clearing the disk data 6-9
- 6.2.7 Installing the RAID controller driver 6-10

- Chapter 7: Driver installation
- 7.1 RAID driver installation..... 7-2
 - Creating a RAID driver disk 7-2
- 7.2 LAN driver installation 7-4
- 7.3 Support CD information 7-5
 - 7.3.1 Running the support CD 7-5
 - 7.3.2 Drivers menu 7-6
 - 7.3.3 Management Software 7-7
 - 7.3.4 Utilities 7-8

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

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



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

Canadian Department of Communications Statement

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

This Class A digital apparatus complies with Canadian ICES-003.

Safety information

Electrical Safety

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

Operation Safety

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



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

Lithium-Ion Battery Warning

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

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

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

About this guide

Audience

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

Contents

This guide contains the following parts:

1. Chapter 1: Product Introduction
This chapter describes the general features of the server, including sections on front panel and rear panel specifications.
2. Chapter 2: Hardware setup
This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.
3. Chapter 3: Installation options
This chapter describes how to install optional components into the barebone server.
4. Chapter 4: Motherboard information
This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.
5. Chapter 5: BIOS information
This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.
6. Chapter 6: RAID configuration
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.
7. Chapter 7: Driver installation
This chapter provides instructions for installing the necessary drivers for different system components.
8. Appendix: Reference information
This appendix includes additional information that you may refer to when configuring the motherboard.

Conventions

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



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



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



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



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

Typography

Bold text	Indicates a menu or an item to select.
<i>Italics</i>	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: <code>format A: /S</code>

References

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

1. ASUS Server Web-based Management (ASWM) user guide
This manual tells how to set up and use the proprietary ASUS server management utility.
2. ASUS websites
The ASUS websites worldwide provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information.

Chapter 1

This chapter describes the general features of the chassis kit. It includes sections on front panel and rear panel specifications.

Product introduction

1.1 System package contents

Check your system package for the following items.

Chassis	ASUS R11 1U rackmount chassis
Motherboard	ASUS KFN4-DRE motherboard
Components	500W Single power supply 1 x Optical drive 2 x Hot-swap SATA-II HDD trays SATA2 backplane 2 x CPU heatsink 2 x Rear fan (40mm x 28mm) 4 x System fan (40mm x 56mm) 2 x System fan (40mm x 28 mm) 1 x Airdut
Cables	AC power cable System cables Pre-connected device/power cables
Accessories	Rackmount rail kit RS161-E4/PA2 user guide RS161-E4/PA2 support CD (includes ASWM*) CA Anti-virus software CD R11 chassis ears (left, right) Bag of screws

* ASUS System Web-based Management



Contact your dealer immediately if any of the items is damaged or missing.

1.2 System specifications

The ASUS RS161-E4/PA2 is a 1U barebone server system featuring the ASUS KFN4-DRE motherboard. The server supports dual Socket-F(1207) 2200 Series AMD Opteron™, plus other latest technologies through the chipsets onboard.

Chassis	Rackmount 1U (R11)
Motherboard	ASUS KFN4-DRE
Chipset	NVIDIA nForce Professional 2200
CPU	Supports Dual Socket F (1207) AMD Opteron 2210/2212/2214/2216/2218(1.8/2.0/2.2/2.4/2.8GHz) processors Supports AMD 64 architecture that enables simultaneous 32-bit and 64-bit computing
Memory	8 x 240-pin DDRII DIMM sockets support registered ECC DDRII-667/533 MHz memory modules Supports 256MB up to 16GB system memory
LAN	2 x Broadcom BCM5721/PCI Express Gigabit LAN controllers comply with PCI Express 1.0a specifications
VGA	ATI ES1000(RN50) VGA controller with 32MB display memory
Storage	nForce Professional 2200 controller supports: - 2 x SATA-II 3Gb/s drives, supports RAID 0, RAID 1 configuration
Expansion slots	2 x full-length/Half-length PCI-Express x16 slot(x8 link) (on a riser card) 1 x SO-DIMM socket for ASUS Server Management Board
Front panel	2 x 3.5-inch hot-swappable SATA-II HDD bays 1 x optical drive 2 x USB 2.0 ports Power switch Reset switch Location switch LEDs: Power, HDD access, location, message, LAN 1, LAN 2 HDD LEDs: Status, activity
Rear panel	1 x PS/2 keyboard port 1 x PS/2 mouse port 1 x Serial port 1 x VGA port 2 x USB 2.0 ports 2 x RJ-45 ports (with LEDs) 1 x Power connector
Management	ASUS Server Web-based Management (ASWM 2.0)
Hardware support	SM-Bus, ASMB3-SOL support IPMI 2.0 Over LAN management card
Hardware monitors	Voltage, temperature, and fan speed monitoring Automatic System Restart (ASR) feature
Power supply	500W single power supply, 100V~240V, 50Hz~60Hz
Dimensions	670mm (l) x 445mm (w) x 43.6mm (h)

1.3 Front panel features

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

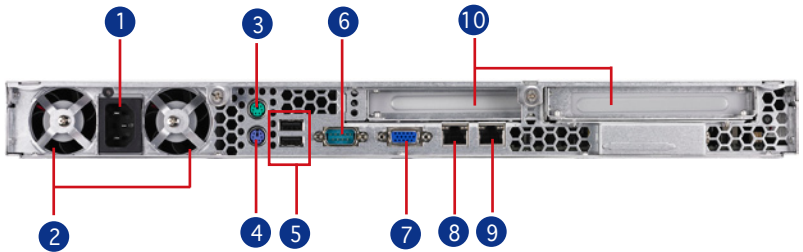


Refer to section 1.6.1 Front panel LEDs for the LED descriptions.



1.4 Rear panel features

The rear panel includes the expansion slot, system power socket, and rear fans. The middle part includes the I/O shield with openings for the rear panel connectors on the motherboard.



- 1. AC power plug
- 2. Rear fans
- 3. PS/2 mouse port
- 4. PS/2 keyboard port
- 5. USB ports
- 6. Serial port
- 7. VGA port
- 8. LAN port 1
- 9. LAN port 2
- 10. Expansion slot



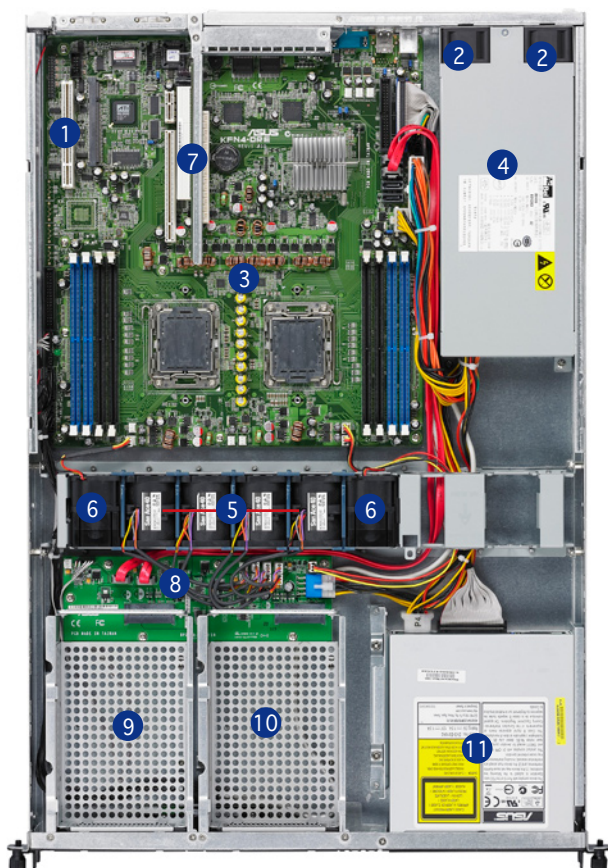
The ports for the PS/2 keyboard, PS/2 mouse, USB, VGA, and Gigabit LAN do not appear on the rear panel if motherboard is not present.



Refer to section 1.6.2 Rear panel LEDs for the LED descriptions.

1.5 Internal features

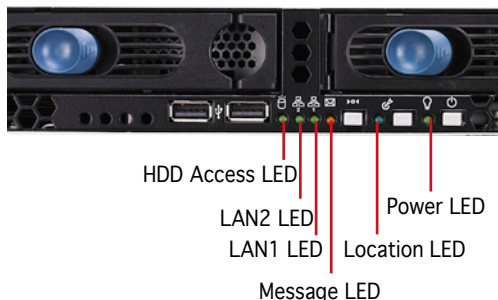
The barebone server includes the basic components as shown.



- | | |
|----------------------------------|--------------------------------|
| 1. PCI Slot | 8. SATA-II backplane |
| 2. Rear fans | 9. Hot-swap HDD tray 1(port0) |
| 3. ASUS KFN4-DRE motherboard | 10. Hot-swap HDD tray 2(Port1) |
| 4. Power supply | 11. Optical drive |
| 5. System fans (40mm x 56mm) x 4 | |
| 6. System fans (40mm x 28mm) x 2 | |
| 7. 2 x PCI-E Slot (riser card) | |

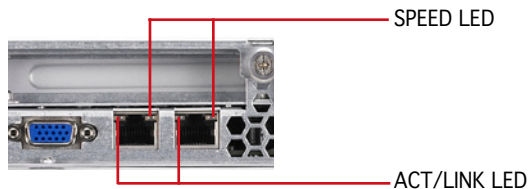
1.6 LED information

1.6.1 Front panel LEDs



LED	Display status	Description
Power LED	ON	System power ON
HDD Access LED	OFF Blinking	No activity Read/write data into the HDD
HDD Status access	ON OFF	HDD is present No HDD present
Message LED	OFF ON	System is in normal condition; no incoming event ASWM detects a system problem; (Log in to ASWM to identify and resolve)
Location LED	OFF ON	Normal status Location switch is pressed (Press the location switch again to turn off)
LAN LEDs	OFF Blinking ON	No LAN connection LAN is transmitting or receiving data LAN connection is present

1.6.2 Rear panel LEDs



ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10Mbps connection
Green	Linked	Orange	100Mbps connection
Blinking	Linking	Green	1000Mbps connection

Chapter 2

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

Hardware setup

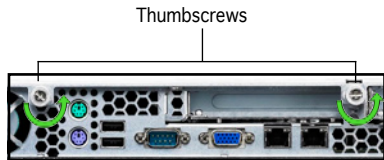
2.1 Chassis cover

2.1.1 Removing the cover

1. Use a Phillips screwdriver to remove the screw on each front end of the top cover.



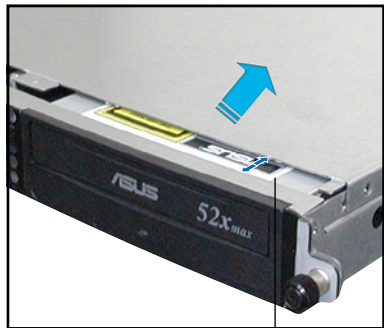
2. Loosen the two thumbscrews on the rear panel to release the top cover from the chassis.



3. Remove the screws on both sides of the chassis.



4. Firmly hold the cover and slide it toward the rear panel for about half an inch until it is disengaged from the chassis.



1/2 inch distance

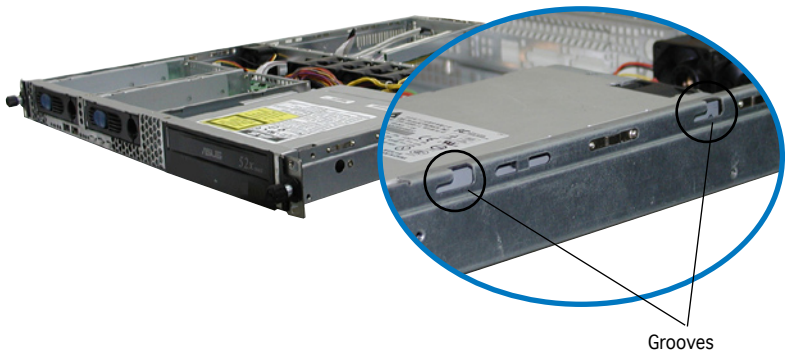
5. Lift the cover from the chassis.

2.1.2 Installing the cover

1. Position the cover on top of the chassis with the thumbscrews on the rear, and leaving a gap of about half an inch from the front panel.

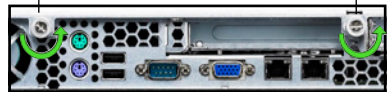


2. Make sure that the side markings on the cover (two on each side) are aligned to the grooves on the chassis.



3. Slide the cover toward the front until it snaps in place.
4. Tighten the thumbscrews on the rear to secure the cover.

Thumbscrews



5. Drive in the screw on both sides of the chassis.



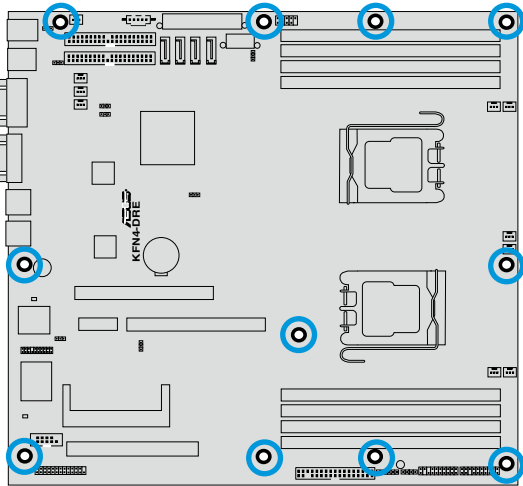
2.2 Motherboard information

Place eleven (11) screws into the holes indicated by circles to secure the motherboard to the chassis.



Refer to "Chapter 4 Motherboard Information" for detailed Information.

Place this side towards
the rear of the chassis



Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.

2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount Socket F designed for the AMD® Opteron® 2200 Series CPU in the Land Grid Array (LGA) package.

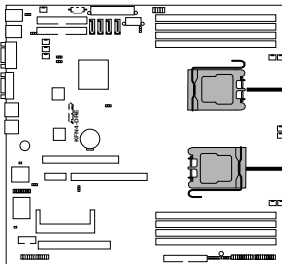


- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS shoulders the repair cost only if the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

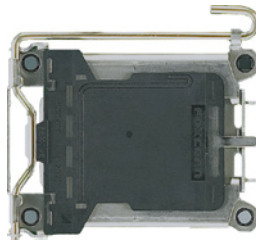
2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

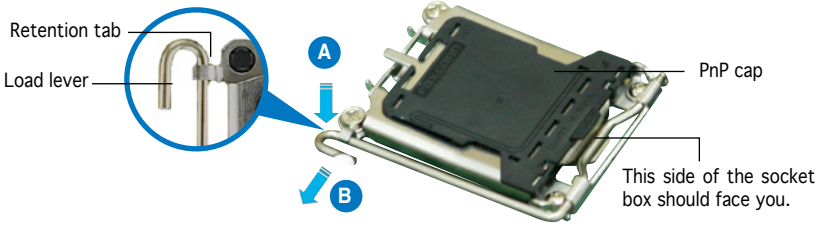


KFN4-DRE CPU Socket 1207



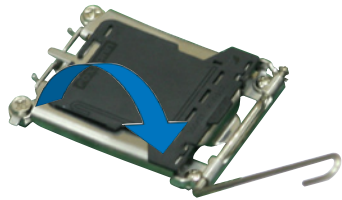
Before installing the CPU, make sure that the cam box is facing towards you and the load lever is on your left.

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

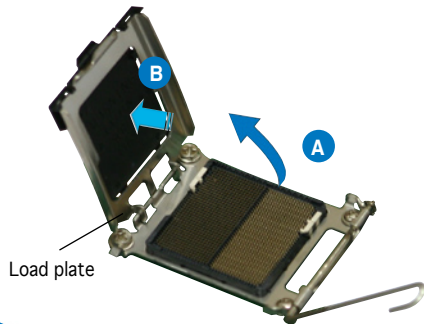


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

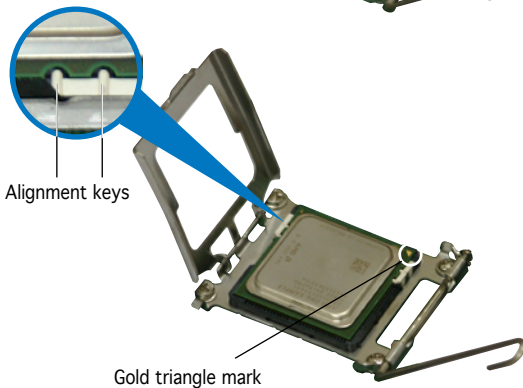
3. Lift the load lever in the direction of the arrow to a 135° angle.



