ASUS® AP1600R-E2 (AA2/AI2)

1U Rackmount Barebone Server

User Guide

E1962

First Edition V1
August 2005

Contents

Notices

Federal Communications Commission Statement

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

• This device may not cause harmful interference, and

• This device must accept any interference received including interference that may cause undesired operation.

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

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

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

Canadian Department of Communications Statement

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

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

Safety information

Electrical Safety

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

Operation Safety

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

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

Lithium-Ion Battery Warning

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

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

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

About this guide

Audience

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

Contents

This guide contains the following parts:

1. **Chapter 1: Product Introduction**

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

2. **Chapter 2: Hardware setup**

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

3. **Chapter 3: Installation options**

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

4. **Chapter 4: Motherboard information**

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

5. **Chapter 5: BIOS information**

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

6. **Chapter 6: Driver installation**

   This chapter provides instructions for creating and configuring RAID, and 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.

References

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

1. **ASUS NCCH-DR motherboard user guide**

   This manual contains detailed information about the ASUS NCCH-DR motherboard.

2. **ASUS Server Web-based Management (ASWM) user guide**

   This manual tells how to set up and use the proprietary ASUS server management utility.

3. **ASUS websites**

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

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

Product introduction

1.1   System package contents

The items in the ASUS AP1600R-E2 (AA2/AI2) product package vary depending on the model your purchased. Check your package for the standard items listed in the following table.

Package items	AA2 model	AI2 model
ASUS AR14 1U rackmount chassis with:		
• ASUS NCCH-DR motherboard	✓	✓
• 500W power supply	✓	✓
• SATA backplane	✓	
• Fan control board		✓
• Optical drive	✓	✓
• System fan	✓	✓
• Device fan	✓	✓
• 2 x internal HDD trays		✓
• 2 x hot-swap HDD trays	✓	
• Pre-connected device/power cables	✓	✓
CPU heatsink	✓	✓
SATA cable	✓	✓
IDE cable		✓
Rackmount rail kit	✓	✓
Bundled CDs		
• AP1600R-E2 drivers and utilities CD	✓	✓
• CA Anti-virus software CD	✓	✓
User guide	✓	✓

* **AA2 model** - supports up to two hot-swap SATA hard disks

* **AI2 model** - supports up to two internal IDE hard disks,
or up to two internal SATA hard disks

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

1.2   System specifications

The ASUS AP1600R-E2 (AA2/AI2) is a 1U barebone server system featuring the ASUS NCCH-DR motherboard. The server supports dual Intel® Xeon™ processors, and includes the latest technologies through the chipsets embedded on the motherboard.

Chassis	Rackmount 1U (AR14)
Motherboard	ASUS NCCH-DR
Chipset	North Bridge: Intel® E7210 Memory Controller Hub (MCH) South Bridge: Intel® 6300ESB
Processor	Supports dual Intel® Xeon™ 3.4+GHz processors with Hyper-Threading Technology via two 604-pin sockets
Memory	4 x 184-pin DDR sockets for up to 8 GB system memory Supports PC3200/PC2700 unbuffered ECC or non-ECC DIMMs Supports dual-channel memory architecture
LAN	Intel® PRO/1000 CT Network Connection (82547GI) Intel® PRO/1000 MT Network Connection (82541GI)
VGA	ATI RAGE-XL PCI-based VGA controller Supports 8MB display memory
Expansion slots	1 x PCI-X 66 MHz/64-bit slot (PCI-X 1.0) 1 x Mini-PCI socket for the ASUS Server Management Board
Storage	Intel® 6300ESB South Bridge supports: - 2 x Ultra DMA 100/66/33 HDDs *(IDE model)* - 2 x SATA HDDs with RAID 0/1 configuration and Intel® Matrix Storage Technology *(SATA model)*
Management	ASUS Server Web-based Management (ASWM)
Hardware monitors	Voltage, temperature, and fan speed monitoring Automatic System Restart (ASR) feature
Power supply	500W power supply, 115V~230V, 50Hz~60Hz
Dimensions	600 mm (l) x 445 mm (w) x 43.6 mm (h))

1.3   Front panel features

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

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

AA2 model

| Rack screw | Hot-swap HDD bays | Optical drive | Rack screw |

USB ports
Power button
Power LED
HDD Access LED
Location switch
LAN2 LED
Location LED
LAN1 LED
Reset button
Message LED

AI2 model

Internal HDD bays
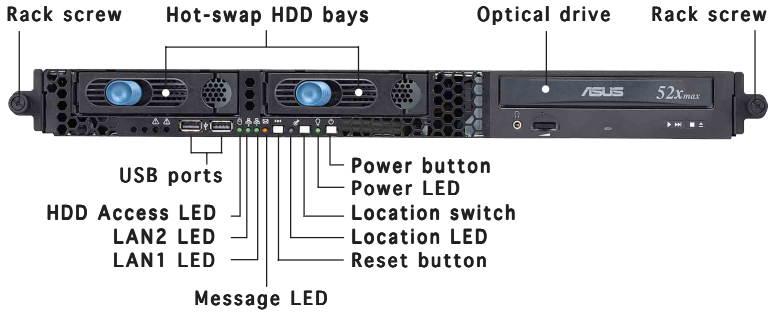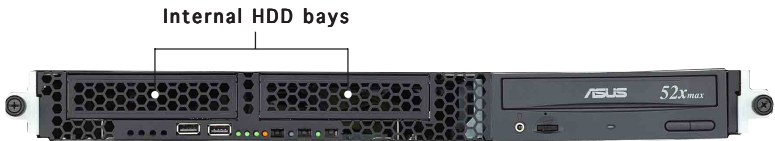
The AA2 and AI2 models have the same front panel features except for the HDD bays.

1.4   Rear panel features

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

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.

AC power socket
Rear fans
PS/2 mouse port
PS/2 keyboard port
USB ports
Serial port
VGA port
LAN port1
LAN port2
Parallel port
Expansion slot
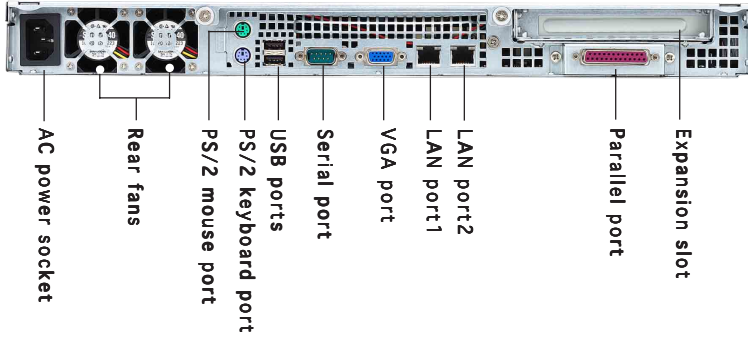
Refer to section "1.6.2 Rear panel LEDs" for the LED descriptions.

1.5 Internal features

The barebone server includes the basic components as shown.

> The AA2 and AI2 models have the same internal features except for the SATA backplane, fan control board, and HDD trays.

AA2 model
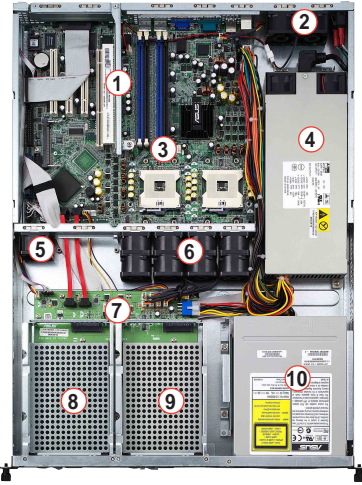
AI2 model

1. PCI-X riser card bracket
2. Rear fans
3. ASUS NCCH-DR motherboard
4. Power supply
5. Device fan
6. System fans
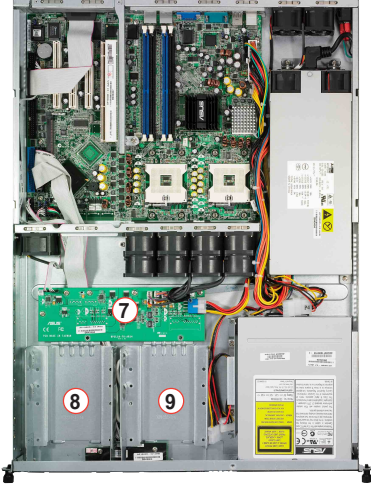
7. **AA2**: SATA backplane
   AI2: Fan control board
8. **AA2**: Hot-swap HDD tray 1
   AI2: Internal HDD tray 1
9. **AA2**: Hot-swap HDD tray 2
   AI2: Internal HDD tray 2
10. Optical drive

> The barebone server does not include a floppy disk drive. Connect an external floppy disk drive (USB interface) to any of the USB ports on the front or rear panel if you need to use a floppy disk.

1.6   LED information

1.6.1   Front panel LEDs

HDD Access LED
LAN2 LED
LAN1 LED
Power LED
Location LED
Message LED
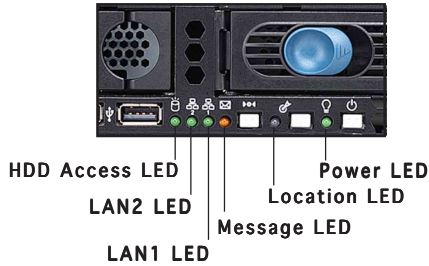
LED	Display status	Description
Power LED	ON	System power ON
HDD Access LED	OFF Blinking	No activity Read/write data into the HDD
Message LED	OFF Blinking	System is normal; no incoming event ASWM indicates a HW monitor event
Location LED	OFF ON	Normal status Location switch is pressed (Press the location switch again to turn off)
LAN LEDs	OFF Blinking ON	No LAN connection LAN is transmitting or receiving data LAN connection is present

1.6.2   Rear panel LEDs

RJ-45
ACT/LNK   SPEED
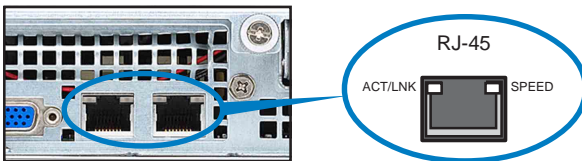
ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10Mbps connection
Green	Linked	Orange	100Mbps connection
Blinking	Linking	Green	1000Mbps connection

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

Hardware setup

2.1   Chassis cover

2.1.1 Removing the cover

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

Thumbscrews

2. Loosen the two thumbscrews on the rear panel to release the top cover from the chassis.
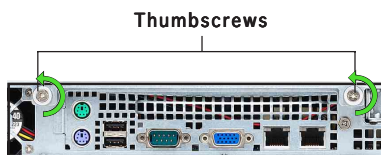
3. Firmly hold the cover and slide it toward the rear panel for about half an inch until it is disengaged from the chassis.

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.

Side markings

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

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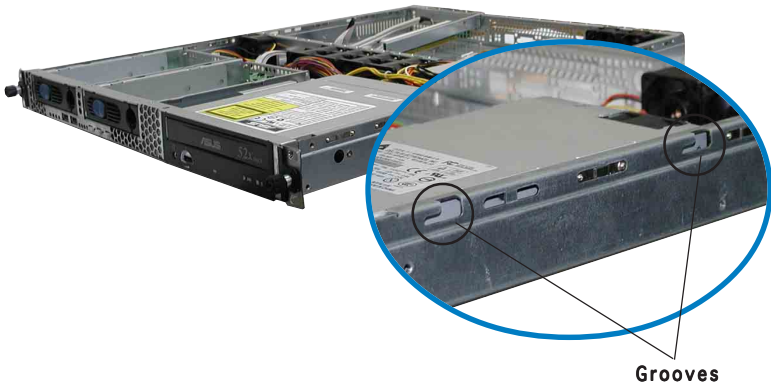
3. Slide the cover toward the front until it snaps in place.
4. Tighten the thumbscrews on the rear to secure the cover.

Thumbscrews
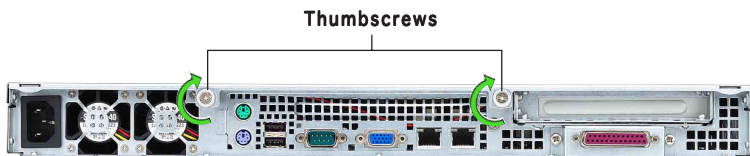
2.2   Central Processing Unit (CPU)

The motherboard comes with two surface mount 604-pin Zero Insertion
Force (ZIF) socket and designed for the Intel® Xeon™ processors.

NCCH-DR CPU Socket 604
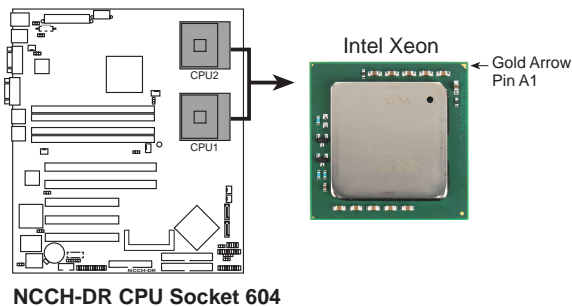
1. The motherboard supports either one or two CPUs. If you are
    installing only one CPU, you MUST install it in CPU socket 1.

2. If you are installing two CPUs, install in the CPU socket 2 first.

2.2.1   Installling a CPU

To install the CPUs:

1. Locate the CPU sockets on the
    motherboard. Flip up the socket
    lever and push it all the way to
    the other side.
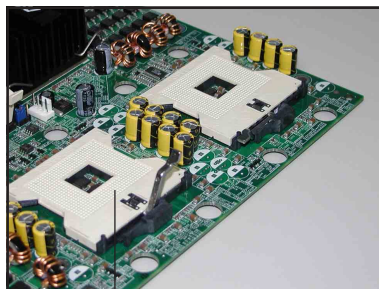
Socket for CPU1

2.   Carefully insert the CPU into the
     socket as shown until it fits in
     place.

⚠️ The CPU fits only in one
     correct orientation. DO NOT
     force the CPU into the socket
     to prevent bending the pins
     and damaging the CPU!
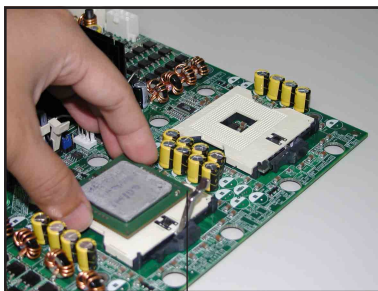
**Marked corner
(gold arrow)**

3.   Carefully push down the socket
     lever to secure the CPU. The
     lever clicks on the side tab to
     indicate that it is locked.
4.   Apply the thermal interface
     material (thermal grease) to the
     top of the CPU. This thermal
     grease should come with the CPU
     package.
5.   Repeat steps 1 to 4 if you wish
     to install a second CPU.
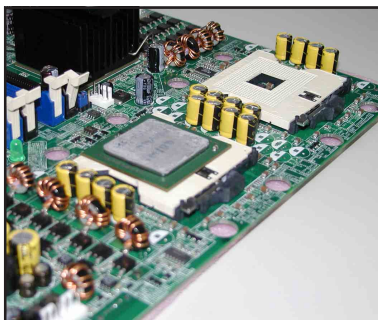
2.2.2 Installing the CPU heatsink

To install the CPU heatsink:

1. Carefully place the heatsink on top of the installed CPU.
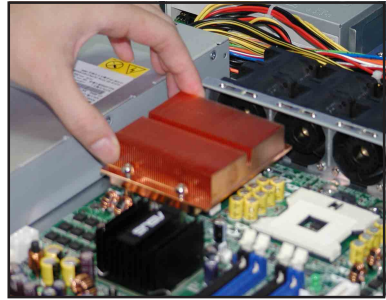
2. Twist each of the four screws with a Philips (cross) screwdriver just enough to attach the heatsink to the motherboard. When the four screws are attached, tighten them one by one to completely secure the heatsink.
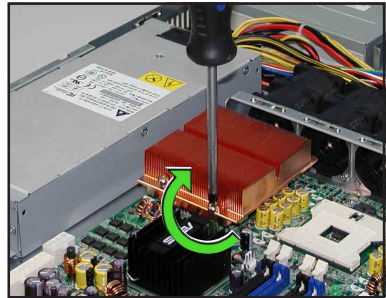
3. Follow steps 1 and 2 to install the second CPU heatsink.
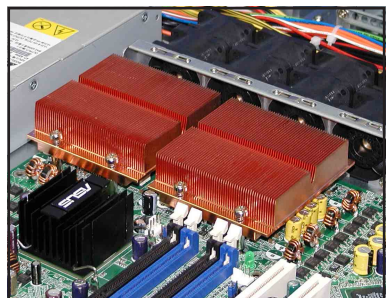
2.4   System memory

2.4.1   Overview

The motherboard comes with four Double Data Rate (DDR) Dual Inline
Memory Modules (DIMM) sockets.

NCCH-DR 184-Pin DDR DIMM sockets
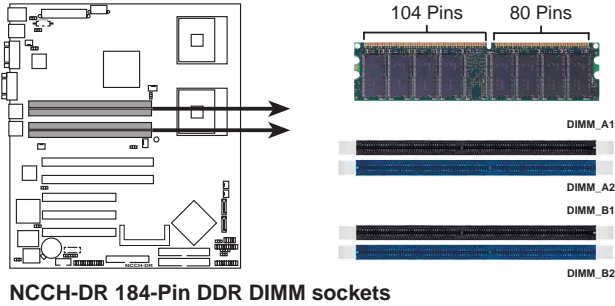
2.4.2   Memory configurations

You may install 128 MB, 256 MB, 512 MB, 1 GB, and 2 GB unbuffered ECC
or non-ECC DDR DIMMs into the DIMM sockets.

- • Always install DIMMs with the same CAS latency. For optimum
  compatibility, it is recommended that you obtain memory modules
  from the same vendor. Refer to the DDR Qualified Vendors List on
  the ASUS website for details.

- • Due to chipset resource allocation, the system may detect less than
  8 GB system memory when you install four 2 GB DDR memory
  modules.

- • This motherboard does not support memory modules made up of
  128 Mb chips or double sided x16 memory modules.

- • Three DDR DIMMs intalled into any three memory sockets will
  function in single-channel mode.

2.4.3 Installing a DIMM

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

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.

DDR DIMM notch

Unlocked retaining clip
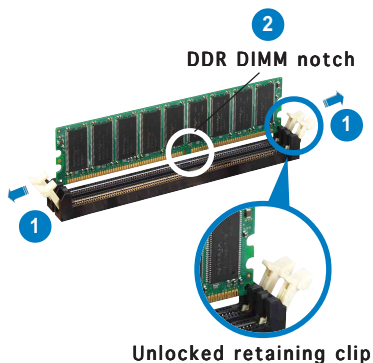
A DDR DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.

Locked Retaining Clip
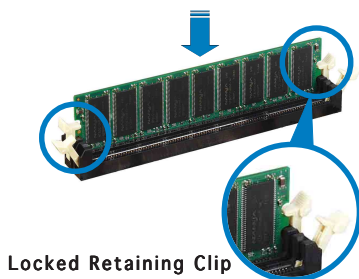
2.4.4 Removing a DIMM

Follow these steps to remove a DIMM.

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

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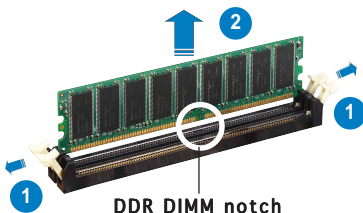
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2. Remove the DIMM from the socket.

2.4   Hard disk drives

2.4.1   Installing a hot-swap SATA HDD *(AA2 model)*

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.
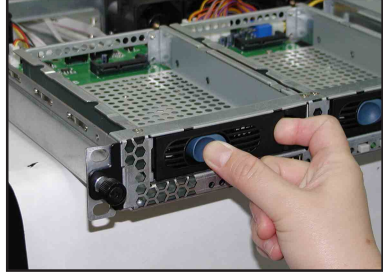
2. Firmly hold the tray lever and pull the drive tray out of the bay.
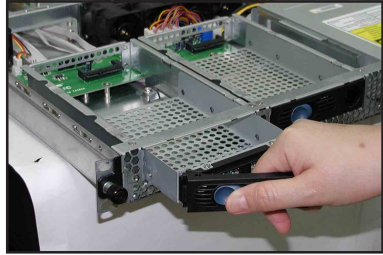
3. Take note of the drive tray holes. Each side has three holes to fit different types of hard disk drives. Use two screws on each side to secure the hard disk drive.

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.
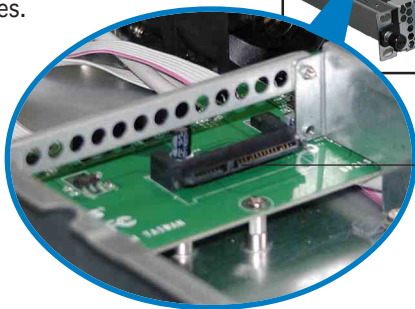
**SATA interface
on the backplane**

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.

