



RS161-E5/PA2

1U Rackmount Server

Service Guide



E3349

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Notices

Federal Communications Commission Statement

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

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

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

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



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

Canadian Department of Communications Statement

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

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



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

Safety information

Electrical safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, 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 barebone server, including sections on the 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 prepare the barebone server for rack mounting.

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 setup

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

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.

Conventions

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



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



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



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



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

Reference

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

Chapter 1

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



Product introduction

1.1 System package contents

Check your system package for the following items.

| | |
|-------------|---|
| Chassis | ASUS R11 1U rackmount chassis |
| Motherboard | ASUS KFSN4-DRE motherboard |
| Components | 1 x 500W Single power supply 1 x Optical drive 2 x Hot-swap SATA-II HDD trays SATA2 backplane 2 x PSU fan (40mm x 28mm) 4 x System fan (40mm x 28 mm) 2 x Device fan (40mm x 28 mm) 1 x Airdut |
| Cables | AC power cable Pre-connected cables Pre-connected device/power cables |
| Accessories | Rackmount rail kit 2 x CPU heatsink RS161-E5/PA2 user guide RS161-E5/PA2 support CD (includes ASWM*) CA Anti-virus software CD Bag of screws |

*ASUS System Web-based Management



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

1.2 System specifications

The ASUS RS161-E5/PA2 is a 1U barebone server system featuring the ASUS KFSN4-DRE motherboard. The server supports dual Socket-F(1207) 2000 Series AMD Opteron™, plus other latest technologies through the chipsets onboard.

| Model Name | | RS161-E5/PA2 |
|----------------------------------|--|---|
| Processor / System Bus | | 2 * Socket F (1207) AMD Opteron™ 2000 series processor (Barcelona Support) Quad Core/Dual Core HyperTransport™ Technology 1.0, 1GHz 512KB L2 cache/Per core, 2MB L3 |
| Core Logic | | nVIDIA nForce Professional 2200 |
| ASUS Features | Smart Fan | Smart Fan II |
| | ASWM2.0 | √ |
| Memory | Total Slots | 16 (2-channel per CPU) |
| | Capacity | Maximum Up to 64GB |
| | Memory Type | DDR2 533/667 Reg. ECC |
| | Memory Size | 512 MB, 1 GB, 2 GB, 4 GB |
| Expansion Slots | Total PCI/PCI-X/PCI-E Slots | 2 |
| | Slot Type | 1 * PCI-E x16 slot (x8 link) (Full-Height/Half-length) 1 * PCI-E x16 slot (x8 link) (4.2" x 5.66") |
| | Additional Slot 1 | 1 * SO-DIMM socket for optional ASMB3-SOL |
| HDD Bays | SATA Controller | nForce Professional 2200: 2 * SATA2 300MB/s ports Support software RAID 0, 1 (Windows) |
| | I = internal A or S will be hot-swappable | 2 * Hot-Swap SATA2 HDDs |
| Networking | LAN | 2 * Broadcom® BCM5721 PCI-E GbE LAN |
| Graphic | VGA | XGI®Z9s VGA Controller / 32MB DDR2 VRAM |
| Auxiliary Storage FDD / CD / DVD | | 1 * 5.25" Optical Device Bay Options: No Device / DVD-ROM / DVD-RW |
| Rear Panel | | 1 * External Serial Port 2 * RJ-45 ports 1 * RJ-45 port for ASMB3 iKVM only 4 * USB 2.0 ports (Front * 2, Rear * 2) 1 * VGA port 1 * COM1 1 * PS/2 keyboard port 1 * PS/2 mouse port |

(continued on the next page)



The RJ-45 port for ASMB3 iKVM is not for Ethernet connection and it functions only when working with ASMB3 iKVM card.

| | | |
|---|--|--|
| OS Support | | Windows® Server 2003 Enterprise R2 SP2 32/64-bit RedHat® Enterprise Linux AS4.0 UP5 32/64-bit SuSE® Linux Enterprise Server 10 32/64-bit Fedora core 7.0 32/64-bit FreeBSD 6.2 (Subject to change without any notice) |
| Anti-virus Software | | Optional CA® eTrust™ 7.1 anti-virus software |
| Management Solution | Software | ASWM2.0 |
| | Out of Band Remote Management | Optional (ASMB3-SOL) |
| Safety | US / Canada (UL1950-CSA950) | √ |
| | Europe (TUV / CE, EN55022 compliance to EU Directive 89 / 366/ EEC) | √ |
| | Europe (TUV) | √ |
| EMI | US (FCC, CFR47 Part 15, Class A) | √ |
| | Europe (CE, EN55022 & EN55024) | √ |
| | Australia (C-TICK) | √ |
| Dimension | | 670mm * 444mm * 43.6mm |
| Net Weight Kg (CPU, DRAM & HDD not included) | | 11.25Kg |
| Power Supply | | 500W Single Power Supply |
| Environment | | Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C Non operation humidity: 20% ~ 90% (Non condensing) |

*Specifications are subject to change without notice.



Refer to **Chapter 4 Motherboard Info** for details on the internal connectors.

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.

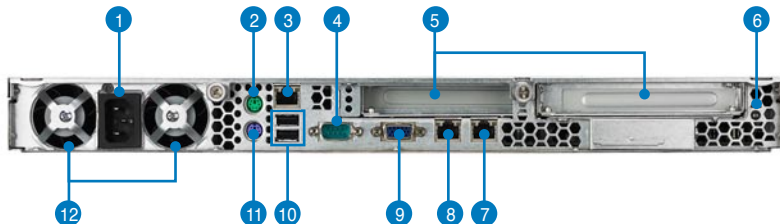


Refer to **1.6.1 Front panel LEDs** for the LED descriptions.



1.4 Rear panel features

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



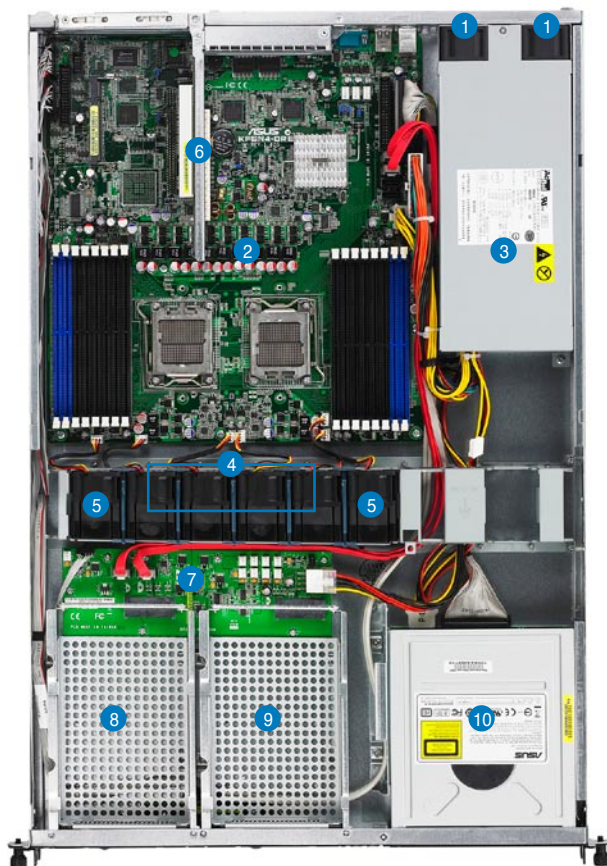
- | | |
|-----------------------------|------------------------|
| 1. AC power plug | 7. LAN port1 |
| 2. PS/2 mouse port | 8. LAN port2 |
| 3. LAN port for ASMB3 iKVM* | 9. VGA port |
| 4. Serial port | 10. USB ports |
| 5. Expansion slot | 11. PS/2 keyboard port |
| 6. Rear location LED | 12. PSU fans |



- 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 **1.6.2 Rear panel LEDs** for the LED descriptions.
- The LAN port for ASMB3 iKVM functions only when you install ASMB3 iKVM management card. Remove the mylar on the LAN port before using.

1.5 Internal features

The barebone server includes the basic components as shown.



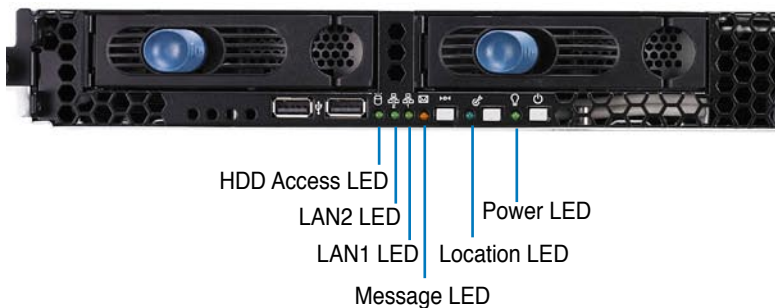
- | | |
|----------------------------------|----------------------------------|
| 1. PSU fans | 5. Device fans (40mm x 28mm) x 2 |
| 2. ASUS KFSN4-DRE motherboard | 6. 2 x PCI-E Slot (riser card) |
| 3. Power supply | 7. SATA-II backplane |
| 4. System fans (40mm x 28mm) x 4 | 8. Hot-swap HDD tray 1(port0) |
| 5. Device fans (40mm x 28mm) x 2 | 9. Hot-swap HDD tray 2(Port1) |
| 6. 2 x PCI-E Slot (riser card) | 10. Optical drive |
| 7. SATA-II backplane | |








The air duct lies on top of the motherboard components. Remove the air duct to access the components. Refer to section 2.1.4 **Removing and installing the air duct** for instructions.

1.6 LED information

1.6.1 Front panel LEDs

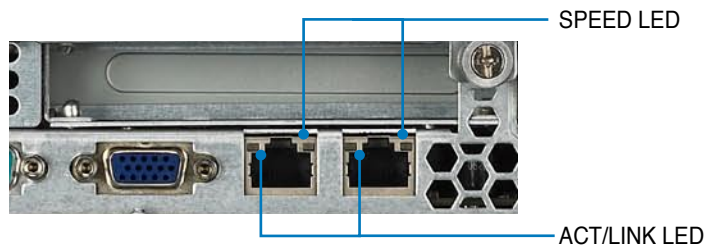


| LED | Icon | Display status | Description |
|--------------------|---|-----------------------|--|
| Power LED |  | ON | System power ON |
| Location LED |  | OFF ON | Normal status Location switch is pressed (Press the location switch again to turn off) |
| Message LED |  | OFF Blinking | System is normal; no incoming event ASWM indicates a HW monitor event |
| LAN1/2 LEDs |  | OFF Blinking ON | No LAN connection LAN is transmitting or receiving data LAN connection is present |
| Storage Access LED |  | OFF Blinking | No activity Read/write data into the HDD |



The location switch and LED are for service purposes. When the system fails or is shut down, the server administrator can press either the front or the rear location switch to identify the location of the specific system in a rack cabinet.

1.6.2 Rear panel LEDs



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

Chapter 2

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



ASUS RS161-E5/PA2

Hardware setup

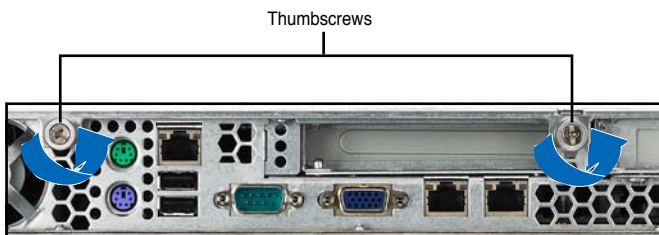
2.1 Chassis cover

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. 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

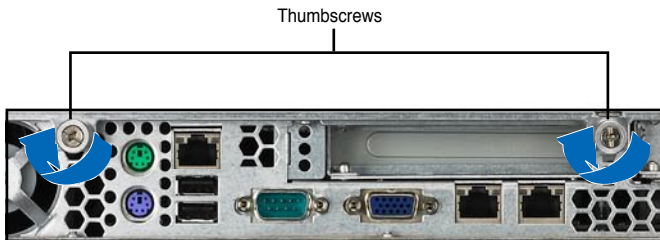
4. Lift the cover from the chassis.

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 pegs inside 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.



2.2 Central Processing Unit (CPU)

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

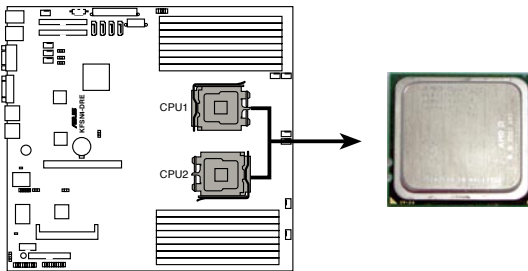


- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the CPU socket.
- Ensure to install identical CPUs to the system. DO NOT mix Quad-core and Dual-core CPUs.
- When you install varying stepping and speed CPUs to the system, the faster CPU downgrades and runs the speed as the slower one.
- 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.

2.2.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

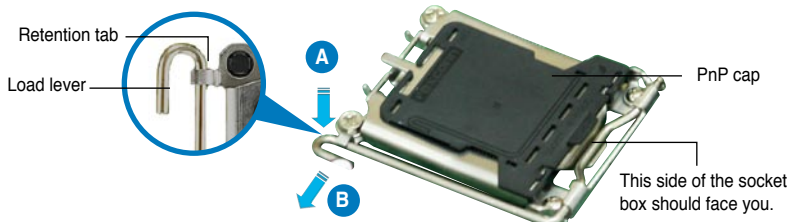


KFSN4-DRE CPU Socket 1207



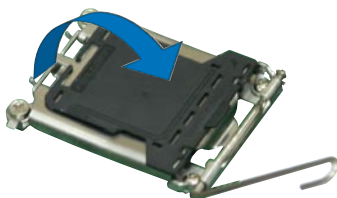
- Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.
- When installing only one CPU, install it in the CPU1 socket, or the CPU warning LED will light.

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

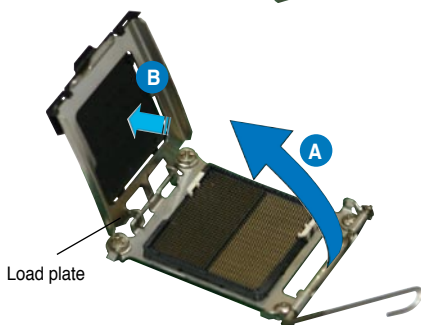


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

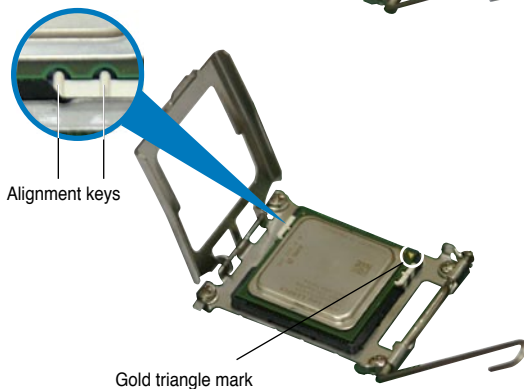
3. Lift the load lever in the direction of the arrow to a 135° angle.



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).