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



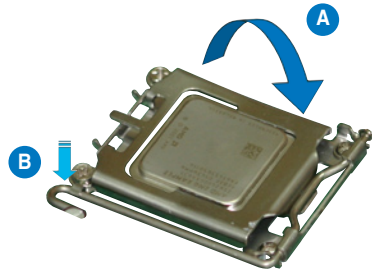
5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-right corner of the socket. The socket alignment keys should fit into the CPU notches.





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 and fan-duct

The AMD Opteron™ socket-F(1207) 2200 series processors require a specially designed heatsink and fan-duct to ensure optimum thermal condition and performance.



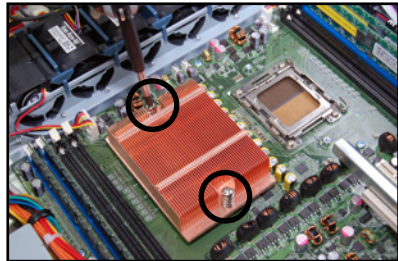
Make sure that you use only qualified heatsink assembly.

Follow these steps to install the CPU heatsink.

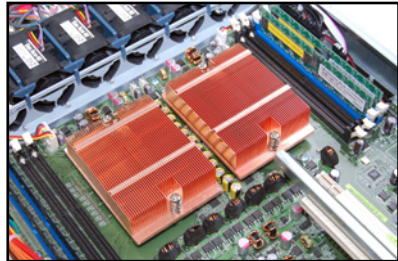
1. Place the heatsink on top of the installed CPU, making sure that the screw holes are matched with the heatsink standoffs.
2. Secure the heatsink with two screws.



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

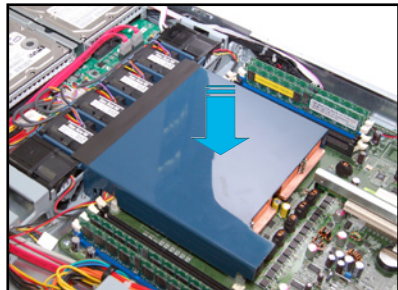


3. If you installed a second processor, repeat steps 1-2 to install the second heatsink.



Follow these steps to install the fan-duct.

1. Position the fan-duct on top of the heatsink.
2. Carefully lower the fan-duck until it fis in place.

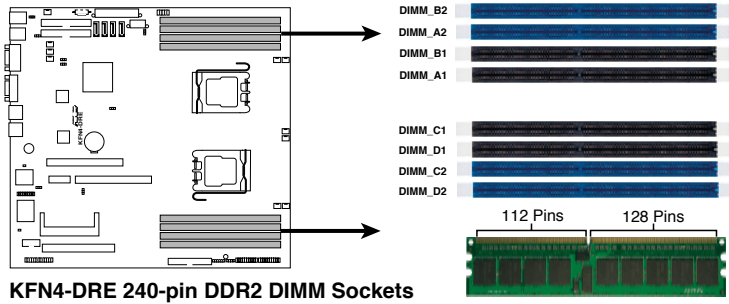


2.4 System memory

2.4.1 Overview

The motherboard comes with eight 240-pin Double Data Rate 2 (DDR2) Dual Inline Memory Modules (DIMM) sockets.

The following figure illustrates the location of the sockets:



For CPU 1	
Sockets	
Channel A	DIMM_A1 and DIMM_A2
Channel B	DIMM_B1 and DIMM_B2
For CPU 2	
Sockets	
Channel A	DIMM_C1 and DIMM_C2
Channel B	DIMM_D1 and DIMM_D2

2.4.2 Memory Configurations

You may install 256 MB, 512 MB, 1 GB, 2 GB, 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.

Recommended memory configuration for CPU1

Mode	DIMM_A1	DIMM_A2	DIMM_B1	DIMM_B2
Single channel	—	populated	—	—
Dual channel	—	populated	—	populated
	populated	populated	populated	populated

Recommended memory configuration for CPU2

Mode	DIMM_C1	DIMM_C2	DIMM_D1	DIMM_D2
Single channel	—	populated	—	—
Dual channel	—	populated	—	populated
	populated	populated	populated	populated

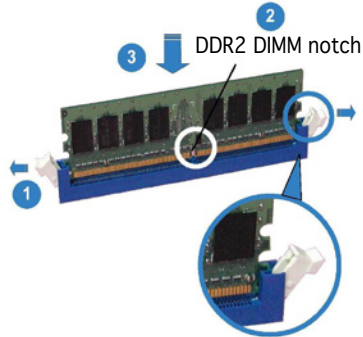
2.4.3 Installing a DIMM



Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

To install a DIMM:

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

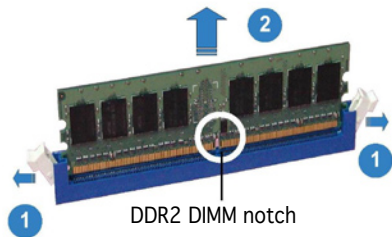


- A DDR2 DIMM is keyed with a notch so that it fits in only one direction. Do not force a DIMM into a socket to avoid damaging the DIMM.
- The DDR2 DIMM sockets do not support DDR DIMMs. DO NOT install DDR DIMMs to the DDR2 DIMM sockets.

2.4.4 Removing a DIMM

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 Hard disk drives

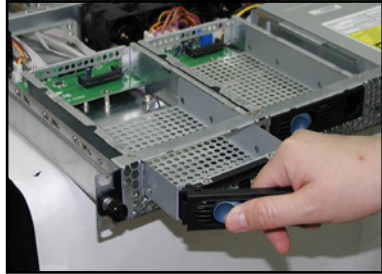
The system supports two hot-swap Serial ATAII hard disk drives.

To install a hot-swap SATAII HDD:

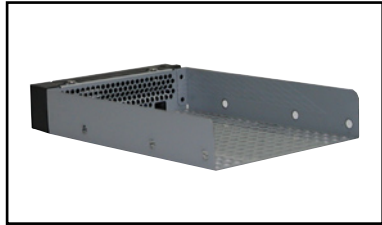
1. Release a drive tray by pushing the spring lock to the right, then pulling the tray lever outward. The drive tray ejects slightly after you pull out the lever.



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



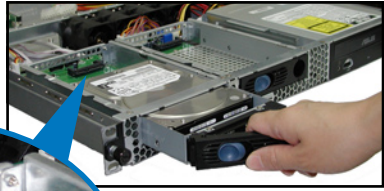
3. Take note of the drive tray holes. Each side has three holes to fit different types of hard disk drives. Use two screws on each side to secure the hard disk drive.



4. Place a SATAII hard disk drive on the tray, then secure it with four screws.



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



SATAII interface on the backplane



When installed, the SATAII connector on the drive connects to the SATAII interface on the backplane.

6. Push the tray lever until it clicks, and secures the drive tray in place. The drive tray is correctly placed when its front edge aligns with the bay edge.
7. Repeat steps 1 to 6 if you wish to install a second SATAII drive.



8. Connect the bundled SATAII cables to the connectors on the SATAII backplane. Refer to section “2.8 SATAII backplane cabling” for information on the SATAII backplane cable connections.

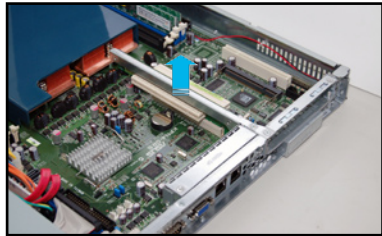
2.6 Expansion slot

2.6.1 Installing an expansion card to the riser card bracket

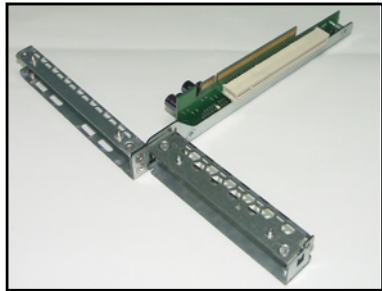
The barebone server comes with a riser card bracket. You need to remove the bracket if you want to install PCI Express x16 expansion cards.

To install the PCI Express x16 expansion cards:

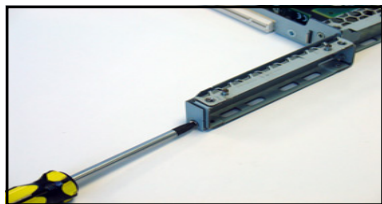
1. Firmly hold the riser card bracket, then pull it up to detach it from the PCI Express x16 slot on the motherboard.



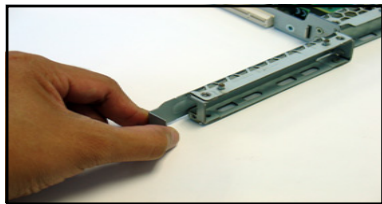
2. Place the riser card bracket on a flat and stable surface, then remove the screw from the slot bay.



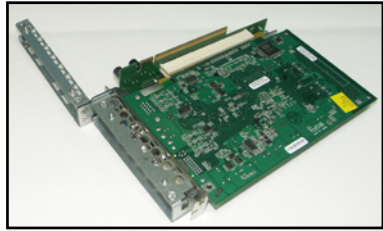
3. Use a Phillips (cross) screw driver to remove the screw that secures the slot metal cover.



4. Remove the slot metal cover, then set it aside.



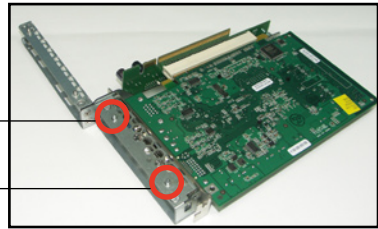
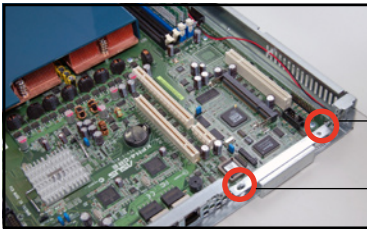
5. Install a PCI Express x16 card to the bracket, then secure the card with the screw you removed earlier.



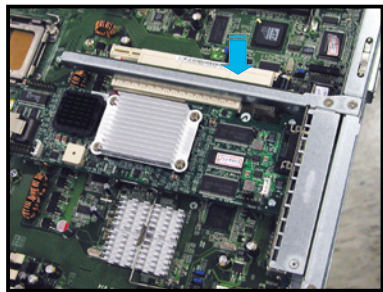
2.6.2 Reinstalling the riser card bracket

To reinstall the riser card bracket:

1. Take note of the holes on the riser card bay. The three pegs on the riser card should match these holes to ensure that the bracket is properly in place.



2. Install the riser card bracket with the card into the PCI Express x16 slot on the motherboard.
3. Press the riser card bracket until the golden connectors completely fit the slot and the bracket aligns with the rear panel.
4. Connect the cable(s) to the card, if applicable.



2.6.3 Configuring an expansion card

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

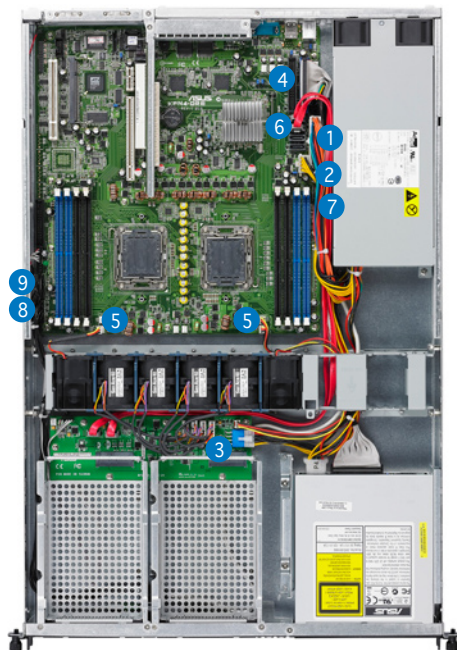
1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 5 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the following tables.
3. Install the software drivers for the expansion card.

Standard interrupt assignments

IRQ	Priority	Standard Function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable interrupt
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.

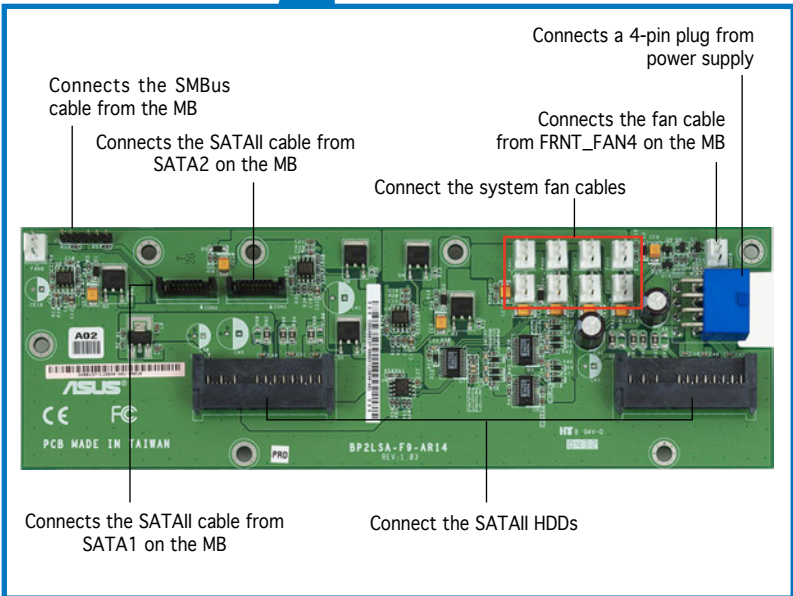
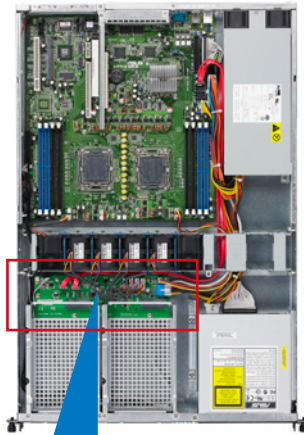
2.7 Cable connections



Pre-connected system cables

1. 24-pin SSI power connector (from power supply to motherboard)
2. 4-pin SSI power connector (power supply to motherboard)
3. SATAII backplane power connector (from power supply)
4. Primary IDE connector (from motherboard to optical drive)
5. Device fan connector (from backplane to device fan)
6. SATAII connectors (from motherboard to SATA backplane board)
7. USB connector (from motherboard to front I/O board)
8. Panel connector (from motherboard to front I/O board)
9. Auxiliary panel connector (from motherboard to front I/O board)

2.8 SATA backplane cabling



2.9 Removable components

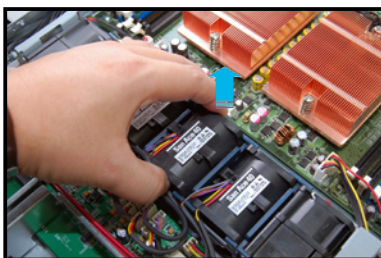
You may need to remove previously installed system components when installing or removing system devices, or when you need to replace defective components. This section tells how to remove the following components:

1. System fans
2. Device fan
3. Power supply module
4. Optical drive
5. Motherboard

2.9.1 System fans

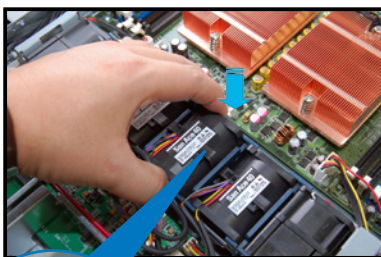
To uninstall the system fans:

1. Disconnect a system fan cable from the fan connector on the backplane board.
2. Lift the fan, then set aside.
3. Repeat step 1 to 2 to uninstall the other system fans.



To reinstall the system fan:

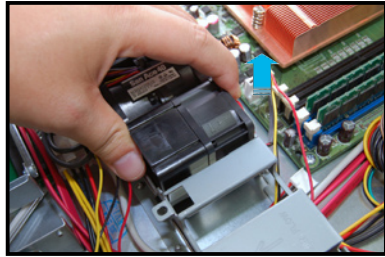
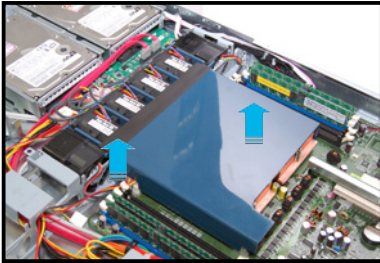
1. Insert the fan to the fan cage. Take note of the airflow directional arrows embossed on the fan side.
2. Connect the system fan cable to the fan connector on the backplane board.