2.4.2 Installing an IDE HDD *(AI2 model)*

To install an IDE HDD:

1. Disconnect all the cables from
    the fan control board. Use a
    Phillips (cross) screwdriver to
    remove the five screws that
    secure the fan control board.
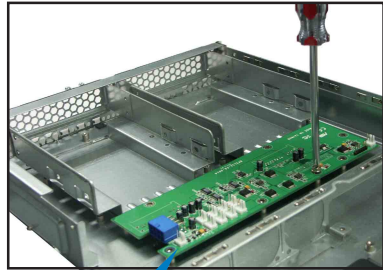
Fan control board screws
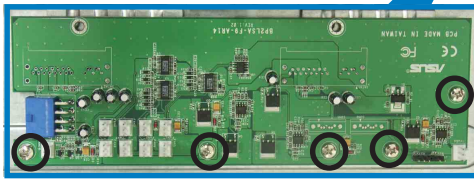
2. Remove the screw that secures
    the hard disk tray to the chassis.
    Slide the tray backward until the
    two tray lock tabs are
    disengaged. Lift the tray from
    the bay.
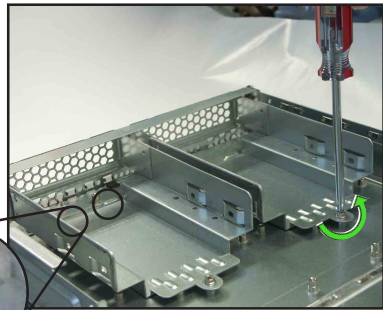
Lock tab
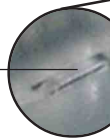
3. Place a hard disk drive on the
    drive tray, and secure it with
    four screws.

4. Carefully place the tray with installed hard disk drive into the drive bay. Slide it forward until the front end aligns with the front panel, and the screw hole matches the standoff.
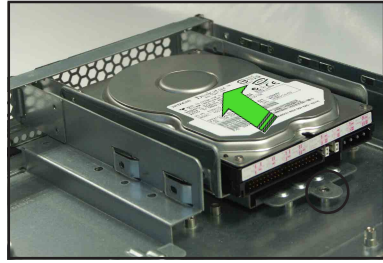
5. Secure the tray with a screw.
6. Repeat steps 2 to 5 if you wish to install a second HDD; otherwise, proceed to step 7.
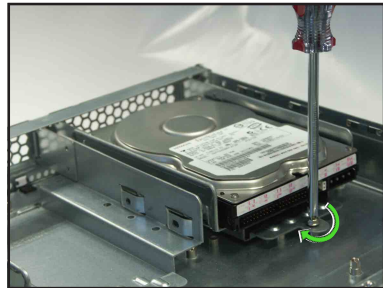
7. Reinstall the fan control board. Secure the board with five screws.
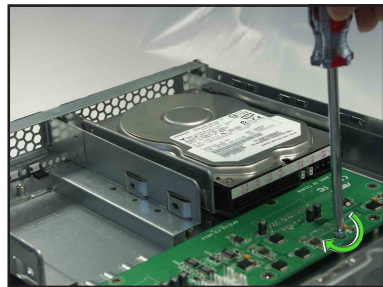
8. Connect the 40-pin IDE cable and a 4-pin power plug to their respective connectors on the back of the drive.

40-pin IDE cable
4-pin power plug

The other end of the IDE cable is pre-connected to the primary IDE connector on the motherboard.

2.4.3 Installing an internal SATA HDD *(AI2 model)*

To install an internal SATA HDD:

1. Follow steps 1 to 7 in section "2.4.2 Installing an IDE hard disk drive."

2. Connect the 7-pin SATA cable to the SATA connector on the back of the drive. Connect the other end to an SATA connector on the motherboard.

SATA connector

7-pin SATA cable

4-pin device power cable
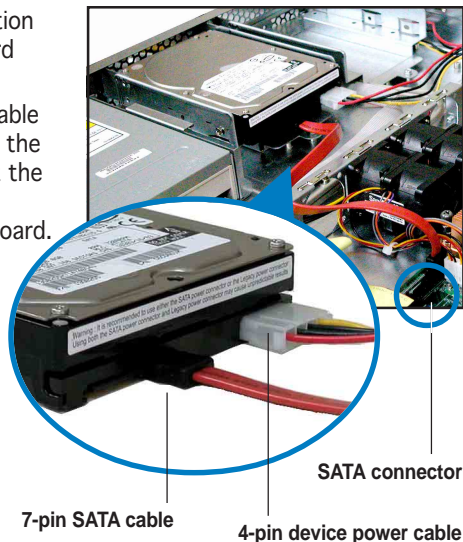
3. Connect the HDD power cable.

•   If you are using SATA HDDs *with a 4-pin power connector*, connect a 4-pin (female) device plug from the power supply to the 4-pin (male) power connector on the back of the drive as shown above.

•   If you are using SATA HDDs *without a 4-pin power connector*, purchase a SATA power cable with a 4-pin/15pin plugs. Connect a 4-pin (female) device plug from the power supply to the 4-pin (male) plug of the SATA power cable. Connect the 15-pin SATA power plug to the power connector on the back of the drive.

4. Repeat steps 1 to 3 to install a second SATA drive.

> Ensure that all cables are held together with the cable clamp, specially those near the system fans. Loose cables may get caught with the fan blades causing fan failure! See step 7 of section "2.4.2 Installing an IDE HDD."!

2.5   Expansion slot

2.5.1   Installing an expansion card

The barebone server comes with a riser card bracket. You need to remove the bracket if you wish to install a PCI-X expansion card.

To install a PCI-X card:

1.   Use a Phillips (cross) screwdriver to remove the screw that secures the riser card to the standoff.

Riser card screw

Riser card standoff
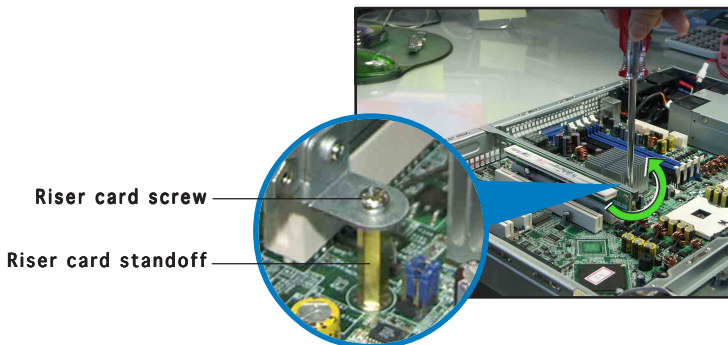
2.   Firmly hold a riser card bracket, then pull it up to detach it from the PCI-X slot on the motherboard.
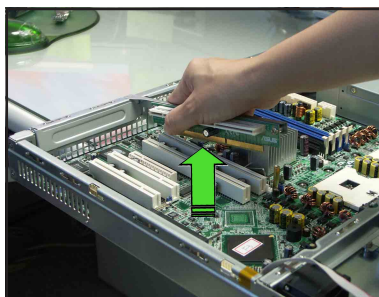
3.   Remove the screw that secures the slot metal cover.
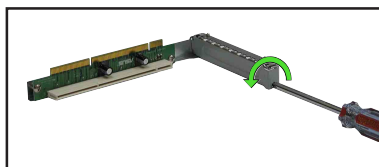
4.   Install a PCI-X card to the bracket as shown, then secure the card with a screw.
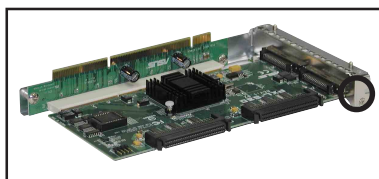
5.   Take note of the holes on the
     riser card bay. The two pegs on
     the riser card bracket should
     match these holes to ensure
     that the bracket is properly in
     place.
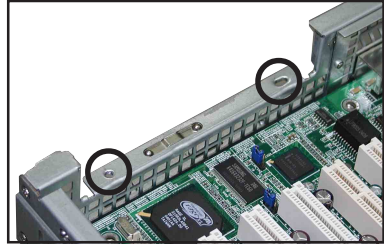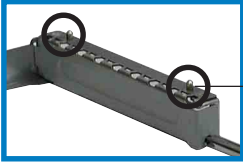
**Peg on the riser
card bracket**

6.   Install the riser card bracket with
     the card into the PCI-X slot on
     the motherboard.
7.   Make sure that the golden
     connectors completely fit the
     slot and the bracket aligns with
     the rear panel.
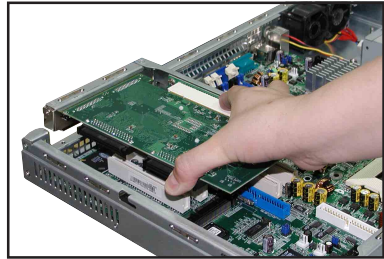
8.   Secure the riser card to the
     standoff.
9.   Connect the cable(s) to the
     card, if applicable.
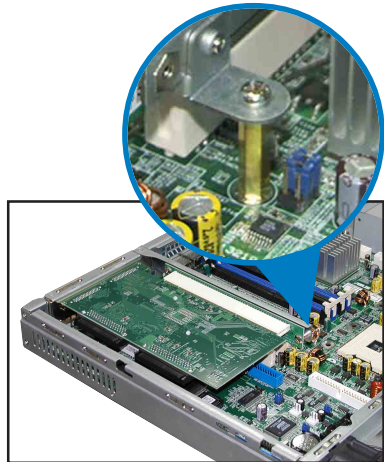
2.5.2 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 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	N/A	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.

IRQ assignments for this motherboard

	INTA#	INTB#	INTC#	INTD#	REQ#	GNT#
ATI Rage XL	PIRQB#	—	—	—	REQ2#	GNT2#
BCM5705E	PIRQF#	—	—	—	REQ3#	GNT3#
PCIX slot 1 (64-bit)	PXIRQ0	PXIRQ1	PXIRQ2	PXIRQ3	X_REQ0	X_GNT0

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

2.6   Cable connections

AA2 model
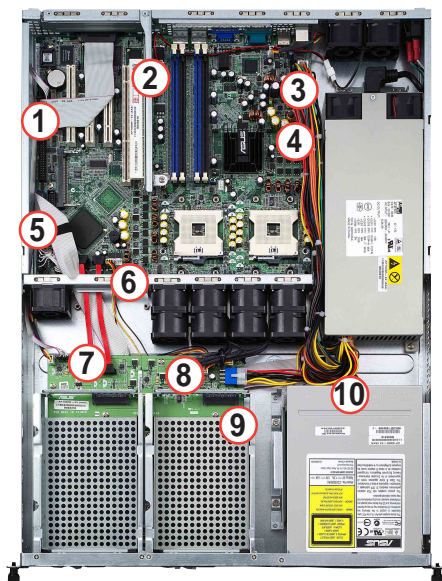
Pre-connected system cables

1.   Parallel port cable (from motherboard to rear panel)
2.   Rear fan connector (from power supply to motherboard)
3.   24-pin SSI power connector (from power supply to motherboard)
4.   8-pin SSI power connector (power supply to motherboard)
5.   Secondary IDE connector (from motherboard to optical drive)
6.   Device fan connector (from motherboard to SATA backplane board)
7.   SATA connectors (from motherboard to SATA backplane board)
8.   System fan connectors (from mid-fans to SATA backplane)
9.   SATA backplane power connector (from power supply)
10. 4-pin power connector (from power supply to optical drive)

AI2 model
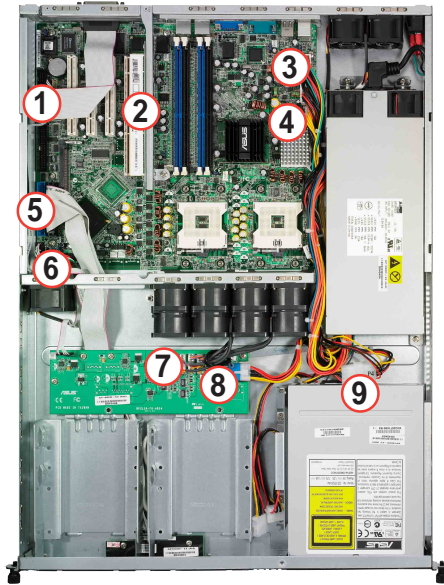
Pre-connected system cables

1. Parallel port cable (from motherboard to rear panel)
2. Rear fan connector (from power supply to motherboard)
3. 24-pin SSI power connector (from power supply to motherboard)
4. 8-pin SSI power connector (power supply to motherboard)
5. Secondary IDE connector (from motherboard to optical drive)
6. Device fan connector (from device fan to motherboard)
7. System fan connectors (from mid-fans to SATA backplane)
8. Fan control board power connector (from power supply)
9. 4-pin power connector (from power supply to optical drive)

2.7 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

2.7.1 System fans

To uninstall the system fans:

1. Disconnect all the system fan cables from the connectors on the backplane board.
2. Remove the four screws that secure a fan.
3. Repeat step 2 to uninstall the other fans.

Fan screw

2.7.2 Device fan

To uninstall the device fan:

1. Disconnect the system fan cable from the connector on the motherboard.
2. Remove the four screws that secure the device fan.
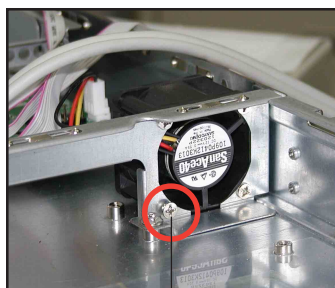
Fan screw

2.7.3 Power supply module

To uninstall the power supply module:

1. Disconnect all the power cables connected to the motherboard and other system devices.
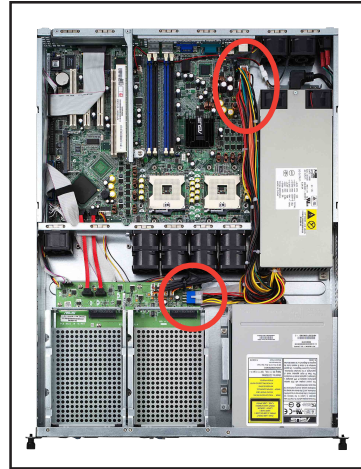
2. Use a Phillips (cross) screwdriver to remove the screw the secures the front end of the power supply.

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

2.7.4 Optical drive

To uninstall the optical drive:

1. Please use a pin-ejector (paper
    clipper may be used) for tray-
    out.. (or you can open the tray
    by pushing the "open botton")

When changing ODD, the black ODD front plastic housing is already
removed. User can uninstall/install ODD after remove the tray bezel.

2. Then remove the tray bezel
    demonstrated in the photo.
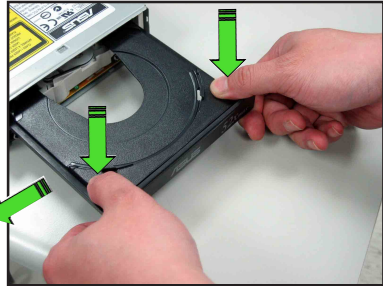
3. Disconnect the power and signal
    cabled connected to the rear of
    the ODD.

4. Use a Philips (cross) screwdriver
    to remove the two screws that
    secure the metal bracket on the
    side of the ODD.

5. Remove the bracket to release
    the drive.

To install an optical drive:

1. Please follow previous Step 1 instructions to tray-out and to remove the ODD bezel.
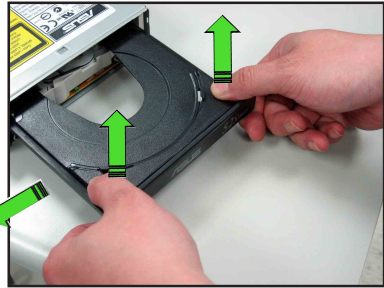
2. Then put the ODD inside the server and insert ODD into the ODD bay.

The purpose of the metal bracket is to secure the ODD us securely in place.

Drive holes to match the pegs on the metal bracket

Drive metal bracket

Bracket pegs

Holes to match the standoffs

Standoffs to match the holes on the metal bracket
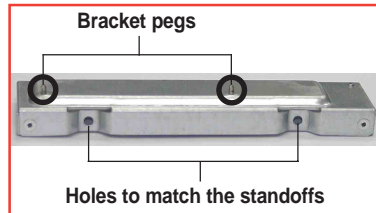
3. Secure the bracket with two screws and re-connect the power and signal cables in place. Put back the tray bezel to finish ODD installation.

2.7.5 Motherboard

To uninstall the motherboard:

1.   Disconnect all the pre-connected cables from the motherboard. See
      section "2.6 Cable connections" for illustration.
2.   Uninstall all the devices from the motherboard including the CPU and
      heatsink, riser card bracket, and DDR DIMMs. Refer to the
      corresponding sections for instructions on removing these
      components.
3.   Remove the riser card standoff by twisting it counterclockwise.

Riser card standoff
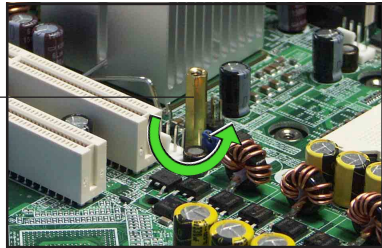
3.   Use a Phillips (cross) screwdriver
      to remove the screws that
      secure the motherboard to the
      base of the chassis.
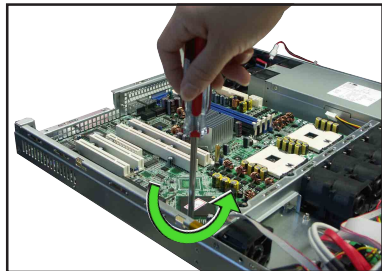
4.   Carefully lift the motherboard
      out of the chassis as shown.
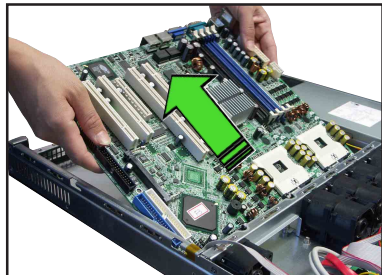
To reinstall the motherboard:

1. Firmly hold the motherboard by the sides and insert it into the chassis as shown.
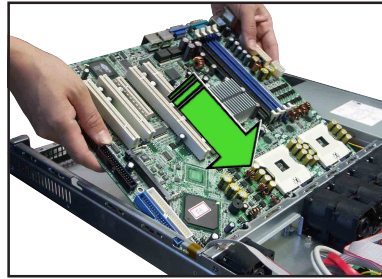
2. Carefully adjust the motherboard until the rear panel ports fit in place.
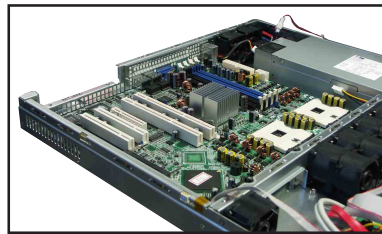
3. Use a Phillips (cross) screwdriver to secure the motherboard with nine (9) screws in the holes as shown.

Screw hole
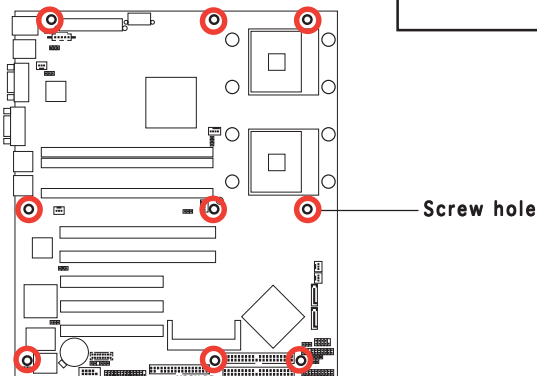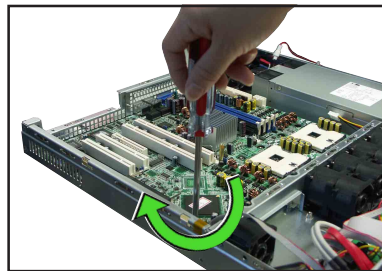
4. Insert the riser card standoff into the motherboard hole beside the PCI-X slot, and twist it clockwise until secure.
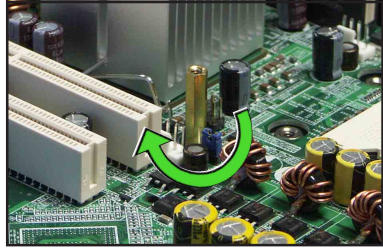
5. Reconnect all the required cables to the motherboard. See section "2.6 Cable connections" for illustration.
6. Reinstall all the devices that you have previously removed.