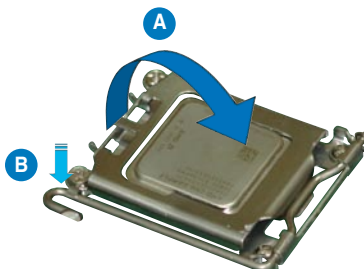
5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-right corner of the socket. The socket alignment keys should fit into the CPU notches.





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!

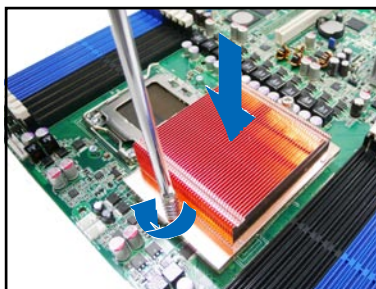
6. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab.



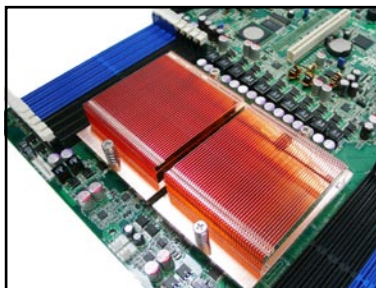
2.2.2 Installing the CPU heatsink and airduct

To install the CPU heatsink:

1. Carefully place the heatsink on top of the installed CPU and secure the heatsink to the motherboard with a Philips (cross) screwdriver.



2. Attach the other heatsink if you install two CPUs on this system.

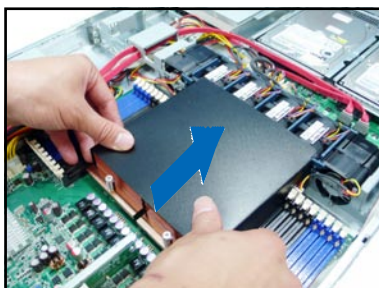


To install the airduct:

1. Position the airduct on top of the heatsink.



2. Carefully lower the airduct until it fits in place.



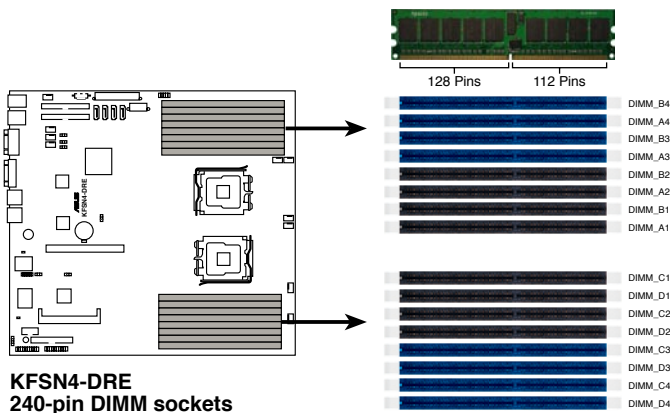
2.3 System memory

2.3.1 Overview

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

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

The figure illustrates the location of the DDR2 DIMM sockets:



2.3.2 Memory Configurations

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



- For dual-channel configuration, the total size of memory module(s) installed per channel must be the same for better performance.
Single CPU:
DIMM_A1=DIMM_A2=DIMM_B1=DIMM_B2;
DIMM_A3=DIMM_A4=DIMM_B3=DIMM_B4

Dual CPU:
DIMM_A1=DIMM_A2=DIMM_B1=DIMM_B2=
DIMM_C1=DIMM_C2=DIMM_D1=DIMM_D2;

DIMM_A3=DIMM_A4=DIMM_B3=DIMM_B4=
DIMM_C3=DIMM_C4=DIMM_D3=DIMM_D4
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

Memory population table

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

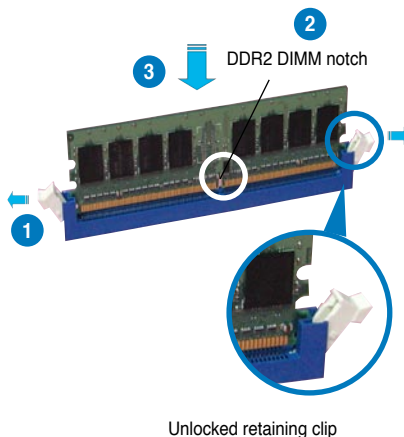
2.3.3 Installing a DIMM



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.



Unlocked retaining clip



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

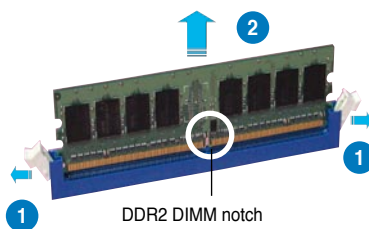
2.3.4 Removing a DIMM

Follow these steps 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.



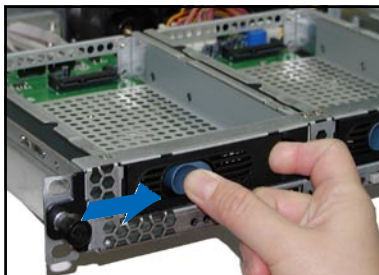
2. Remove the DIMM from the socket.

2.4 Hard disk drives

The system supports two hot-swap Serial ATA hard disk drives. The hard disk drive installed on the left tray connects to the motherboard SATA1 (Port0) port, while the right tray hard disk drive connects to the motherboard SATA3 (Port2) port via the SATA backplane.

To install a hot-swap SATA 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 SATA 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.



SATA interface
on the backplane



When installed, the SATA connector on the drive connects to the SATA 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 SATA drive.



8. Connect the bundled SATA cables to the connectors on the SATA backplane. Refer to section **2.7 SATA backplane cabling** for information on the SATA backplane cable connections.

2.5 Expansion slot

2.5.1 Installing an expansion card to the riser card bracket

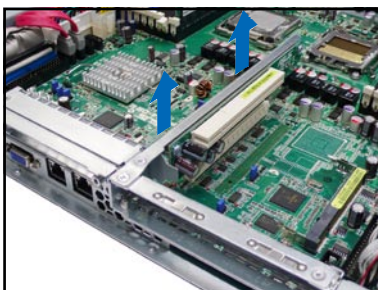
The barebone server comes with a riser card bracket. You need to remove the bracket if you want to install a PCI Express expansion cards.

To install a PCI-E card:

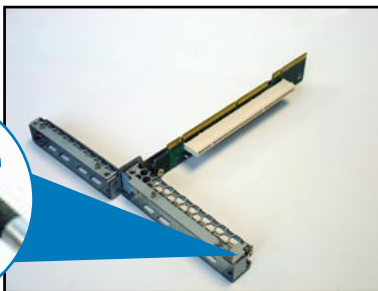


Your add-on card should be compliant with the PCI Express specification requirement, or it might cause the system malfunction. Confirm with your vendor before the installation.

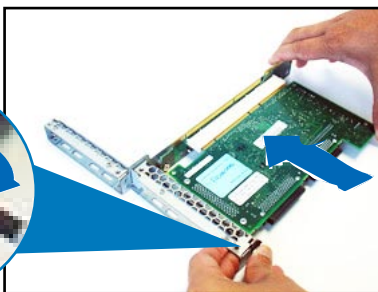
1. Firmly hold the riser card bracket, then pull it up to detach it from the PCI Express slot on the motherboard.



2. Place the riser card bracket on a flat and stable surface, then remove the screw from the PCI-E x16 slot bay.



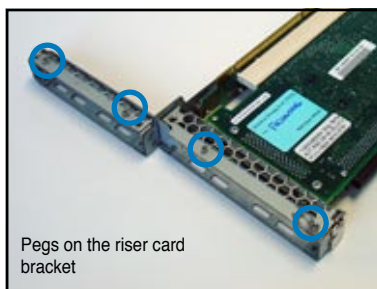
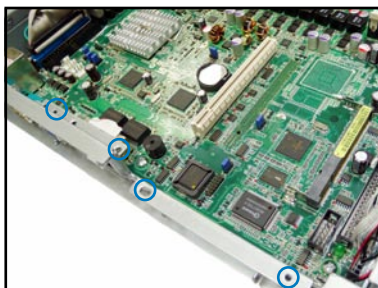
3. Install a PCI-E card to the bracket as shown, then secure the card with a screw.



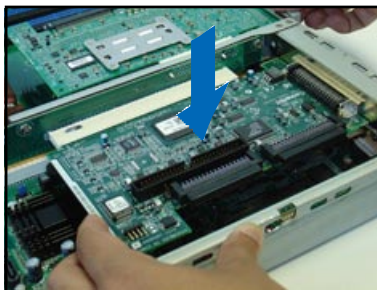
2.5.2 Reinstalling the riser card bracket

To reinstall the riser card bracket:

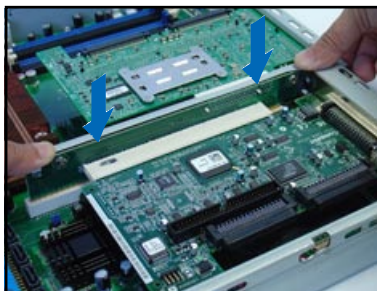
1. Take note of the holes on the riser card bay. The three pegs on the riser card bracket should match these holes to ensure that the bracket is properly in place.



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.



2.5.3 Configuring an expansion card

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

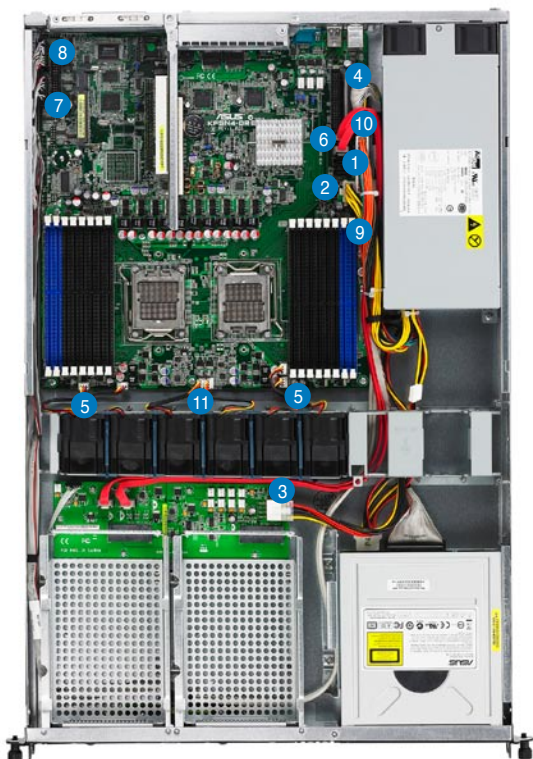
1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 5 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the following tables.
3. Install the software drivers for the expansion card.

Standard interrupt assignments

| IRQ | Priority | Standard function |
|-----|----------|-----------------------------|
| 0 | 1 | System Timer |
| 1 | 2 | Keyboard Controller |
| 2 | - | Programmable Interrupt |
| 3* | 11 | Communications Port (COM2) |
| 4* | 12 | Communications Port (COM1) |
| 5* | 13 | Sound Card (sometimes LPT2) |
| 6 | 14 | Floppy Disk Controller |
| 7* | 15 | Printer Port (LPT1) |
| 8 | 3 | System CMOS/Real Time Clock |
| 9* | 4 | ACPI Mode when used |
| 10* | 5 | IRQ Holder for PCI Steering |
| 11* | 6 | IRQ Holder for PCI Steering |
| 12* | 7 | PS/2 Compatible Mouse Port |
| 13 | 8 | Numeric Data Processor |
| 14* | 9 | Primary IDE Channel |
| 15* | 10 | Secondary IDE Channel |

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

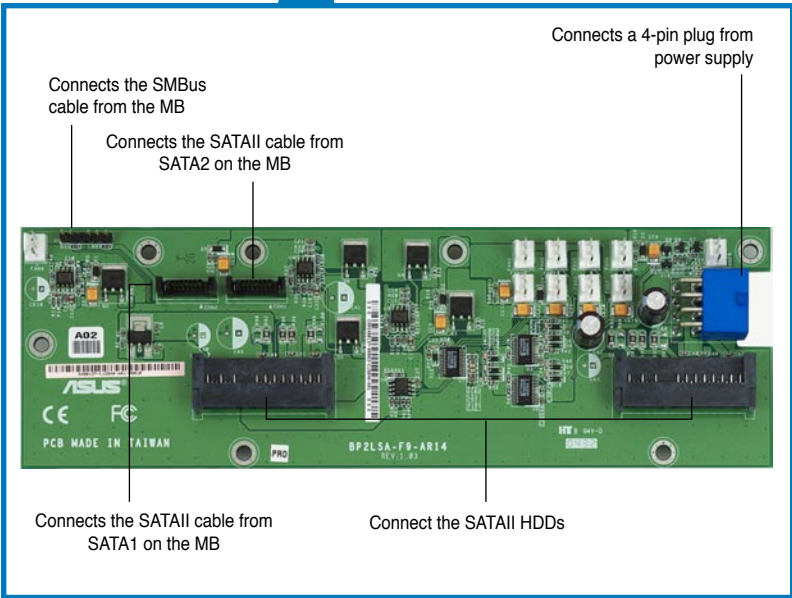
2.6 Cable connections



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. SATA backplane power connector (from power supply)
4. Primary IDE connector (from motherboard to optical drive)
5. Device fan connector (from motherboard FRNT_FAN2&6 to device fans)
6. SATA connectors (from motherboard SATA 1-2 to SATA backplane board)
7. Panel connector (from motherboard to front I/O board)
8. Auxiliary panel connector (from motherboard to front I/O board)
9. USB connector (from motherboard to front I/O board)
10. PSUSMB1 connector (from power supply)
11. System fan connector (from motherboard FRNT_FAN 1/3/4/5 to system fans)

2.7 SATA backplane cabling



2.8 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

2.8.1 System fans

The system comes with four units of 28 mm x 40 mm 15500 rpm fan with dummy case. Refer to the illustration below for location of the system fans.



28 mm x 40 mm fan with dummy case



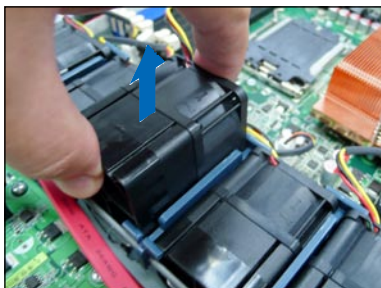
Incorrect installation of the system fan with dummy case may result to CPU overheating and/or automatic system shutdown.

To uninstall the system fans:

1. Disconnect a system fan cable from the fan connector on the motherboard.



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. The airflow directional arrow on the fan side should point towards the system rear panel.
2. Connect the system fan cable to the fan connector on the motherboard (refer to **2.6 Cable connections**).