2.9.2 Device fan

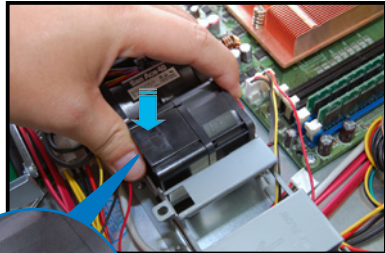
To uninstall the device fan:

1. Remove the fan-Duct , than disconnect the device fan cable from the connector on the motherboard or backplane board.
2. Lift the fan, then set aside.



To reinstall the device fan:

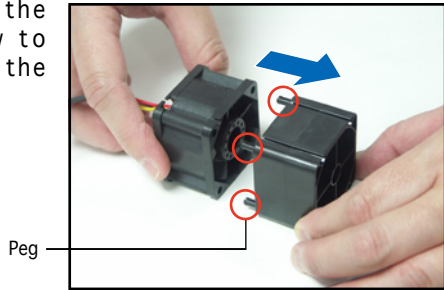
1. Insert the fan to the fan cage. Take note of the airflow directional arrows embossed on the fan side.
2. Connect the device fan cable to the fan connector on the backplane board or on the motherboard.



2.9.3 Device fan with dummy case

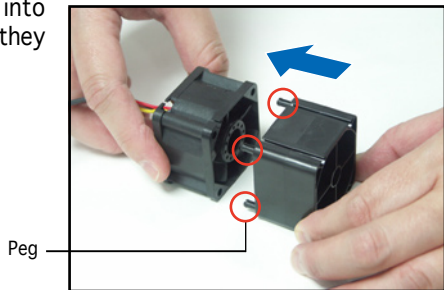
The device fan for the memory module(s) comes with a dummy case that allows it to fit in the fan cage. Follow these instructions when replacing this fan.

1. Uninstall the fan following the instructions in the previous section.
2. Pull the dummy case to the direction of the arrow to disengage its pegs from the device fan.
3. Replace the device fan.

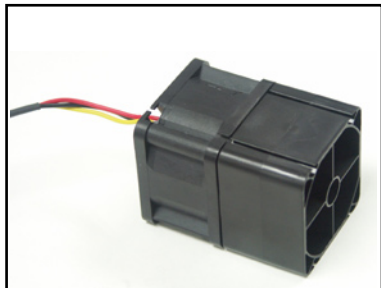


To reinstall the device fan with the dummy case:

1. Insert the dummy case pegs into to the device fan holes until they fit in place.



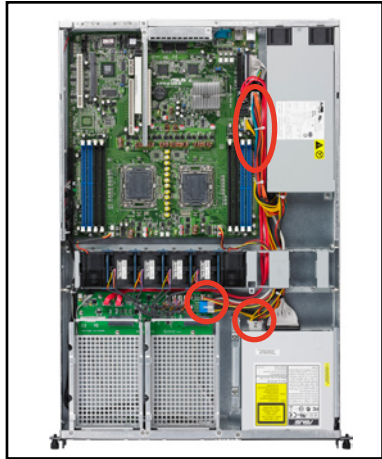
2. The device fan and dummy case look like this when put together correctly.
3. Reinstall the device fan by following the instructions in the previous section.



2.9.4 Power supply module

To uninstall the power supply module:

1. Disconnect all the power cables connected to the motherboard and other system devices.



2. Use a Phillips (cross) screwdriver to remove the screws that secure the front end of the power supply.



3. From the rear panel, remove two screws that secure the power supply from the chassis.



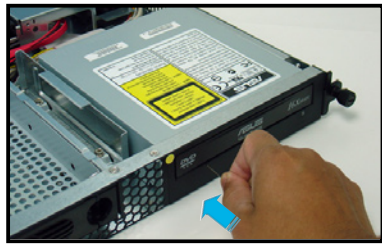
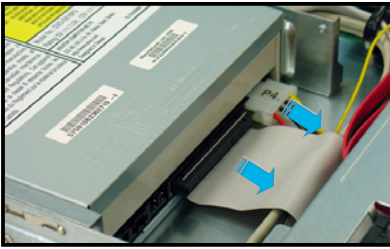
4. Slide the power supply forward for about half an inch, then carefully lift it out from the chassis.



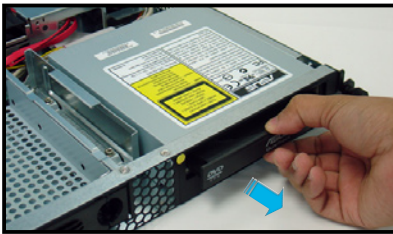
2.9.5 Optical drive

To uninstall the optical drive:

1. Disconnect the power and signal cables connected to the rear of the optical drive.
2. Insert the optical drive emergency eject pin to the emergency eject pin hole until the drive tray ejects.



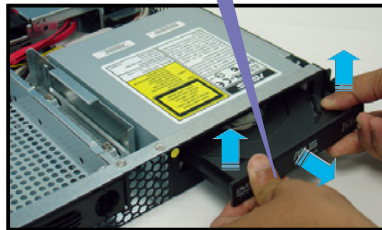
3. Pull out half of the drive tray to remove the tray bezel.
4. Pull the center of the bezel outward (A).



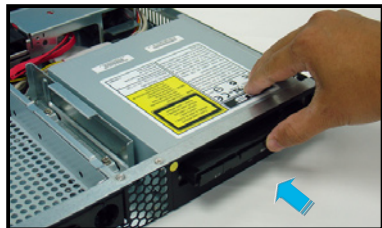
5. Then lift the sides (B) to remove.



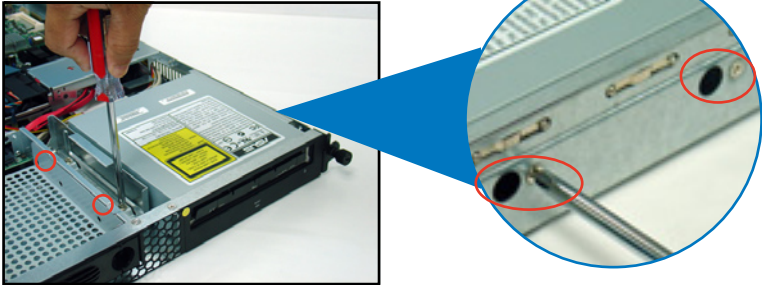
Do not apply too much force when removing the bezel. Too much force may break the drive tray!



6. Replace the drive tray.



6. Remove two metal bracket screws and screws on the other side of the drive. Keep the screws for later use.



7. Pull the metal bracket to the direction of the arrow until its pegs disengage from the drive holes.
8. Lift the metal bracket, then set aside.



9. Push the drive inward, then lift it out from the chassis.

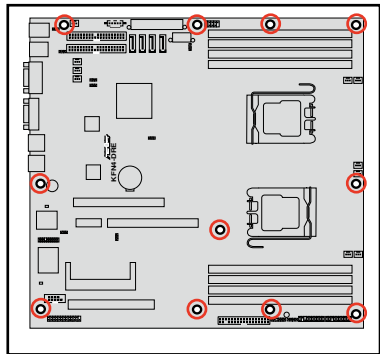
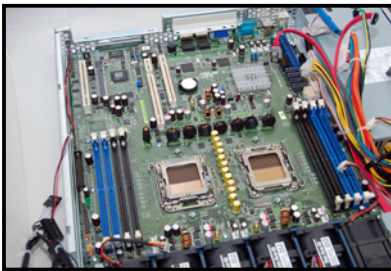


2.9.6 Motherboard

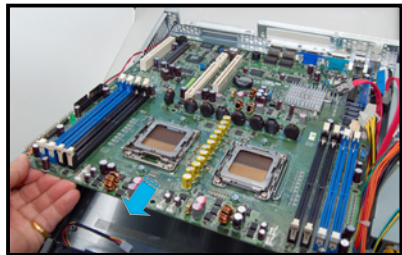
To uninstall the motherboard:

1. Disconnect all the pre-connected cables from the motherboard. See section “2.7 Cable connections” for illustration.
2. Uninstall all the devices from the motherboard including the CPU and heatsink, riser card bracket, and DDR DIMMs. Refer to the corresponding sections for instructions on removing these components.
3. Use a Phillips (cross) screwdriver to remove the screws that secure the motherboard to the base of the chassis.

Refer to the illustration below for the location of the motherboard screws.

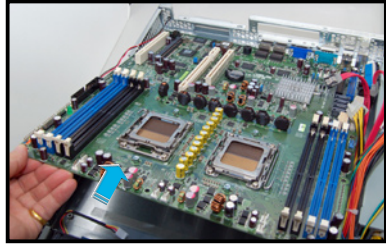


4. Carefully lift the motherboard out of the chassis.

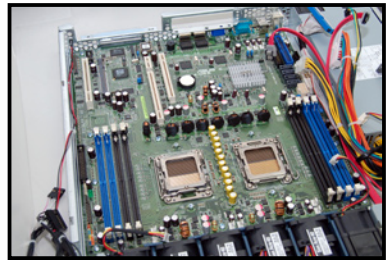
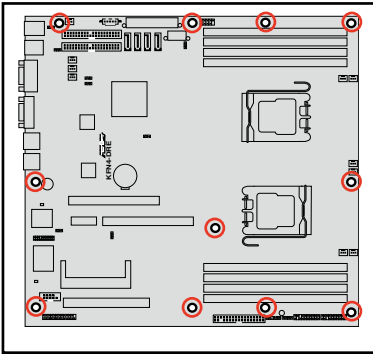


To reinstall the motherboard:

1. Firmly hold the motherboard by the sides and insert it into the chassis.
2. Carefully adjust the motherboard until the rear panel ports fit in place.



3. Use a Phillips (cross) screwdriver to secure the motherboard with 10 screws in the holes as shown in the illustration.



4. Reconnect all the required cables to the motherboard. See section “2.7 Cable connections” for illustration.
5. Reinstall all the devices that you have previously removed.

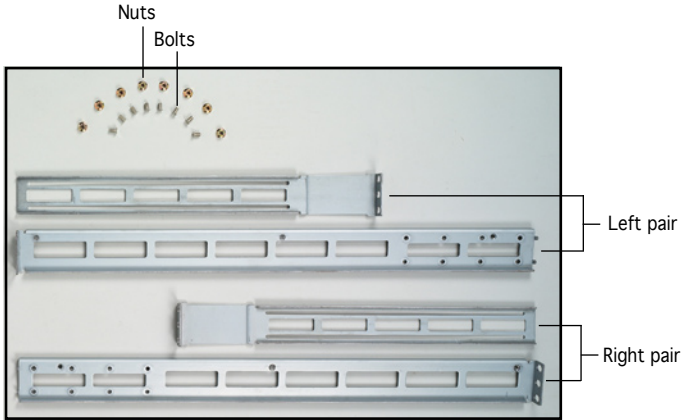
Chapter 3

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

Installation options

3.1 Rackmount rail kit items

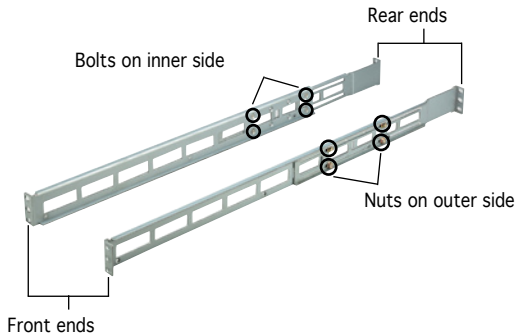
If you have the rackmount rail kit, it contains two pairs of rails (one pair for each side of the barebone system), and eight (8) pairs of nut-and-bolt type screws.



3.2 Rack rails assembly

To assemble the rack rails:

1. Determine the depth of the rack where you wish to install the system.
2. Match one long and one short rail to your desired length, and fix them together using four (4) pairs of nuts and bolts.
3. Repeat step 2 to assemble the other rail pair.



3.3 Attaching the rails to the rack

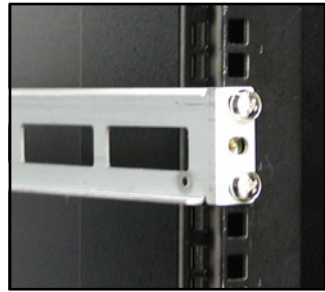
To attach the rails to the rack:

1. Select one unit of space (1U) on the rack where you wish to install the barebone server.
2. Remove the screws from the 1U space on the rack front.

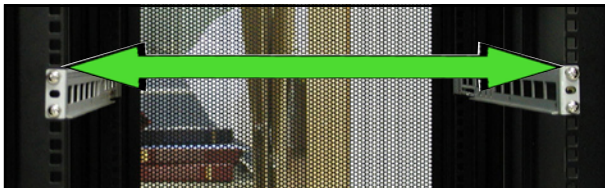


1U space

3. Align the front end holes of a rack rail pair to the 1U space.
4. Drive in two screws on the outer holes to secure the front end.



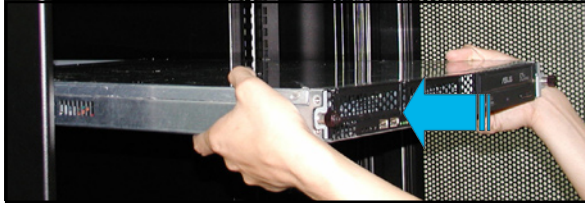
5. Find the rear 1U space that corresponds to the front 1U space where you attached the rail.
6. Remove the screws from the rear 1U space, and align the rear end holes.
7. Drive in two screws on the outer holes to secure the rear end.
8. From the rack front, find the corresponding 1U space for the second rail pair.
9. Repeat steps 2 to 7 to attach the second rail pair. When properly installed, the rack rails appear as shown.



3.4 Rackmounting the server

To mount the server to the rack:

1. Firmly hold the server on both sides and insert the rear panel side to the front end of the rack rail, then carefully push the server all the way to the back until the front panel fits the front end of the rack, and the rack screws on the server match the middle hole on the rack..



2. Tighten the two rack screws to secure the server to the rack.



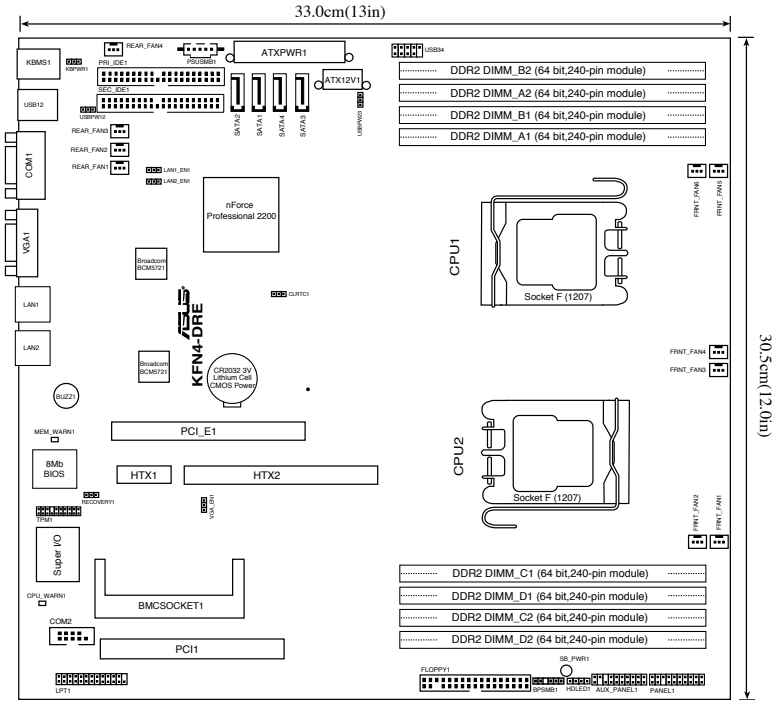
Rack screw

Chapter 4

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

Motherboard Info

4.1 Motherboard layout



4.1.1 Layout Contents

Slots/Sockets	Page
1. CPU sockets	4-2
2. DDR2 DIMM sockets	4-2
3. PCI Express x16 slot	4-2
4. PCI slot	4-2

Jumpers	Page
1. Clear RTC RAM (CLRRTC1)	4-4
2. Keyboard power (3-pin KBPWR1)	4-5
3. Gigabit LAN1 controller setting (3-pin LAN1_EN1)	4-5
4. Gigabit LAN2 controller setting (3-pin LAN2_EN1)	4-6
5. USB device wake-up (3-pin USBPW12, USBPW34)	4-6
6. BIOS recovery setting (3-pin RECOVERY1)	4-7
7. VGA graphics controller setting (3-pin VGA_EN1)	4-7