2.8   SATA backplane cabling *(for AA2)*

Connects the SMBus
cable from the MB

(FAN1) Connects the fan cable
from CPU_FAN1 on the MB

Connect the SATA
cables from the MB

Connect the
system fan cables

Connects the
device fan cable

Connect the SATA HDDs

Connects a 4-pin plug
from power supply
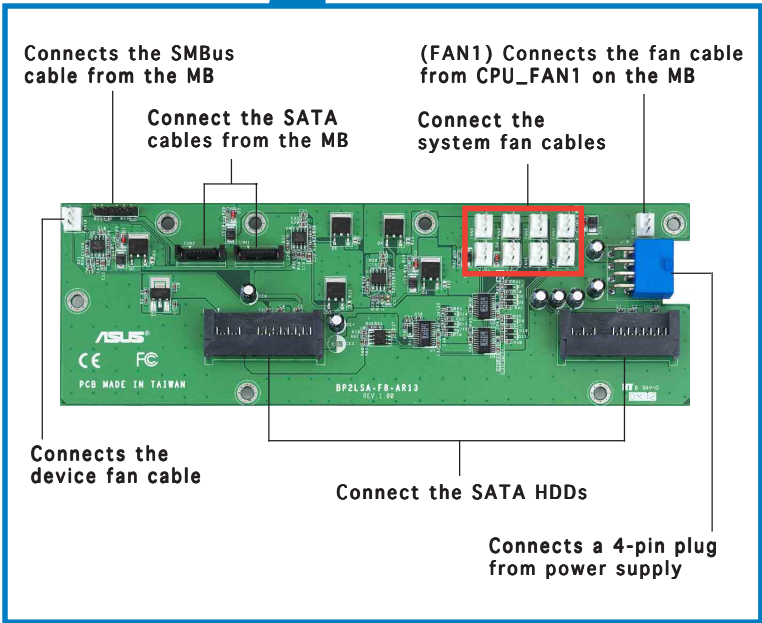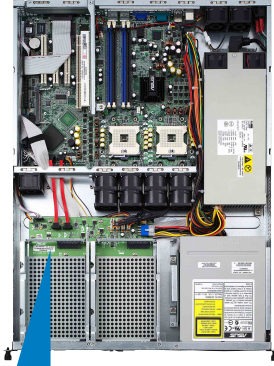
2.9   Fan control board cabling *(for AI2)*

Connects the SMBus
cable from the MB

(FAN1) Connects the fan cable
from CPU_FAN1 on the MB

Connect the
system fan cables

Connects the
device fan cable

Connects a 4-pin plug
from power supply
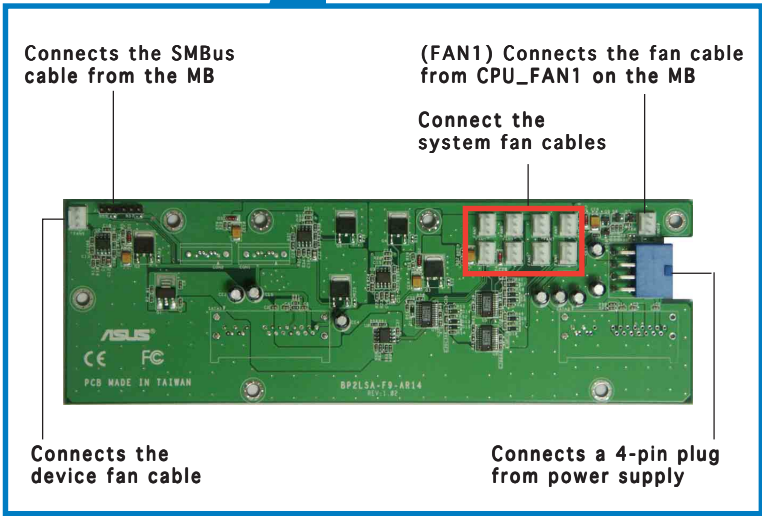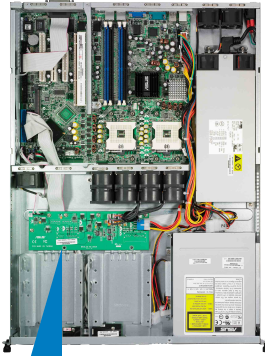
This chapter describes how to install the optional components and devices into the barebone server.

Installation options

3.1   Rackmount rail kit items

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

Nuts
Bolts

Left pair

Right pair
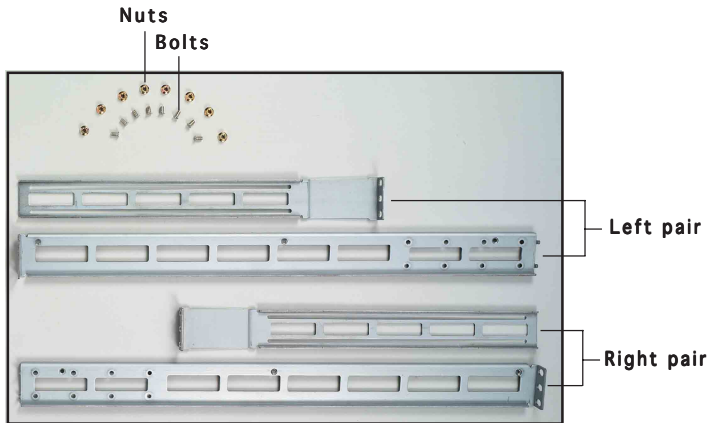
3.2   Rack rails assembly

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.

Rear ends

Bolts on inner side

Nuts on outer side
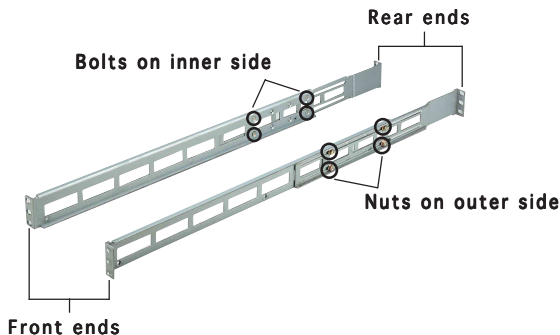
Front ends

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.
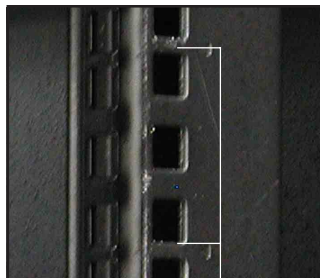
1U space

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.
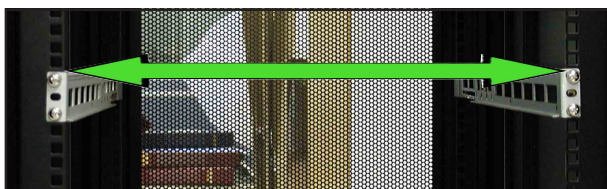
3.4   Rackmounting the server

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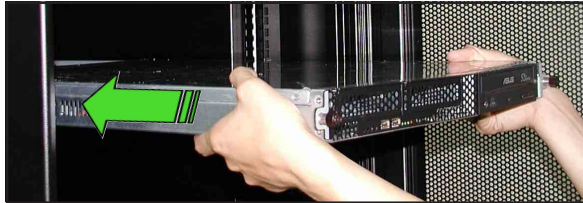
2.   Tighten the two rack screws to secure the server to the rack.

Rack screw

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

Motherboard info

4.1 Motherboard layout

26.8cm (10.5in)

30.5cm (12in)

PS/2KBMS
T: Mouse
B: Keyboard

KBPWR1
ATXPWR1
ATX12V1
PSUSMB1
USBPW12
USB12
REAR_FAN2
LAN_EN1
COM1
Intel
82547GI
Gigabit
Ethernet
Intel
MCH
E7210
VGA
CPU_FAN2
FM_CPU2
LAN1
DDR DIMM_A1 (64 bit,184-pin module)
DDR DIMM_A2 (64 bit,184-pin module)
LAN2
DDR DIMM_B1 (64 bit,184-pin module)
DDR DIMM_B2 (64 bit,184-pin module)
SB_PWR1
REAR_FAN1
FM_CPU1 CPU_FAN1
PCIX1 (64-bit, 66MHz 3V)
Intel
82541GI
Gigabit
Ethernet
PCIX2 (64-bit, 66MHz 3V)
LAN_EN2
FRNT_FAN2
FRNT_FAN1
ATI
RAGE XL
VGA
Controller
PCI3 (32-bit, 33MHz 5V)
PCI4 (32-bit, 33MHz 5V)
SATA2
VGA_EN1
Intel
ICH
6300ESB
PCI5 (32-bit, 33MHz 5V)
SATA1
Super
I/O
USB34
USBPW34
BMCSOCKET1
AUX_PANEL1
CR2032 3V
Lithium Cell
CMOS Power
BMCCONN1
SEC_IDE
PRI_IDE
HDLED
RECOVERY
CLRTC1
8Mbit
Flash
BIOS
BPSMB1
FLOPPY
LPT1
COM2
PANEL1

NCCH-DR

mPGA 604

CPU2

mPGA 604

CPU1

The four grayed out card slots are present on the motherboard but are not used in this system. You may install one PCI-X card via the riser card bracket.

Layout contents

4.2 Jumpers

1. Clear RTC RAM (CLRTC1)

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

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.

2. Remove the onboard battery.

3. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.

4. Re-install the battery.

5. Plug the power cord and turn ON the computer.

6. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

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

CLRTC1

2 1   3 2

Normal   Clear CMOS
(Default)

NCCH-DR Clear RTC RAM
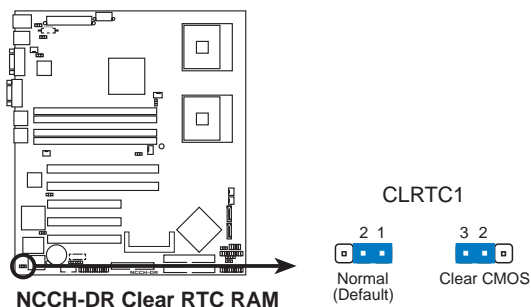
2. CPU fan pin selection (3-pin FM_CPU1, FM_CPU2)

These jumpers allow you to connect either a 3-pin or a 4-pin CPU fan cable plug to the CPU fan connectors (CPU_FAN1, CPU_FAN2). Set these jumpers to pins 1-2 if you are using a 3-pin fan cable plug, or to pins 2-3 if you are using a 4-pin plug.

FM_CPU2

2
1
DC mode
(Default)

3
2
PWM

FM_CPU1

1 2
DC mode
(Default)

2 3
PWM

NCCH-DR FM_CPU setting
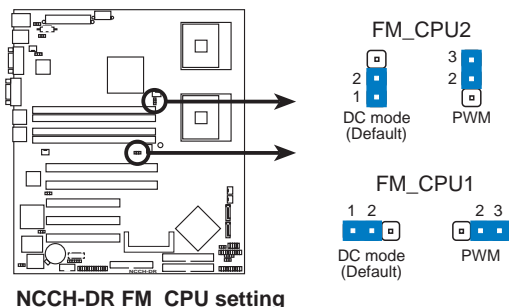
3. USB device wake-up (3-pin USBPW12, USBPW34)

Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set to +5VSB to wake up from S3 and S4 sleep modes (no power to CPU, DRAM in slow refresh, power supply in reduced power mode).

USBPW12

1 2
+5V
(Default)

2 3
+5VSB

USBPW34

1 2
+5V
(Default)

2 3
+5VSB

NCCH-DR USB device wake-up
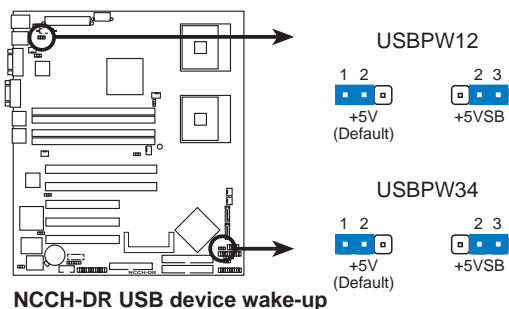
> • The USB device wake-up feature requires a power supply that can provide 500mA on the +5VSB lead for each USB port; otherwise, the system would not power up.
>
> • The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

4. Keyboard power (3-pin KBPWR1)

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

KBPWR1

1 2   2 3

+5V   +5VSB
(Default)
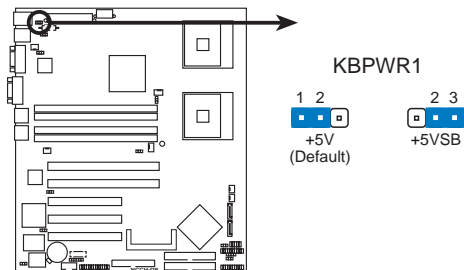
NCCH-DR Keyboard power setting

5. Gigabit LAN1 controller setting (3-pin LAN_EN1)

This jumper allows you to enable or disable the Intel® 82547GI Gigabit LAN controller (CSA) that controls the LAN1 port. Place a jumper cap on pins 1-2 to activate the Gigabit LAN1 controller.

LAN_EN1

1 2   2 3

Enable   Disable
(Default)
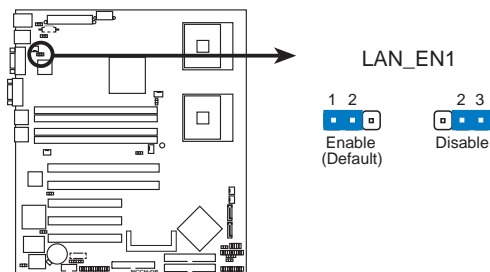
NCCH-DR LAN_EN1 setting

6. Gigabit LAN2 controller setting (3-pin LAN_EN2)

This jumper allows you to enable or disable the Intel® 82541GI Gigabit LAN controller (32-bit) that controls the LAN2 port. Place a jumper cap on pins 1-2 to activate the Gigabit LAN2 controller.

LAN_EN2

1 2   2 3

Enable   Disable
(Default)

NCCH-DR LAN_EN2 setting
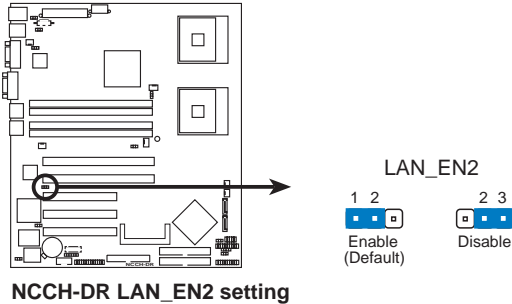
7. Integrated graphics controller (3-pin VGA_EN1)

This jumper allows you enable or disable the onboard graphics controller.

VGA_EN1

1 2   2 3

Enable   Disable
(Default)

NCCH-DR VGA setting
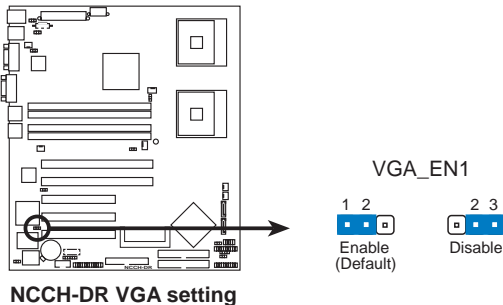
8. Force BIOS recovery (3-pin RECOVERY)

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

To update the BIOS:

1. Prepare a floppy disk that contains the latest BIOS for the motherboard (xxxx-xxx.BIN) and the AWDFLASH.EXE utility.

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.

NCCH-DR BIOS recovery setting
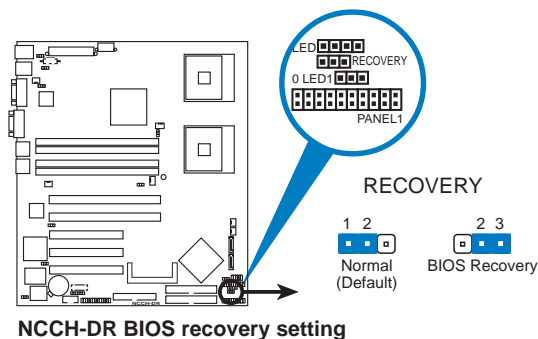
4.3   Connectors

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

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

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

FLOPPY

PIN 1

NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.
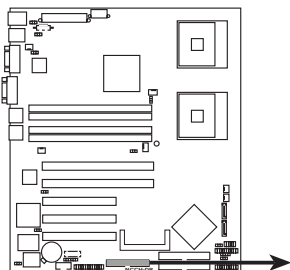
NCCH-DR Floppy disk drive connector

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

These connectors are for Ultra DMA 100/66/33 signal cables. The Ultra DMA 100/66/33 signal cable has three connectors: a blue connector for the primary IDE connector on the motherboard, a gray connector for an Ultra DMA 100/66 IDE master device (hard disk drive), and a black connector for an Ultra DMA 100/66/33 IDE slave device (optical drive/ hard disk drive). If you install two hard disk drives, you must configure the second drive as a slave device by setting its jumper accordingly. Refer to the hard disk documentation for the jumper settings.

- • Pin 20 on the IDE connectors are removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.

- • Use the 80-conductor IDE cable for Ultra DMA 100/66/33 IDE devices.

SEC_IDE

PIN 1

PRI_IDE
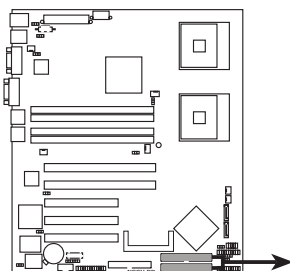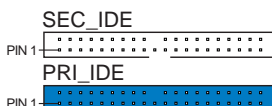
PIN 1

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

NCCH-DR IDE connectors

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

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

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

These connectors are set to **Standard IDE** mode by default. In **Standard IDE** mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the **SATA Mode** item in the BIOS to [RAID]. See page 5-28 and 5-29 for details.

SATA2

GND
RSATA_TXP2
RSATA_TXN2
GND
RSATA_RXN2
RSATA_RXP2
GND

SATA1

GND
RSATA_TXP1
RSATA_TXN1
GND
RSATA_RXN1
RSATA_RXP1
GND
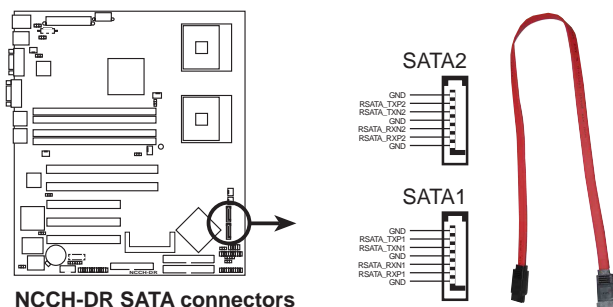
NCCH-DR SATA connectors

Important notes on Serial ATA

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

Serial ATA hard disk drive connection

Connector	Setting	Use
SATA1	Master	Boot disk
SATA2	Slave	Data disk

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

For some storage cards, such as SCSI card, with access signals for external LEDs, this connector allows the access signals to go through the front panel IDE_LED lead.

HDLED1

1

NC
ADD_IN_CARD_ACT#
ADD_IN_CARD_ACT#
NC

NCCH-DR
SCSI/SATA card activity LED connector
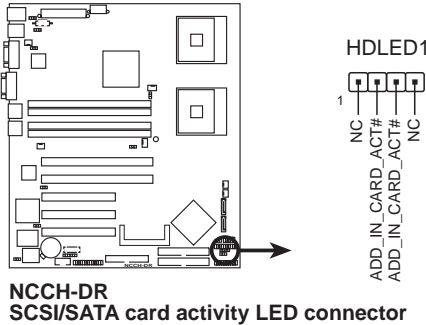
5. CPU and system fan connectors (4-pin CPU_FAN1/2, 3-pin REAR_FAN1/2, FRNT_FAN1/2)

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

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

CPU_FAN1

GND
FANPWR2
Rotation
FANOUT4

CPU_FAN2

FANOUT6
Rotation
FANPWR3
GND

REAR_FAN1

Rotation
+12V
GND

REAR_FAN2

GND
+12V
Rotation

FRNT_FAN1

GND
+12V
Rotation

FRNT_FAN2

GND
+12V
Rotation

NCCH-DR Fan connectors

6. USB port connector (10-1 pin USB34)

This connector is for additional 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.

> ⚠ Never connect a **1394 cable** to the USB connectors. Doing so will damage the motherboard!

NCCH-DR USB 2.0 connector

USB34

USB+5V
USB_P3-
USB_P3+
GND

USB+5V
USB_P4-
USB_P4+
GND
NC

> 🖉 The USB port module is purchased separately.

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

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

COM2

PIN 1

NCCH-DR
Serial port2 (COM2) connector

> 🖉 The serial port module is purchased separately.

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

These connectors are for SSI 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.

- Use of an SSI 12 V Specification 2.0-compliant power supply unit (PSU) that provides a minimum power of 450 W is recommended for a fully-configured system.

- Do not forget to connect the 8-pin ATX +12 V power plug; otherwise, the system will not boot up.

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

- You must install a PSU with a higher power rating if you intend to install additional devices.