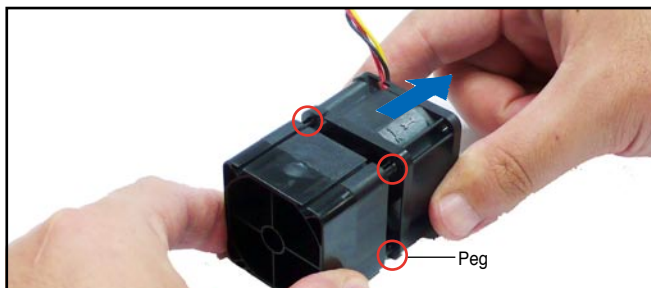


2.8.2 System fan with dummy case

The system fan for the memory module(s) comes with a dummy case that allows it to fit in the fan cage.

To replace the system fan with dummy case:

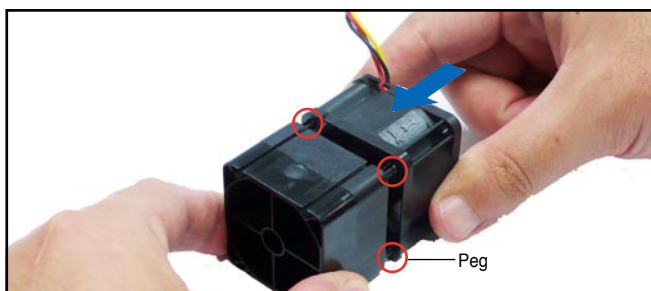
1. Uninstall the fan following the instructions in the previous section.
2. Pull the dummy case to the direction of the arrow just enough to disengage its pegs from the system fan.



3. Replace the system fan.

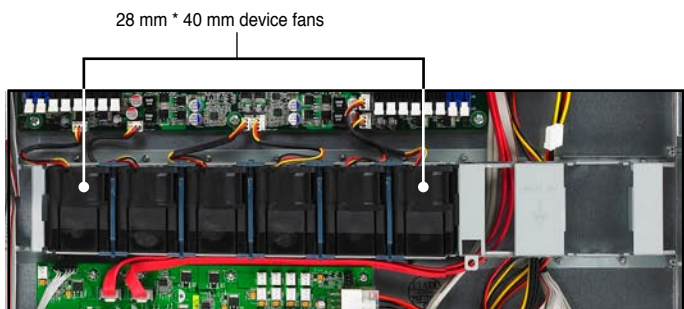
To reinstall the system fan with the dummy case:

1. Insert the dummy case pegs to the system fan holes until it fits in place.
2. Reinstall the system fan by following the instructions in the previous section.



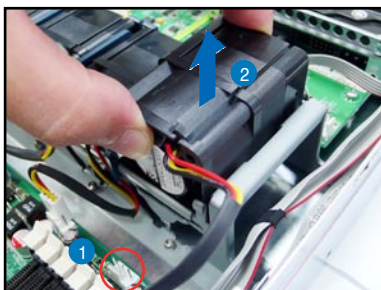
2.8.3 Device fan

The system comes with two 28 mm * 40 mm (15500 rpm) device fans with dummy. Refer to the illustration below for location of the device fans.



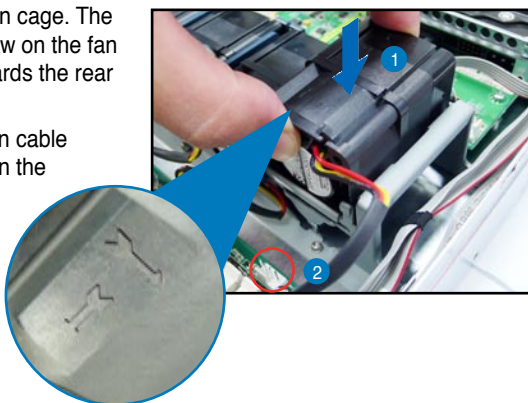
To uninstall the device fan:

1. Disconnect the device fan cable from the connector on the motherboard.
2. Lift the fan, then set aside.



To reinstall the device fan:

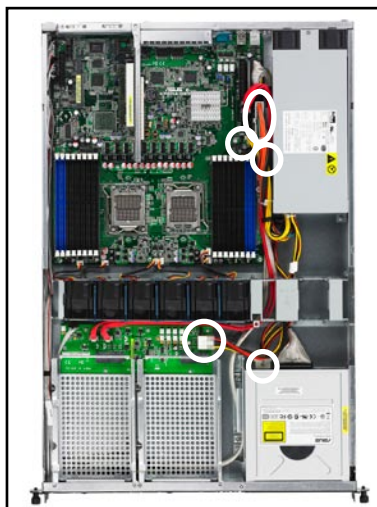
1. Insert the fan to the fan cage. The airflow directional arrow on the fan side should point towards the rear panel.
2. Connect the device fan cable to the fan connector on the motherboard.



2.8.4 Power supply module

To uninstall the power supply module:

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



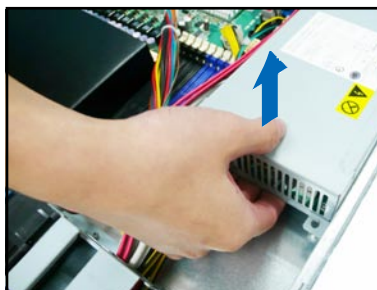
2. Use a Phillips (cross) screwdriver to remove the screws that secure the front end of the power supply.



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



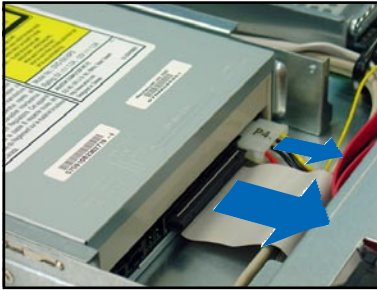
4. Slide the power supply forward for about half an inch, then carefully lift it out from the chassis.



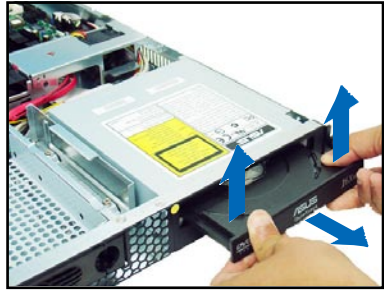
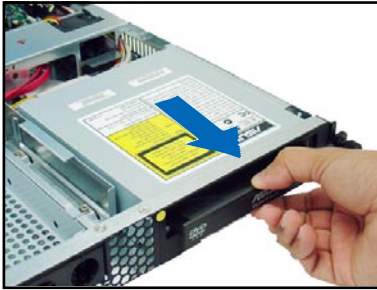
2.8.5 Optical drive

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.

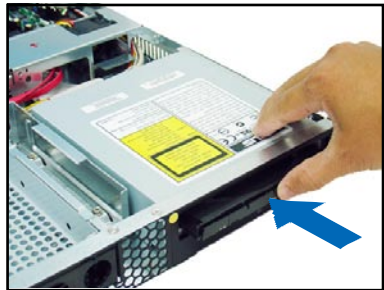


3. Pull out half of the drive tray to remove the tray bezel.
4. Pull the center of the bezel outward (A), then lift the sides (B) to remove.

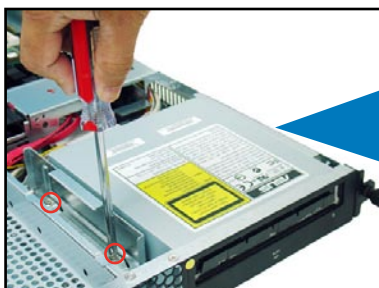


Do not apply too much force when removing the bezel. Too much force may break the drive tray!

5. 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.



10. Remove the metal rail on the other side of the drive.



To reinstall the optical drive, follow the instructions in the previous chapter in a reverse order.



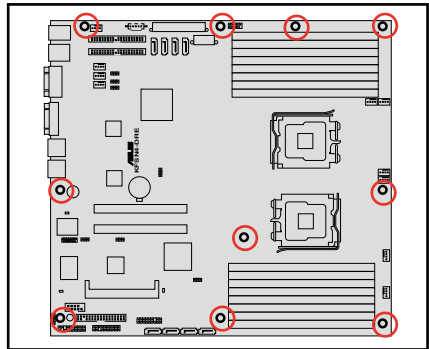
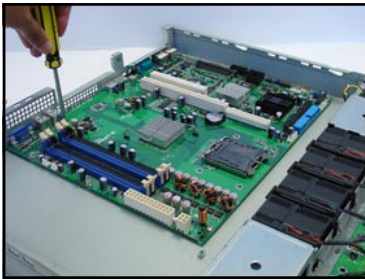
When installing a new optical drive, make sure to remove the drive front panel assembly and tray bezel before installing it to the chassis.

2.8.6 Motherboard

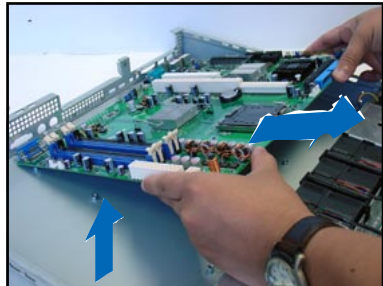
To uninstall the motherboard:

1. Disconnect all the pre-connected cables from the motherboard. See section **2.6 Cable connections** for details.
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 Philips (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.

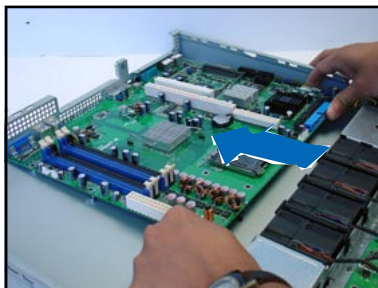


4. Carefully lift the motherboard out of the chassis as shown.

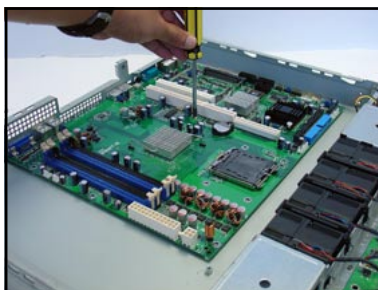


To reinstall the motherboard:

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



3. Use a Phillips (cross) screwdriver to secure the motherboard with ten (10) screws in the holes as shown in the illustration in the previous section.
4. Reconnect all the required cables to the motherboard. See section 2.6 **Cable connections** for details.
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.

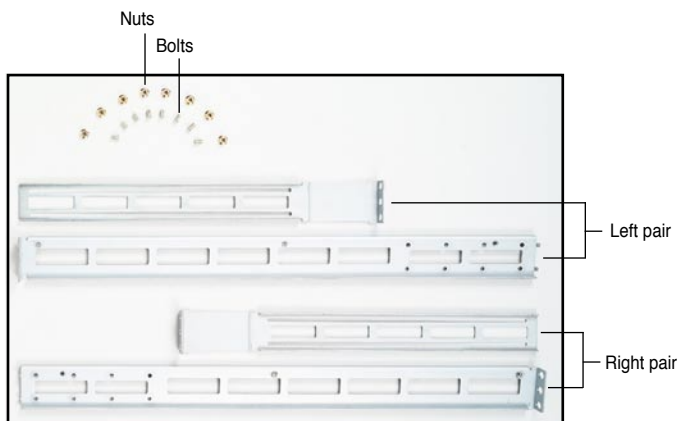


ASUS RS161-E5/PA2

Installation options

3.1 Rackmount rail kit items

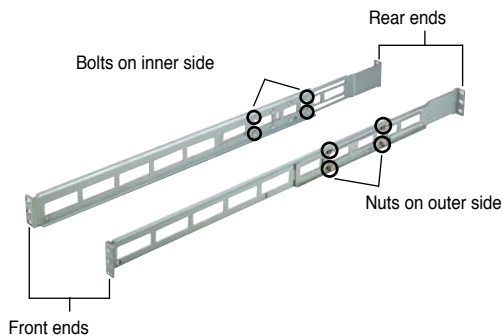
If you have the rackmount rail kit, it contains two pairs of rails (one pair for each side of the barebone system), and eight (8) pairs of nut-and-bolt type screws.



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.

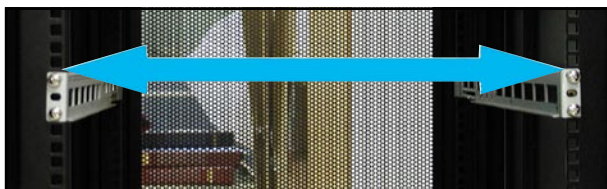


1U space

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

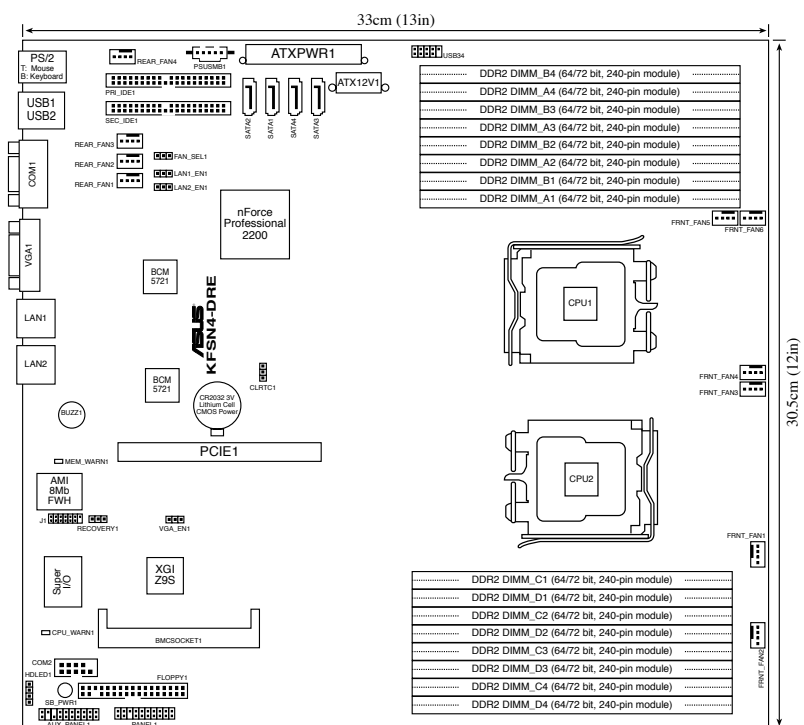
Chapter 4

This chapter includes the motherboard layout, and brief descriptions of the jumpers and internal connectors.