Internal connectors	Page
1. Floppy disk drive connector (34-1 pin FLOPPY1)	4-8
2. IDE connectors (40-1 pin PRL_IDE1, SEC_IDE1)	4-9
3. Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4)	4-10
4. Backplane SMBus connector (6-1 pin BPSMB)	4-10
5. Storage add-in card activity LED connector (4-pin HDLED1)	4-11
6. USB connectors (10-1 pin USB34)	4-11
7. Front and rear fan connectors (3-pin FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, FRNT_FAN4, FRNT_FAN5, FRNT_FAN6, REAR-FAN1, REAR_FAN2, REAR_FAN3, REAR_FAN4)	4-12
8. Serial port connector (10-1 pin COM2)	4-12
9. ATX power connectors (24-pin ATXPWR1, 8-pin ATX12V1)	4-13
10. Power supply SMBus connector (5-pin PSUSMB1)	4-14
11. Parallel port connector (26-1 pin LPT1)	4-14
12. BMC and Mini PCI (200-pin BMC SOCKET1)	4-15
13. System panel auxiliary connector (20-2 pin AUX_PANEL1)	4-16
14. System panel connector (20-1 pin PANEL1)	4-17

4.2 Jumpers

1. Clear RTC RAM (CLRTC1)

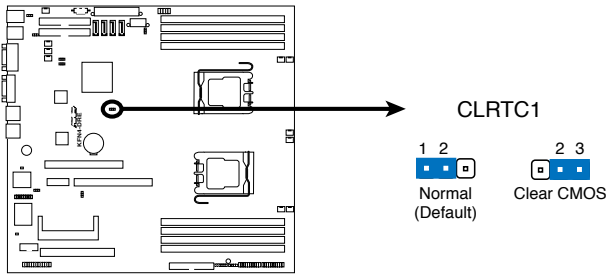
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

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



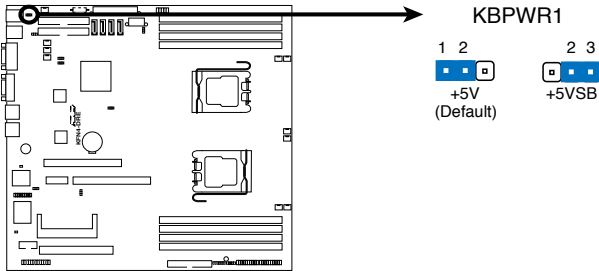
Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



KFN4-DRE Clear RTC RAM

2. Keyboard power (3-pin KBPWR1)

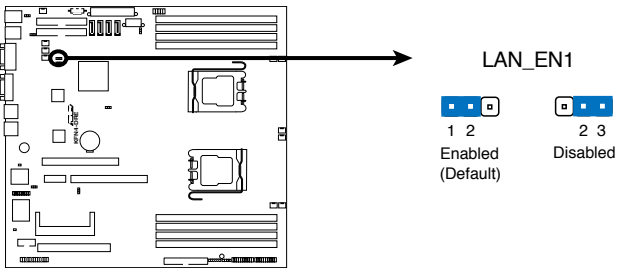
This jumper allows you to enable or disable the keyboard wake-up feature. Set this jumper to pins 1-2 (+5VSB) to wake up the computer when you press a key on the keyboard (the default is the Space Bar). This feature requires an ATX power supply that can supply at least 1A on the +5VSB lead, and a corresponding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



KFN4-DRE Keyboard Power Setting

3. Gigabit LAN1 controller setting (3-pin LAN1_EN1)

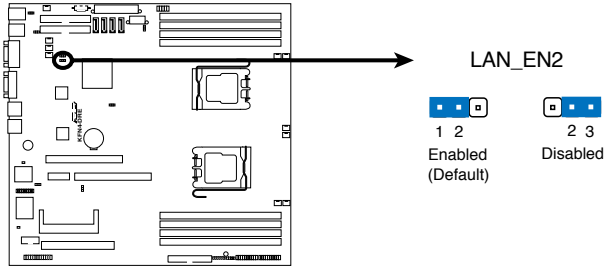
This jumper allows you to enable or disable the onboard Broadcom® BCM5721 Gigabit LAN1 controller. Set to pins 1-2 to activate the Gigabit LAN feature.



KFN4-DRE LAN_EN1 Setting

4. Gigabit LAN2 controller setting (3-pin LAN2_EN1)

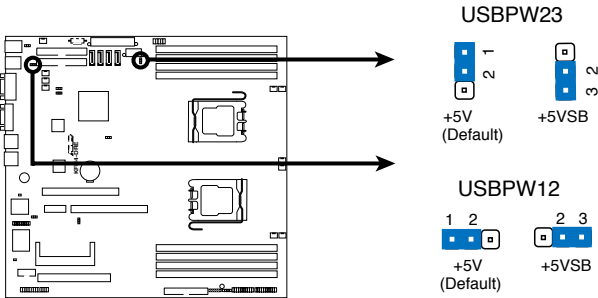
This jumper allows you to enable or disable the onboard Broadcom® BCM5721 Gigabit LAN2 controller. Set to pins 1-2 to activate the Gigabit LAN feature.



KFN4-DRE LAN_EN2 Setting

5. USB device wake-up (3-pin USBPW12, USBPW23)

Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set to +5VSB to wake up from S4 and S5 sleep modes (no power to CPU, DRAM).



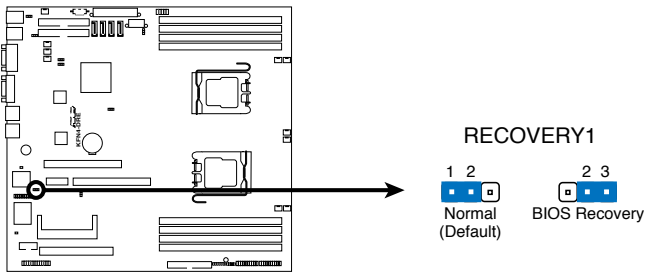
KFN4-DRE USB device Wake up

6. BIOS Recovery (3-pin RECOVERY1)

This jumper allows you to recover your original BIOS from a floppy disk in case the BIOS codes and data are corrupted.

To recover the BIOS:

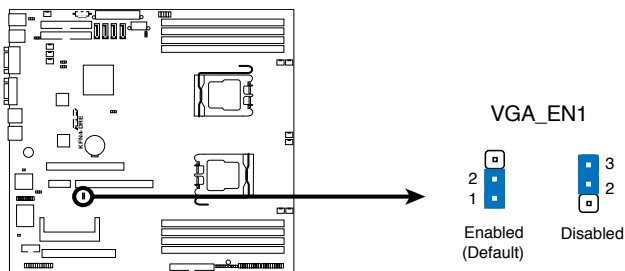
1. Turn OFF your computer and unplug the power cord.
2. Move the jumper cap from pins 1-2 (default) to pins 2-3.
3. Insert a floppy disk with the original or updated BIOS file.
4. Plug the power cord and turn ON the computer.
5. The system searches for the BIOS file in the floppy then reflashes the BIOS.
6. When finished, shut down your computer.
7. Replace the jumper cap from pins 2-3 to pins 1-2.
8. Reboot your computer.
9. Hold down the key during the boot process and enter BIOS setup to re-enter data.



KFN4-DRE BIOS Recovery Setting

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

These jumpers allow you to enable or disable the onboard ATI Rage XL video graphics controller. Set to pins 1-2 to enable the video graphics controller.

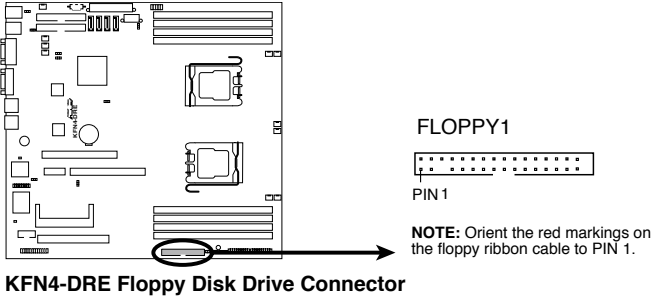


KFN4-DRE VGA_EN1 Setting

4.3 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.



2. IDE connectors (40-1 pin PRI_IDE, SEC_IDE)

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).

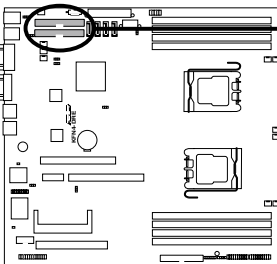
	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master Slave	Black Gray
	Master Slave	Master Slave	Black or gray



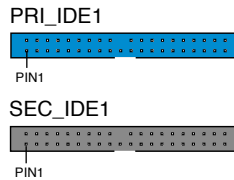
- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra DMA 133/100/66 IDE devices.



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



KFN4-DRE IDE Connectors

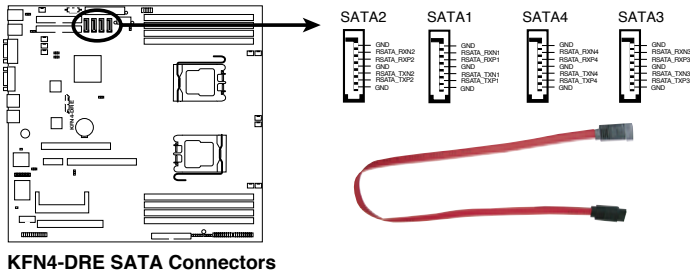


NOTE: Orient the red markings (usually zigzag) on the ID ribbon cable to PIN 1.

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 configuration.

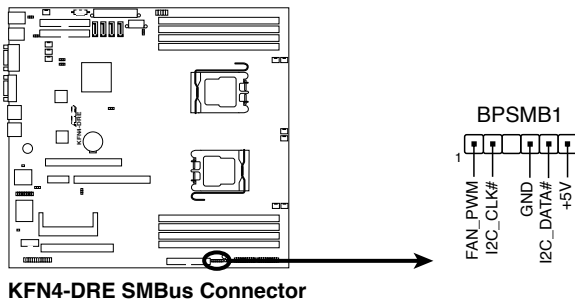


Important notes on Serial ATA

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

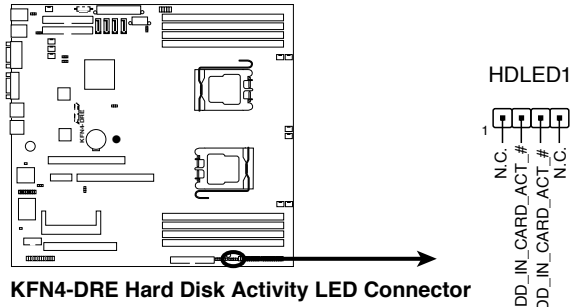
4. Backplane SMBus connector (6-1 pin BPSMB1)

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



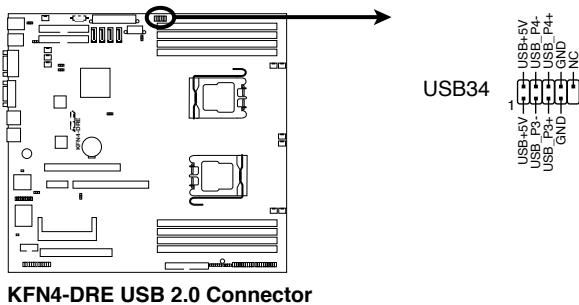
5. Storage add-on card activity LED connector (4-pin HDLED1)

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.



6. USB connector (10-1 pin USB34)

This connector is for USB 2.0 ports. This connector complies with the USB 2.0 specification that supports up to 480 Mbps connection speed.

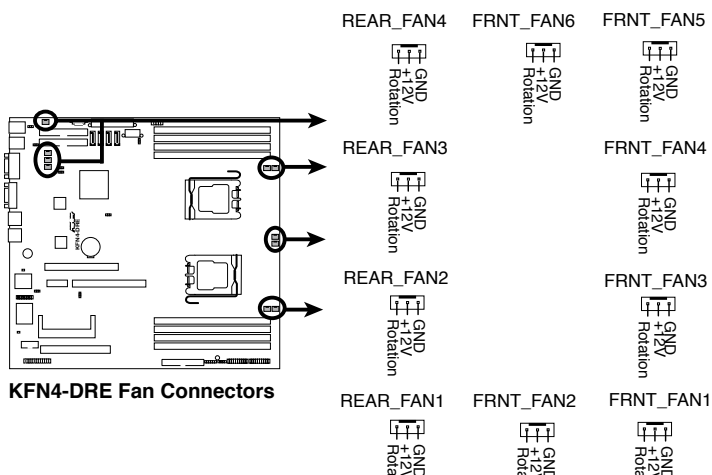


7. Front and rear fan connectors (3-pin FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, FRNT_FAN4, FRNT_FAN5, FRNT_FAN6, REAR_FAN1, REAR_FAN2, REAR_FAN3, REAR_FAN4)

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.

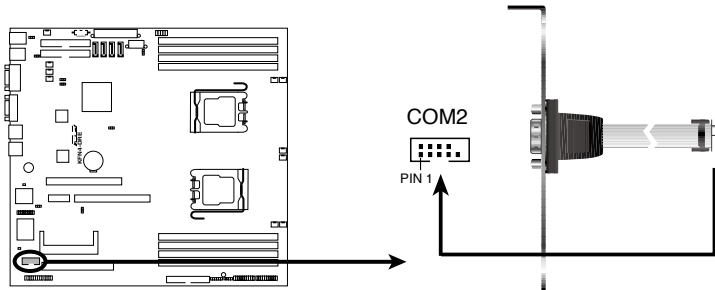


- Do not forget to connect the fan cables to the fan connectors. Lack of sufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fan features the ASUS Smart Fan technology.



8. 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.



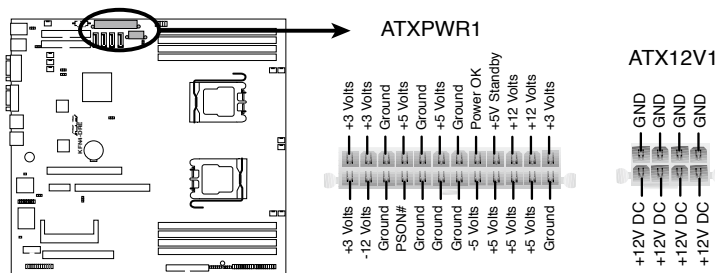
KFN4-DRE COM Port Connector

9. 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.



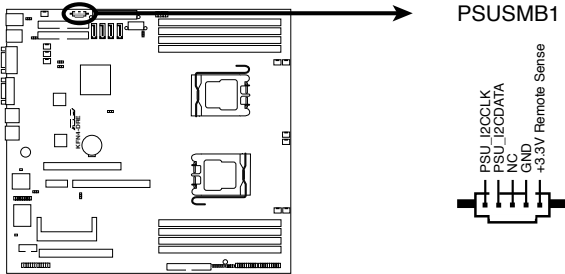
- Do not forget to connect the 8-pin ATX +12 V power plug; otherwise, the system will not boot.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- Make sure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



KFN4-DRE ATX Power Connector

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

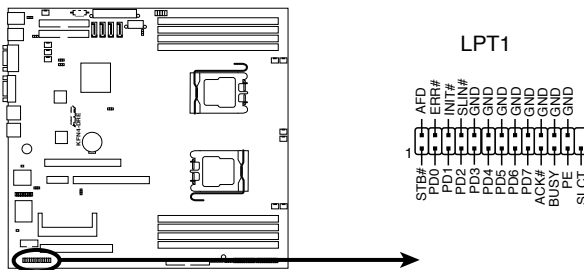
This connector allows you to connect SMBus (System Management Bus) devices to the power supply unit. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.



KFN4-DRE Power Supply SMBus Connector

11. Parallel port connector (26-pin LPT1)

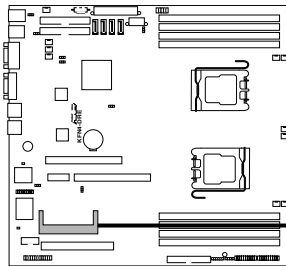
This connector is for a parallel port. Connect the parallel port module cable to this connector, then install the module to a slot opening at the back of the system chassis.



KFN4-DRE Parallel Port Connector

12. BMC and Mini PCI connectors (200-pin BMC SOCKET1)

This connectors is for the ASUS server management card (SO-DIMM socket for ASMB3-SOL).



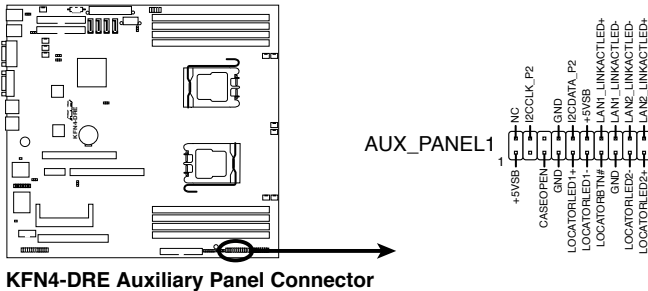
KFN4-DRE BMC SOCKET Connector

BMC SOCKET1



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

This connector supports several server system functions.