NCCH-DR Power connectors
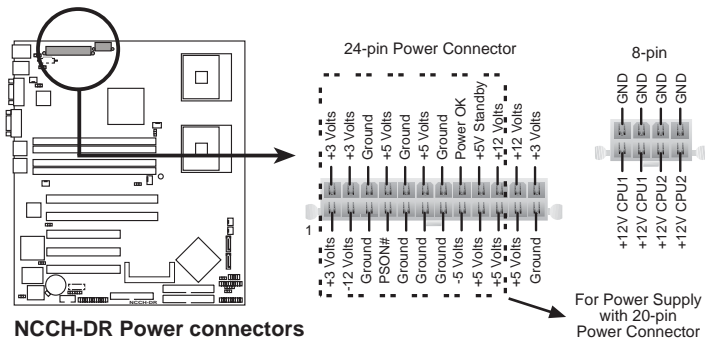
9. Printer port connector (26-1 pin LPT1)

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

LPT1

Pin 1

AFD#
ERROR#
PINIT#
SLIN#
GND
GND
GND
GND
GND
GND
GND
GND
GND

STB#
SPD0
SPD1
SPD2
SPD3
SPD4
SPD5
SPD6
SPD7
ACK#
BUSY
PE
SLCT

NCCH-DR Parallel port connector
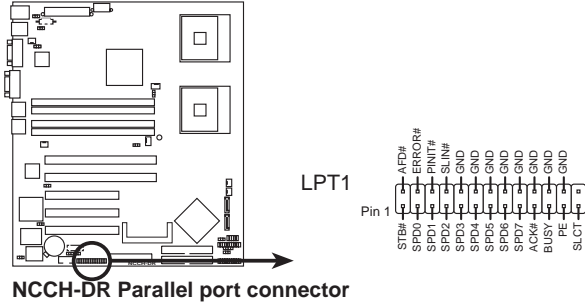
10. BMC connector (16-pin BMCCONN1)

This connector is for the optional ASUS server management card.

BMCCONN1

1

2

+5VSB
+5VSB
BMC_LANCLK#
BMC_SMBCLK#
PSON#
BMC_RSTBTN#
PWROK
PSONEN

+5VSB
+5VSB
BMC_LANDATA#
BMC_SMBDATA#
BMC_PWRBTN#
PRESENCE#
SMIOUT#
GND

NCCH-DR BMC connector
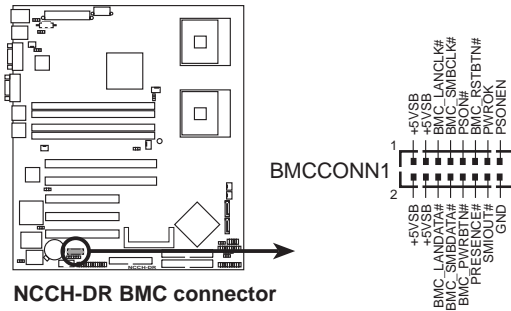
11. Backplane SMBus connector (6-1 pin BPSMB1)

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

BPSMB1

NCCH-DR SMBus connector

FAN_PWM
I2C_6_CLK#
GND
I2C_6_DATA#
+5V
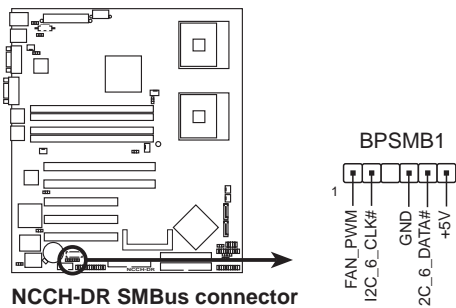
12. Power supply SMBus connector (5-pin PSUSMB1)

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

PSUSMB1

NCCH-DR Power supply SMBus connector

+3.3V Remote Sense
GND
NC
PSU_I2CDATA
PSU_I2CCLK
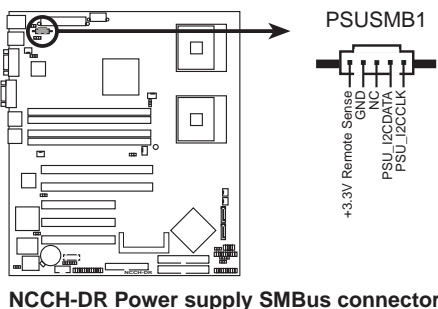
13. Auxilliary panel connector (20-2 pin AUX_PANEL1)

This connector supports several front panel chassis-mounted functions including chassis intrusion, LAN1/LAN2 link and activity LEDs, Locator LED1/2, Locator switch, and front panel System Management bus (SMBus).

AUX_PANEL1
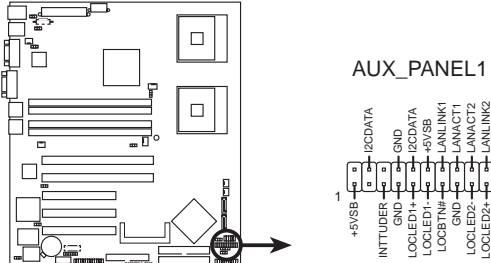
NCCH-DR Auxiliary panel connector

14. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.
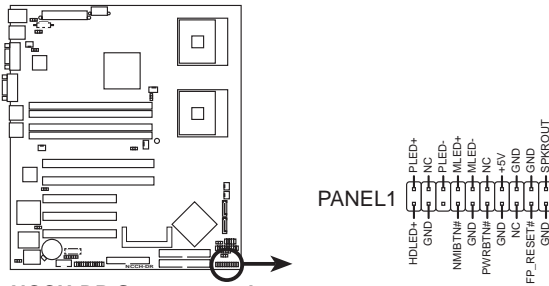
PANEL1

NCCH-DR System panel connector

The sytem panel connector is color-coded for easy connection. Refer to the connector descriptions on the next page for details.

- **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.

- **Message LED (Brown 2-pin MLED)**
  This connector is for the message LED cable that connects to the front panel message LED. The message LED indicates the booting status. The LED blinks when the system is in the boot process until the operating system is loaded.

- **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.

- **Hard disk drive activity LED (Red 2-pin HDD 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.

- **ATX power button/soft-off button (Yellow 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.

- **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.

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

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

Refer to the corresponding sections for details on these utilities.

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

5.1.1 Creating a bootable floppy disk

> This barebone system does not include a floppy disk drive. Connect an external floppy disk drive (USB interface) to any of the USB 2.0 ports on the front or rear panel if you need to use a floppy disk.

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

    a. Insert a 1.44MB floppy disk into the drive.

    b. At the DOS prompt, type `format A:/S` then press <Enter>.
    Windows® XP environment

    a. Insert a 1.44 MB floppy disk to the floppy disk drive.

    b. Click **Start** from the Windows® desktop, then select **My Computer**.

    c. Select the 3 1/2 Floppy Drive icon.

    d. Click **File** from the menu, then select **Format**. A **Format 3 1/2 Floppy Disk** window appears.

    e. **Windows® XP users:** Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.

Windows® 2000 environment

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

a. Insert a formatted, high density 1.44 MB floppy disk into the drive.

b. Insert the Windows® 2000 CD to the optical drive.

c. Click **Start**, then select **Run**.

d. In the **Open** field, type `D:\bootdisk\makeboot a:`

    assuming that D is your optical drive letter.

e. Press <Enter>, then follow screen instructions to continue.

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

5.1.2 AwardBIOS Flash Utility

The Basic Input/Output System (BIOS) can be updated using the AwardBIOS Flash Utility. The following sections tell you how to update the BIOS or how to save the current BIOS file.

Updating the current BIOS file

To update the current BIOS file:

1. Download the latest BIOS file from the ASUS web site. Extract the zipped file, then save it to a floppy disk as ***.BIN**.

> Save only the updated BIOS file in the floppy disk to avoid loading the wrong BIOS file.

2. Copy the AwardBIOS Flash Utility (awdflash.exe) from the Software folder of the support CD to the floppy disk with the latest BIOS file.

3. Boot the system in DOS mode using the bootable floppy disk you created earlier.

4. When the A:> appears, replace the bootable floppy disk with the floppy disk containing the new BIOS file and the Award BIOS Flash Utility.

5. At the prompt, type awdflash then press <Enter>. The Award BIOS Flash Utility screen appears.

```
       AwardBIOS Flash Utility for ASUS V1.05
 (C) Phoenix Technologies Ltd. All Rights Reserved

For Canterwood - NCCH-DRC-00      DATE:  07/14/2004
Flash Type - SST 49LF008A /3.3V

File Name to Program :




Message: Please input File Name!
```

6. Type the BIOS file name in the File Name to Program field, then press <Enter>.

```
        AwardBIOS Flash Utility for ASUS V1.05
    (C) Phoenix Technologies Ltd. All Rights Reserved

For Canterwood - NCCH-DRC-00       DATE:  07/14/2004
Flash Type - SST 49LF008A /3.3V

File Name to Program :  1001.bin




Message: Do You Want To Save BIOS (Y/N)
```

7. The utility prompts you to save the current BIOS file. Press <Y> to save the current BIOS file to the floppy disk, or <N> to continue.

> If you intend to save the current BIOS file, make sure that the floppy disk has enough disk space to save the file. See the next section for details on saving the current BIOS file.

8. The utility verifies the BIOS file in the floppy disk and starts flashing the BIOS file.

> Do not turn off or reset the system during the flashing process!

```
        AwardBIOS Flash Utility for ASUS V1.05
    (C) Phoenix Technologies Ltd. All Rights Reserved

For Canterwood - NCCH-DRC-00       DATE:  07/14/2004
Flash Type - SST 49LF008A /3.3V

File Name to Program :  1001.bin

Program Flashing Memory - 0FE00 OK

    ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓


    Write OK          No Update        Write Fail
   Warning: Don't Turn Off Power Or Reset System!
```

9. After the flashing process is completed, press <F1> to restart your computer.

Copying the current BIOS file

You can use the AwardBIOS Flash Utility to save the current BIOS file. You can load the current BIOS file when the BIOS file gets corrupted during the flashing process.

To save the current BIOS file using the AwardBIOS Flash Utility:

1. Follow steps 1 to 6 of the previous section.
2. Press <Y> when the utility prompts you to save the current BIOS file. The following screen appears.

```
        AwardBIOS Flash Utility for ASUS V1.05
   (C) Phoenix Technologies Ltd. All Rights Reserved

For Canterwood - NCCH-DRC-00      DATE:  07/14/2004
Flash Type - SST 49LF008A /3.3V

File Name to Program : 1001.bin

Save current BIOS as :




Message:
```

3. Type a filename for the current BIOS file in the Save current BIOS as field, then press <Enter>.

```
        AwardBIOS Flash Utility for ASUS V1.05
   (C) Phoenix Technologies Ltd. All Rights Reserved

For Canterwood - NCCH-DRC-00      DATE:  07/14/2004
Flash Type - SST 49LF008A /3.3V

File Name to Program : 1001.bin
           Checksum : 0E00
Save current BIOS as : old.bin




Message: Please Wait!
```

4. The utility saves the current BIOS file to the floppy disk, then returns to the BIOS flashing process.

```
        AwardBIOS Flash Utility for ASUS V1.05
 (C) Phoenix Technologies Ltd. All Rights Reserved

For Canterwood - NCCH-DRC-00      DATE:   07/14/2004
Flash Type - SST 49LF008A /3.3V

File Name to Program : 1001.bin
                 Now Backup System BIOS to
                           File!



Message: Please Wait!
```
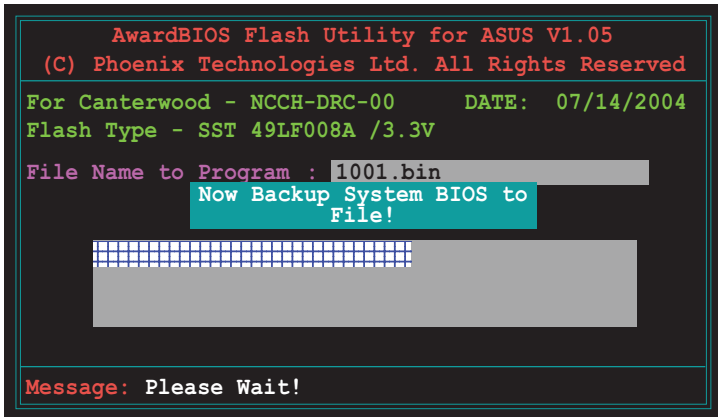
5.1.3 ASUS CrashFree BIOS 2 utility

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 floppy disk that contains the updated BIOS file and the AwardBIOS Flash Utility or the motherboard support CD.

> Prepare the floppy disk containing the updated motherboard BIOS and the AwardBIOS Flash Utility or the motherboard support CD before using this utility.

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

1. Turn on the system, then insert the bootable floppy disk to the floppy disk drive. The following screen appears when the BIOS file is corrupted.

```
Award BootBlock BIOS v.1.0
Copyright (c) 2000, Award Software, Inc.

BIOS ROM checksum error

Detecting IDE ATAPI device...
   Found CD-ROM, try to Boot from it ... Fail

Detecting floppy drive A media ....
INSERT SYSTEM DISK AND PRESS ENTER_
```

2. Press <Enter>. When the A:> appears, replace the bootable floppy disk with the floppy disk containing the new BIOS file and the Award BIOS Flash Utility.

3. At the prompt, type awdflash then press <Enter>. The Award BIOS Flash Utility screen appears.

```
        AwardBIOS Flash Utility for ASUS V1.05
  (C) Phoenix Technologies Ltd. All Rights Reserved

For Canterwood - NCCH-DRC-00      DATE:   07/14/2004
Flash Type - SST 49LF008A /3.3V

File Name to Program :




Message: Please input File Name!
```

4. Update the BIOS file following the instructions on the section "AwardBIOS Flash Utility".

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

Recovering the BIOS from the support CD

To recover the BIOS from the support CD:

1. Place the motherboard support CD to the optical drive, remove any floppy disk from the floppy disk drive, then restart the system. The following screen appears when the BIOS file is corrupted.

```
Award BootBlock BIOS v.1.0
Copyright (c) 2000, Award Software, Inc.

BIOS ROM checksum error

Detecting IDE ATAPI device...
   Found CD-ROM, try to Boot from it ... Pass

   1. FD 1.44MB  System Type-(00)
Loading FreeDOS  FAT KERNEL GO!
Press any key to boot from CDROM...
```

2. When prompted, press any key to boot from the CD. The CD loads the boot files to the system, then prompts you to recover the BIOS file.

```
The BIOS was corrupted! Do you want to recover (y/n)?
```

3. Press <Y>. The following screen appears.

```
Would you like to FLASH bios now? (y/n)
Yes or No _
```

4. Press <Y>. The AwardBIOS Flash Utility appears.

```
        AwardBIOS Flash Utility for ASUS V1.05
 (C) Phoenix Technologies Ltd. All Rights Reserved

For Canterwood - NCCH-DRC-00     DATE:  07/14/2004
Flash Type - SST 49LF008A /3.3V

File Name to Program :




Message: Please input File Name!
```

The AwardBIOS Flash Utility searches the support CD for the updated BIOS file. When found, the utility automatically updates the BIOS, then restarts the system.

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

5.1.4 ASUS EZ Flash utility

The ASUS EZ Flash feature allows you to update the BIOS without having to go through the long process of booting from a floppy disk and using a DOS-based utility. The EZ Flash utility is built-in the BIOS chip so it is accessible by pressing <Alt> + <F2> during the Power-On Self Tests (POST).

To update the BIOS using EZ Flash:

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

2. Save the BIOS file to a floppy disk, then restart the system.

3. Press <Alt> + <F2> during POST to display the following.

```
   Insert Disk press Enter or Esc to continue POST
```

4. Insert the floppy disk that contains the BIOS file to the floppy disk drive, then press <Enter>. When the correct BIOS file is found, EZ Flash opens the AwardBIOS Flash Utility.

    The AwardBIOS Flash Utility searches the floppy disk for the updated BIOS file. When found, the utility automatically updates the BIOS, then restarts the system.

```
        AwardBIOS Flash Utility for ASUS V1.05
   (C) Phoenix Technologies Ltd. All Rights Reserved
For Canterwood - NCCH-DRC-00       DATE:   07/14/2004
Flash Type - SST 49LF008A /3.3V

File Name to Program :  1001.bin
```

> • Do not shutdown or reset the system while updating the BIOS to prevent system boot failure!
>
> • A "Source File Not Found!" error message appears if the correct BIOS file is not found in the floppy disk.

5.1.5   ASUS Update utility

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

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

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

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

Installing ASUS Update

To install ASUS Update:

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

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

Updating the BIOS through the Internet

To update the BIOS through the Internet:

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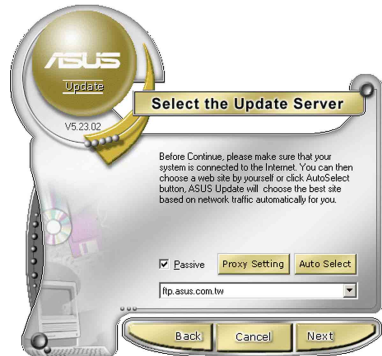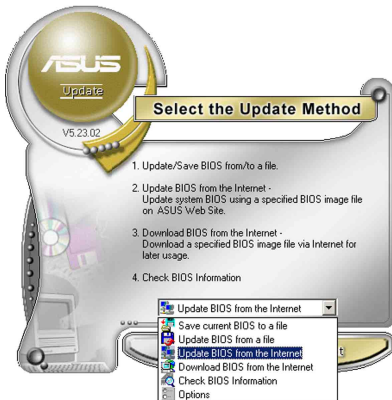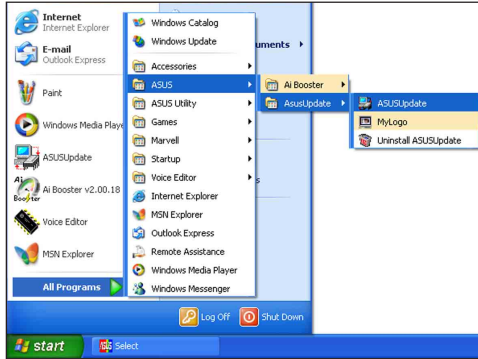
2. Select **Update BIOS from the Internet** option from the drop-down menu, then click **Next**.

3. Select the ASUS FTP site nearest you to avoid network traffic, or click **Auto Select**. Click **Next**.

4.	From the FTP site, select the BIOS version that you wish to download. Click Next.

5.	Follow the screen instructions to complete the update process.

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

Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

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

2.	Select **Update BIOS from a file** option from the drop-down menu, then click **Next**.
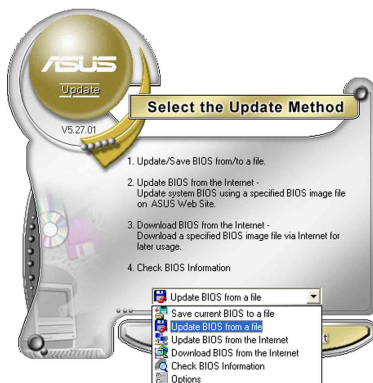
3.	Locate the BIOS file from the **Open** window, then click **Save**.

4.	Follow the screen instructions to complete the update process.

5.2   BIOS Setup program

This motherboard includes a Flash ROM that you can update using the provided utility described in section "4.1 Managing and updating your BIOS."

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

Even if you are not prompted to use the Setup program, you may want to change the configuration of your computer in the future. For example, you may want to enable the security password feature or make changes to 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 Flash ROM.

The Flash ROM 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 <Delete> 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. It is a menu-driven program, which means you can scroll through the various sub-menus and make your selections among the predetermined choices.

Because the BIOS software is constantly being updated, the following BIOS setup screens and descriptions are for reference purposes only, and may not exactly match what you see on your screen.

5.2.1 BIOS menu screen

Menu bar Menu items   General help

```
              Phoenix - Award BIOS CMOS Setup Utility
   Main  Advanced  Power  Boot  Exit

   System Time            11: 10 : 30                 Select Menu
   System Date            Wed, Jul 21 2004
                                               Item Specific Help ▶
   Legacy Diskette A      [1.44M, 3.5 in.]
   Floppy 3 Mode Support  [Disabled]          Change the internal
                                              clock.
 ▶ Primary IDE Master     [None]
 ▶ Primary IDE Slave      [None]
 ▶ Secondary IDE Master   [None]
 ▶ Secondary IDE Slave    [None]
 ▶ Third IDE Master       [None]
 ▶ Fourth IDE Master      [None]

   Base Memory                 640K
   Extended Memory        260096K
   Total Memory           261120K



 F1:Help    ↑↓:Select Item  -/+: Change Value       F5:Setup Defaults
 ESC:Exit   ←→:Select Menu  Enter: Select SubMenu   F10:Save and Exit
```

Navigation keys   Field settings

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 settings

Advanced   For changing the advanced system settings

Power   For changing the power configuration settings

Boot   For changing the system boot configuration settings

Exit   For selecting the exit options and loading default settings

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

5.2.3 Navigation keys

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

✎   The navigation keys differ from one screen to another.

5.2.4 General help

On the right side of the menu screen is a brief description of the selected item.