Motherboard info

4.1 Motherboard layout



Layout contents

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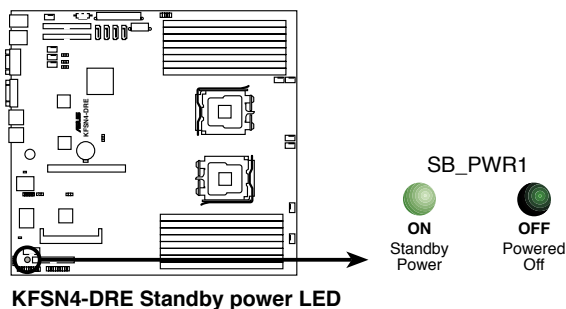
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| 11. | Auxiliary panel connector (20-2 pin AUX_PANEL1) | 4-14 |
| 12. | System panel connector (20-1 pin PANEL1) | 4-15 |

4.2 Onboard LED

1. Standby Power LED

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

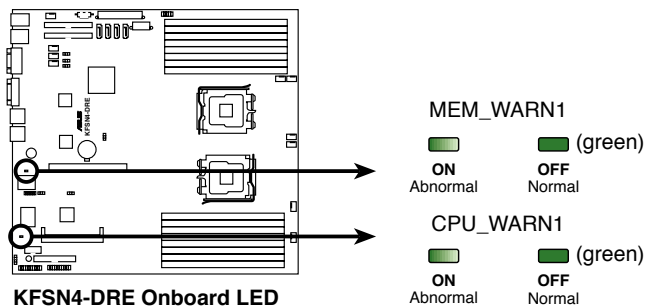


2. CPU warning LED (CPU_WARN1)

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

3. Memory warning LED (MEM_WARN1)

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



4.3 Jumpers

1. Clear RTC RAM (CLRTC1)

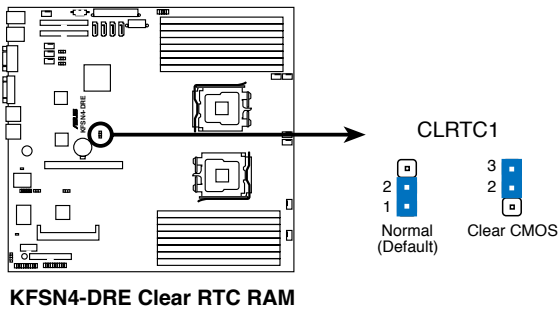
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

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

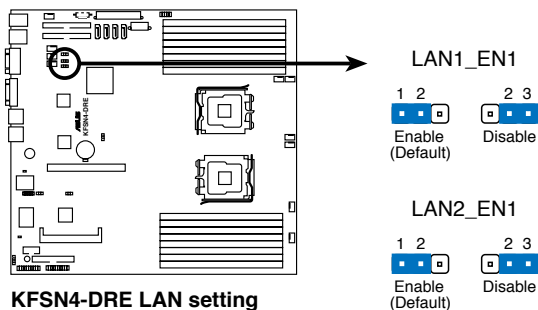


Except when clearing the RTC RAM, NEVER remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



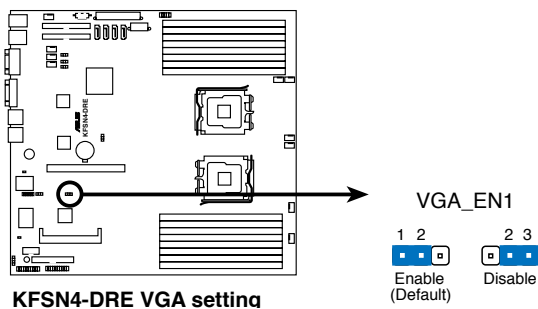
2. Gigabit LAN1 controller setting (3-pin LAN1_EN1, LAN2_EN1)

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



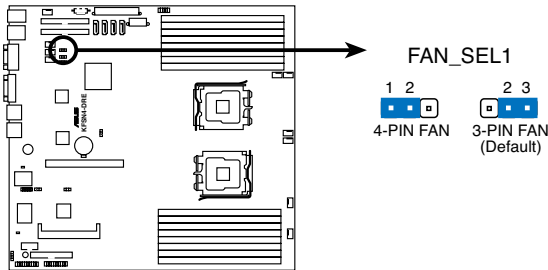
3. VGA Graphics controller setting (3-pin VGA_EN1)

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



4. Fan control setting (3-pin FAN_SEL1)

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



KFSN4-DRE FAN setting



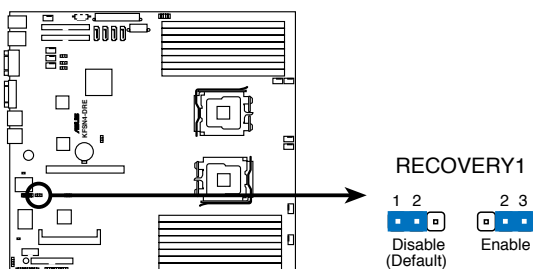
- If you use a 4-pin fan but set the jumper to pin 2-3, the fan you installed may not work.
- If you use a 3-pin fan but set the jumper for a 4-pin fan, the fan control will not work and the fan you installed will always run at full speed.

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

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

To update the BIOS:

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

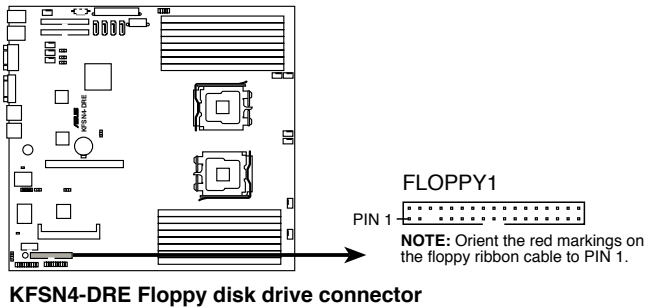


KFSN4-DRE BIOS recovery setting

4.4 Internal connectors

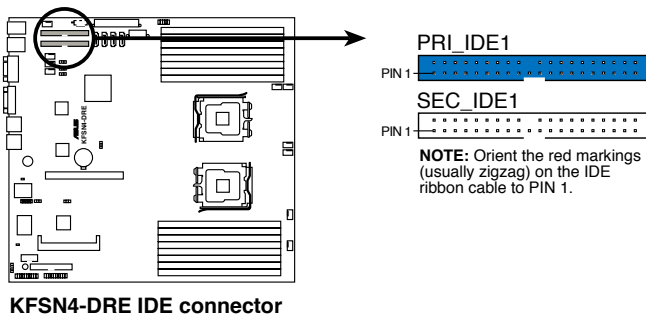
1. Floppy disk drive connector (34-1 pin FLOPPY1)

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_IDE1, SEC_IDE1)

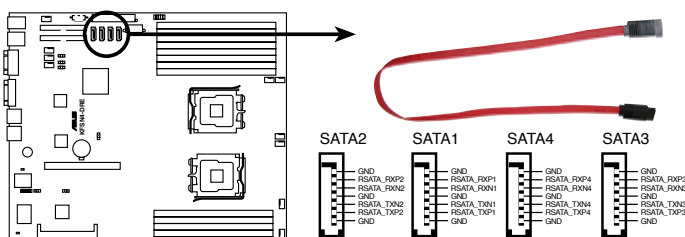
The onboard IDE connectors are for Ultra DMA 133/100/66 signal cables.



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

Supported by the NVIDIA® nForce Professional 2200 chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 3Gb/s of data transfer rate.

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



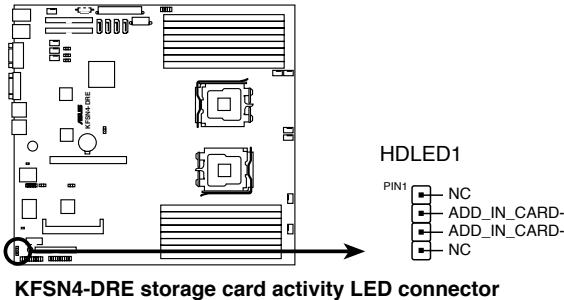
KFSN4-DRE SATA connectors



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

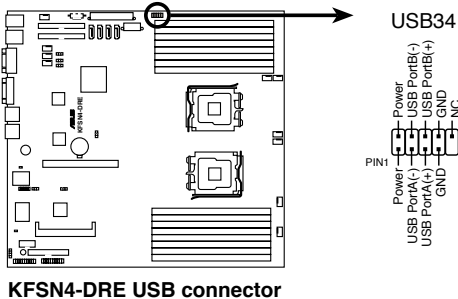
4. Hard disk activity LED connector (4-pin HDLED1)

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



5. USB connector (10-1 pin USB34)

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

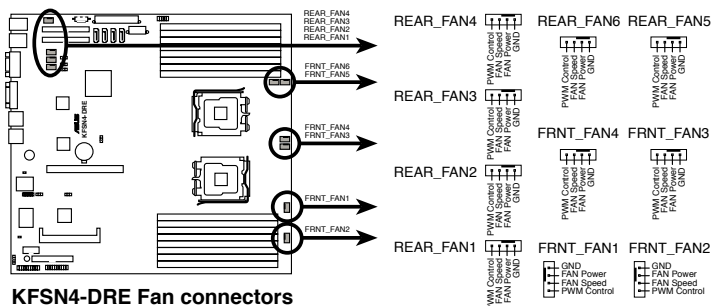


6. Front and rear fan connectors (3-pin FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, FRNT_FAN4, REAR_FAN1, REAR_FAN2, REAR_FAN3, REAR_FAN4, REAR_FAN5, REAR_FAN6)

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

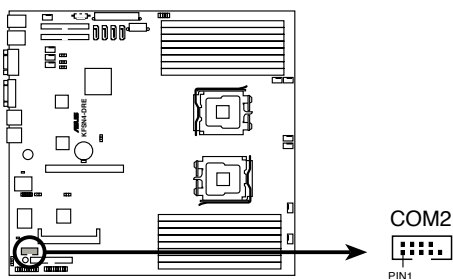


- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fans feature the ASUS Smart Fan technology.



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

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

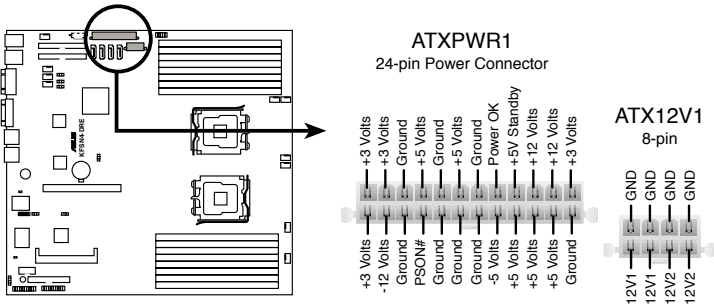


8. ATX power connectors (24-pin ATXPWR1, 8-pin ATX12V1)

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



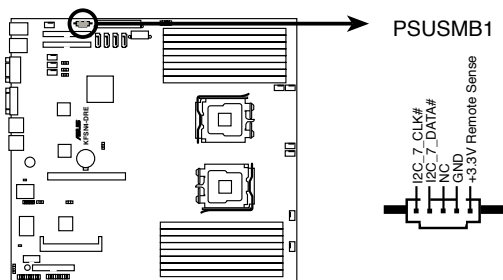
- DO NOT forget to connect the 8-pin ATX +12 V power plug; otherwise, the system will not boot.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- Make sure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



KFSN4-DRE ATX power connectors

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

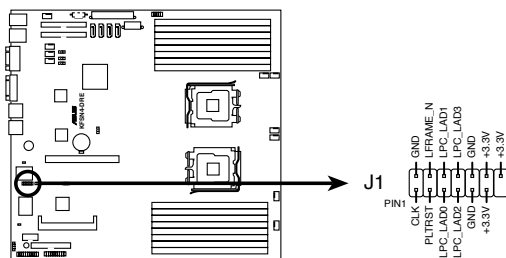
This connector allows you to connect SMBus (System Management Bus) to the power supply unit to read PSU information. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.



KFSN4-DRE Power supply SMBus connector

10. LPC debug card connector (14-1 pin LPC1)

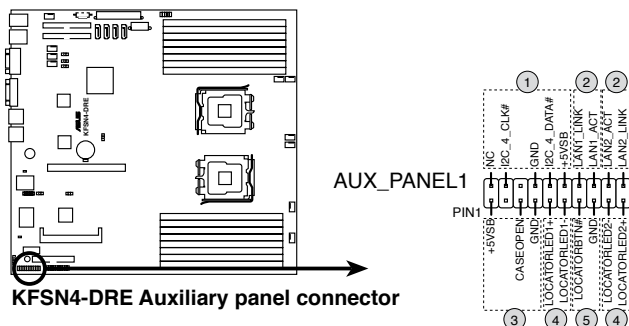
This is a low pin count interface used to plug in the LPC debug card.



KFSN4-DRE LPC debug card connector

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

This connector supports several server system functions.



1. Front Panel SMBus (6-1 pin)

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

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

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

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

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

4. Chassis Intrusion connector (3-pin CASEOPEN)

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

5. Locator LED 1 (2-pin LOCATORLED1)

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

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

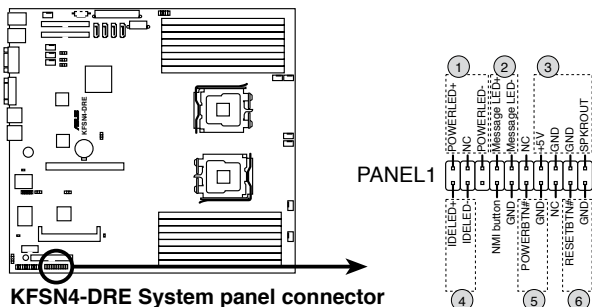
This connector is for the locator button. This button queries the state of the system locator.

7. Locator LED 2 (2-pin LOCATORLED2)

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

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

This connector supports several chassis-mounted functions.



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

1. System power LED (Green 3-pin PLED)

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

2. Message LED (Brown 2-pin MLED)

This 2-pin connector is for the message LED cable that connects to the front message LED. The message LED shows the hardware status and is controlled by ASWM software. This function only works under the operating system installed ASWM.

3. System warning speaker (Orange 4-pin SPEAKER)

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

4. Hard disk drive activity LED (Red 2-pin IDE_LED)

This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

5. ATX power button/soft-off button (Green 2-pin PWRSW)

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

6. Reset button (Blue 2-pin RESET)

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

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

Refer to the corresponding sections for details on these utilities.