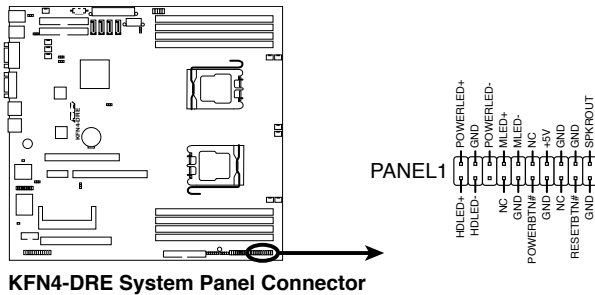


KFN4-DRE Auxiliary Panel Connector

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

14. System panel connector (20-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 SPKRROUT)**
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 RESEBTBN)**
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

Chapter 5

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

5.1 Managing and updating your BIOS

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

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

Refer to the corresponding sections for details on these utilities.



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

5.1.1 Creating a bootable floppy disk

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

DOS environment

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

Windows® XP environment

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

5.1.2 AFUDOS utility

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

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:



- Make sure that the floppy disk is not write-protected and has at least 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 / [filename]
```

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

```
A:\>afudos /RS161E4.ROM
```

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

```
A:\>afudos /RS161E4.ROM /pbnc
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 /RS161E4.ROM /pbnc
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:\>
```

5.1.3 ASUS CrashFree BIOS 2 utility

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



- Prepare the motherboard support CD or the floppy disk containing the updated motherboard BIOS before using this utility.
- Make sure that you rename the original or updated BIOS file in the floppy disk to KFN4DRE.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.
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 "RS161E4.ROM". Completed.  
Start flashing...
```



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

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

Recovering the BIOS from the support CD

To recover the BIOS from the support CD:

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

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

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

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
Floppy not found!
Checking for CD-ROM...
CD-ROM found!
Reading file "RS161E4.ROM". Completed.
Start flashing...
```



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

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



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

5.1.4 ASUS Update utility

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

- Save the current BIOS file
- Download the latest BIOS file from the Internet
- Update the BIOS from an updated BIOS file
- Update the BIOS directly from the Internet, and
- View the BIOS version information.

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



ASUS Update requires an Internet connection either through a network or an Internet Service Provider (ISP).

Installing ASUS Update

To install ASUS Update:

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

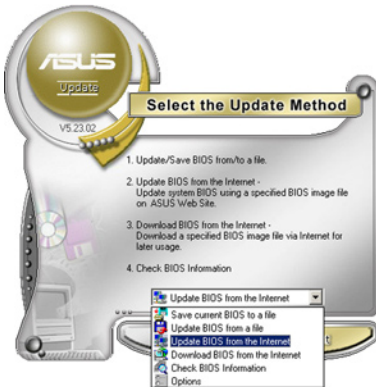
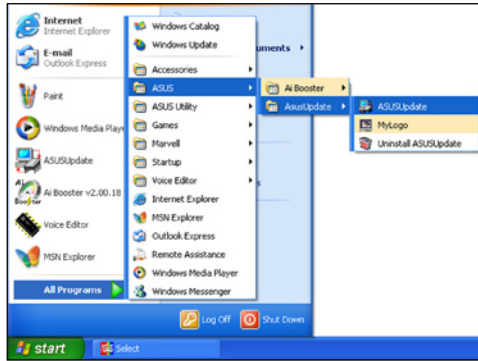


Quit all Windows® applications before you update the BIOS using this utility.

Updating the BIOS through the Internet

To update the BIOS through the Internet:

1. Launch the ASUS Update utility from the Windows® desktop by clicking **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate**. The ASUS Update main window appears.



2. Select Update BIOS from the Internet option from the drop-down menu, then click **Next**.
3. Select the ASUS FTP site nearest you to avoid network traffic, or click **Auto Select**. Click **Next**.

- From the FTP site, select the BIOS version that you wish to download. Click **Next**.
- Follow the screen instructions to complete the update process.



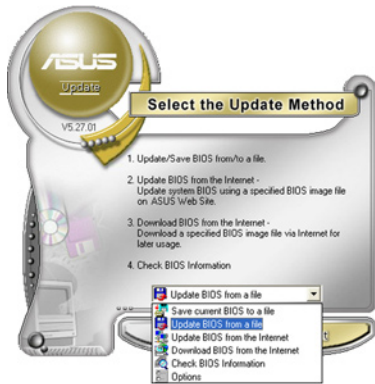
The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.



Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

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



- Locate the BIOS file from the Open window, then click Open.
- Follow the screen instructions to complete the update process.

5.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section “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.

The firmware device 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>+, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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



- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section “4.7 Exit Menu.”
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

5.2.1 BIOS menu screen

The screenshot shows the BIOS Setup Utility menu. At the top, the title bar reads "BIOS SETUP UTILITY" and lists menu items: Main, Advanced, Server, Security, Boot, and Exit. The main menu area is divided into three sections: "System Date" and "System Time" (with a red box around them), "Floppy A:" (with a red box around it), and a list of IDE configurations (with a red box around the list). To the right, there are configuration fields for the date and time, and a "Disabled" field. Further right, there are instructions for using [ENTER], [TAB], or [SHIFT-TAB] to select a field, and instructions for using [+] or [-] to configure system Date. At the bottom right, there is a list of navigation keys: →← Select Screen, ↑↓ Select Item, +- Change Field, Tab Select Field, F1 General Help, F10 Save and Exit, and ESC Exit. At the bottom of the screen, it says "V00.00 (C) Copyright 1985-2004, American Megatrends, Inc." Annotations with lines point to various parts of the screen: "Menu items" points to the top bar, "Menu bar" points to the top bar, "Configuration fields" points to the date and time fields, "General help" points to the navigation key list, "Sub-menu items" points to the IDE Configuration list, and "Navigation keys" points to the navigation key list.

Menu items Menu bar Configuration fields General help

```
BIOS SETUP UTILITY
Main  Advanced  Server  Security  Boot  Exit

System Date
System Time

Floppy A:

▶ IDE Configuration
▶ Primary IDE Master
▶ Primary IDE Slave
▶ Secondary IDE Master
▶ Secondary IDE Slave
▶ Tertiary IDE Master
▶ Fourth IDE Master
▶ Fifth IDE Master
▶ Sixth IDE Master
▶ System Information

[Mon, 06/27/2005]
[08:52:30]

[Disabled]

[ATAPI CDROM]
[Not Detected]
[Not Detected]
[Not Detected]
[Hard Disk]
[Hard Disk]
[Not Detected]
[Not Detected]

Use [ENTER], [TAB]
or [SHIFT-TAB] to
select a field.

Use [+] or [-] to
configure system Date.

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

V00.00 (C) Copyright 1985-2004, American Megatrends, Inc.
```

Sub-menu items Navigation keys

5.2.2 Menu bar

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

Main	For changing the basic system configuration
Advanced	For changing the advanced system settings
Server	For changing the advanced server 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.

5.2.3 Navigation keys

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

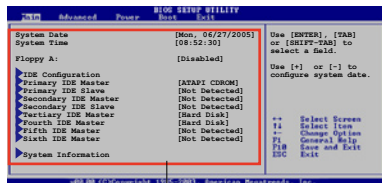


Some of the navigation keys differ from one screen to another.

5.2.4 Menu items

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

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



Main menu items

5.2.5 Sub-menu items

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

5.2.6 Configuration fields

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

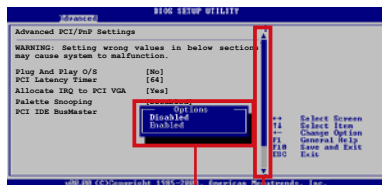
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to “4.2.7 Pop-up window.”

5.2.7 Pop-up window

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

5.2.8 Scroll bar

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



Pop-up window Scroll bar

5.2.9 General help

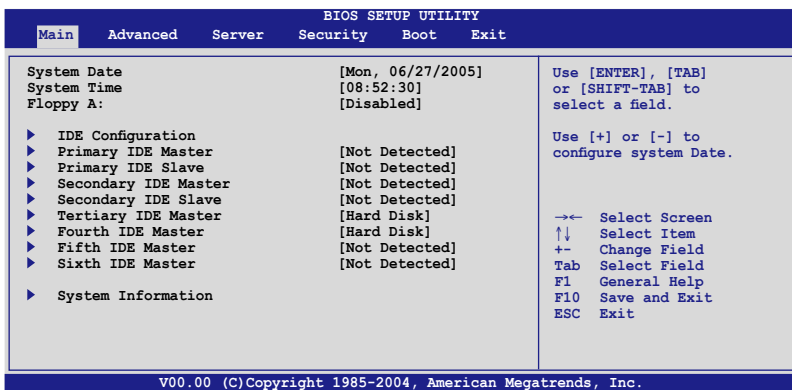
At the top right corner of the menu screen is a brief description of the selected item.

5.3 Main menu

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



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



5.3.1 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

5.3.2 System Time [xx:xx:xx]

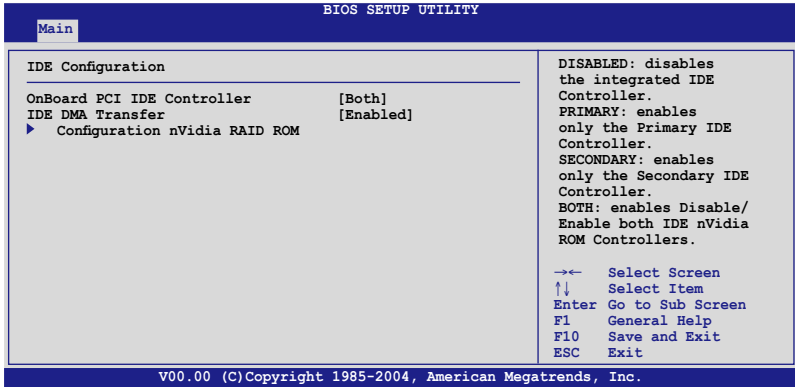
Allows you to set the system time.

5.3.3 Floppy A [Disabled]

Sets the type of floppy drive installed. Configuration options: [Disabled] [360K, 5^{1/4}"] [1.2M, 5^{1/4}"] [720K, 3^{1/2}"] [1.44M, 3^{1/2}"] [2.88M, 3^{1/2}"]

5.3.4 IDE Configuration

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



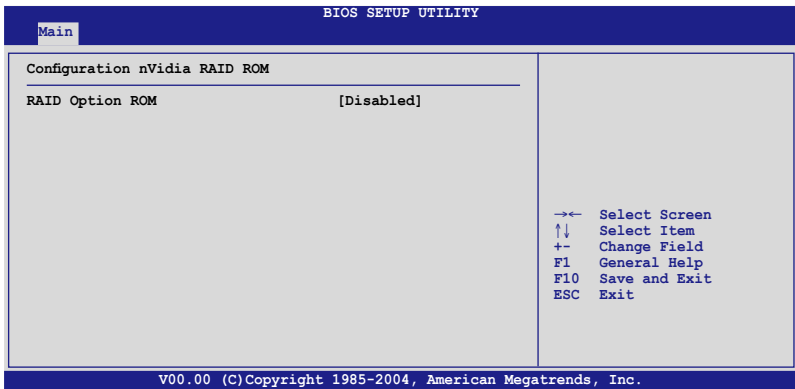
OnBoard PCI IDE Controller [Both]

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 IDE DMA transfers. Configuration options: [Disabled] [Enabled]

Configuration nVidia RAID ROM



RAID Option ROM [Disabled]

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



The following items appear when the RAID Option ROM is Enabled.

Tertiary Master as RAID [Disabled]

Sets the tertiary master interface as RAID. Configuration options: [Disabled] [Enabled]

Fourth Master as RAID [Disabled]

Sets the fourth master interface as RAID. Configuration options: [Disabled] [Enabled]

Fifth Master as RAID [Disabled]

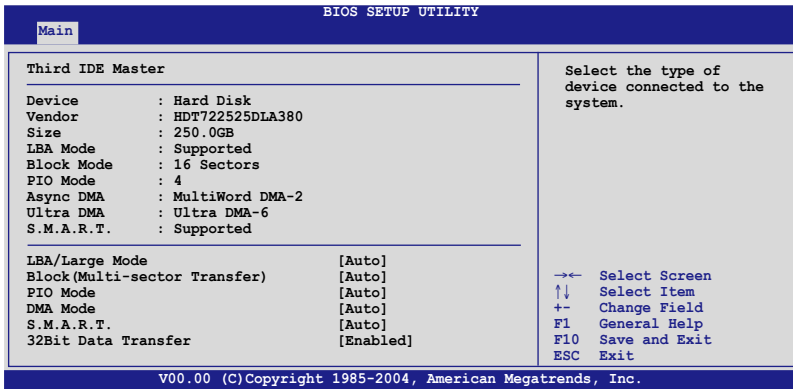
Sets the fifth master interface as RAID. Configuration options: [Disabled] [Enabled]

Sixth Master as RAID [Disabled]

Sets the sixth master interface as RAID. Configuration options: [Disabled] [Enabled]

5.3.5 Primary, Secondary, Tertiary, Fourth, Fifth, and Sixth IDE Master/Slave

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



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.

LBA/Large Mode [Auto]

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

Block (Multi-sector Transfer) [Auto]

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

PIO Mode [Auto]

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

DMA Mode [Auto]

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

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

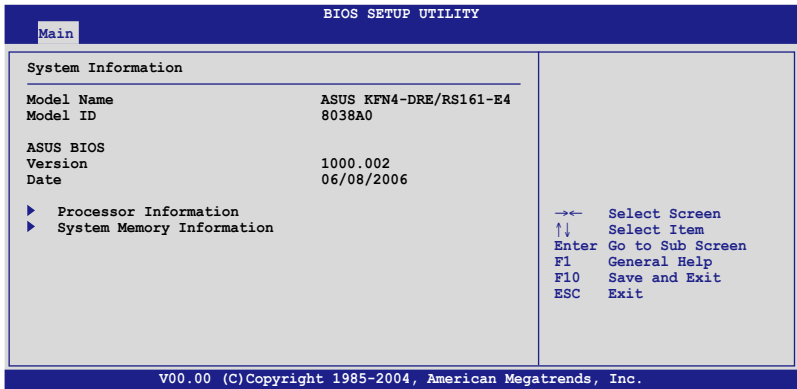
Sets the Smart Monitoring, Analysis, and Reporting Technology. Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

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

5.3.6 System Information

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



Processor Information

Displays the installed processor information.

The screenshot shows the BIOS Setup Utility Main menu. The title bar reads "BIOS SETUP UTILITY" and the current menu is "Main". The "Processor Information" section is displayed, showing details for two CPUs. CPU1 and CPU2 are both Dual-Core AMD Opteron(tm) Processor 2210. The ID/uCode is 040F12h/None, the speed is 1.80GHz, and the ratio is Actual 9 Max 9. The cache configuration is L1/256KB L2/2048KB, and the revision is 0. On the right side of the screen, a legend indicates the navigation keys: right arrow for Select Screen, up/down arrows for Select Item, F1 for General Help, F10 for Save and Exit, and ESC for Exit. At the bottom, the copyright information "V00.00 (C) Copyright 1985-2004, American Megatrends, Inc." is visible.

Processor Information	
***CPU1:	
Brand	Dual-Core AMD Opteron(tm) Processor 2210
ID/uCode	040F12h/None
Speed	1.80GHz
Ratio	Actual 9 Max 9
Cache	L1/256KB L2/2048KB
Revision	0
***CPU2:	
Brand	Dual-Core AMD Opteron(tm) Processor 2210
ID/uCode	040F12h/None
Speed	1.80GHz
Ratio	Actual 9 Max 9
Cache	L1/256KB L2/2048KB
Revision	0

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

V00.00 (C) Copyright 1985-2004, American Megatrends, Inc.

System Memory Information

Displays the installed system memory information.

The screenshot shows the BIOS Setup Utility Main menu. The title bar reads "BIOS SETUP UTILITY" and the current menu is "Main". The "System Memory Information" section is displayed, showing the total memory as 4096MB. It details the Node0 and Node1 memory configurations. Node0 has four DIMMs (DIMM01-DIMM04) with speeds of 667, None, 1024, and 1024 MB respectively. Node1 has four DIMMs (DIMM05-DIMM08) with speeds of 667, None, 1024, and 1024 MB respectively. On the right side of the screen, a legend indicates the navigation keys: right arrow for Select Screen, up/down arrows for Select Item, F1 for General Help, F10 for Save and Exit, and ESC for Exit. At the bottom, the copyright information "V00.00 (C) Copyright 1985-2004, American Megatrends, Inc." is visible.

System Memory Information	
Total Memory	4096MB
Node0 Memory Configuration:	
Speed	DDR2 667
DIMM01	- None
DIMM02	- 1024MB
DIMM03	- None
DIMM04	- 1024MB
Node1 Memory Configuration :	
Speed	DDR2 667
DIMM05	- None
DIMM06	- 1024MB
DIMM07	- None
DIMM08	- 1024MB

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

V00.00 (C) Copyright 1985-2004, American Megatrends, Inc.

5.4 Advanced menu

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



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

```
BIOS SETUP UTILITY
Main  Advanced  Server  Security  Boot  Exit

WARNING: Setting wrong values in the sections below
may cause system to malfunction.