5.2.5 Sub-menu

An item with a sub-menu on any menu screen is distinguished by a solid triangle before the item. To display the sub-menu, select the item and press <Enter>.

5.2.6 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 **Up/Down arrow keys** or **PageUp/PageDown keys** to display the other items on the screen.

5.2.7 Pop-up window

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

5.3   Main menu

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

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

```
                Phoenix - Award BIOS CMOS Setup Utility
   Main  Advanced  Power  Boot  Exit

   System Time               11: 10 : 30            Select Menu
   System Date               Wed, Jul 21 2004
                                                Item Specific Help ▶
   Legacy Diskette A         [1.44M, 3.5 in.]
   Floppy 3 Mode Support     [Disabled]         Change the internal
                                                clock.
 ▶ Primary IDE Master        [None]
 ▶ Primary IDE Slave         [None]
 ▶ Secondary IDE Master      [None]
 ▶ Secondary IDE Slave       [None]
 ▶ Third IDE Master          [None]
 ▶ Fourth IDE Master         [None]

   Base Memory                  640K
   Extended Memory           260096K
   Total Memory              261120K



 F1:Help    ↑↓:Select Item   -/+: Change Value       F5:Setup Defaults
 ESC:Exit   →←:Select Menu    Enter: Select SubMenu   F10:Save and Exit
```

System Time (hh:mm:ss)

Sets the system to the time that you specify (usually the current time). The format is hour:minute:second. Valid values for hour, minute, and second are Hour: (00 to 23), Minute: (00 to 59), Second: (00 to 59). Use the <Tab> key to move between the hour, minute, and second fields.

System Date (mm:dd:yy)

Sets the system to the date that you specify (usually the current date). The format is month:day:year. Valid values for month, day, and year are Month: (1 to 12), Day: (1 to 31), Year: (1999 to 2099). Use the <Tab> key to move between the month, day, and year fields.

Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed. Configuration options: [Disabled] [360K, 5.25 in.] [1.2M , 5.25 in.] [720K , 3.5 in.] [1.44M, 3.5 in.] [2.88M, 3.5 in.]

Floppy 3 Mode Support [Disabled]

Enables support for older Japanese floppy drives. The Floppy 3 Mode feature allows reading and writing of 1.28 MB (as opposed to 1.44 MB) on a 3.5-inch floppy disk. Configuration options: [Disabled] [Drive A]

Base/Extended/Total Memory [xxxK]

The base memory, extended memory, and total memory values are auto-detected. These fields are not user-configurable.

5.3.1   Primary IDE Master

```
                    Phoenix - Award BIOS CMOS Setup Utility
 ┌ Main
 ├──────────────────────────────────────────────┬──────────────────────────┐
 │         Primary Master                        │       Select Menu        │
 ├──────────────────────────────────────────────┼──────────────────────────┤
 │   Primary IDE Master       [Auto]             │  Item Specific Help ▶    │
 │   Access Mode              [Auto]             │                          │
 │                                               │  Selects the type of     │
 │   Capacity                    0 MB            │  fixed disk connected to │
 │                                               │  the system. 'Manual'    │
 │   Cylinder                    0               │  will let you select the │
 │   Head                        0               │  number of cylinders,    │
 │   Precomp                     0               │  heads, etc.             │
 │   Landing Zone                0               │  Note: PRECOMP=65535     │
 │   Sector                      0               │  means none!             │
 │   PIO Mode                 [Auto]             │                          │
 │   UDMA Mode                [Auto]             │                          │
 │   Transfer Mode             None              │                          │
 │   S.M.A.R.T Status          None              │                          │
 │                                               │                          │
 │                                               │                          │
 │                                               │                          │
 ├──────────────────────────────────────────────┴──────────────────────────┤
 │  F1:Help     ↑↓:Select Item   -/+: Change Value        F5:Setup Defaults │
 │  ESC:Exit    ←→:Select Menu    Enter: Select SubMenu   F10:Save and Exit  │
 └──────────────────────────────────────────────────────────────────────────┘
```

Primary IDE Master [Auto]

Select [Auto] to automatically detect an IDE drive. If automatic detection is successful, the setup BIOS automatically fills in the correct values for the remaining fields on this sub-menu.

If automatic detection fails, this may be because the IDE drive is too old or too new. If the drive was already formatted on a previous system, the BIOS may detect incorrect parameters. In these cases, select [Manual] to manually enter the IDE drive parameters. Refer to the section "Manually detecting an IDE drive."

If no drive is installed or if you are removing a drive and not replacing it, select [None]. Configuration options: [None] [Auto] [Manual]

The IDE drive information items are grayed out when this item is set to [Auto].

Access Mode [Auto]

Allows selection of the sector addressing mode. The default [Auto] allows automatic detection of an IDE drive. Set this item to [CHS] if the **Primary IDE Master** item is set to [Manual] so you can manually enter the drive values. Configuration options: [CHS] [LBA] [Large] [Auto]

PIO Mode [Auto]

Sets the PIO mode for the IDE drive. The settings Mode 0 to 4 allow successive increase in performance. Configuration options: [Auto] [Mode 0] [Mode 1] [Mode 2] [Mode 3] [Mode 4]

UDMA Mode [Auto]

When this item is set to [Auto], the UDMA capability allows improved transfer speeds and data integrity for supported IDE drives. Configuration options: [Disabled] [Auto]

Manually detecting an IDE drive

If you wish to manually enter the drive information, set the Primary IDE Master item to [Manual], and the Access Mode item to [CHS].

```
                Phoenix - Award BIOS CMOS Setup Utility
  Main

                    Primary Master                      Select Menu

   Primary IDE Master         [Manual]        Item Specific Help ▶
   Access Mode                [CHS]
                                              Selects the type of
   Capacity                      0 MB         fixed disk connected to
                                              the system. 'Manual'
   Cylinder                   [     0]        will let you select the
   Head                       [     0]        number of cylinders,
   Precomp                    [     0]        heads, etc.
   Landing Zone               [     0]        Note: PRECOMP=65535
   Sector                     [     0]        means none!
   PIO Mode                   [Auto]
   UDMA Mode                  [Auto]
   Transfer Mode               None
   S.M.A.R.T Status            None



  F1:Help      ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
  ESC:Exit     ←→:Select Menu   Enter: Select SubMenu  F10:Save and Exit
```

> ⚠️ Before attempting to manually configure an IDE drive, make sure that you have the correct configuration information supplied by the drive manufacturer. Incorrect settings may cause the system to fail to recognize the installed IDE drive!

To manually enter the number of cylinder, head, precomp, landing zone, and sector per track for the drive, highlight an item, key-in the value that you obtained from the drive documentation, then press <Enter>. Refer to the drive documentation or the drive label for this information.

To enter a value, you may also highlight the item, then press <Enter> to display a pop-up menu. Type in the value from the drive documentation, then press <Enter>.

Capacity [xxxxx MB]

Displays the auto-detected hard disk capacity. The value is not user-configurable.

Cylinder

Shows the number of the hard disk cylinders.

Head

Shows the number of the hard disk read/write heads.

Precomp

Displays the precompressed volumes on the hard disk, if any, on the motherboard.

Landing Zone

Displays the drive's maximum usable capacity as calculated by the BIOS based on the drive information you entered.

Sector

Shows the number of sectors per track.

Transfer Mode

Shows the data transfer mode if the IDE hard disk drive supports the feature. Otherwise, this item is grayed out and shows the value [None].

S.M.A.R.T. Status

Shows the Smart Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.) status if the IDE hard disk drive supports the feature. Otherwise, this item is grayed out and shows the value [None].

> After entering the IDE hard disk drive information, use a disk utility, such as FDISK, to partition and format new IDE drives. This is necessary so that you can write or read data from the hard disk. Make sure to set the partition of the Primary IDE hard disk drive to "Active."

5.3.2   Primary IDE Slave

When configuring a drive as Primary IDE Slave, refer to section "5.3.1 Primary IDE Master" for the menu item descriptions.

5.3.3   Secondary IDE Master

When configuring a drive as Secondary IDE Master, refer to section "5.3.1 Primary IDE Master" for the menu item descriptions.

5.3.4   Secondary IDE Slave

When configuring a drive as Secondary IDE Slave, refer to section "5.3.1 Primary IDE Master" for the menu item descriptions.

5.4 Advanced menu

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

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

```
                Phoenix - Award BIOS CMOS Setup Utility
  Main  Advanced  Power  Boot  Exit
 ┌──────────────────────────────────────────┬──────────────────────────┐
 │                                           │      Select Menu         │
 │ ▶ Advanced BIOS Features                  │                          │
 │ ▶ CPU Configuration                       │  Item Specific Help ▶    │
 │ ▶ Memory Configuration                    │                          │
 │ ▶ Chipset                                 │  Virus Protection, Boot  │
 │ ▶ Onboard Device                          │  Sequence...             │
 │ ▶ PCIPnP                                  │                          │
 │ ▶ USB Configuration                       │                          │
 │                                           │                          │
 │                                           │                          │
 │                                           │                          │
 │                                           │                          │
 │                                           │                          │
 │                                           │                          │
 │                                           │                          │
 └──────────────────────────────────────────┴──────────────────────────┘
  F1:Help      ↑↓:Select Item    -/+: Change Value        F5:Setup Defaults
  ESC:Exit     →←:Select Menu    Enter: Select SubMenu    F10:Save and Exit
```

5.4.1 Advanced BIOS Features

This menu shows the console redirection and agent information. Select an item then press <Enter> to display a pop-up menu with the configuration options.

```
                   Phoenix - Award BIOS CMOS Setup Utility
     Advanced

            Advanced BIOS Features                      Select Menu

     Console Redirection      [Disabled]       Item Specific Help ▶▶
     Baud Rate                19200
     Agent Address            [Auto]           Enabled - Attempt to
     Agent after boot         [Disabled]       redirect console via COM
                                               port.

                                               Disabled - Attempt to
                                               redirect console when
                                               keyboard is absent.






     F1:Help      ↑↓:Select Item    -/+: Change Value       F5:Setup Defaults
     ESC:Exit     ⇄:Select Menu     Enter: Select SubMenu   F10:Save and Exit
```
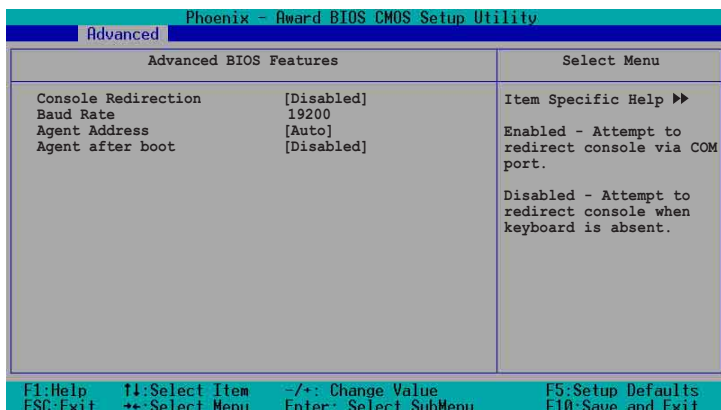
Console Redirection [Disabled]

Allows you to redirect the console through the serial port. when set to [Enabled], the **Baud Rate** option is activated.
Configuration options: [Disabled] [Enabled]

Baud Rate [19200]

Allows you to set the console redirection Baud rate. This item is user-configurable only when the **Console Redirection** option is set to [Enabled]. Configuration options: [9600] [19200] [38400] [57600] [115200]

Agent Address [Auto]

This option allows you to select the agent address.
Configuration options: [3F8h] [2F8h] [3E8h] [2E8h] [Auto]

Agent after boot [Disabled]

This option allows you to enable or disable the agent after boot-up.
Configuration options: [Disabled] [Enabled]

5.4.2 CPU Configuration

This menu shows the CPU configuration settings. Select an item then press <Enter> to display a pop-up menu with the configuration options.

```
                    Phoenix - Award BIOS CMOS Setup Utility
        Advanced

                CPU Configuration                    Select Menu

    CPU L1 & L2 Cache           [Enabled]       Item Specific Help ►►
    Hyper-Threading Technology  [Enabled]
                                                Disable/Enable CPU L1
                                                L2 cache.












    F1:Help    ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
    ESC:Exit   ◄►:Select Menu    Enter: Select SubMenu   F10:Save and Exit
```
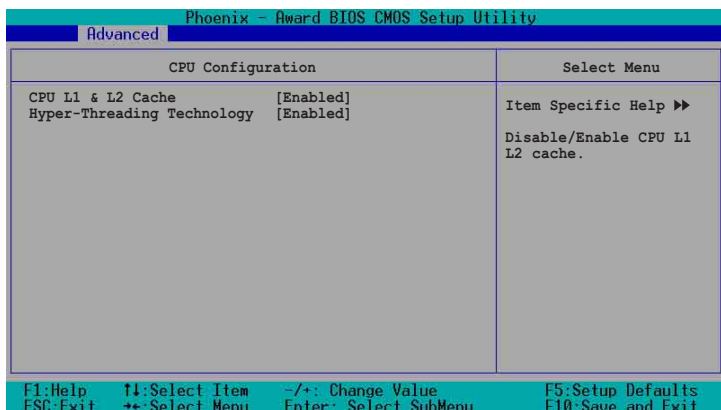
CPU L1 & L2 Cache [Enabled]

Allows you to enable or disable the CPU L1 and L2 cache.
Configuration options: [Disabled] [Enabled]

Hyper-Threading Technology [Enabled]

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

5.4.3 Memory Configuration

This menu shows the memory configuration settings. Select an item then press <Enter> to display a pop-up menu with the configuration options.

```
                 Phoenix - Award BIOS CMOS Setup Utility
    Advanced

              Memory Configuration                  Select Menu

   DRAM Frequency            [Auto]
   Memory Timing Selectable  [By SPD]        Item Specific Help ▶▶
   Cache Latency Time         3
   Active to Precharge Delay  8              Set DRAM Frequency.
   DRAM RAS# to CAS# Delay    4
   DRAM RAS# Precharge        4
   Memory Parity Check        Disabled




   F1:Help    ↑↓:Select Item   -/+: Change Value       F5:Setup Defaults
   ESC:Exit   ←→:Select Menu    Enter: Select SubMenu   F10:Save and Exit
```

DRAM Frequency [Auto]

This item sets the DRAM operating frequency.
Configuration options: [DDR266] [DDR320] [DDR400] [Auto]

Memory Timing Selectable [By SPD]

The DRAM clock are set according to the DRAM SPD (Serial Presence Detect). Select [By SPD] for automatic DRAM clock detection. Select [Manual] to allow setting the succeeding memory items to optimal timings. Configuration options: [Manual] [By SPD]

> The items CAS Latency Time, Active to Precharge Delay, DRAM RAS# to CAS# Delay, and DRAM RAS# Precharge are configurable only when the Memory Timing Selectable item is set to [Manual].

CAS Latency Time [2.5]

This item sets the latency (in clocks) between the DRAM read command and the time the data actually becomes available.
Configuration options: [2] [2.5] [3]

Active to Precharge Delay [7]

This item controls the number of DRAM clocks used for DRAM parameters.
Configuration options: [8] [7] [6] [5]

DRAM RAS# to CAS# Delay [3]

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

DRAM RAS# Precharge [3]

This item controls the idle clocks after issuing a precharge command to the DDR SDRAM. Configuration options: [4] [3] [2]

Memory Parity Check [Enabled]

Allows memory parity checking option. This item is not user-configurable and set to [Enabled] by default.

5.4.4   Chipset

This menu shows the chipset configuration settings. Select an item then press <Enter> to display a sub-menu with additional items, or show a pop-up menu with the configuration options.

```
                  Phoenix - Award BIOS CMOS Setup Utility
         Advanced

                     Chipset                         Select Menu

      System BIOS Cacheable      [Enabled]        Item Specific Help ▶▶
      Video  BIOS Cacheable      [Disabled]
      Init Display First         [PCI VGA Card]   Press <Enter> to enable
      Auto Detect PCI Clk        [Enabled]        or disable BIOS
                                                  cacheable.












      F1:Help    ↑↓:Select Item   -/+: Change Value        F5:Setup Defaults
      ESC:Exit   ←→:Select Menu   Enter: Select SubMenu    F10:Save and Exit
```
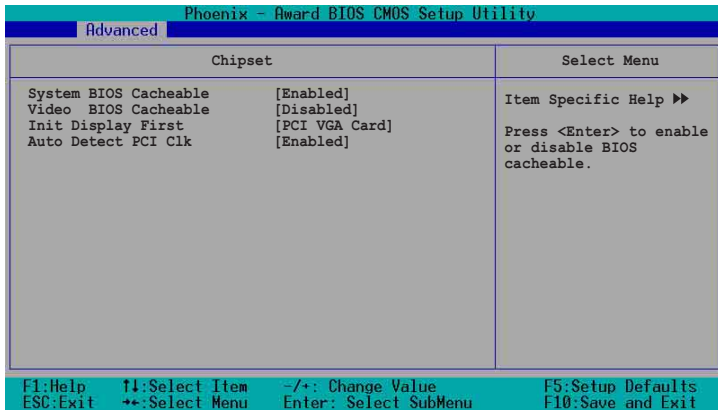
System BIOS Cacheable [Enabled]

Allows you to enable or disable the cache function of the system BIOS. Configuration options: [Disabled] [Enabled]

Video BIOS Cacheable [Disabled]

Allows you to enable or disable the cache function of the video BIOS. Setting to [Enabled] improves the display speed by caching the display data. Configuration options: [Disabled] [Enabled]

Init Display First [PCI VGA Card]

Allows you to select the graphics controller to use as primary boot device. Configuration options: [PCI VGA Card] [Onboard VGA]

Auto Detect PCI Clk [Enabled]

Allows you to select the maximum PCI bus speed to be programmed. Configuration options: [Enabled] [Disabled]

5.4.5 Onboard Device

This menu shows the onboard device configuration settings. Select an item then press <Enter> to display a sub-menu with additional items, or show a pop-up menu with the configuration options.

```
              Phoenix - Award BIOS CMOS Setup Utility
   Advanced
┌─────────────────────────────────────────┬──────────────────────┐
│              Onboard Device              │      Select Menu     │
│                                          │                      │
│   H/W Jumper of CSA LAN      Enabled     │  Item Specific Help ▶▶│
│   Onboard CSA LAN Boot ROM  [Disabled]   │                      │
│   H/W Jumper of ONB LAN      Enabled     │  Enable/Disable Onboard│
│   Onboard LAN Boot ROM      [Disabled]   │  CSA LAN device boot ROM│
│ ▶ Super I/O Device                       │  support.             │
│ ▶ SATA Configuration                     │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
├─────────────────────────────────────────┴──────────────────────┤
│ F1:Help    ↑↓:Select Item   -/+: Change Value     F5:Setup Defaults│
│ ESC:Exit   ←→:Select Menu   Enter: Select SubMenu  F10:Save and Exit│
└─────────────────────────────────────────────────────────────────┘
```
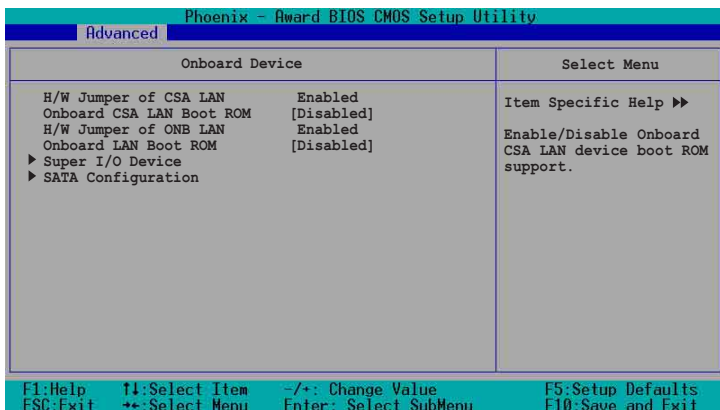
H/W Jumper of CSA LAN [Enabled]

This option tells whether the CSA LAN jumper labeled LAN_EN1 on the motherboard is enabled or disabled. See section "2.6 Jumpers" for details.

Onboard CSA LAN Boot ROM [Disabled]

Allows you to enable or disable the onboard CSA LAN boot ROM. Configuration options: [Disabled] [Enabled]

H/W Jumper of ONB LAN [Enabled]

This option tells whether the onboard LAN jumper labeled LAN_EN2 on the motherboard is enabled or disabled. See section "2.6 Jumpers" for details.