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

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 3½ Floppy Drive icon.
 - d. Click **File** from the menu, then select **Format**. A **Format 3½ Floppy Disk** window appears.
 - e. Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.
2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

5.1.2 AFUDOS utility

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

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:



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

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

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

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

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

Main filename Extension name

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

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

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

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

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



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

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

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

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

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

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

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

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

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



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

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

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

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

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

Please restart your computer

A:\>
```

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 CD or the floppy disk that contains the updated BIOS file.



- Prepare the 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 CD or floppy disk to KFSN4-DRE.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 "KFN4DRE.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.

5.2 BIOS setup program

This motherboard supports a programmable Serial Peripheral Interface (SPI) chip that you can update using the provided utility described in section **5.1 Managing and updating your BIOS**.

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

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

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

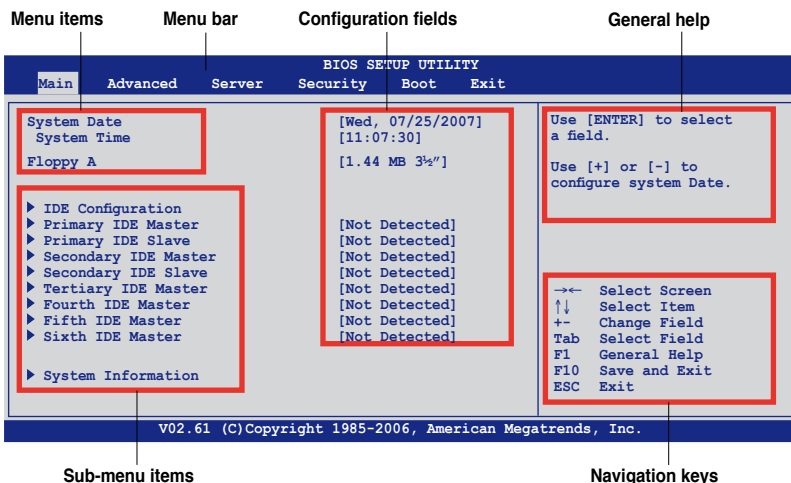
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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



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

5.2.1 BIOS menu screen



5.2.2 Menu bar

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

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

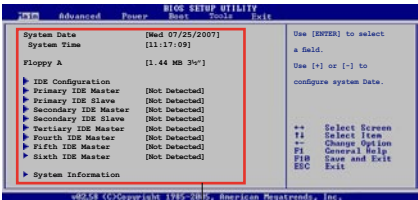


Some of the navigation keys differ from one screen to another.

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.

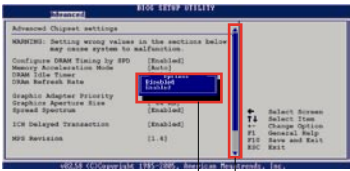
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to 5.2.7 Pop-up window.

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

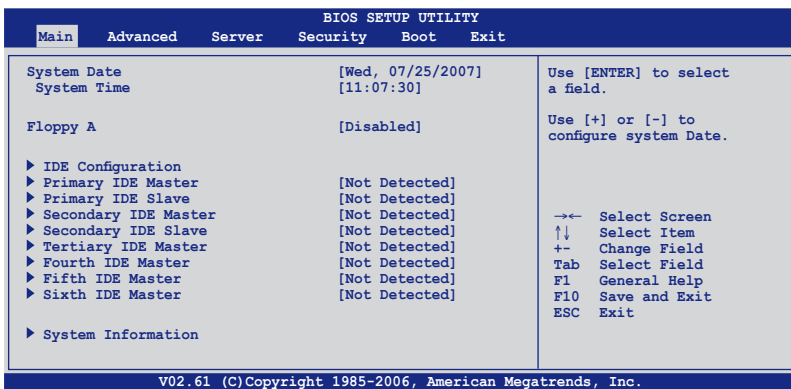
At the top right corner of the menu screen is a brief description of the selected item.

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.

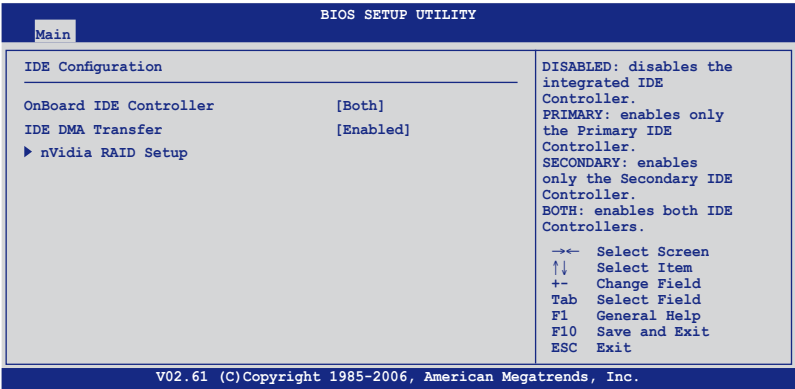
5.3.3 Floppy A [Disabled]

Sets the type of floppy drive installed.

Configuration options: [Disabled] [360 KB 5¼"] [1.2 MB 5¼"] [720 KB 3½"] [1.44 MB 3½"] [2.88 MB 3½"]

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.



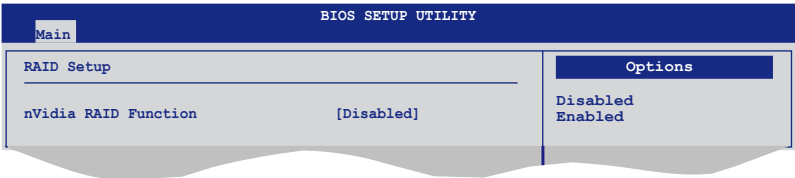
OnBoard IDE Controller [Both]

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

IDE DMA Transfer [Enabled]

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

nVidia RAID Setup



nVidia RAID Function [Disabled]

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



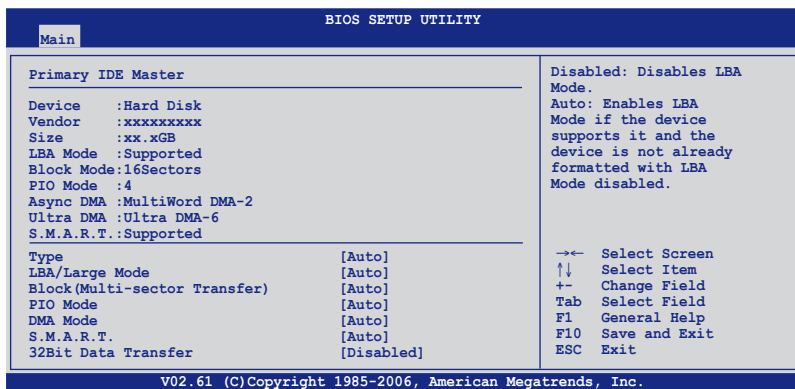
The following items appear when the **nVidia RAID Function** is set to [Enabled].

SATA1/2 Primary/Secondary Channel [Disabled]

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

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

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



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

Type [Auto]

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

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

LBA/Large Mode [Auto]

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

Block (Multi-sector Transfer) [Auto]

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

Configuration options: [Disabled] [Auto]

PIO Mode [Auto]

Allows you to select the data transfer mode.

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

DMA Mode [Auto]

Sets the DMA mode.

Configuration options: [Auto] [SWDMA0] [SWDMA1] [SWDMA2] [MWDMA0] [MWDMA1] [MWDMA2] [UDMA0] [UDMA1] [UDMA2] [UDMA3] [UDMA4]

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

Sets the Smart Monitoring, Analysis, and Reporting Technology.

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

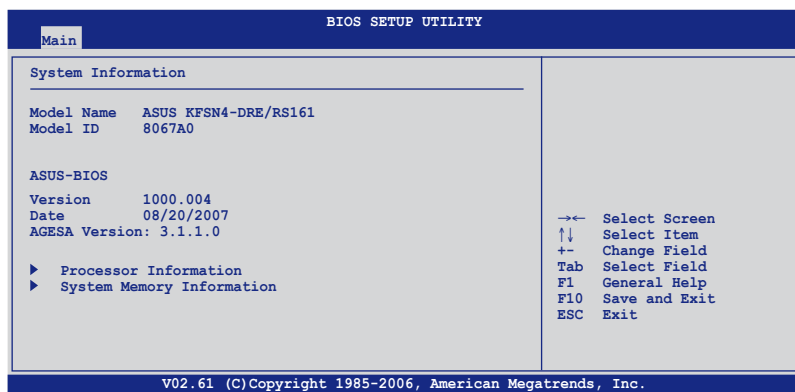
32Bit Data Transfer [Disabled]

Enables or disables 32-bit data transfer.

Configuration options: [Disabled] [Enabled]

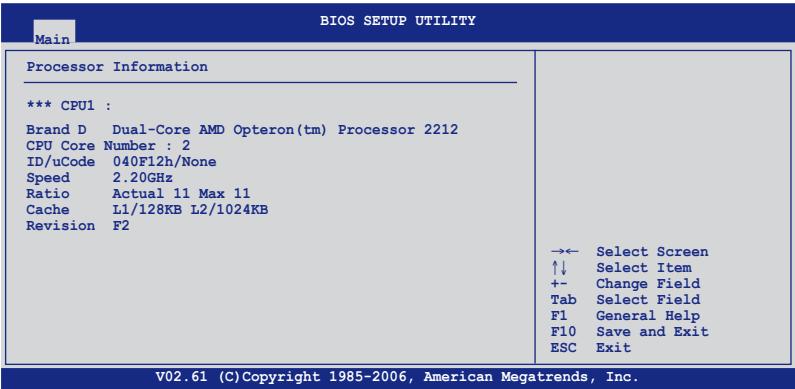
5.3.6 System Information

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



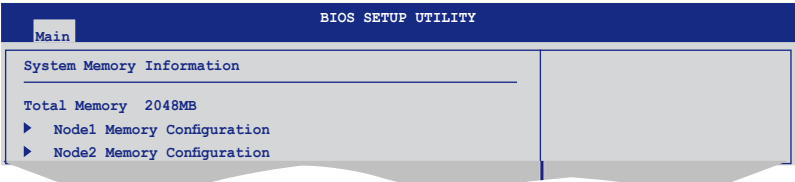
Processor

Displays the installed processor information.

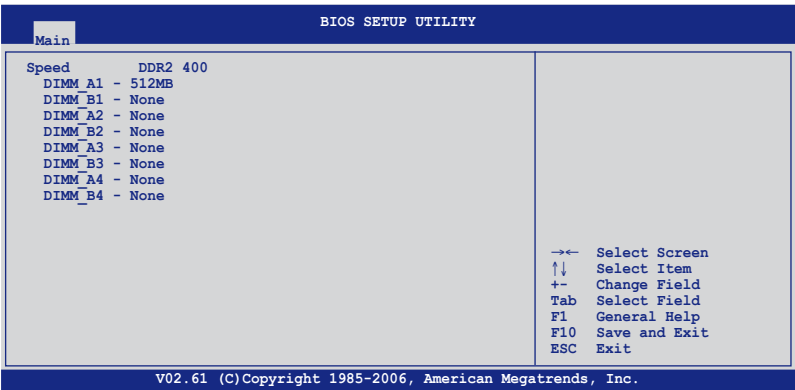


System Memory

Displays the installed system memory information.



Node1/2 Memory Configuration

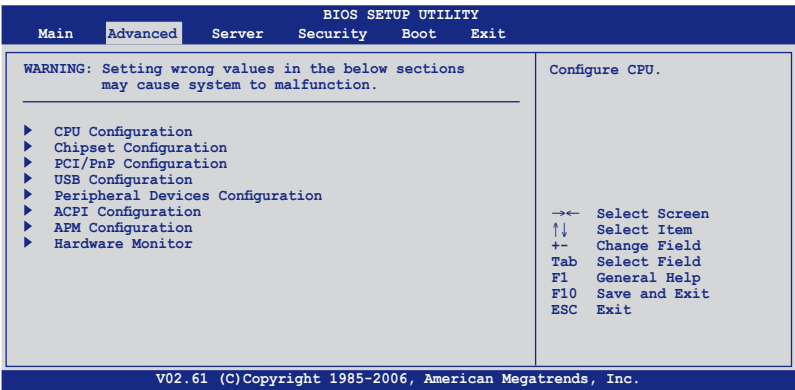


5.4 Advanced menu

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

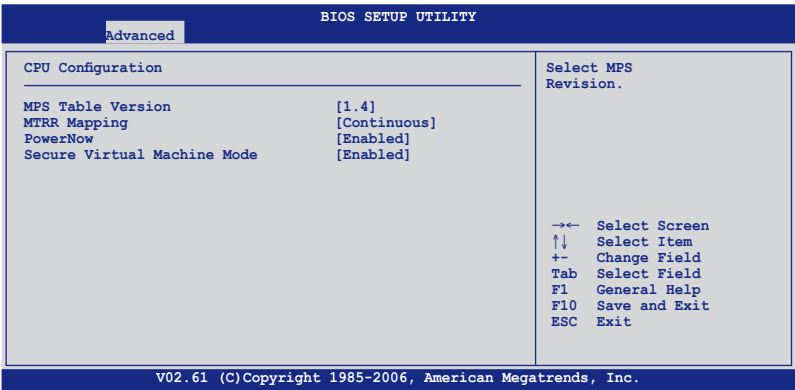


Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



5.4.1 CPU Configuration

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



MPS Table Version [1.4]

Sets the Multi-Processor System (MPS) table version.

Configuration options: [1.1] [1.4]

MTRR Mapping [Continuous]

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

PowerNow [Enabled]

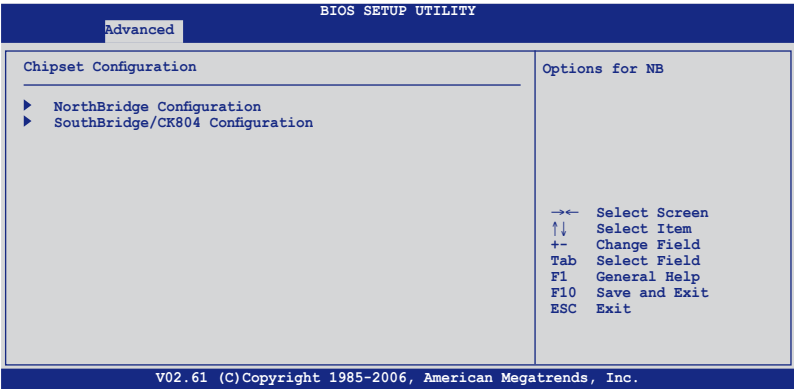
Enables or disables the generation of ACPI_PPC/_PSS/_PCT objects. Configuration options: [Enabled] [Disabled]

Secure Virtual Machine Mode [Enabled]

Enables or disables Secure Virtual Machine mode.

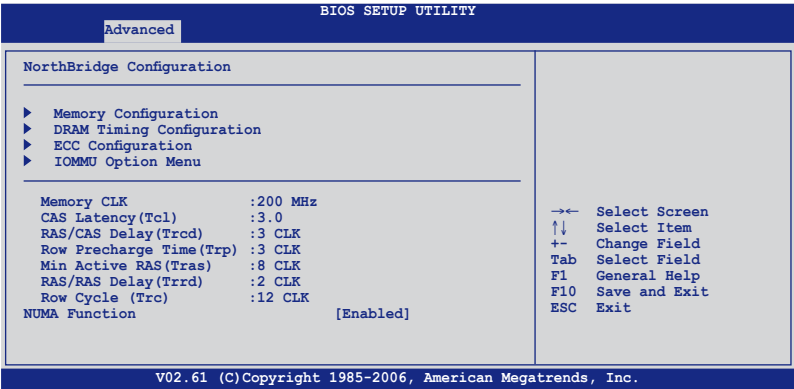
5.4.2 Chipset Configuration

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



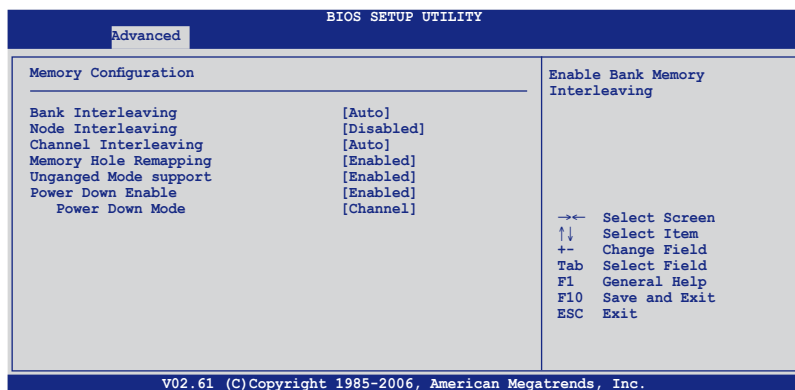
NorthBridge Configuration

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



Memory Configuration

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



Bank Interleaving [Auto]

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

Node Interleaving [Disabled]

Enables node interleaving.

Configuration options: [Disabled] [Enabled]

Channel Interleaving [Auto]

Enables channel memory interleaving.

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

Memory Hole Remapping [Enabled]

Enables memory remapping around memory hole.

Configuration options: [Disabled] [Enabled]

Unganged Mode support [Enabled]

Enables or disables the force unganged mode.

Configuration options: [Disabled] [Enabled]

Power Down Enable [Enabled]

Enables or disables the DDR power down mode.

Configuration options: [Enabled] [Disabled]



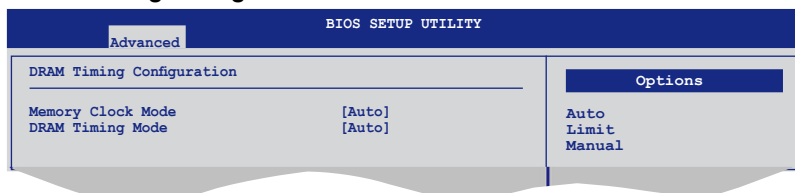
The following item appears when you enable the **Power Down Enable** item.