Options for CPU.

▶ CPU Configuration
▶ Chipset Configuration
▶ PCI/PnP Configuration
▶ USB Configuration
▶ Peripheral Devices Configuration
▶ ACPI Configuration
▶ APM Configuration
▶ Hardware Monitor
▶ Trusted Computing
▶ ASUSLog Configuration

-><- Select Screen
↑↓ Select Item
+<u>-</u> Change Field
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit

V00.00 (C) Copyright 1985-2004, American Megatrends, Inc.
```

5.4.1 CPU Configuration

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

```
BIOS SETUP UTILITY
Advanced

CPU Configuration

MPS Table Version [1.4]
MTRR Mapping [Continuous]
PowerNow [Disabled]

Select MPS

-><- Select Screen
↑↓ Select Item
+<u>-</u> Change Field
F1 General Help
F10 Save and Exit
ESC Exit

V00.00 (C) Copyright 1985-2004, American Megatrends, Inc.
```

MPS Table Version [1.4]

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

MTRR Mapping [Continuous]

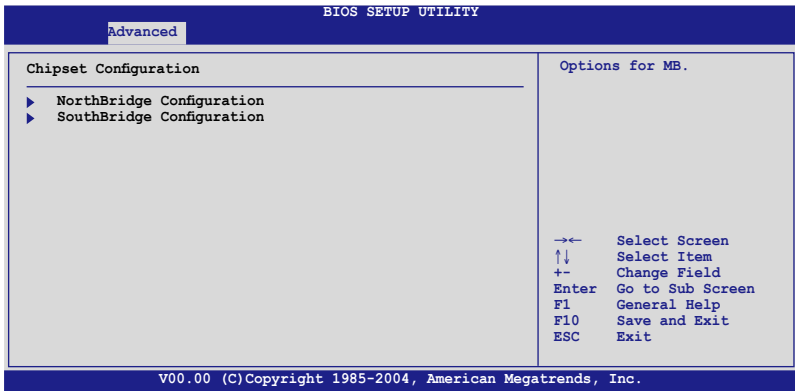
Determines the method used for programming processor MTRRs when using more than 4GB of system memory. Configuration options: [Continuous] [Discrete]

PowerNow [Disabled]

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

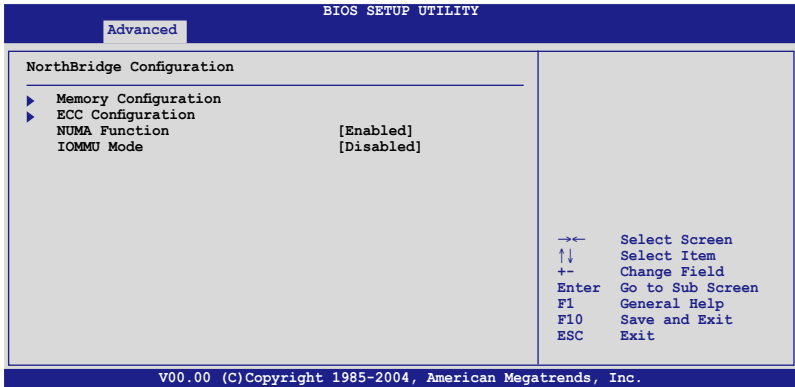
5.4.2 Chipset Configuration

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



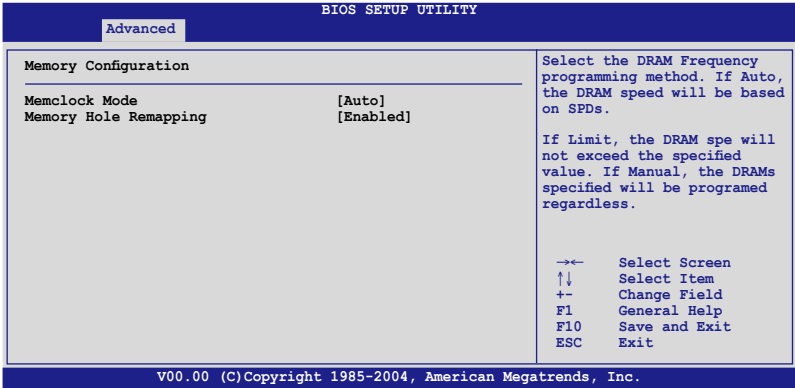
NorthBridge Configuration

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



Memory Configuration

The Memory Configuration menu allows you to change the Memory settings.



Memclock Mode [Auto]

Select the DRAM Frequency programming method. If Auto, the DRAM speed will be based on SPDs. If Limit, the DRAM spe will not exceed the specified value. If Manual, the DRAMs specified will be programed regardless. Configuration options: [Auto] [Limit] [Manual]



The Memclock Value item appear when the Memclock Mode set [Limit] or [Manual].

Memclock Value [400 MHz]

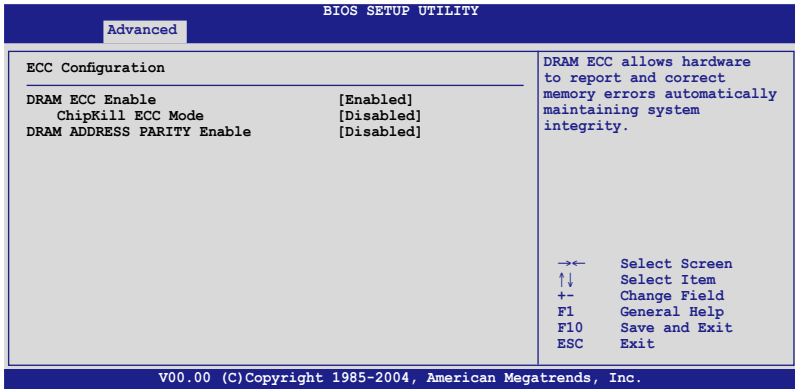
Configuration options: [400 MHz] [533 MHz] [667 MHz]

Memory Hole Remapping [Enabled]

Enables Memory Remapping Around Memory Hole. Configuration options: [Disabled] [Enabled]

ECC Configuration

The ECC Configuration menu allows you to change the DRAM ECC settings.



DRAM ECC Enable [Enabled]

Allows hardware to report and correct memory errors automatically maintaining system integrity. Configuration options: [Disabled] [Enabled]



The following items appear when the DRAM ECC Enable set [Enabled].

ChipKill ECC Mode [Disabled]

Enables or Disables ChipKill ECC Mo. Configuration options: [Disbled] [Enabled]

DRAM ADDRESS PARITY Enable [Disabled]

Allows hardware to report and correct memory address errors automatically maintain system integrity. Configuration options: [Disabled] [Enabled]

NUMA Function [Enabled]

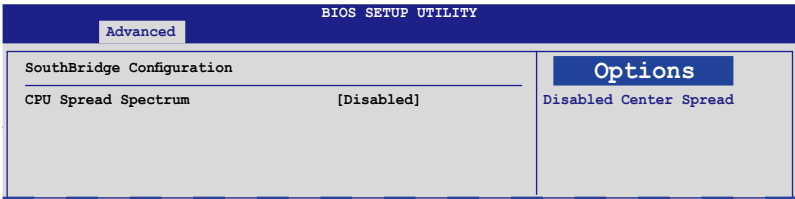
Enables or disables the non-uniform memory access (NUMA) function. Configuration options: [Disabled] [Enabled]

IOMMU Mode [Disabled]

Set GART size in systems without AGP, or disable altogether. Some OSes require valid GART for proper operation, select appropriate option to ensure proper AGP operation. Configuration options: [AGP Present] [Disabled] [64MB] [128MB] [256MB] [512MB] [1GB]

SouthBridge Configuration

The SouthBridge configuration menu allows you to change the Southbridge settings.



CPU Spread Spectrum [Disabled]

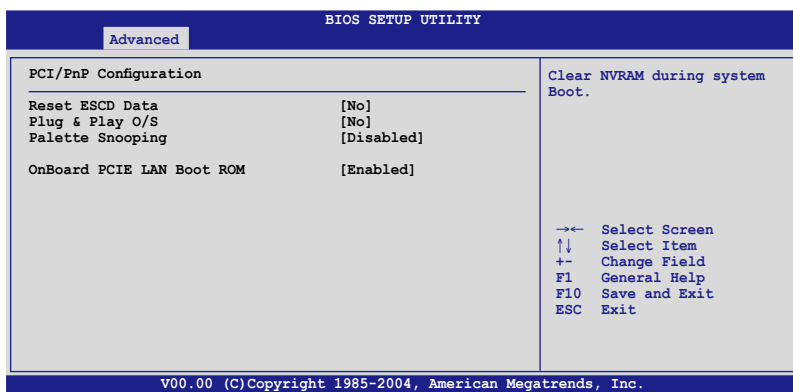
Sets or disables the processor spread spectrum. Configuration options: [Disabled] [Center Spread]

5.4.3 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]

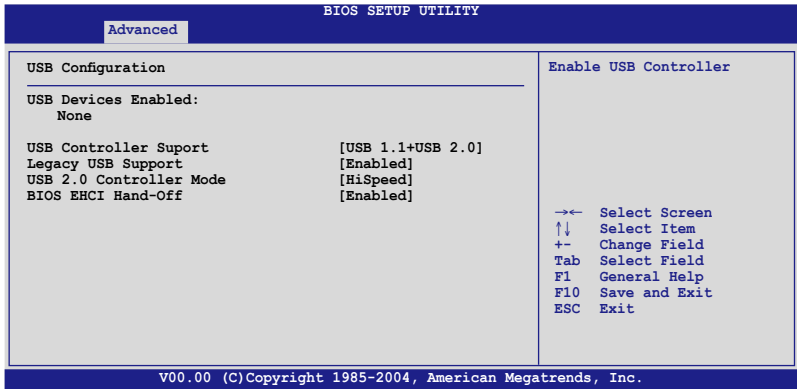
When set to [Enabled], the palette snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

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]

5.4.4 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 Module Version and USB Devices Enabled items show the auto-detected values. If no USB device is detected, the USB Devices Enabled item shows None.

USB Controller Support [USB 1.1+USB 2.0]

Sets or disables the USB controller support. Configuration options: [Disabled] [USB 1.1 Only] [USB 1.1+USB 2.0]

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]

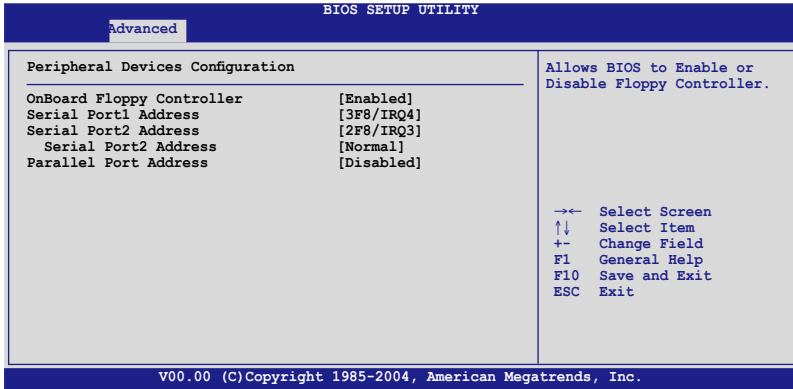
USB 2.0 Controller Mode [HiSpeed]

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

BIOS EHCI Hand-Off [Enabled]

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

5.4.5 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 [Disabled]

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



The following items appear when the Parallel Port Address set [378] or [278].

Parallel Port Mode [Normal]

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

EPP Version [1.9]

Allows selection of the Parallel Port EPP version. This item appears when the Parallel Port Mode is set to [EPP] or [ECP & EPP]. Configuration options: [1.9] [1.7]

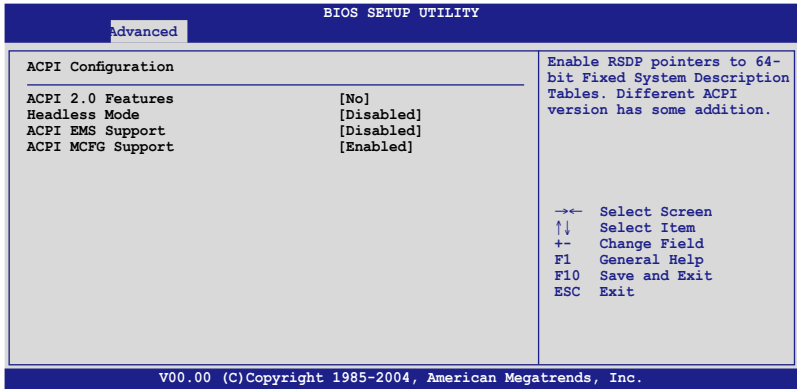
ECP Mode DMA Channel [DMA3]

Appears when the Parallel Port Mode is set to [ECP] or [ECP & EPP]. This item allows you to set the Parallel Port ECP DMA. Configuration options: [DMA0] [DMA1] [DMA3]

Parallel Port IRQ [IRQ7]

Sets the Parallel port IRQ. Configuration options: [IRQ5] [IRQ7]

5.4.6 ACPI Configuration



ACPI 2.0 Features [No]

Enables or disables the ACPI 2.0 features. Configuration options: [Yes] [No]

Headless Mode [Disabled]

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

ACPI EMS Support [Disabled]

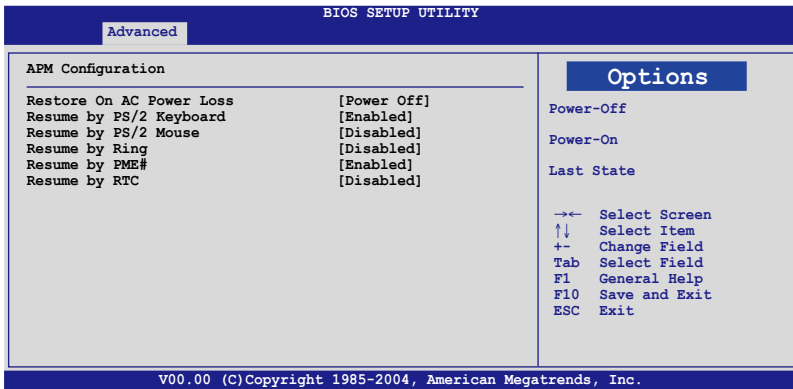
Enables or disables the ACPI EMS support. Configuration options: [Disabled] [Enabled]

ACPI MCFG Support [Enabled]

When Enabled, BIOS will reoprt ACPI MCFG Table. Configuration options: [Disabled] [Enabled]

5.4.7 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 [Power Off]

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 PS/2 Keyboard [Enabled]

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

Resume By PS/2 Mouse [Disabled]

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

Resume 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]

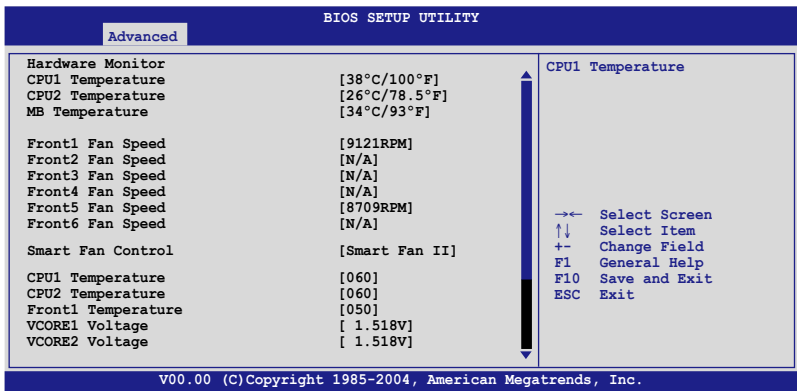
Resume By PME# [Disabled]

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(Days), RTC Alarm Hour(Hours), RTC Alarm Minute(Minutes), and RTC Alarm Second(Seconds) appear with set values. Configuration options: [Disabled] [Enabled]

5.4.8 Hardware Monitor



CPU1/CPU2 Temperature [xxx°C/xxx°F]

MB Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the motherboard and CPU temperatures. Select [Ignored] if you do not wish to display the detected temperatures. The CPU2 Temperature shows N/A if no processor is installed in CPU 2 socket.

Front1/2/3/4/5/6 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 [Disabled]

Allows you to enable or disable the ASUS Smart Fan feature that smartly adjusts the fan speeds for more efficient system operation. Configuration options: [Disabled] [Enabled]



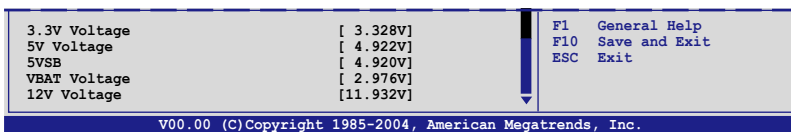
The CPU1 Temperature, CPU2 Temperature, and Front1 Temperature items appear when you enable the Smart Fan Control feature.

CPU1/CPU2 Temperature [XXX]

Front1 Temperature [XXX]

Allows you to set the CPU and system threshold temperature before the Smart Fan Control is disabled.

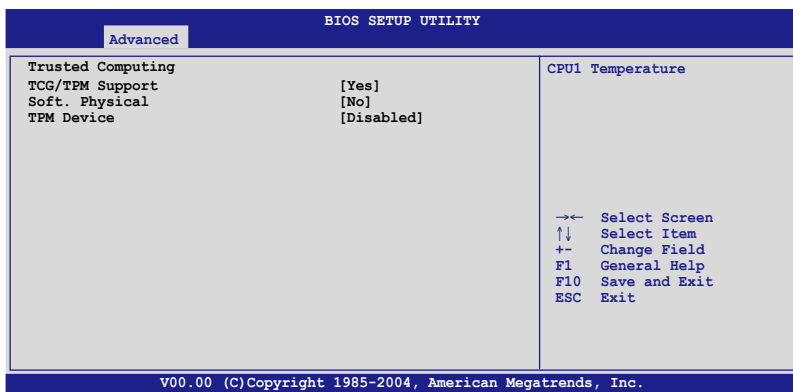
Use the arrow down key to scroll down the menu.



VCORE1 Voltage, VCORE2 Voltage, 3.3V 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 CPU 2 socket.

5.4.9 Trusted Computing



TCG/TPM Support [Yes]

Enables or Disables TPM TCG (TPM 1.1/1.2) support in BIOS.



The Soft Physical item appear when the TCG/TPM Support set [Yes].

Soft. Physical [No]

Configuration options: [Yes] [No]

TPM Device [Disabled]

Enables or Disables TPM device. Configuration options: [Disabled] [Enabled]

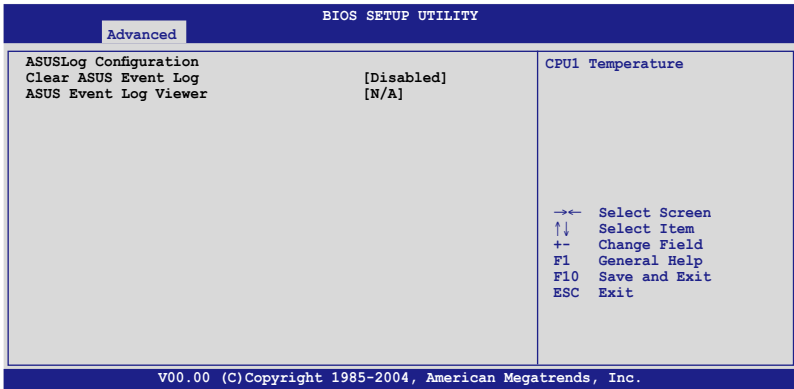


The TPM Owner item appear when the TPM Device set [Enabled].

TPM Oener [Don't Change]

Configuration options: [Clear] [Don't Change]

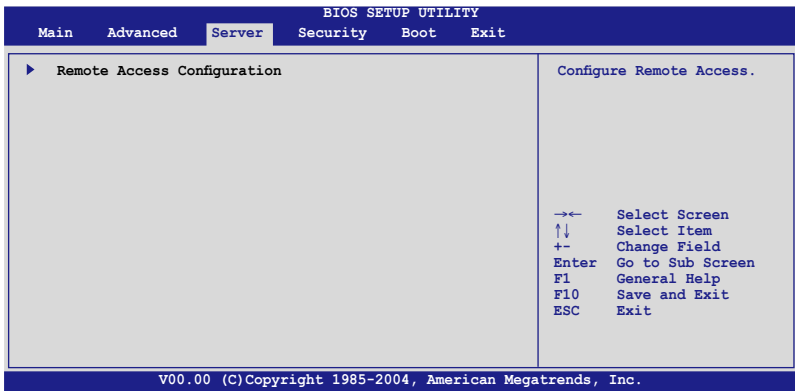
5.4.10 ASUSLog Configuration



Clear ASUS Event Log [Disabled]

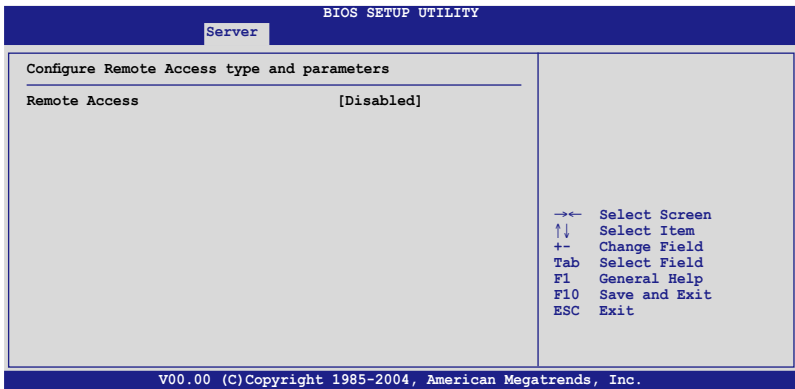
Enables or disables Clear ASUS Event Log. Configuration options: [Disabled] [Enabled]