Onboard LAN Boot ROM [Disabled]

Allows you to enable or disable the onboard LAN boot ROM. Configuration options: [Disabled] [Enabled]

Super I/O Device

```
                Phoenix - Award BIOS CMOS Setup Utility
    ┌─Advanced──────────────────────────────────────────────────────────
    │              Super I/O Device                │   Select Menu
    │                                              │
    │  Serial Port1 Address       [3F8/IRQ4]       │ Item Specific Help ▶▶▶
    │  Serial Port2 Address       [2F8/IRQ3]       │
    │  Onboard Parallel Port      [378/IRQ7]       │ Set Base I/O address
    │  Parallel Port Mode         [SPP]            │ for serial port 1.
    │  EPP Mode Select             EPP1.7          │
    │  ECP Mode Use DMA            3               │
    │                                              │
    │                                              │
    │                                              │
    │                                              │
    │                                              │
    │                                              │
    │                                              │
    │                                              │
    │                                              │
    │                                              │
    │                                              │
    │                                              │
    │ F1:Help    ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
    │ ESC:Exit   ←→:Select Menu    Enter: Select SubMenu  F10:Save and Exit
```

Serial Port 1 [3F8/IRQ4]
Serial Port 2 [2F8/IRQ3]

Allow you to select the serial port base addresses.
Configuration options: [Disabled] [3F8/IRQ4] [2F8/IRQ3] [3E8/IRQ4]
[2E8/IRQ3] [Auto]

Onboard Parallel Port [378/IRQ7]

Allows you to select the parellel port base address.
Configuration options: [Disabled] [378/IRQ7] [278/IRQ5] [3BC/IRQ7]

Parallel Port Mode [SPP]

Allows you to select the parallel port mode.
Configuration options: [SPP] [EPP] [ECP] [ECP+EPP] [Normal]

EPP Mode Select [EPP1.7]

Allows you to select the EPP mode. This item becomes configurable only if
the **Parallel Port Mode** is set to [EPP] or [ECP+EPP].|
Configuration options: [EPP 1.9] [EPP 1.7]

ECP Mode Use DMA [3]

Allows you to select the ECP mode. This item becomes configurable only if
the **Parallel Port Mode** is set to [ECP] or [ECP+EPP].
Configuration options: [1] [3]

SATA Configuration

```
                  Phoenix - Award BIOS CMOS Setup Utility
     Advanced

        SATA Configuration                      Select Menu

    *** On-Chip Serial ATA Setting ***      Item Specific Help ▶▶
    On-Chip Serial ATA        [Auto]
    SATA Mode                 IDE           [Disabled]: Disable
    Serial ATA Port0 Mode     SATA0 master  SATA Controller.
    Serial ATA Port1 Mode     SATA1 master  [Auto]: Auto-arrange
                                            the BIOS.
                                            [Combined Mode]: PATA
                                            and SATA are combined.
                                            Max. of 2 IDE drives on
                                            each channel.
                                            [Enhanced Mode]: Enable
                                            both SATA and PATA.
                                            Max. of 6 IDE drives
                                            are supported.
                                            [SATA Only]: SATA is
                                            opeating in legacy
                                            mode.

    F1:Help     ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
    ESC:Exit    ←→:Select Menu    Enter: Select SubMenu  F10:Save and Exit
```

On-Chip Serial ATA Setting

The SATA Mode and Serial ATA Port0 Mode items are configurable only when the On-Chip Serial ATA item is set to [Combined Mode] [Enhanced Mode] or [SATA Only].

On-chip Serial ATA [Auto]

This item allows you to configure your serial ATA devices, if present. Configuration options: [Disabled] [Auto] [Combined Mode] [Enhanced Mode] [SATA Only]

a.   Setting to [Auto] allows BIOS to automatically configure the SATA devices.

b.   Setting to [Combined Mode] allows you to install parallel ATA and serial ATA devices at the same time. You may install **two IDE devices on any of the parallel ATA channels**, and **one IDE device on each serial ATA channel** for a maximum of **four** devices. Use ths option when you installed a legacy operating system like MS-DOS, Windows ME/98/NT4.0.

c.   Setting to [Enhanced Mode] allows you to install parallel ATA and serial ATA devices at the same time, with a maximum of **six** IDE devices on each channel. Use this option when you installed a native operating system like Windows 2000/XP.

d.   Setting to [SATA Only] allows you to install IDE devices on the Serial ATA channels only.

e.   Setting to [Disabled] disables the onboard SATA controller. The RAID feature is also disabled.

SATA Mode [IDE]

When set to [RAID], this item allows configuration of the installed IDE devices into a disk array. Configuration options: [IDE] [RAID]

Serial ATA Port0 Mode [SATA0 master]
Serial ATA Port1 Mode [SATA1 master]

Allow you to set the SATA Port0 and Serial ATA Port1 modes. The options for these items vary depending on the setting of the **On-Chip Serial ATA** item. Configuration options: [Primary Master] [Primary Slave] [Secondary Master] [Secondary Slave] [SATA0 master] SATA1 master]

5.4.6 PCIPnP

This menu shows the PCIPnP configuration settings. Select an item then press <Enter> to display a pop-up menu with the configuration options.

```
              Phoenix - Award BIOS CMOS Setup Utility
   Advanced

             PCIPnP                        Select Menu

  Reset Configuration Data    [Disabled]    Item Specific Help ►►

  Resources Controlled By     [Auto]        Default is Disabled.
  IRQ Resources                             Select Enabled to reset
                                            Extended System
  PCI/VGA Pallete Snoop       [Disabled]    Configuration Data
  INT Pin 1 Assignment        [Auto]        (ESCD) when you exit
  INT Pin 2 Assignment        [Auto]        Setup, if you installed
  INT Pin 3 Assignment        [Auto]        a new add-on card and
  INT Pin 4 Assignment        [Auto]        the system
  INT Pin 5 Assignment        [Auto]        reconfiguration has
  INT Pin 6 Assignment        [Auto]        caused a serious
  INT Pin 7 Assignment        [Auto]        conflict that the OS
  INT Pin 8 Assignment        [Auto]        cannot boot.




  F1:Help    ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
  ESC:Exit   →←:Select Menu    Enter: Select SubMenu   F10:Save and Exit
```

Reset Configuration Data [Disabled]

Allows you to enable or disabled resetting of the Extended System Configuration Data (ESCD) when you exit the Setup. The ESCD includes information on non-PnP devices. Set this item to [Enabled] if you installed an expansion card that conflicts with other devices and cause system boot failure. Configuration options: [Disabled] [Enabled]

Resources Controlled By [Auto]

When set to [Auto(ESCD)], allows BIOS to automatically configure of all boot and Plug and Play devices. When set to [Manual], you can assign the available IRQ Resources to the PCI devices.
Configuration options: [Auto] [Manual]

> When the item **Resources Controlled By** is set to [Auto], the item IRQ Resources is grayed out and not user-configurable. Refer to the section "IRQ Resources" for information on how to enable this item.

PCI/VGA Pallete Snoop [Disabled]

Some non-standard VGA cards, like graphics accelerators or MPEG video cards, may not show colors properly. Setting this field to [Enabled] corrects this problem. If you are using a standard VGA card, leave this field to the default setting [Disabled]. Configuration options: [Disabled] [Enabled]

INT Pin 1~8 Assignment [Auto]

Allows you to select the appropriate interrupt to the specific devices to avoid conflict. Configuration options: [Auto] [3] [4] [5] [7] [9] [10] [11] [12] [14] [15]

IRQ Resources

Set the item **Resources Controlled By** is set to [Manual] to enable the item **IRQ Resources** and assign the interrupts depending on the type of installed PCI device.

```
          Phoenix - Award BIOS CMOS Setup Utility
  Advanced

              PCIPnP                      Select Menu

  Reset Configuration Data    [Disabled]   Item Specific Help ▶▶

  Resources Controlled By     [Manual]     BIOS can automatically
▶ IRQ Resources                            configure all the boot
                                           and Plug and Play
  PCI/VGA Pallete Snoop       [Disabled]   compatible devices. If
  INT Pin 1 Assignment        [Auto]       you choose auto, you
  INT Pin 2 Assignment        [Auto]       cannot select IRQ DMA
  INT Pin 3 Assignment        [Auto]       and memory base address
  INT Pin 4 Assignment        [Auto]       fields, since BIOS
```

```
          Phoenix - Award BIOS CMOS Setup Utility
  Advanced

            IRQ Resources                  Select Menu

  IRQ-3  assigned to      [PCI Device]   Item Specific Help ▶▶▶
  IRQ-4  assigned to      [PCI Device]
  IRQ-5  assigned to      [PCI Device]   Legacy ISA for devices
  IRQ-7  assigned to      [PCI Device]   compliant with the
  IRQ-9  assigned to      [PCI Device]   original PC AT bus
  IRQ-10 assigned to      [PCI Device]   specification, PCI/ISA
  IRQ-11 assigned to      [PCI Device]   PnP for devices
  IRQ-12 assigned to      [PCI Device]   compliant with the Plug
  IRQ-14 assigned to      [PCI Device]   and Play standard
  IRQ-15 assigned to      [PCI Device]   whether designed for PCI
                                         or ISA bus architecture.




  F1:Help    ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
  ESC:Exit   ←→:Select Menu   Enter: Select SubMenu  F10:Save and Exit
```

IRQ-xx assigned to [PCI device]

The IRQ Resources sub-menu is activated when the Resources Controlled by parameter is set to [Manual]. Select [PCI Device] to assign an IRQ address to a Plug and Play device. Setting to [Reserved] reserves the IRQ address. Configuration options: [PCI Device] [Reserved]

5.4.7 USB Configuration

This menu shows the USB configuration settings. Select an item then press
<Enter> to display a pop-up menu with the configuration options.

```
                 Phoenix - Award BIOS CMOS Setup Utility
     Advanced

              USB Configuration                        Select Menu

  USB Controller              [Enabled]       Item Specific Help ▶▶
  USB 2.0 Support             [Enabled]
  USB Legacy Mode Support     [Enabled]       Configures the USB
                                              controller.




  F1:Help    ↑↓:Select Item    -/+: Change Value        F5:Setup Defaults
  ESC:Exit   ←→:Select Menu     Enter: Select SubMenu    F10:Save and Exit
```
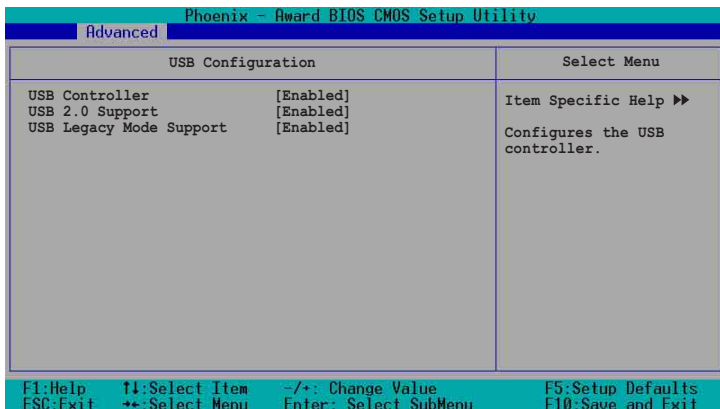
USB Controller [Enabled]

Allows you enable or disable the USB controller.
Configuration options: [Enabled] [Disabled]

USB 2.0 Support [Enabled]

Allows you to enable or disable the EHCI controller. Setting this item to
[Enabled] allows the built-in high speed USB support in the BIOS to turn on
automatically when you install high speed USB devices.
Configuration options: [Enabled] [Disabled]

USB Legacy Mode Support [Enabled]

Allows you enable or disable support for the legacy USB devices.
Configuration options: [Disabled] [Enabled]

5.5   Power menu

The Power menu items allow you to change the settings for the Advanced
Power Management (APM). Select an item then press <Enter> to display
the configuration options.

```
                    Phoenix - Award BIOS CMOS Setup Utility
        Main   Advanced  Power  Boot  Exit

         ACPI APIC Support            [Enabled]              Select Menu
      ▶ APM Configuration
      ▶ Hardware Configuration                       Item Specific Help ▶

                                                     Enable/Disable ACPI
                                                     support for Operating
                                                     System.











         F1:Help     ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
         ESC:Exit    ←→:Select Menu   Enter: Select SubMenu  F10:Save and Exit
```
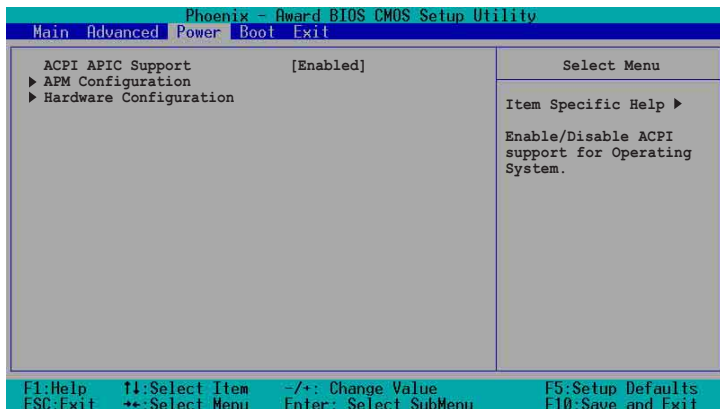
ACPI APIC Support [Enabled]

Allows you to enable or disable the ACPI feature on the operating system.
Configuration options: [Disabled] [Enabled]

5.5.1 APM Configuration

This menu shows the Advanced Power Management (APM) configuration settings. Select an item then press <Enter> to display a pop-up menu with the configuration options.

```
                Phoenix - Award BIOS CMOS Setup Utility
              Power
          APM Configuration                          Select Menu

    Power Management        [User Define]      Item Specific Help ▶▶
    HDD Power Down          [Disabled]
    Suspend Mode           [Disabled]          This field allows you
    Suspend Type           [Stop Grant]        to set the automatic
    Restore on AC Power Loss [Power Off]        power saving features.
    Video Off Method       [DPMS]
    Video Off In Suspend    [Yes]
    MODEM Use IRQ          [3]
    Soft-Off by PWR-BTN     [Instant-Off]
    Power On By PCI Devices [Enabled]
    Power On By External Modem  [Disabled]
    POWER ON Function      [Button Only]
    KB Power On Password    Enter
    Hot Key Power ON        Ctrl-F1
    Resume By Alarm        [Disabled]
     Date (of Month) Alarm    0
     Time (hh:mm:ss) Alarm    0 :  0 :  0


    F1:Help    ↑↓:Select Item   -/+: Change Value     F5:Setup Defaults
    ESC:Exit   ←→:Select Menu   Enter: Select SubMenu  F10:Save and Exit
```

Power Management [User Define]

Allows you to set the automatic power saving features.
Configuration options: [User Define] [Min. Saving] [Max. Saving]

HDD Power Down [Disabled]

Shuts down any IDE hard disk drives in the system after a period of inactivity as set in this user-configurable field. This feature does not affect SCSI hard drives. Configuration options: [Disabled] [1 Min] ... [15 Min]

Suspend Mode [Disabled]

Sets the time period before the system goes into suspend mode.
Configuration options: [Disabled] [1 Min] [2 Min] [4 Min] [8 Min] [12 Min] [20 Min] [30 Min] [40 Min] [1 Hr]

Suspend Type [Stop Grant]

Allows you to select the suspend type.
Configuration options: [Stop Grant] [PwrOn Suspend]

Restore on AC Power Loss [Power Off]

When set to [Power Off], the system goes into "off state" after an AC power interruption. When set to [Power On], the system turns on automatically after an power interruption. When set to [Last State], the system goes into whatever was the system state (on or off) before the power interruption. Configuration options: [Power Off] [Power On] [Last State]

Video Off Method [DPMS]

This item determines the video off features. The Display Power Management System (DPMS) feature allows the BIOS to control the video display card if it supports the DPMS feature. [Blank Screen] only blanks the screen. Use this for monitors without power management or "green" features. Configuration options: [Blank Screen] [V/H SYNC+Blank] [DPMS]

Video Off In Suspend [Yes]

This item determines when to activate the video off feature for monitor power management. Configuration options: [No] [Yes]

MODEM Use IRQ [3]

Allows you to select the IRQ assignment for the modem.
Configuration options: [NA] [3] [4] [5] [7] [9] [10] [11]

Soft-Off by PWR-BTN [Instant-Off]

When set to [Instant-Off], the system goes to soft off when you press the power button for **less** than 4 seconds. When set to [Delay 4 Sec], press the power button for **more** than 4 seconds to power off the system.
Configuration options: [Instant-Off] [Delay 4 Sec.]

Power On By PCI Devices [Enabled]

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

Power On By External Modem [Disabled]

Allows you to enable or disable system power up when the external modem receives a call while in soft-off mode.
Configuration options: [Disabled] [Enabled]

Power On Function [BUTTON ONLY]

Allows you to select a device to turn the system power on.
Configuration options: [Password] [Hot Key] [Any KEY] [BUTTON ONLY] [PS/2 Mouse]

KB Power On Password [Enter]

Allows you to set a password to turn the system power on. Highlight this item then press enter to set a password.

To configure this item, you should set the **Power On Function** item to [Password].

Hot Key Power On [Ctrl-F1]

Allows you to set a hot key combination to turn the system power on. Configuration options: [Ctrl-F1] ... [Ctrl-F12]

> To configure this item, you should set the **Power On Function** item to [Hot Key].

Resume by Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake event. When this item is enabled, you can set the date and time of alarm using the two following items. Configuration options: [Disabled] [Enabled]

Date (of Month) Alarm [0]

To set the date of alarm, highlight this item and press <Enter> to display a pop-up menu. Key-in a value within the specified range then press <Enter>. Configuration options: [Min=0] [Max=31]

Time (hh:mm:ss) Alarm [0 : 0 : 0]

To set the time of alarm:

1. Highlight this item and press <Enter> to display a pop-up menu for the hour field.
2. Key-in a value (Min=0, Max=23), then press <Enter>.
3. Press tab to move to the minutes field, then press <Enter>.
4. Key-in a minute value (Min=0, Max=59), then press <Enter>.
5. Press tab to move to the seconds field, then press <Enter>.
6. Key-in a value (Min=0, Max=59), then press <Enter>.

5.5.2 Hardware Monitor

This menu shows the hardware monitoring status. Select a sub-menu then press <Enter> to display the configuration options.

```
             Phoenix - Award BIOS CMOS Setup Utility
                    Power
 ┌──────────────────────────────────────────────┬─────────────────────┐
 │          Hardware Monitor                     │    Select Menu      │
 │                                               │                     │
 │ ▶ Voltage Monitor                             │ Item Specific Help ▶│
 │ ▶ Smart Q-Fan Configuration                   │                     │
 │   System Temperature          42ºC/107ºF      │ Press Enter to view.│
 │   CPU1 Temperature            56ºC/132ºF      │                     │
 │   CPU2 Temperature            45ºC/113ºF      │                     │
 │   M/B Front Temperature       29ºC/ 84ºF      │                     │
 │   M/B Rear Temperature        36ºC/ 96ºF      │                     │
 │   Front Fan1 Speed               0 RPM        │                     │
 │   CPU   Fan1 Speed            5152 RPM        │                     │
 │   CPU   Fan2 Speed            5100 RPM        │                     │
 │   Front Fan2 Speed               0 RPM        │                     │
 │   Rear  Fan1 Speed               0 RPM        │                     │
 │   Rear  Fan2 Speed               0 RPM        │                     │
 │                                               │                     │
 │                                               │                     │
 ├──────────────────────────────────────────────┴─────────────────────┤
 │ F1:Help    ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults│
 │ ESC:Exit   ←→:Select Menu   Enter: Select SubMenu  F10:Save and Exit│
 └─────────────────────────────────────────────────────────────────────┘
```

Voltage Monitor

```
             Phoenix - Award BIOS CMOS Setup Utility
                    Power
 ┌──────────────────────────────────────────────┬─────────────────────┐
 │           Voltage Monitor                     │    Select Menu      │
 │                                               │                     │
 │   CPU VCORE A (V)             1.48V           │ Item Specific Help ▶│
 │   +3.3V Voltage               3.26V           │                     │
 │   +12V  Voltage              11.79V           │                     │
 │   +1.5V Voltage               1.49V           │                     │
 │   +2.5V Voltage               2.47V           │                     │
 │   +5VCC Voltage               4.99V           │                     │
 │   +5VSB Voltage               4.75V           │                     │
 │   VBAT Voltage                3.10V           │                     │
 │                                               │                     │
 │                                               │                     │
 │                                               │                     │
 │                                               │                     │
 │                                               │                     │
 │                                               │                     │
 │                                               │                     │
 ├──────────────────────────────────────────────┴─────────────────────┤
 │ F1:Help    ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults│
 │ ESC:Exit   ←→:Select Menu   Enter: Select SubMenu  F10:Save and Exit│
 └─────────────────────────────────────────────────────────────────────┘
```

CPU VCORE A, +3.3V Voltage, +12V Voltage, +1.5V Voltage, +2.5V Voltage, +5VCC Voltage, +5VSB Voltage,VBAT Voltage,

These fields show the auto-detected voltages through the onboard voltage regulators.