Power Down Mode [Channel]

Sets the DDR Power down mode.

Configuratoin options: [Channel] [Chip Select]

DRAM Timing Configuration



Memory Clock Mode [Auto]

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



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

Memclock Value [200 MHz]

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

DRAM Timing Mode [Auto]

Allows you to select the DRAM timing mode.

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



The following items appear when **DRAM Timing Mode** is set to [DCT 0], [DCT 1] or [Both]. We strongly recommend you not to change the default value of the following items. Changing the values might cause the system unstable.

CAS Latency (CL) [Auto]

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

TRCD [Auto]

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

TRP [Auto]

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

tRTP [Auto]

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

TRAS [Auto]

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

TRRD [Auto]

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

TRC [Auto]

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

tWR [Auto]

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

tRWTTO [2 CLK]

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

tWRRD [0 CLK]

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

tWTR [Auto]

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

tWRWR [1 CLK]

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

tRDRD [2 CLK]

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

tRFC0 [Auto]

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

tRFC1 [Auto]

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

tRFC2 [Auto]

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

tRFC3 [Auto]

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

ECC Configuration

| BIOS SETUP UTILITY | | |
|---------------------|------------|--|
| Advanced | | |
| ECC Configuration | [Good] | Set GART size in systems without AGP, or disable altogether. Some OSes require valid GART for proper operation. If AGP is present, select appropriate option to ensure proper AGP operation. |
| DRAM ECC Enable | [Enabled] | |
| DRAM SCRUB REDIRECT | [Enabled] | |
| 4-Bit ECC Mode | [Enabled] | |
| DRAM BG Scrub | [1.31ms] | |
| Data Cache BG Scrub | [Disabled] | |
| L2 Cache BG Scrub | [Disabled] | |
| L3 Cache BG Scrub | [Disabled] | |

ECC Configuration [Good]

Allows you to set the level of ECC protection.

Configuration options: [Basic] [Good] [Super] [Max] [User] [Disabled]



The following items become configurable when **ECC Configuration** is set to [User]. We strongly recommend you not to change the default value of the following items.

DRAM ECC Enable [Enabled]

Configuration options: [Enabled] [Disabled]

DRAM SCRUB REDIRECT [Enabled]

Configuration options: [Enabled] [Disabled]

4-Bit ECC Mode [Enabled]

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

DRAM BG Scrub [1.31ms]

Configuration options:

Data Cache BG Scrub [Disabled]

Configuration options: [Enabled] [Disabled]

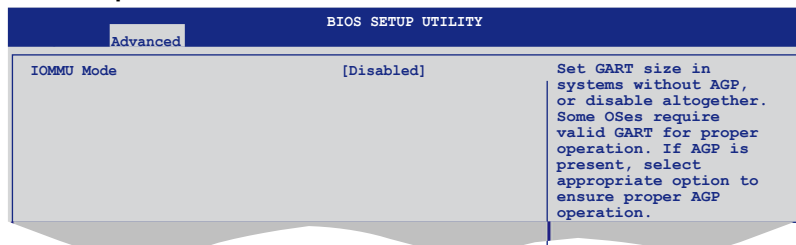
L2 Cache BG Scrub [Disabled]

Configuration options: [Enabled] [Disabled]

L3 Cache BG Scrub [Disabled]

Configuration options: [Enabled] [Disabled]

IOMMU Option Menu

**IOMMU Mode [Disabled]**

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

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

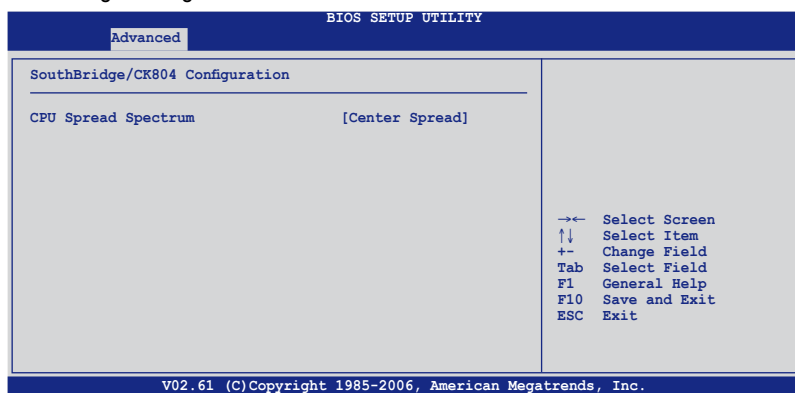
NUMA Function [Enabled]

Enables or disables the building of ACPI SRAT Table.

Configuration options: [Enabled] [Disabled]

SouthBridge/CK804 Configuration

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



CPU Spread Spectrum [Center Spread]

Sets or disables the processor clock spread spectrum.

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

| BIOS SETUP UTILITY | |
|---------------------------------|------------|
| Advanced | |
| PCI/PnP Configuration | |
| Reset ESCD Data | [No] |
| Plug & Play O/S | [No] |
| Palette Snooping | [Disabled] |
| OnBoard PCIE LAN Boot ROM | [Enabled] |
| Clear NVRAM during System Boot. | |
| →← Select Screen | |
| ↑↓ Select Item | |
| +- Change Field | |
| Tab Select Field | |
| F1 General Help | |
| F10 Save and Exit | |
| ESC Exit | |

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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]

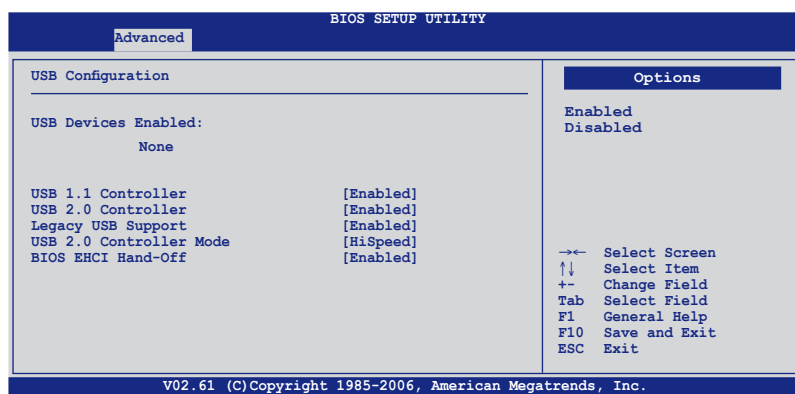
When set to [Enabled], the palette snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

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

USB 1.1 Controller [Enabled]

Enables or disables the USB 1.1 controller support.

Configuration options: [Enabled] [Disabled]

USB 2.0 Controller [Enabled]

Enables or disables the USB 2.0 controller support.

Configuration options: [Enabled] [Disabled]

Legacy USB Support [Enabled]

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



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

USB 2.0 Controller Mode [HiSpeed]

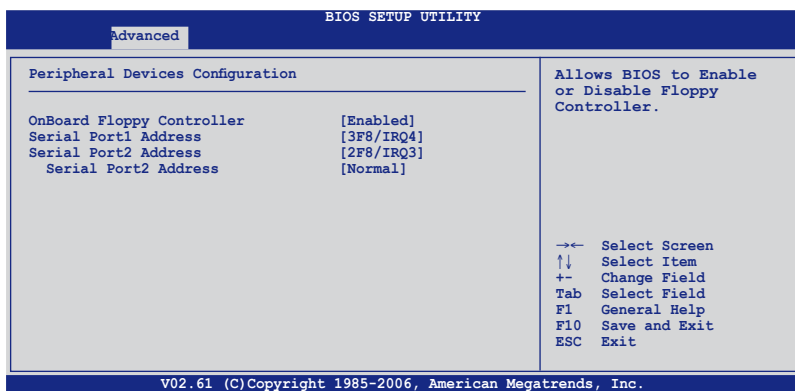
Allows you to set the USB 2.0 controller mode to HiSpeed (480 Mbps) or FullSpeed (12 Mbps). Configuration options: [FullSpeed] [HiSpeed]

BIOS EHCI Hand-Off [Enabled]

Enables or disables the BIOS EHCI hand-off support.

Configuration options: [Disabled] [Enabled]

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.

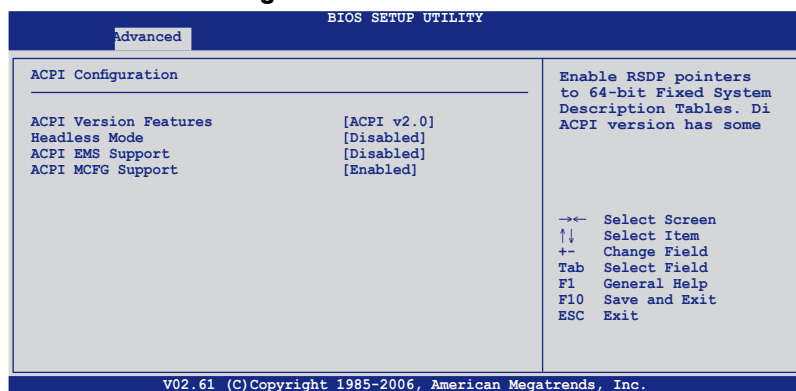
Configuration options: [Disabled] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

Serial Port 2 Mode [Normal]

Sets the serial port 2 mode.

Configuration options: [Normal] [IrDA] [ASK IR]

5.4.6 ACPI Configuration



ACPI Version Features [ACPI v2.0]

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

Headless Mode [Disabled]

Enables or disables the headless operation mode in ACPI.

Configuration options: [Disabled] [Enabled]

ACPI EMS Support [Disabled]

Enables or disables the ACPI EMS support.

Configuration options: [Disabled] [Enabled]

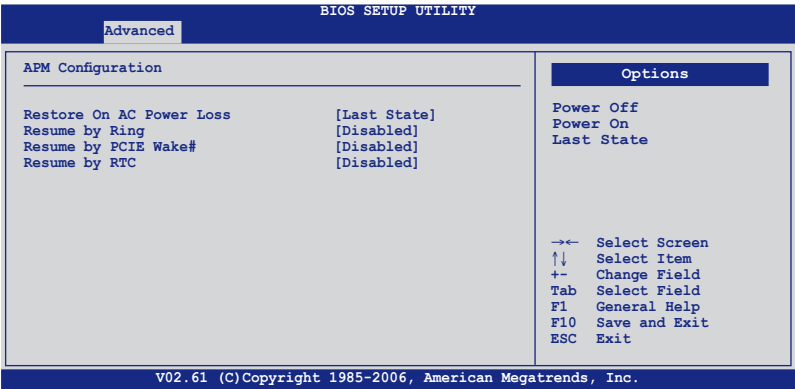
ACPI MCFG Support [Enabled]

Enables or disables the ACPI MCFG support.

Configuration options: [Disabled] [Enabled]

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 [Last State]

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

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

Resume By Ring [Disabled]

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

Configuration options: [Disabled] [Enabled]

Resume By PCIE Wake# [Disabled]

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

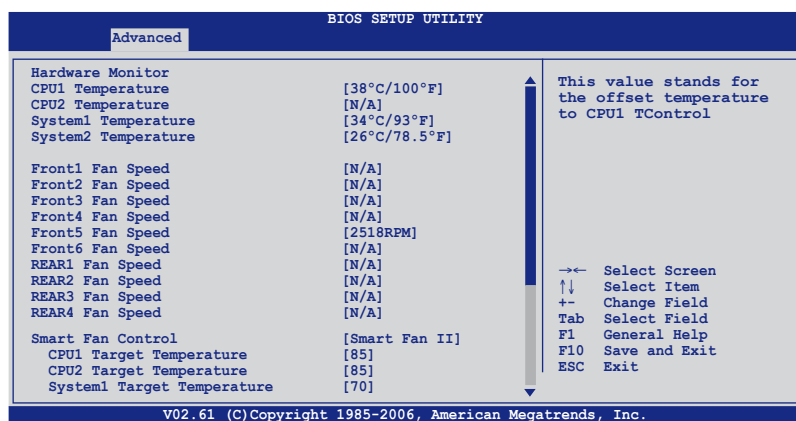
Configuration options: [Disabled] [Enabled]

Resume by RTC [Disabled]

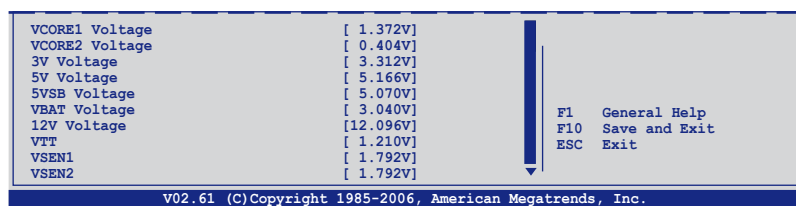
Allows you to enable or disable RTC to generate a wake event. When this item is set to [Enabled], the items RTC Alarm Date, RTC Alarm Hour, RTC Alarm Minute, and RTC Alarm Second appear with set values.

Configuration options: [Disabled] [Enabled]

5.4.8 Hardware Monitor



Scroll down for more items.



CPU1/CPU2 Temperature [xxx°C/xxx°F]

System1/2 Temperature [xxx°C/xxx°F]

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

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

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

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

Smart Fan Control [Smart Fan II]

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

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



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

CPU1/CPU2 Target Temperature [85]

Allows you to set the CPU target temperature.