5.5 Server menu



5.5.1 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 the Remote Access item is 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]

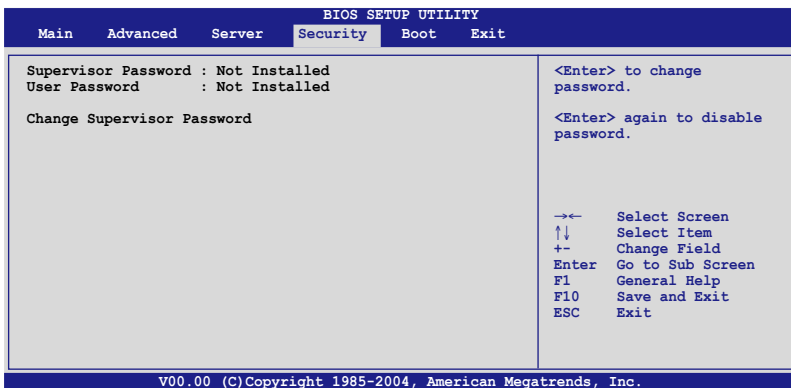
Enables or disables the VT-UTF8 combo key support for ANSI or VT100 terminals. Configuration options: [Disabled] [Enabled]

Media Type [Serial]

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

5.6 Security menu

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



Change Supervisor Password

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

To set a Supervisor Password:

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

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

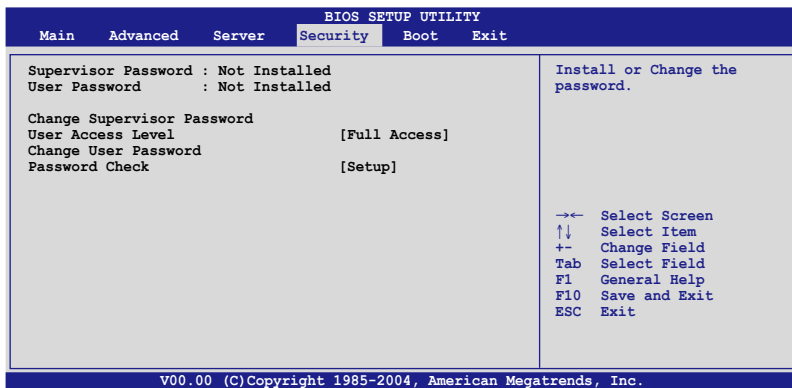
To change the user password, follow the same steps as in setting a supervisor password.

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



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

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



User Access Level [Limited]

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.

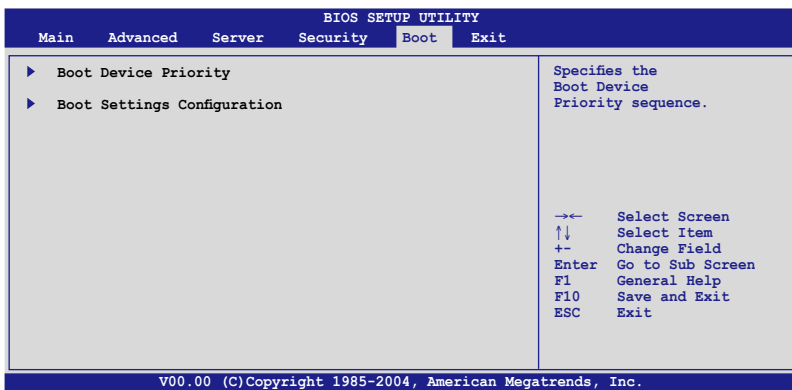
To change the user password, follow the same steps as in setting a user password.

Password Check [Setup]

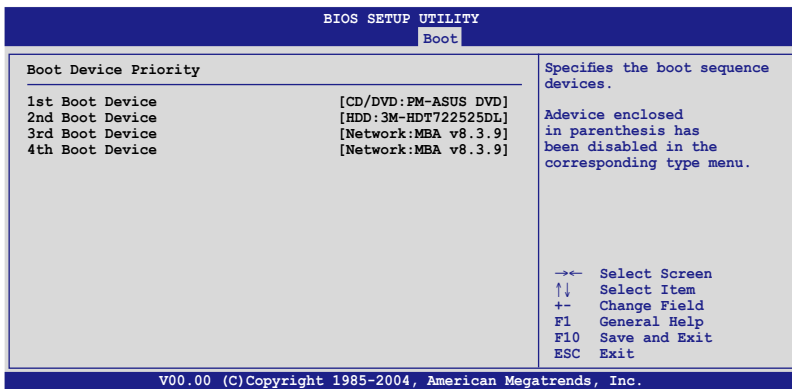
When set to [Setup], BIOS checks for user password when accessing the Setup utility. When set to [Always], BIOS checks for user password both when accessing Setup and booting the system.
Configuration options: [Setup] [Always]

5.7 Boot menu

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



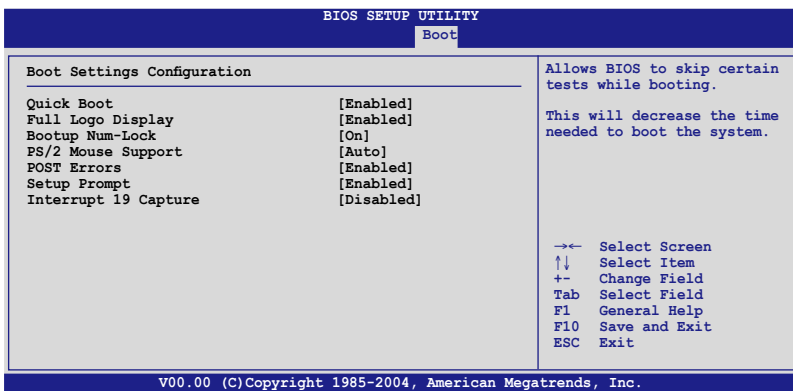
5.7.1 Boot Device Priority



1st ~ 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]

5.7.3 Boot Settings Configuration



Quick Boot [Enabled]

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

Full Logo Display [Enabled]

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



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

Bootup Num-Lock [On]

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

PS/2 Mouse Support [Auto]

Allows you to enable or disable support for PS/2 mouse. Configuration options: [Disabled] [Enabled] [Auto]

POST Errors [Enabled]

Wait for F1 Key to be pressed if error occurs. Configuration options: [Disabled] [Enabled]

Setup prompt [Enabled]

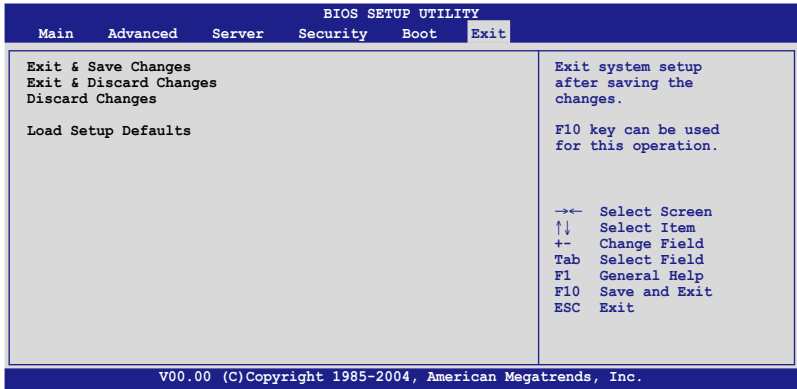
Display “Press DEL to run Setup” in POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Disabled]

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

5.8 Exit menu

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



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 computer is turned off. When you select this option, a confirmation window appears. Select Ok to save the 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

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

Load Setup Defaults

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

Chapter 6

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

RAID Configuration

6.1 Setting up RAID

The motherboard comes with the following RAID solutions:

- 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.

6.1.1 RAID definitions

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

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



If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support CD to a floppy disk before you install an operating system to the selected hard disk drive. Refer to Chapter 7 for details.

6.1.2 Installing hard disk drives

The motherboard supports Serial ATA (both models) 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.

6.1.3 RAID configuration utility

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.

6.2 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.

6.2.1 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.

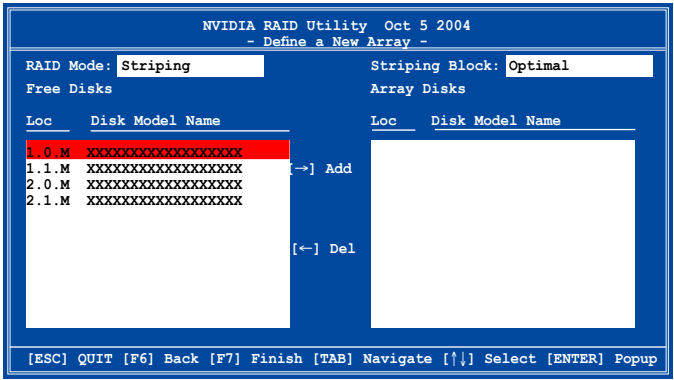


-
- Refer to Chapter 5 for details on entering and navigating through the BIOS Setup.
 - The RAID BIOS setup screens shown in this section are for reference only, and may not exactly match the items on your screen.
-

6.2.2 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.

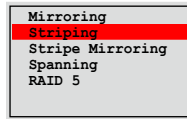


The navigation keys vary depending on the menu level or option.

6.2.3 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.

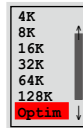


Use the up or down arrow keys to select a RAID mode, then press <Enter>. You can select either Mirroring, Striping, Spanning, Stripe Mirroring, or RAID 5.



- 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:



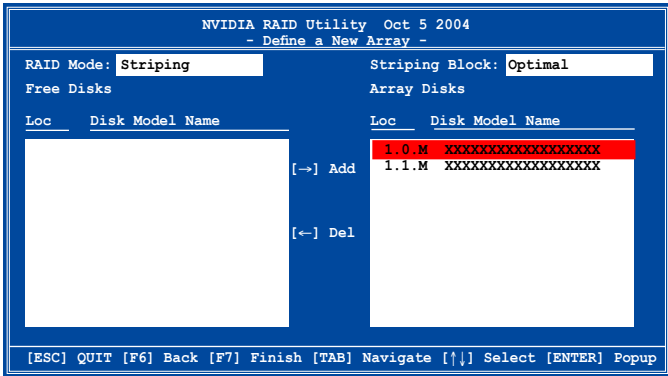
The available stripe size values range from 4KB to 128KB. The default stripe size is optimal (64KB). You must choose the stripe size value based on the projected drive usage. For low disk usage, select 4 KB/16 KB. For typical disk usage, select 64 KB. Select 128KB for performance disk usage.



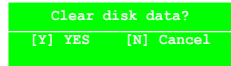
For server systems, we recommend using a lower array block size. For multimedia computer systems used mainly for audio and video editing, we recommend a higher array block size for optimum performance.

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.

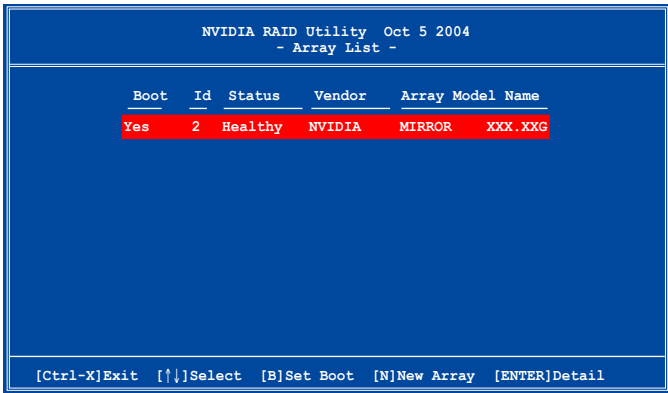


5. Press <Y> to delete all data from the hard disk drives, or <N> to continue creating the RAID set without deleting the data on the disks. The Array List windows appears.



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

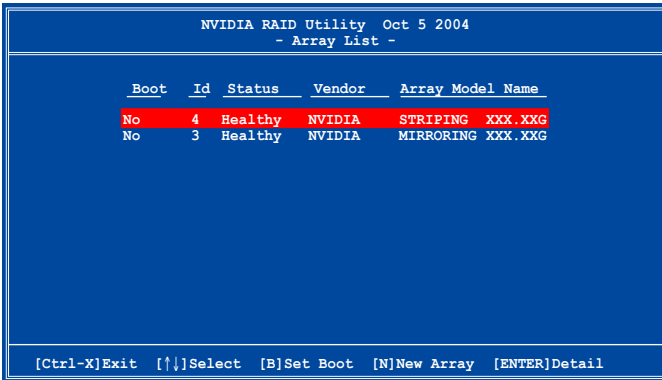
6. The utility displays the created RAID set. Press <Ctrl+X> to save your settings and exit the utility.



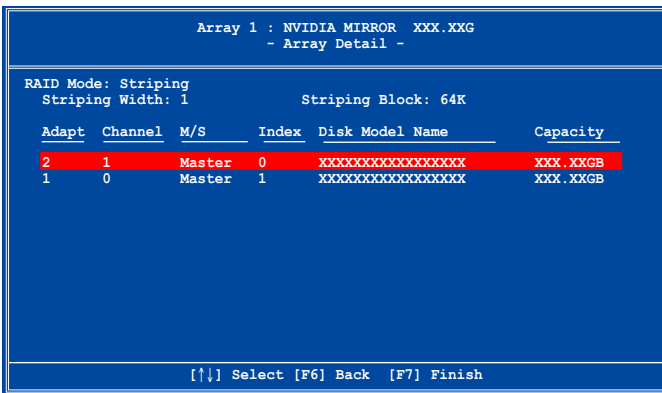
6.2.4 Rebuilding a RAID set

To rebuild a RAID set:

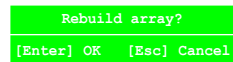
1. From the Array List, use the up or down arrow keys to select the RAID set you want to rebuild, then press <Enter>. The RAID set details appear.



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.



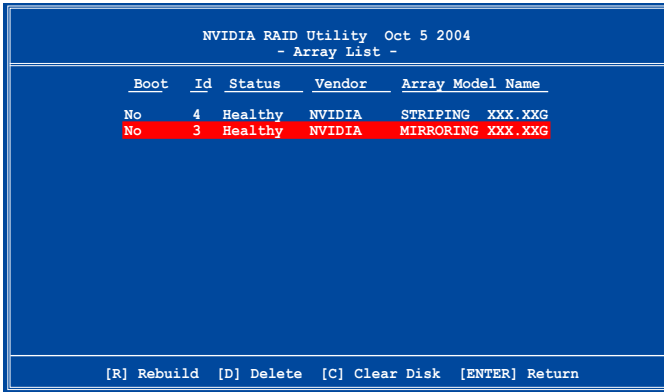
4. Press <Enter> to start rebuilding the array, or <Esc> to cancel. The Array List screen displays the RAID set after rebuilding.



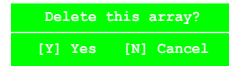
6.2.5 Deleting a RAID array

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.



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.



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.

6.2.6 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.

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

[Ctrl-X]Exit [↑↓]Select [B]Set Boot [N]New Array [ENTER]Detail

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

Adapt	Channel	M/S	Index	Disk Model Name	Capacity
2	1	Master	0	XXXXXXXXXXXXXXXXXXXX	XXX.XXGB
1	0	Master	1	XXXXXXXXXXXXXXXXXXXX	XXX.XXGB

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

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

Clear disk data?
[Y] Yes [N] Cancel

6.2.7 Installing the RAID controller driver

Windows® 2000/2003 Server OS

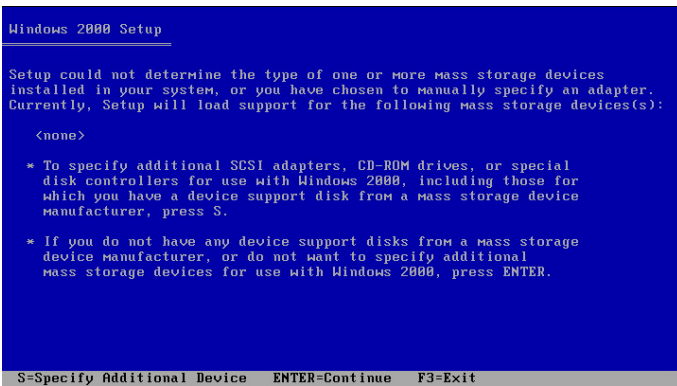
During Windows® 2000/2003 Server OS installation

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

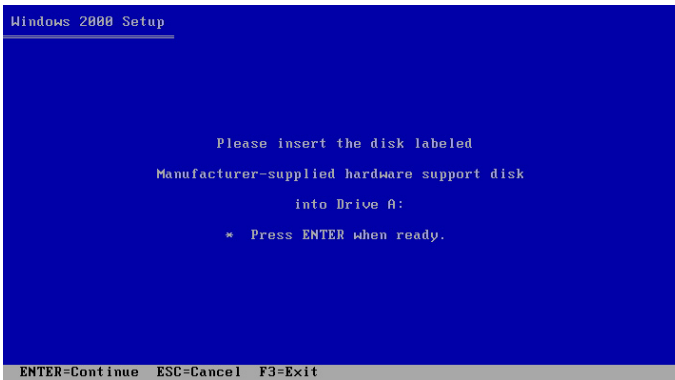
1. Boot the computer using the Windows® 2000/2003 Server installation CD. The Windows® 2000/2003 Setup starts.



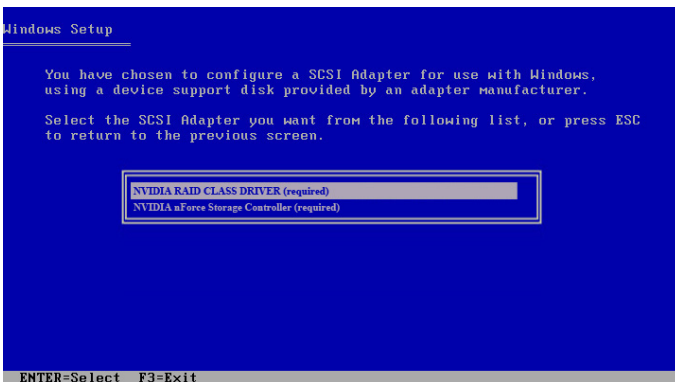
2. Press <F6> when the message “Press F6 if you need to install a third party SCSI or RAID driver...” appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



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

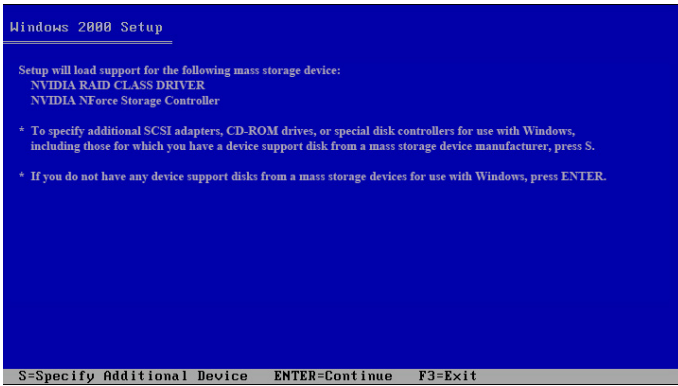


5. Select the NVIDIA RAID CLASS DRIVER (required), then press <Enter>.



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.

Chapter 7

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

Driver installation

7.1 RAID driver installation

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

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:

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. When prompted, press any key to boot from the support CD.

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

The Makedisk menu appears.