Smart Q-Fan Configuration

```
                Phoenix - Award BIOS CMOS Setup Utility
                ┌──────┐
                │ Power│
    ┌───────────────────────────────────────┬─────────────────────────┐
    │      Smart Q-Fan Configuration         │      Select Menu         │
    ├───────────────────────────────────────┼─────────────────────────┤
    │   Smart Fan Control        [Disabled]  │   Item Specific Help ►►► │
    │   System Target Temperature    50      │                          │
    │   CPU1 Target Temperature      55      │   Press Enter to enable  │
    │                                        │   or disable the Smart   │
    │                                        │   Fan.                   │
    │                                        │                          │
    │                                        │                          │
    │                                        │                          │
    │                                        │                          │
    │                                        │                          │
    │                                        │                          │
    ├───────────────────────────────────────┴─────────────────────────┤
    │  F1:Help      ↑↓:Select Item   -/+: Change Value    F5:Setup Defaults │
    │  ESC:Exit     ←→:Select Menu   Enter: Select SubMenu F10:Save and Exit │
    └──────────────────────────────────────────────────────────────────┘
```
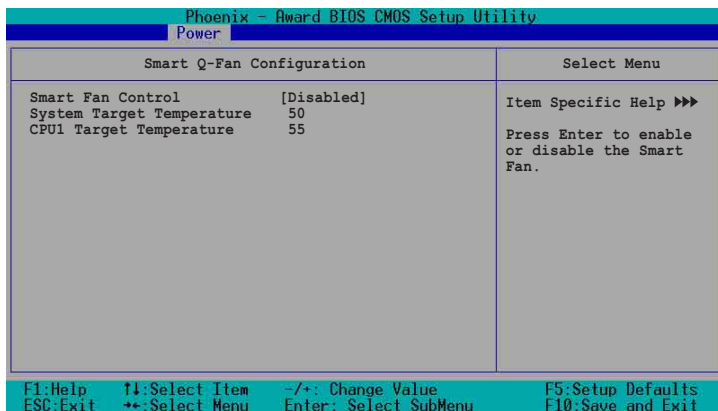
Smart Fan Control [Disabled]

Allows you to enable or disable the Smart Fan feature. This feature smartly
adjusts the CPU/system fan rotations based on the user-assigned
threshold temperature. Configuration options: [Disabled] [Enabled]

System Target Temperature [50]
CPU1 Target Temperature [55]

Allows you to set the threshold temperature at which the Smart Fan
Control feature is enabled.

Use the ASUS Server Web-based Management (ASWM) to obtain the
actual fan RPM (rotations per minute).

5.6 Boot menu

The Boot menu items allow you to change the system boot settings. Select an item then press <Enter> to display a sub-menu with additional items, or show a pop-up menu with the configuration options.

```
                 Phoenix - Award BIOS CMOS Setup Utility
     Main  Advanced  Power  Boot  Exit
  ┌─────────────────────────────────────────────┬──────────────────────┐
  │  ▶ Boot Device Priority                      │      Select Menu     │
  │                                              │                      │
  │  ▶ Hard Disk Boot Priority                   │  Item Specific Help ▶│
  │  ▶ Removable Device Priority                 │                      │
  │  ▶ CD-ROM Boot Priority                      │  Select Boot Device  │
  │                                              │  Priority.           │
  │  ▶ Boot Settings Configuration               │                      │
  │  ▶ Security                                  │                      │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  └─────────────────────────────────────────────┴──────────────────────┘
     F1:Help    ↑↓:Select Item    -/+: Change Value     F5:Setup Defaults
     ESC:Exit   ←→:Select Menu    Enter: Select SubMenu  F10:Save and Exit
```
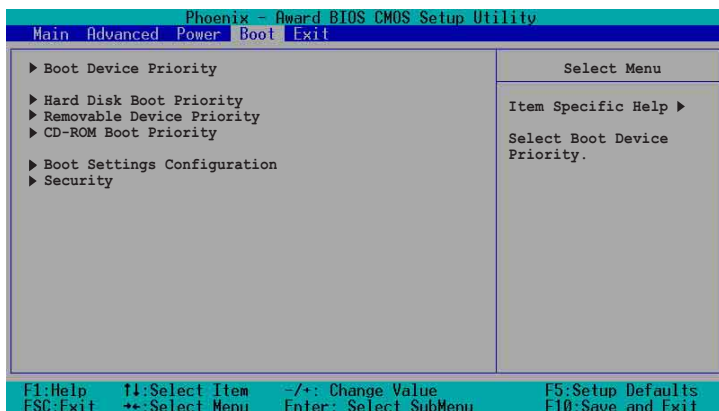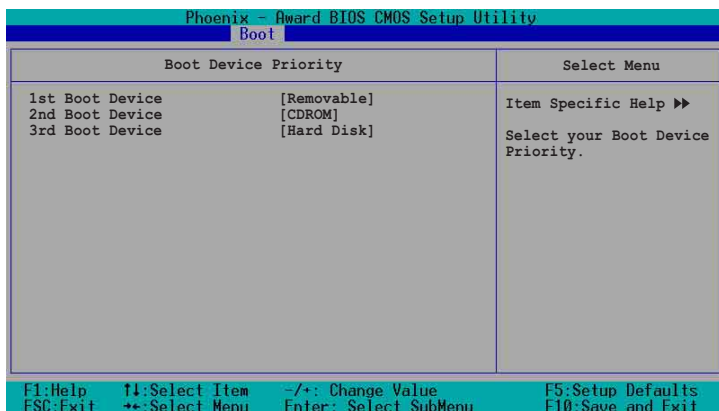
5.6.1 Boot Device Priority

```
                 Phoenix - Award BIOS CMOS Setup Utility
                          Boot
  ┌─────────────────────────────────────────────┬──────────────────────┐
  │       Boot Device Priority                   │      Select Menu     │
  │                                              │                      │
  │   1st Boot Device        [Removable]         │  Item Specific Help ▶▶│
  │   2nd Boot Device        [CDROM]             │                      │
  │   3rd Boot Device        [Hard Disk]         │  Select your Boot Device│
  │                                              │  Priority.           │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  │                                              │                      │
  └─────────────────────────────────────────────┴──────────────────────┘
     F1:Help    ↑↓:Select Item    -/+: Change Value     F5:Setup Defaults
     ESC:Exit   ←→:Select Menu    Enter: Select SubMenu  F10:Save and Exit
```
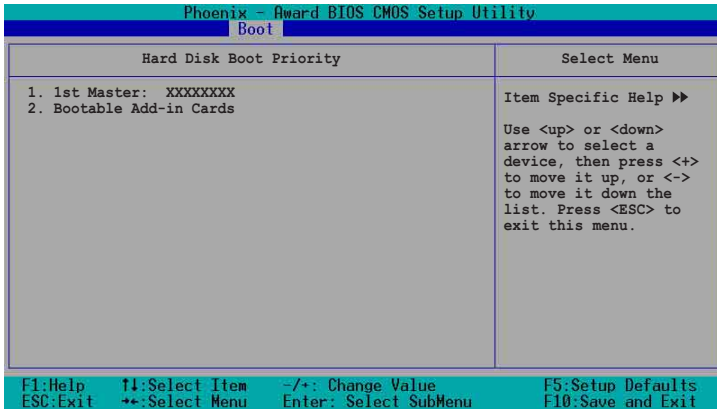
1st Boot Device [Removable]
2nd Boot Device [CDROM]
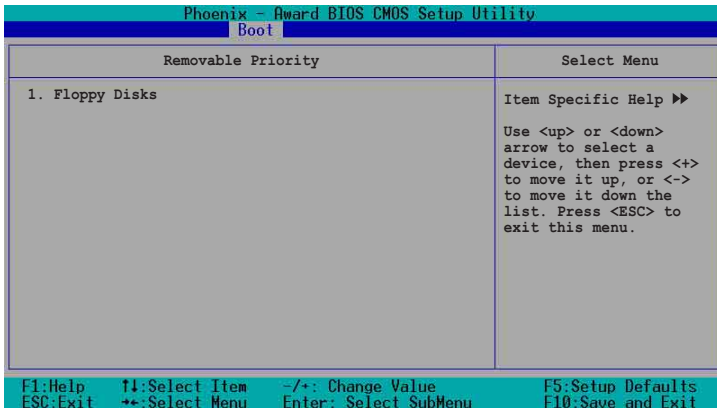### 3rd Boot Device [Hard Disk]

Allows you to select your boot device priority.
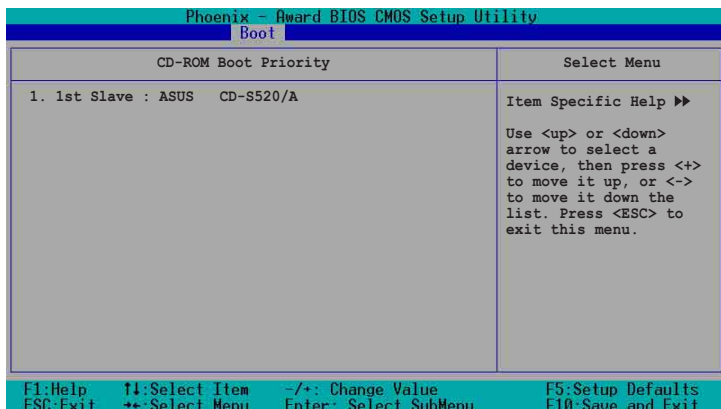Configuration options: [Removable] [Hard Disk] [CDROM] [Legacy LAN] [Disabled]
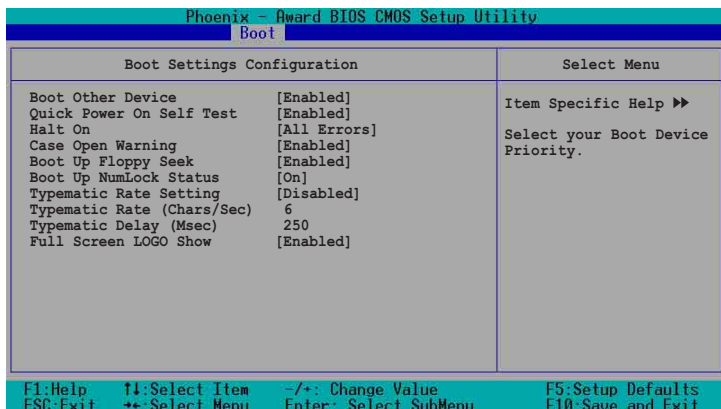
5.6.2 Hard Disk Boot Priority

```
                    Phoenix - Award BIOS CMOS Setup Utility
                                   Boot
┌──────────────────────────────────────────────┬────────────────────────┐
│          Hard Disk Boot Priority              │      Select Menu        │
├──────────────────────────────────────────────┼────────────────────────┤
│  1. 1st Master:  XXXXXXXX                      │  Item Specific Help ▶▶  │
│  2. Bootable Add-in Cards                      │                         │
│                                               │  Use <up> or <down>     │
│                                               │  arrow to select a      │
│                                               │  device, then press <+> │
│                                               │  to move it up, or <->  │
│                                               │  to move it down the    │
│                                               │  list. Press <ESC> to   │
│                                               │  exit this menu.        │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
└──────────────────────────────────────────────┴────────────────────────┘
 F1:Help    ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
 ESC:Exit   ↔:Select Menu    Enter: Select SubMenu   F10:Save and Exit
```

5.6.3 Removable Device Priority

```
                    Phoenix - Award BIOS CMOS Setup Utility
                                   Boot
┌──────────────────────────────────────────────┬────────────────────────┐
│           Removable Priority                  │      Select Menu        │
├──────────────────────────────────────────────┼────────────────────────┤
│  1. Floppy Disks                              │  Item Specific Help ▶▶  │
│                                               │                         │
│                                               │  Use <up> or <down>     │
│                                               │  arrow to select a      │
│                                               │  device, then press <+> │
│                                               │  to move it up, or <->  │
│                                               │  to move it down the    │
│                                               │  list. Press <ESC> to   │
│                                               │  exit this menu.        │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
└──────────────────────────────────────────────┴────────────────────────┘
 F1:Help    ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
 ESC:Exit   ↔:Select Menu    Enter: Select SubMenu   F10:Save and Exit
```

5.6.4   CD-ROM Boot Priority

```
            Phoenix - Award BIOS CMOS Setup Utility
                           Boot
┌─────────────────────────────────────────┬─────────────────────────┐
│         CD-ROM Boot Priority             │      Select Menu        │
├─────────────────────────────────────────┼─────────────────────────┤
│  1. 1st Slave : ASUS   CD-S520/A         │ Item Specific Help ►►   │
│                                          │                         │
│                                          │ Use <up> or <down>      │
│                                          │ arrow to select a       │
│                                          │ device, then press <+>  │
│                                          │ to move it up, or <->   │
│                                          │ to move it down the     │
│                                          │ list. Press <ESC> to    │
│                                          │ exit this menu.         │
│                                          │                         │
│                                          │                         │
│                                          │                         │
│                                          │                         │
│                                          │                         │
└─────────────────────────────────────────┴─────────────────────────┘
  F1:Help    ↑↓:Select Item   -/+: Change Value    F5:Setup Defaults
  ESC:Exit   ←→:Select Menu    Enter: Select SubMenu  F10:Save and Exit
```

5.6.5   Boot Settings Configuration

```
            Phoenix - Award BIOS CMOS Setup Utility
                           Boot
┌─────────────────────────────────────────┬─────────────────────────┐
│        Boot Settings Configuration       │      Select Menu        │
├─────────────────────────────────────────┼─────────────────────────┤
│  Boot Other Device         [Enabled]     │ Item Specific Help ►►   │
│  Quick Power On Self Test   [Enabled]     │                         │
│  Halt On                   [All Errors]  │ Select your Boot Device │
│  Case Open Warning         [Enabled]     │ Priority.               │
│  Boot Up Floppy Seek       [Enabled]     │                         │
│  Boot Up NumLock Status    [On]          │                         │
│  Typematic Rate Setting    [Disabled]    │                         │
│  Typematic Rate (Chars/Sec)  6           │                         │
│  Typematic Delay (Msec)     250          │                         │
│  Full Screen LOGO Show     [Enabled]     │                         │
│                                          │                         │
│                                          │                         │
│                                          │                         │
│                                          │                         │
└─────────────────────────────────────────┴─────────────────────────┘
  F1:Help    ↑↓:Select Item   -/+: Change Value    F5:Setup Defaults
  ESC:Exit   ←→:Select Menu    Enter: Select SubMenu  F10:Save and Exit
```

Boot Other Device [Enabled]

Allows you to enable or disable selection of other boot device.
Configuration options: [Disabled] [Enabled]

Quick Power On Self Test [Enabled]

This field speeds up the Power-On-Self Test (POST) routine by skipping
retesting a second, third, and fourth time. Configuration options: [Disabled]
[Enabled]

Halt On [All Errors]

Sets the system to halt on errors according to the system functions specified in each option. Configuration options: [All Errors] [No Errors] [All, But Keyboard] [All , But Diskette] [All, But Disk/Key]

Case Open Warning [Enabled]

Allows you to enable or disable the case open status feature. Setting to [Enabled] clear the case open status. Configuration options: [Disabled] [Enabled]

Boot Up Floppy Seek [Enabled]

When enabled, the BIOS will seek the floppy disk drive to determine whether the drive has 40 or 80 tracks. Configuration options: [Disabled] [Enabled]

Boot Up NumLock Status [On]

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

Typematic Rate Setting [Disabled]

Allows you to enable or disable the keyboard typematic rate setting. Set to [Enabled] to configure the Type Rate and Type Delay items. Configuration options: [Disabled] [Enabled]

The items **Typematic Rate (Chars/Sec)** and **Typematic Delay** become configurable only when the item Typematic Setting is enabled.

Typematic Rate (Chars/Sec) [6]

Allows you to select the rate at which character repeats when you hold a key. Configuration options: [6] [8] [10] [12] [15] [20] [24] [30]

Typematic Delay (Msec) [250]

Allows you to set the delay before key strokes begin to repeat. Configuration options: [250] [500] [750] [1000]

Full Screen LOGO Show [Enabled]

Setting to [Enabled] displays the logo instead of the POST messages. Setting to [Disabled] displays the normal POST messages. Configuration options: [Disabled] [Enabled]

5.6.6 Security

```
              Phoenix - Award BIOS CMOS Setup Utility
                      Boot

          Security                          Select Menu

    Supervisor Password        Clear        Item Specific Help ▶▶
    User Password              Clear
    Password Check            [Setup]       Supervisor password
                                            control full access.




    F1:Help    ↑↓:Select Item  -/+: Change Value       F5:Setup Defaults
    ESC:Exit   ←→:Select Menu   Enter: Select SubMenu   F10:Save and Exit
```
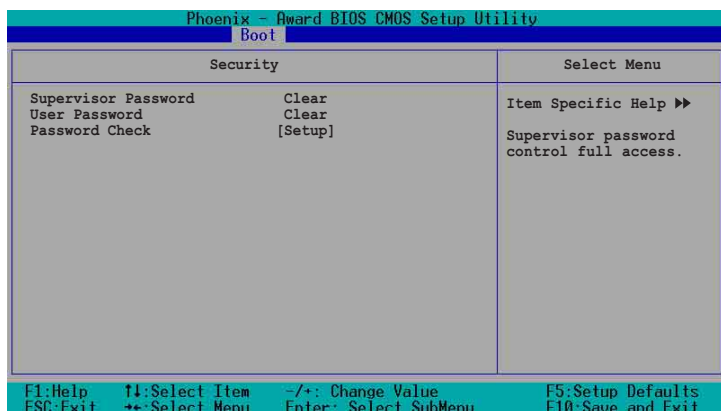
Supervisor Password [Clear]
User Password [Clear]

These fields allow you to set passwords.

To set a password:

1. Highlight an item then press <Enter>.
2. Type in a password using eight (8) alphanumeric characters, then press <Enter>.
3. When prompted, confirm the password by typing the exact characters again, then press <Enter>. The password field setting is changed to [Set].

To clear the password:

1. Highlight the password field, and press <Enter> twice. The following message appears:

    "PASSWORD DISABLED!!! Press any key to continue..."
2. Press any key to return to the menu.

    A note about passwords

    The Supervisor password is required to enter the BIOS Setup program preventing unauthorized access. The User password is required to boot the system preventing unauthorized use.

Forgot the password?

If you forget your password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. The RAM data containing the password information is powered by the onboard button cell battery. If you need to erase the CMOS RAM, refer to section "2.6 Jumpers" for instructions.

Password Check [Setup]

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

5.7 Exit menu

The Exit menu items allow you to load the BIOS setup default settings, save or discard any changes you made, or exit the Setup utility.

```
              Phoenix - Award BIOS CMOS Setup Utility
   Main  Advanced  Power  Boot  Exit

  Exit & Save Changes                        Select Menu
  Exit & Discard Changes
  Load Setup Defaults            Item Specific Help ▶
  Discard Changes
                                 This option saves data
                                 to CMOS before exiting
                                 Setup.


  F1:Help     ↑↓:Select Item   -/+: Change Value      F5:Setup Defaults
  ESC:Exit    ←→:Select Menu   Enter: Select SubMenu  F10:Save and Exit
```
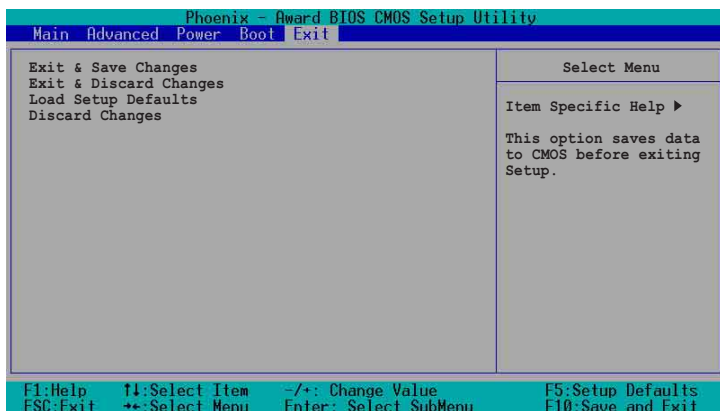
Exit & Save Changes

Select this option then press Enter, or simply press <F10>, to save your changes to CMOS before exiting the Setup utility. When a confirmation window appears, type [Y] to save and exit, or [N] to cancel and return to the menu.

Exit & Discard Changes

Select this option then press Enter if you wish to exit the Setup utility without saving your changes. When a confirmation window appears, type [Y] to exit and discard your changes, or [N] to cancel and return to the menu.

Load Setup Defaults

Select this option then press Enter, or simply press <F5>, to load the optimized values for each of the Setup menu items. When a confirmation window appears, type [Y] to load the default values, or [N] to cancel and return to the menu.

Discard Changes

Select this option to discard the changes that you made, and restore the previously saved values. When a confirmation appears, type [Y] to discard any changes and load the previously saved values, or [N] to cancel and return to the menu.

This chapter provides instructions for creating and configuring RAID, and installing the necessary drivers for different system components.

Driver installation

6.1   RAID

The server system/motherboard comes with the **Adaptec® HostRAID™**
technology embedded in the Intel® 6300ESB Southbridge to support up to
two SATA hard disk drives and RAID 0, 1, and JBOD configurations.