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

System1 Target Temperature [70]

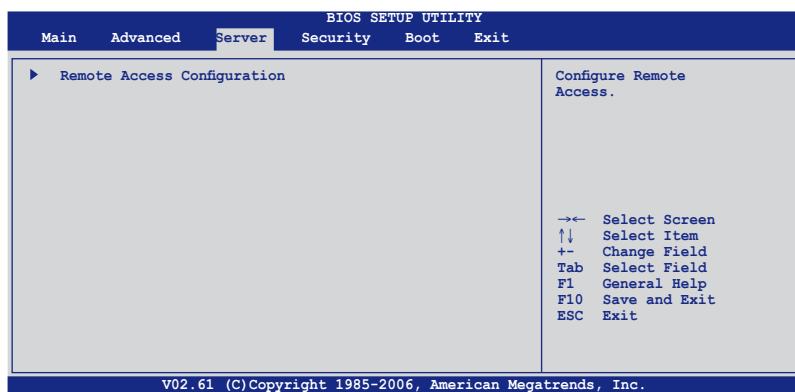
Allows you to set the system target temperature.

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

**VCORE1 Voltage, VCORE2 Voltage, 3V Voltage, 5V Voltage,
5VSB Voltage, VBAT Voltage, 12V Voltage, VTT, VSEN1/2**

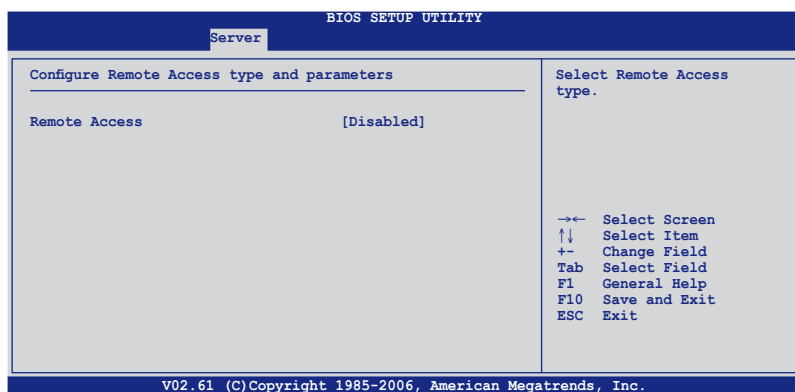
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. The VCORE2 item shows N/A if no processor is installed in CPU2 socket.

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 **Remote Access** is set to [Enabled].

Serial port number [COM1]

Selects the serial port for console redirection.

Configuration options: [COM1] [COM2]

Baudrate [57600]

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

Flow Control [None]

Allows you to select the flow control for console redirection.

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

Redirection After BIOS POST [Always]

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

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

Terminal Type [ANSI]

Allows you to select the target terminal type.

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

VT-UTF8 Combo Key Support [Disabled]

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

Configuration options: [Disabled] [Enabled]

Media Type [Serial]

Allows you to select the media for console redirection.

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

5.6 Security

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

| BIOS SETUP UTILITY | | | | | |
|--|----------|--------|--|------|------|
| Main | Advanced | Server | Security | Boot | Exit |
| Supervisor Password : Not Installed User Password : Not Installed Change Supervisor Password | | | <p><Enter> to change password. <Enter> again to disable password.</p> <p>→← Select Screen ↑↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit</p> | | |
| V02.61 (C) Copyright 1985-2006, American Megatrends, Inc. | | | | | |

Change Supervisor Password

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

To set a Supervisor Password:

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

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

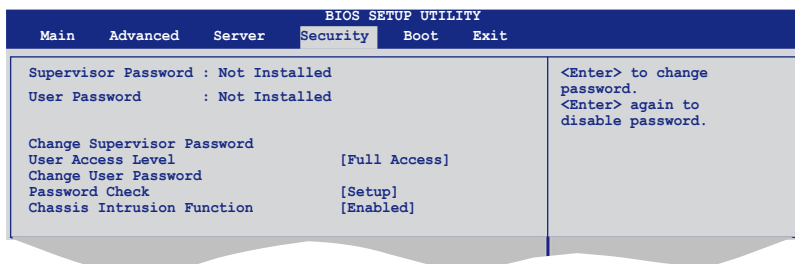
To change the supervisor password, follow the same steps as in setting a user password.

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



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

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



User Access Level [Full Access]

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

[No Access] prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

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

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

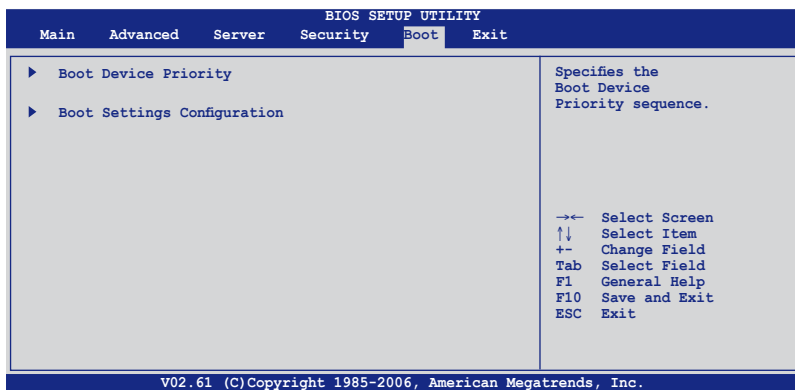
To change the user password, follow the same steps as in setting a user password.

Password Check [Setup]

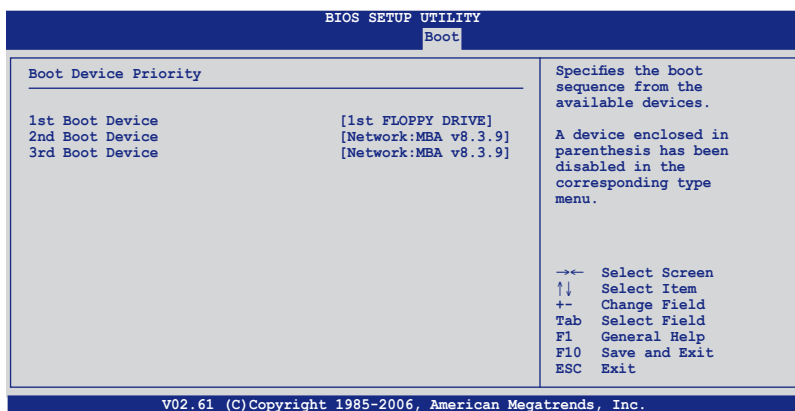
When set to [Setup], BIOS checks for user password when accessing the Setup utility. When set to [Always], BIOS checks for user password both when accessing Setup and booting the system. Configuration options: [Setup] [Always]

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]

5.7.2 Boot Settings Configuration

| BIOS SETUP UTILITY | | |
|---|-----------|---|
| Boot | | |
| Boot Settings Configuration | | |
| Quick Boot | [Enabled] | Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system. |
| Full Logo Display | [Enabled] | |
| Bootup Num-Lock | [On] | |
| PS/2 Mouse Support | [Auto] | |
| POST Error | [Enabled] | |
| Setup Prompt | [Enabled] | |
| Interrupt 19 Capture | [Enabled] | |
| | | →← Select Screen ↑↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit |
| V02.61 (C) Copyright 1985-2006, American Megatrends, Inc. | | |

Quick Boot [Enabled]

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

Full Logo Display [Enabled]

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



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

Bootup Num-Lock [On]

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

PS/2 Mouse Support [Auto]

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

POST Error [Enabled]

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

Setup Prompt [Enabled]

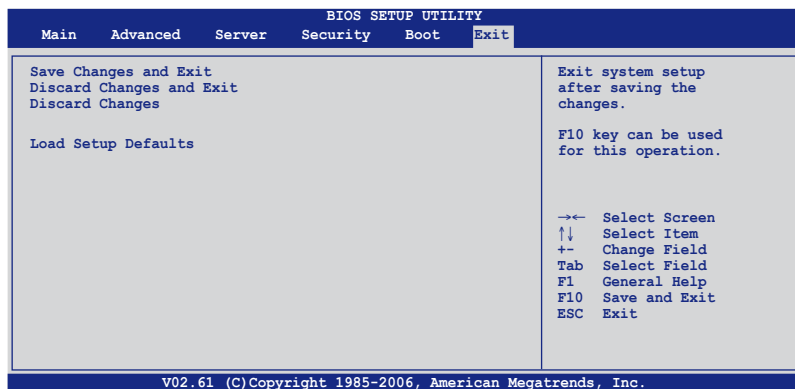
When set to [Enabled], the system displays the message “Press DEL to run Setup” during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Enabled]

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

5.8 Exit menu

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



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

Exit & Save Changes

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



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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

Chapter 6

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



ASUS RS161-E5/PA2

RAID Configuration

6.1 Setting up RAID

The system 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.

NVIDIA RAID Utility Mar 23 2006
- Define a New Array -

RAID Mode: **Striping** Striping Block: **Optimal**

Free Disks Array Disks

| Loc | Disk Model Name |
|-------|----------------------|
| 1.0.M | XXXXXXXXXXXXXXXXXXXX |
| 1.1.M | XXXXXXXXXXXXXXXXXXXX |
| 2.0.M | XXXXXXXXXXXXXXXXXXXX |
| 2.1.M | XXXXXXXXXXXXXXXXXXXX |

[>] Add [←] Del

[ESC] QUIT [F6] Back [F7] Finish [TAB] Navigate [↑↓] Select [ENTER] Popup

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.

[ESC] QUIT [F6] Back [F7] Finish [TAB] Navigate [↑↓] Select [ENTER] Popup

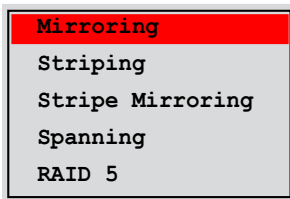


The navigation keys vary depending on the menu level or option.

6.2.3 Creating a RAID Volume

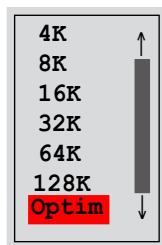
To create a RAID 0 set:

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.

NVIDIA RAID Utility Mar 23 2006
- Define a New Array -

| RAID Mode: Striping | | Striping Block: Optimal | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|----------------------|--------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|-----|-----------------|-------|----------------------|-------|----------------------|
| Free Disks | | Array Disks | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Loc</th> <th style="text-align: left;">Disk Model Name</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> | Loc | Disk Model Name | | | | | | | | | | | | | | | | | | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Loc</th> <th style="text-align: left;">Disk Model Name</th> </tr> </thead> <tbody> <tr style="background-color: red;"> <td>1.0.M</td> <td>XXXXXXXXXXXXXXXXXXXX</td> </tr> <tr> <td>1.1.M</td> <td>XXXXXXXXXXXXXXXXXXXX</td> </tr> </tbody> </table> | Loc | Disk Model Name | 1.0.M | XXXXXXXXXXXXXXXXXXXX | 1.1.M | XXXXXXXXXXXXXXXXXXXX |
| Loc | Disk Model Name | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Loc | Disk Model Name | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.0.M | XXXXXXXXXXXXXXXXXXXX | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.M | XXXXXXXXXXXXXXXXXXXX | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [→] Add | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [←] Del | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [ESC] QUIT [F6] Back [F7] Finish [TAB] Navigate [↑↓] Select [ENTER] Popup | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

4. Press <F7> to create the RAID set.

A pop-up window appears.

| | |
|------------------|------------|
| Clear disk data? | |
| [Y] YES | [N] Cancel |

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.

NVIDIA RAID Utility Mar 23 2006