```
A) FreeDOS command prompt  
B) Create NVIDIA nForce SATA RAID for Windows 2000 Driver Disk  
C) Create NVIDIA nForce SATA RAID for Windows 2003 Driver Disk  
D) Create NVIDIA nForce SATA RAID for Windows 2003 64 bit Driver Disk  
E) Flash AMI BIOS for RS161-E4/PA2  
F) Write RS161-E4/PA2 FRU  
G) Broadcom ASF Firmware Update  
Please choose A TO G:
```

5. Place a blank, high-density floppy disk to the floppy disk drive.

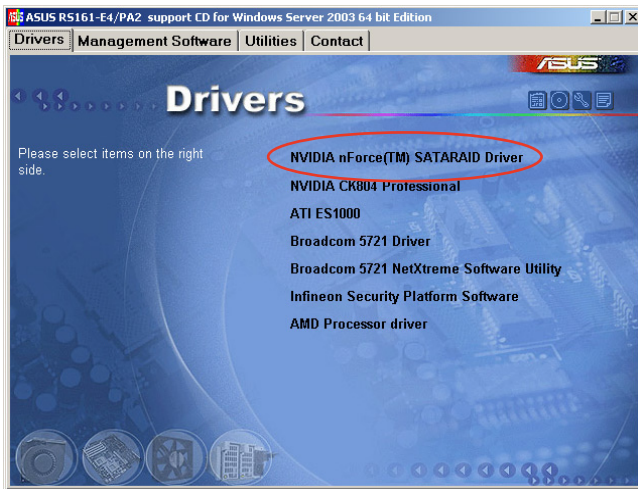


When you insert a floppy disk with data, the utility erases all the data before copying the RAID drivers.

6. Type the letter of the option you like to select, then press <Enter>. For example, if you want to create an NVIDIA nForce(TM) SATA RAID driver disk for a 32-bit Windows 2003 system, press <c>, then press <Enter>.
7. The RAID drivers are copied to the floppy disk. After creating a RAID driver disk, eject the floppy disk, then write-protect it to prevent computer virus infection.

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 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 key if you are installing a third-party 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.

7.2 LAN driver installation

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

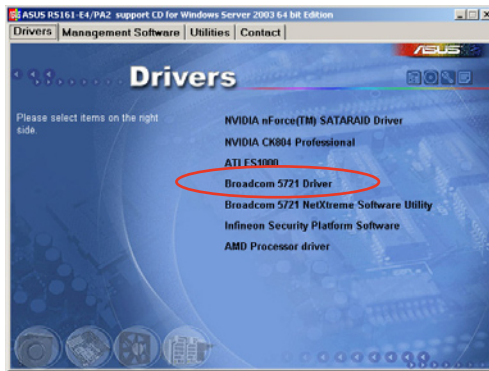
To install the LAN controller drivers:

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.

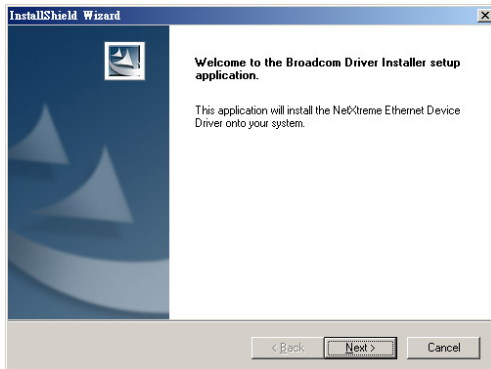


- Windows® automatically detects the LAN controllers and displays a New Hardware Found window. Click Cancel to close this window.
- If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run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

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



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



7.3 Support CD information

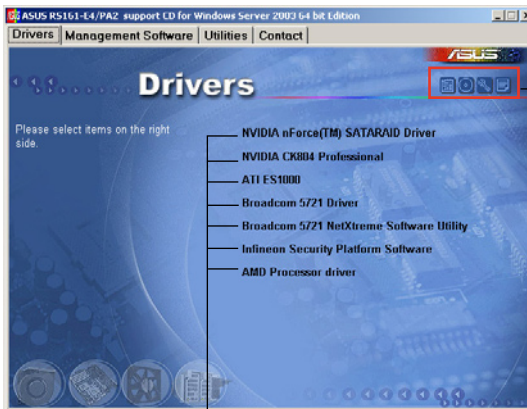
The support CD that came with the motherboard package contains the drivers, software applications, and utilities that you can install to avail all motherboard features.



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

7.3.1 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.



Click an icon to display support CD/motherboard information

Click an item to install



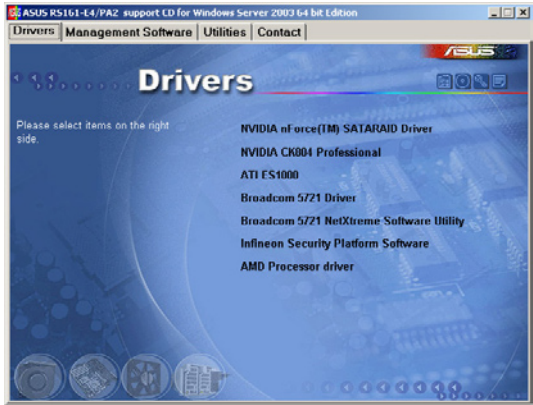
If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the CD.

7.3.2 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.



NVIDIA nForce(TM) SATORAID Driver

Creates a driver disk for the NVIDIA® nForce(TM) Serial ATA RAID controller.

NVIDIA CK804 Professional

Installs the driver for the NVIDIA® CK804(nVidia Professional 2200) chip.

ATI ES1000 Display Driver

Installs the driver for the ATI ES1000 display controller.

Broadcom 5721 dirver

Installs the Broadcom® 5751 NetXtreme Gigabit Ethernet driver. See page 6-13 for details.

Broadcom 5721 NetXtreme Software Utility

Installs the Broadcom® NetXtreme software application. Refer to the application help file for details.

Infineon Security Platform Software

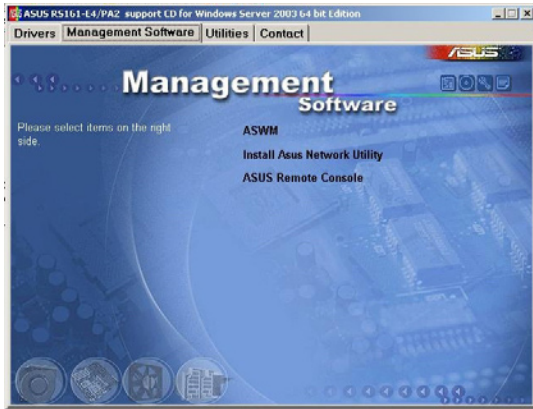
Installs the Infineon Security Platform Software.

AMD Processor driver

Installs the AMD processor driver.

7.3.3 Management Software

The Management Software menu shows the available server management software applications.



ASWM

Installs the ASUS System Web-base Management utility. Refer to the application help file for details.

Install ASUS Network Utility

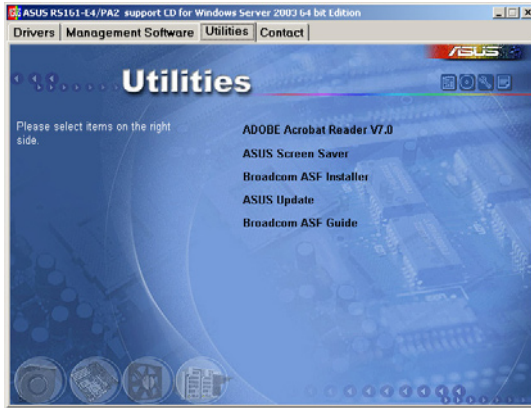
Installs the ASUS Network Utility. Refer to the application help file for details.

ASUS Remote Console

Installs the ASUS Remote Console.

7.3.4 Utilities

The Utilities menu shows the available software applications for your barebone server.



ADOBE Acrobat Reader

The Adobe Acrobat® Reader V5.0 is for opening, viewing, and printing documents in Portable Document Format (PDF).

ASUS Screen Saver

Bring life to your idle screen by installing the ASUS screen saver.

Broadcom ASF Installer

Open the Broadcom ASF Installer.

ASUS Update

The ASUS Update utility that allows you to update the motherboard BIOS in Windows® environment. This utility requires an Internet connection either through a network or an Internet Service Provider (ISP).

Broadcom ASF Guide

Open the Broadcom ASF user's manual.