- Array List -

| Boot | Id | Status | Vendor | Array | Model Name |
|------|----|---------|--------|--------|------------|
| Yes | 2 | Healthy | NVIDIA | MIRROR | XXX.XXG |

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

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.

| NVIDIA RAID Utility Mar 23 2006 | | | | | |
|--|----|---------|--------|-----------|------------|
| - Array List - | | | | | |
| Boot | Id | Status | Vendor | Array | Model Name |
| Yes | 4 | Healthy | NVIDIA | STRIPING | XXX.XXG |
| Yes | 3 | Healthy | NVIDIA | MIRRORING | XXX.XXG |
| [Ctrl-X]Exit [↑↓]Select [B]Set Boot [N]New Array [ENTER]Detail | | | | | |

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.

| Array 1 : NVIDIA MIRROR XXX.XXG | | | | | | |
|-----------------------------------|---------|--------|---------------------|--------------------|------------|----------|
| - Array Detail - | | | | | | |
| RAID Mode: Striping | | | | | | |
| Striping Width: 1 | | | Striping Block: 64K | | | |
| Adapt | Channel | M/S | Index | Disk | Model Name | Capacity |
| 2 | 1 | Master | 0 | XXXXXXXXXXXXXXXXXX | XXX.XXGB | |
| 1 | 0 | Master | 1 | XXXXXXXXXXXXXXXXXX | XXX.XXGB | |
| [↑↓] Select [F6] Back [F7] Finish | | | | | | |

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

| Rebuild array? | |
|----------------|--------------|
| [Enter] OK | [Esc] Cancel |

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.

| NVIDIA RAID Utility Mar 23 2006 | | | | | |
|--|----|---------|--------|-----------|------------|
| - Array List - | | | | | |
| Boot | Id | Status | Vendor | Array | Model Name |
| No | 4 | Healthy | NVIDIA | STRIPING | XXX.XXG |
| No | 3 | Healthy | NVIDIA | MIRRORING | XXX.XXG |
| [R] Rebuild [D] Delete [C] Clear Disk [ENTER] Return | | | | | |

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

Delete this array?

[Y] Yes [N] Cancel



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

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

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.

| NVIDIA RAID Utility Mar 23 2006 | | | | | |
|--|----|---------|--------|-----------|------------|
| - Array List - | | | | | |
| 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.

| Array 1 : NVIDIA MIRROR XXX.XXG | | | | | |
|--|---------|--------|---------------------|--------------------|----------|
| - Array Detail - | | | | | |
| RAID Mode: Striping | | | | | |
| Striping Width: 1 | | | Striping Block: 64K | | |
| Adapt | Channel | M/S | Index | Disk Model Name | Capacity |
| 2 | 1 | Master | 0 | XXXXXXXXXXXXXXXXXX | XXX.XXGB |
| 1 | 0 | Master | 1 | XXXXXXXXXXXXXXXXXX | 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

Chapter 7

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



ASUS RS161-E5/PA2

Driver installation

7.1 RAID driver installation

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

7.1.1 Creating a RAID driver disk



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

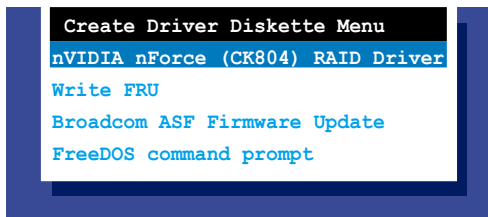
A floppy disk with the RAID driver is required when installing Windows® 2000/XP operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support CD) or in Windows® environment.

To create a RAID driver disk in DOS environment:

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

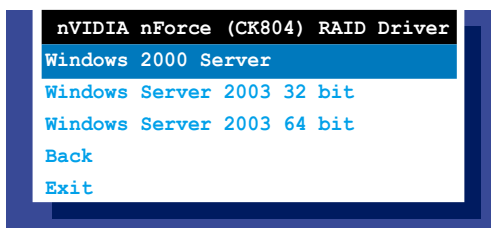
```
Loading FreeDOS FAT KERNEL GO!  
Press any key to boot from CDROM...
```

The Makedisk menu appears.



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

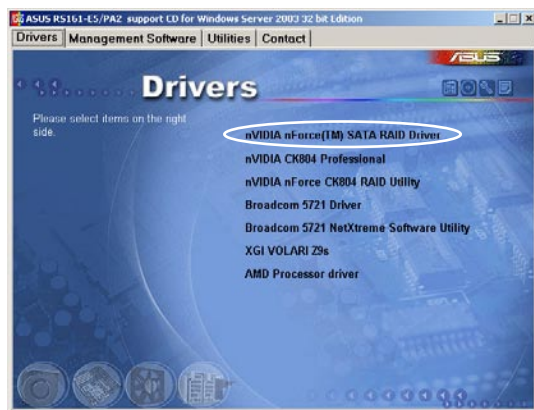
nVIDIA nForce SATA RAID Driver



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

To create a RAID driver disk in Windows®:

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



To install the RAID driver:

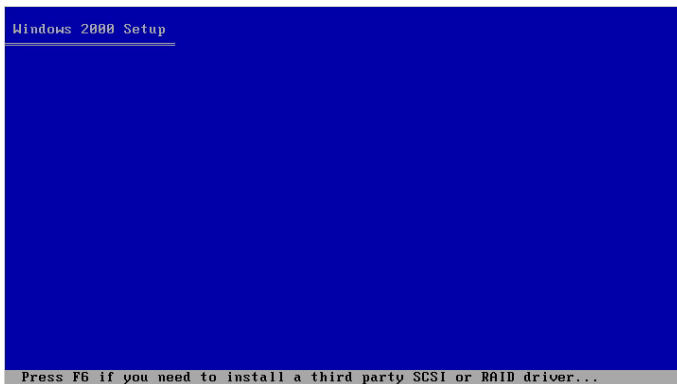
1. Install an operating system to the selected hard disk drive. During installation, the computer prompts you to press the <F6> if you are installing a third-party SCSI or RAID driver.
2. Press <F6>, then insert the RAID driver disk to the floppy disk drive.
3. Follow screen instructions to install the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

7.1.2 Installing the RAID controller driver

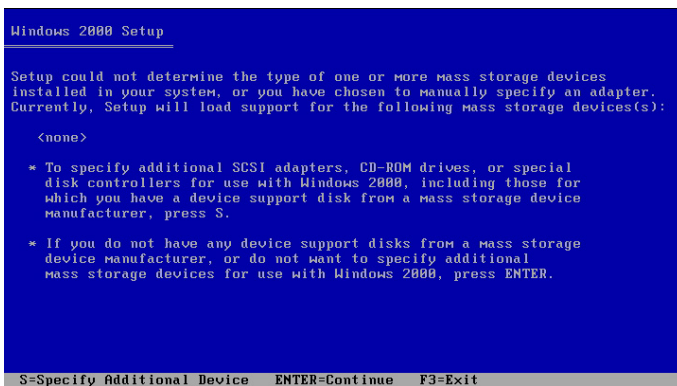
Windows® 2000/2003 Server OS

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

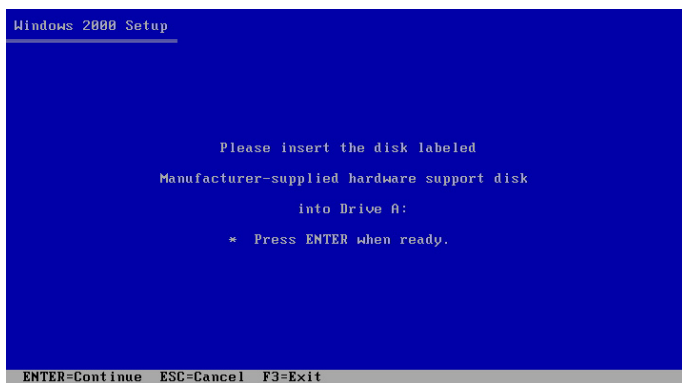
1. Boot the computer using the Windows® 2000/2003 Server installation CD. The Windows® 2000/2003 Setup starts.



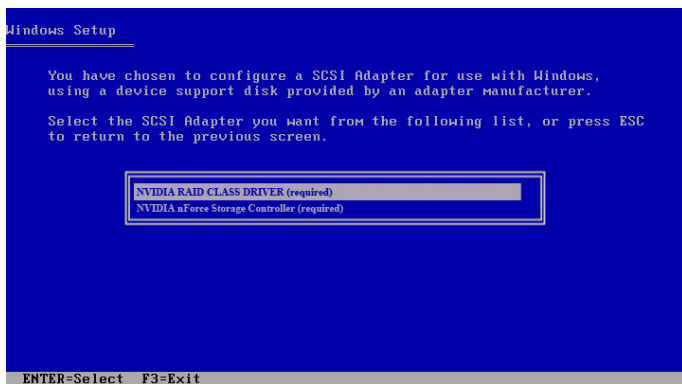
2. Press <F6> when the message "Press F6 if you need to install a third party SCSI or RAID driver..." appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



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



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



6. Press <S> again and select **NVIDIA nForce Storage Controller (required)** 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 continuen with Windows® 2000/2003 installation.



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

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.

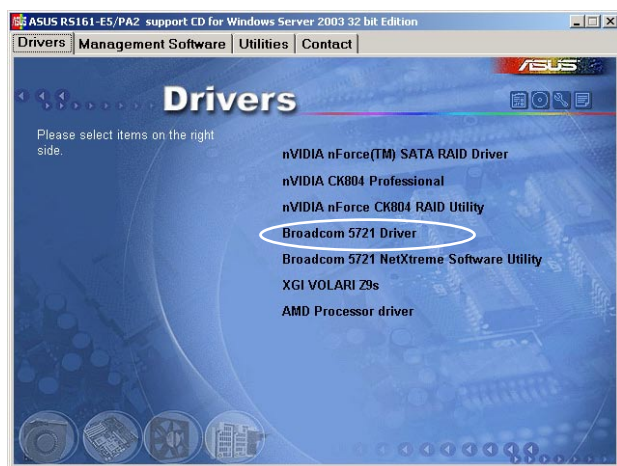
To install the LAN controller drivers:

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.

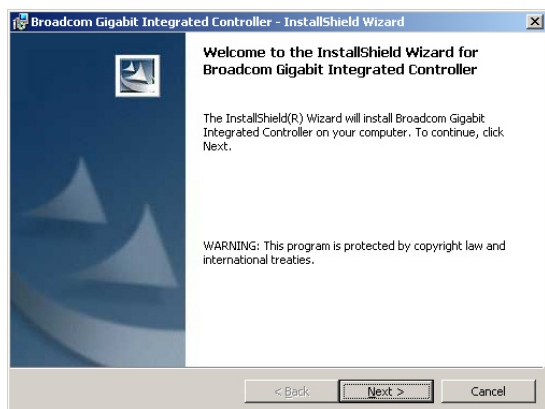


- Windows® automatically detects the LAN controllers and displays a New Hardware Found window. Click **Cancel** to close this window.
- If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to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

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



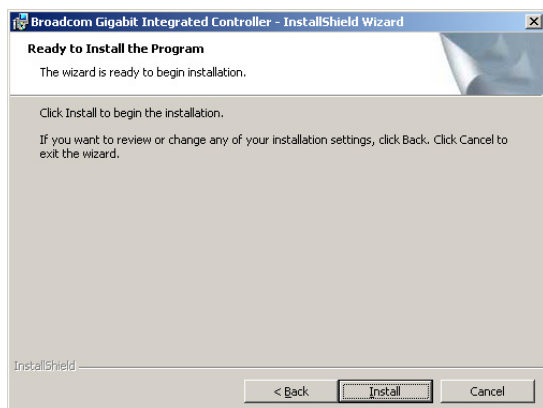
- Click **Next** when the InstallShield Wizard window appears.



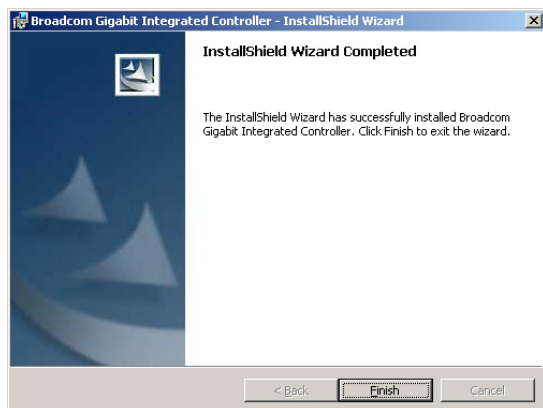
- Toggle **I accept the terms in the license agreement** and click **Next** to continue.



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



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



7.3 nVIDIA® driver installation

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

7.3.1 Windows 2000/Server 2003

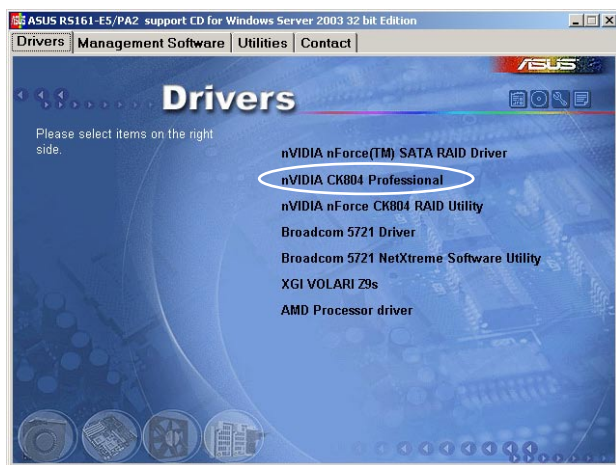
To install the nVIDIA® drivers on a Windows® 2000/ Server 2003 OS:

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

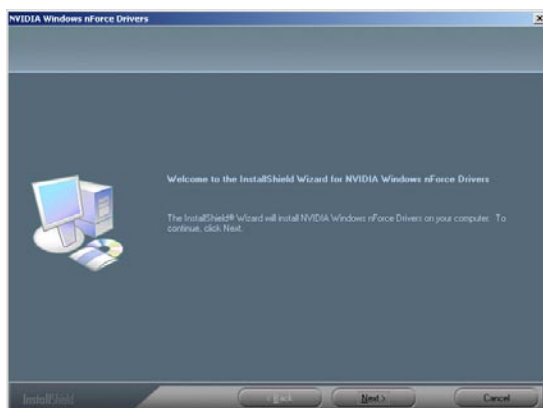


If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the CD.

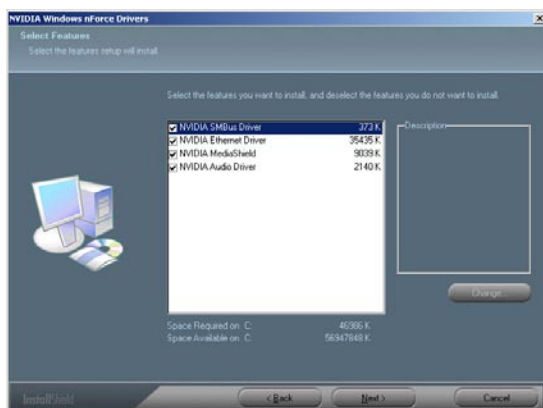
3. Click the **nVIDIA CK804 Professional** option.



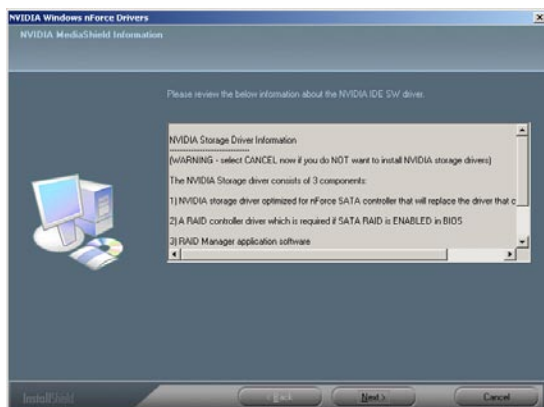
4. Click **Next** when the InstallShield Wizard window appears.



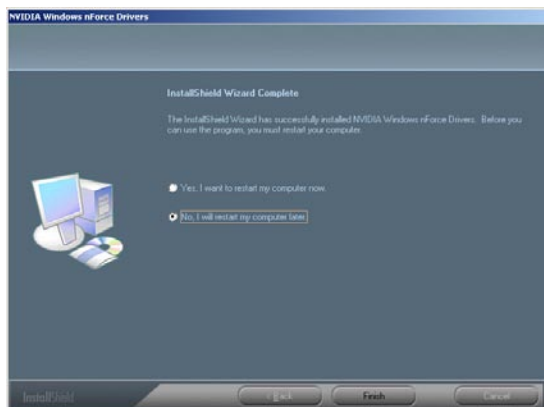
5. Check the box before the driver you want to install and click **Next** to continue.



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



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



7.4 Management applications and utilities installation

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



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

7.4.1 Running the support CD

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



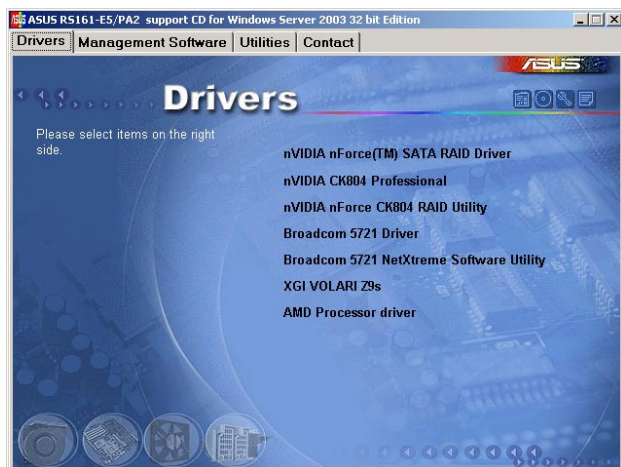
If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the CD.

7.4.2 Drivers menu

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

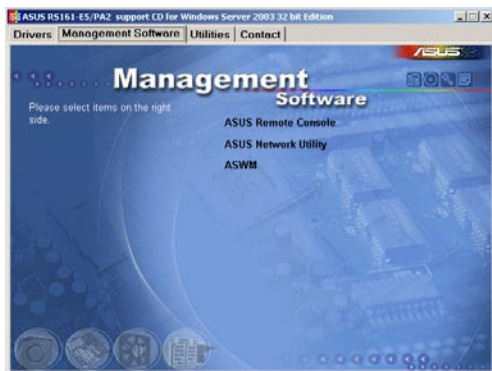


The screen display and driver options vary under different operating system versions.



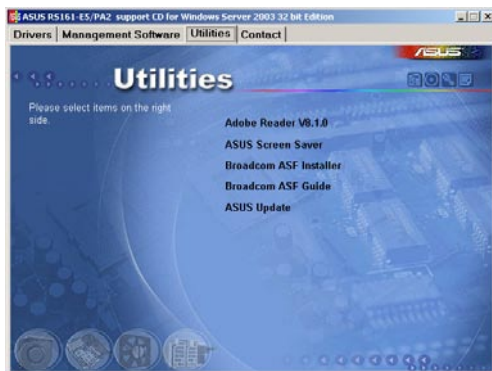
7.4.3 Management Software menu

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



7.4.4 Utilities menu

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



7.4.5 Contact information

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