Refer to the RAID definitions below.

6.1.1   RAID configurations

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.

JBOD *(Spanning)* stands for **Just a Bunch of Disks** and refers to hard
disk drives that are not yet configured as a RAID set. This configuration
stores the same data redundantly on multiple disks that appear as a single
disk on the operating system. Spanning does not deliver any advantage
over using separate disks independently and does not provide fault
tolerance or other RAID performance benefits.

> 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 section "2. RAID driver installation" for details.

6.1.2   Installing hard disk drives

The motherboard supports Serial ATA hard disk drives 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 Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set(s). To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Advanced Menu**, select **Onboard device**, then press <Enter>.
3. Select the item **SATA Configuration**, then press <Enter> to display the configuration options.
4. Select **RAID** from the **SATA Mode** options, then press <Enter>.
5. Save your changes, then exit the BIOS Setup.

> Refer to the BIOS setup for details on configuring the BIOS.

6.1.4 RAID configuration utility

You can create a RAID set using the utility embedded in the RAID controller. For example, you can use the **Adaptec RAID Configuration Utility** if you installed SATA hard disk drives on the SATA connectors supported by the Intel® 6300ESB Southbridge.

The Adaptec RAID Configuration Utility allows you to create RAID 0 and RAID 1 set using the SATA hard disk drives connected to the SATA connectors supported by the motherboard Southbridge chip.

To enter the Adaptec RAID Configuration Utility:

1. Turn on the system after installing all the SATA hard disk drives.
2. During POST, the Adaptec HostRAID™ technology automatically detects the installed SATA hard disk drives and displays any existing RAID set(s). Press <Ctrl> <A> to enter the utility.

```
Adaptec Embedded SATA HostRAID BIOS V2.2-1 1237
(c) 1998-2004 Adaptec, Inc. All Rights Reserved.

*** Press <Ctrl><A> for Adaptec RAID Configuration Utility! ***

Controller #00: HostRAID-ICHS   at PCI Bus:00, Dev:1F, Func:02
Loading Configuration...Done.
Port#00 ST380023AS        3.01       74.53 GB Healthy
Port#01 ST380023AS        3.01       74.53 GB Healthy

SATA JBOD- PORT-0   ST380023AS       74.53 GB
SATA JBOD- PORT-1   ST380023AS       74.53 GB

2 JBOD Device(s) Found.
```

3. Use the arrow keys to highlight an option.

The **Array Configuration Utility** menu lets you create and manage RAID sets. The **Disk Utilities** allows you to check and verify SATA hard disk drives.

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

6.1.4.1 Creating a RAID 0 set (Striped)

To create a RAID 0 set:

1. From the Adaptec RAID Configuration Utility initial menu, highlight **Array Configuration Utility**, then press <Enter>.

2. From the Main Menu, select **Create Array**, then press <Enter>.

3. Select the first drive you want to add to the array, then press <Insert>. The selected drive appears in the **Selected Drives** section.

A RAID 0 set requires two identical hard disk drives.

4. When all the drives required for a RAID 0 set appear in the **Selected Drives** field, press <Enter>.
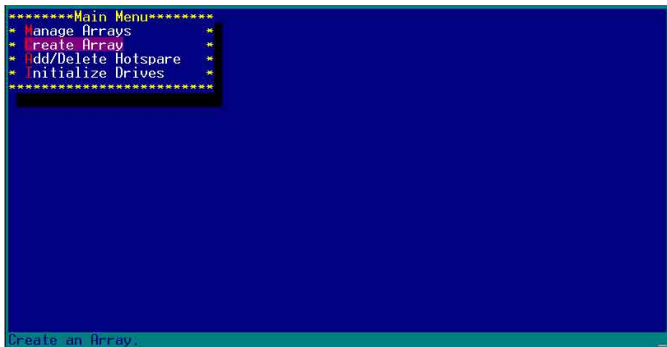
5. A message appears on screen, warning users that initialization will erase all array information on the drives. Press <Y> to proceed or press <N> to abort creating the RAID 0 set.
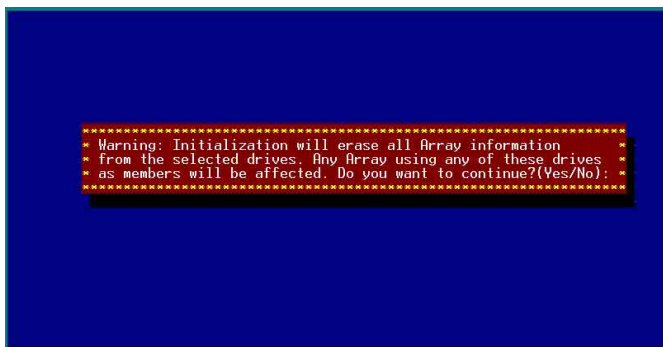
6. After disk initialization, the utility displays the **Array Properties** menu. Select **Array Type** > **RAID 0 (Stripe)**, then press <Enter>.

7. Move the cursor to the **Array Label** option, then type a name for
    the RAID 0 set. Press <Enter> when done.

```
************************Array Properties*********************
*                                                          *
* Array Type          :  RAID 0(Stripe)                    *
*                                                          *
* Array Label         :  6300ESB                           *
*                                                          *
* Array Size          :  149.031 GB                        *
*                                                          *
* Stripe Size         :  64KB                              *
*                                                          *
* Create RAID via     :                                    *
*                                                          *
*                        [Done]                            *
************************************************************


<Tab> Next Field, <Shift+Tab> Previous Field
<Enter> Accept Value, <Esc> Cancel Dialog Box, <F1> Help
```

8. Move the cursor to the **Stripe Size** option, select **64KB** from the
    menu, then press <Enter> to select.

```
************************Array Properties*********************
*                                                          *
* Array Type          :  RAID 0(Stripe)                    *
*                                                          *
* Array Label         :  6300ESB                           *
*                                                          *
* Array Size          :  149.031 GB                        *
*                        ********                          *
* Stripe Size         :  * 16KB *                          *
*                        * 32KB *                          *
* Create RAID via     :  * 64KB *                          *
*                        ********                          *
*                        [Done]                            *
************************************************************


<==> Moves Cursor, <Esc> Cancel Selection, <Enter> Accept Selection,<F1> Help
```

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

9. Move the cursor to the **Create RAID via** option, select **No Init** from the menu, then press <Enter> to select.

```
********************Array Properties********************
*                                                      *
* Array Type        :  RAID 0(Stripe)                  *
*                                                      *
* Array Label       :  6300ESB                         *
*                                                      *
* Array Size        :  149.031 GB                      *
*                                                      *
* Stripe Size       :  64KB                            *
*                      ***************                  *
* Create RAID via   :  * No Init      *                *
*                      * Migrate      *                *
*                      [D***************                *
********************************************************
 *
```
<***> Moves Cursor, <Esc> Cancel Selection, <Enter> Accept Selection.<F1> Help

10. When you have finished setting the array properties, move the cursor to **Done**, then press <Enter> to create the RAID 0 set.

```
********************Array Properties********************
*                                                      *
* Array Type        :  RAID 0(Stripe)                  *
*                                                      *
* Array Label       :  6300ESB                         *
*                                                      *
* Array Size        :  149.031 GB                      *
*                                                      *
* Stripe Size       :  64KB                            *
*                                                      *
* Create RAID via   :  No Init                         *
*                                                      *
*                      [Done]                          *
********************************************************
```
<Tab> Next Field, <Shift+Tab> Previous Field
<Enter> Accept Value, <Esc> Cancel Dialog Box, <F1> Help

11. After you have created the RAID 0 set, the utility main menu appears. Select **Manage Arrays** to display the array, then press <Enter> to view the array properties.

12. The screen displays the array properties. Press <Esc> to return to the previous menu.

6.1.4.2 Creating a RAID 1 set (Mirrored)

To create a RAID 1 set:

1. Follow instructions 1 to 5 of the section "Creating a RAID 0 set (Stripe)."

2. From the **Array Properties** menu, select **Array Type** > **RAID 1 (Mirror)**, then press <Enter>.

3. Move the cursor to the **Array Label** option, then type a name for the RAID 1 set. Press <Enter> when finished.

4. Move the cursor to the **Create RAID via** option, select **Quick Init** from the menu, then press <Enter> to select.

5. When you have finished setting the array properties, move the cursor to **Done**, then press <Enter> to create the RAID 1 set.

6. A message appears on screen informing you that a RAID 1 array created with Quick Init requires you to run a Verify W/FIX on the drives for consistency. Press any key to continue.

7. After you have created the RAID 1 set, the utility main menu appears. Select **Manage Array** to display the created set. Press <Enter> to view the array properties.

8. The screen displays the array properties. Press <Esc> to return to the previous menu.

9. To exit the utility, press <Esc>, highlight **Yes**, then press <Enter>.

6.1.4.3 Creating a bootable RAID set

To create a bootable RAID set:

1. From the main menu, select **Manage Arrays**, then select the RAID set you want to make as bootable.

2. Press <Ctrl> + <B>. A message appears on screen informing you that all other arrays (if available) will become non-bootable. Press <Y> to continue.

The RAID 0 array becomes bootable. An asterisk precedes a bootable array for easy identification.

3. Press <Esc> to return to the previous menu.
4. Exit the utility, then reboot the system.
5. During POST, press <Esc> to select the boot device.

6. Use the up or down arrow to highlight the bootable RAID set (HostRAID#0-#0 6300ESB), then press <Enter> to select. The system boots from the RAID set.

6.1.4.4 Deleting a RAID 0 set

To delete a RAID 0 set:

1. From the array list, select the RAID set you want to delete, then press <Del>. The Array Properties dialog box appears.

2. Move the cursor to **Delete**, then press <Enter> to delete the selected RAID set; otherwise, move the cursor to **Cancel** to close the dialog box.

3. When prompted, press <Y> to delete the RAID set or press <N> to abort the operation.

4. To verify if the array was deleted, select **Manage Arrays** from the main menu. A **No Arrays Present** message pops up on the screen if no array is detected.

6.1.4.5 Deleting a RAID 1 set

To delete a RAID 1 set:

1. From the array list, select the RAID set you want to delete, then press
    <Del>. The Array Properties dialog box appears.

2. Move the cursor to **Delete**, then press <Enter> to delete the
    selected RAID set; otherwise, move the cursor to **Cancel** to close the
    dialog box.
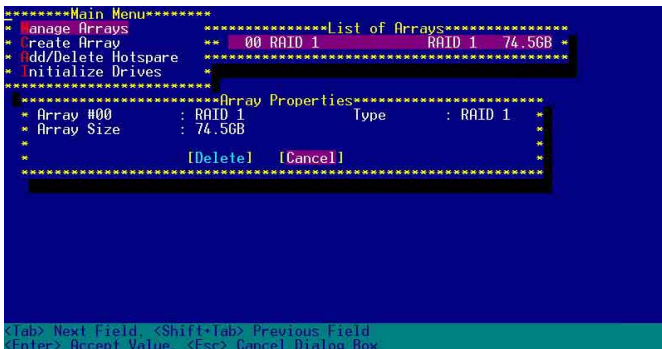
3.   When prompted, press <Y> to delete the RAID set or press <N> to
      abort the operation.

4.   When prompted, use the arrow keys to select either **Member#0** or
      Member#1 to delete a RAID 1 set member. Select **[None]** or
      [Both] if you want to delete the entire array.

5.   To verify if the array was deleted, select **Manage Arrays** from the
      main menu. A **No Arrays Present** message pops up on the screen
      if no array is detected.

6.1.4.6 Rebuilding a RAID set

The utility displays the condition of the RAID set during the POST. When a RAID set is degraded, you can use the utility to rebuild it.

Check the physical connections of the SATA hard disk drives before you rebuild a degraded RAID set. Check the system and motherboard user guide for additional information.

To rebuild a RAID array:

1. Enter the Adaptec RAID Configuration Utility following the instructions in the section "Creating a RAID 0 (Stripe)."
2. Select **Array Configuration Utility** from the initial menu, then press <Enter>.
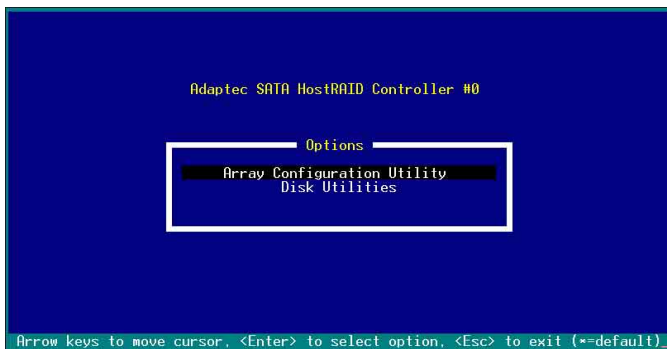
3. From the main menu, highlight Manage Arrays, then press <Enter> to display the installed RAID sets.
4. Highlight the degraded RAID set, then press <Enter> to display the array properties. The **Array Status** shows DEGRADED.

5. Press <Ctrl> + <R> to rebuild the RAID set. The **Array Status** shows the rebuilding progress.

To rebuild the RAID set using the RAID management application in the operating system, press <Esc> while the RAID set is being rebuilt to exit the application. A message pops up for confirmation. Press <Y> to exit.
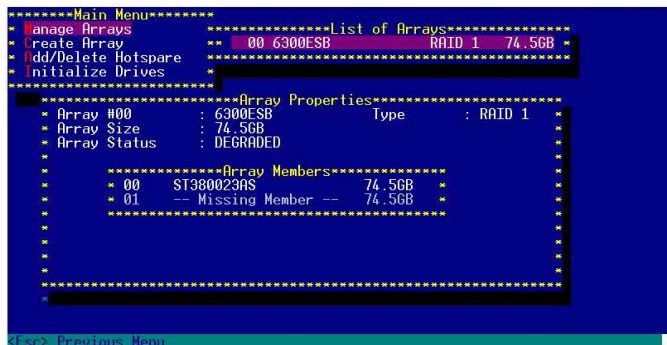
6.1.5 Creating a RAID driver disk

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

6.1.5.1 Windows® 2000/2003 Server

A floppy disk with the RAID driver is required when installing Windows® 2000/2003 Server operating system on a hard disk drive that is assigned to an array.

To create a RAID driver disk from Windows® environment:

1. Place the system or motherboard support CD in the optical drive.
2. When the **Drivers** menu appears, select the RAID driver disk you want to create.

    OR

    Browse the contents of the support CD to locate the driver disk utility. The **Intel® 6300ESB** RAID Driver Disk is located in:

    \Drivers\6300ESB\Windows

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

6.1.5.2 Red Hat® Linux 9.0

To create an **Intel® 6300ESB** Red Hat® Linux 9.0 driver disk:

1. Insert a blank formatted high-density floppy disk to the floppy disk drive.
2. Decompress the file **RH9.0+release+build+16.gz** into the floppy disk from the following path in the support CD:

    \Drivers\6300ESB\Linux

3. Eject the floppy disk.

6.1.6 Installing the Intel® 6300ESB RAID controller driver

6.1.6.1 Windows® 2000/2003 Server OS

During Windows® 2000/2003 Server OS installation

To install the Intel® 6300ESB 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.


```
Windows 2000 Setup
```



```
Press F6 if you need to install a third party SCSI or RAID driver...
```

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


```
Windows 2000 Setup

    Setup could not determine the type of one or more mass storage devices
    installed in your system, or you have chosen to manually specify an adapter.
    Currently, Setup will load support for the following mass storage devices(s):

        <none>

      * To specify additional SCSI adapters, CD-ROM drives, or special
        disk controllers for use with Windows 2000, including those for
        which you have a device support disk from a mass storage device
        manufacturer, press S.

      * If you do not have any device support disks from a mass storage
        device manufacturer, or do not want to specify additional
        mass storage devices for use with Windows 2000, press ENTER.



   S=Specify Additional Device    ENTER=Continue    F3=Exit
```

4. Insert the Intel® 6300ESB RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.

```
Windows 2000 Setup




                      Please insert the disk labeled

                 Manufacturer-supplied hardware support disk

                            into Drive A:

                   *  Press ENTER when ready.







    ENTER=Continue   ESC=Cancel   F3=Exit
```

5. Select the **Adaptec Embedded Serial ATA HostRAID Driver for Windows 2000/XP/2003**, then press <Enter> to select.

```
Windows 2000 Setup

    You have chosen to configure a SCSI Adapter for use with Windows 2000,
    using a device support disk provided by an adapter manufacturer.

    Select the SCSI Adapter you want from the following list, or press ESC
    to return to the previous screen.


    Adaptec Embedded Serial ATA HostRAID Driver For Windows 2000/XP/2003






    ENTER=Select   ESC=Cancel   F3=Exit
```
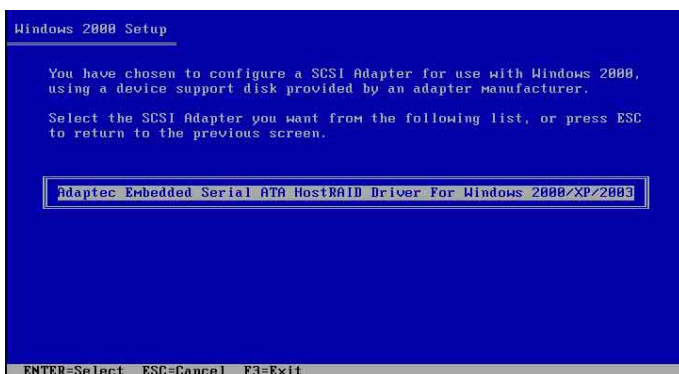
6. The Windows® 2000/2003 Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

To an existing Windows® 2000/2003 Server OS

To install the Intel® 6300ESB RAID controller driver on an existing
Windows® 2000/2003 Server OS:

1. Restart the computer, then log in with **Administrator** privileges.

2. Windows® automatically detects the RAID controller and displays a
    New Hardware Found window. Click **Cancel**.

3. Right-click the **My Computer** icon on the Windows® desktop , then
    select **Properties** from the menu.

4. Click the **Hardware** tab, then click the **Device Manager** button to
    display the list of devices installed in the system.
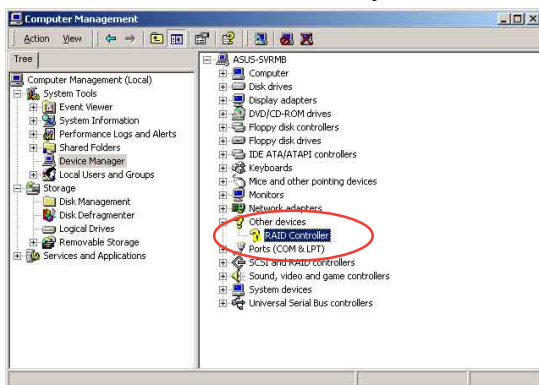
5. Right-click the **RAID controller** item, then select **Properties**.

6. Click the **Driver** tab, then click the **Update Driver** button.

7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.

8. Insert the RAID driver disk you created earlier to the floppy disk drive.

9. Select the option "**Search for a suitable driver for my device
    (recommended)**, then click **Next**.

10. The wizard searches the RAID
    controller drivers. When
    found, click **Next** to install
    the drivers.

11. Click **Finish** after the driver
    installation is done.

To verify the Intel® 6300ESB RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then
    select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **SCSI and RAID controllers**.
    The **Adaptec Embedded Serial ATA HostRAID** item should
    appear.
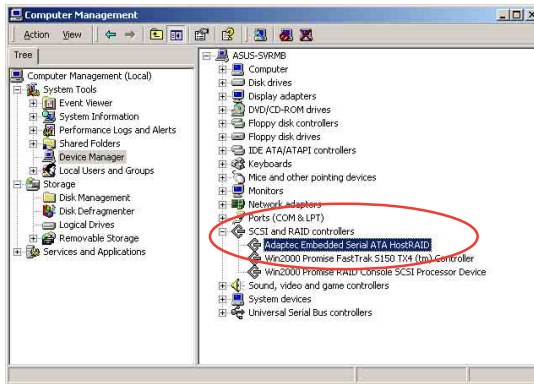
4. Right-click the **Adaptec Embedded**
    Serial ATA HostRAID item, then
    select **Properties** from the menu.
5. Click the **Driver** tab, then click the
    Driver Details button to display the
    RAID controller drivers.
6. Click **OK** when finished.
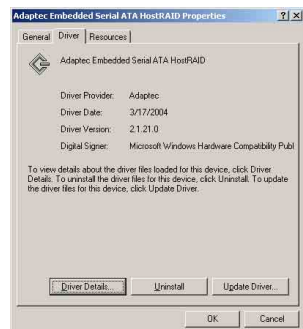
6.1.6.2 Red Hat® Linux 9.0

To install the Intel® 6300ESB RAID controller driver when installing Red Hat® Linux 9.0 OS:

1. Boot the system from the Red Hat® Installation CD.
2. At the **boot:**, type **linux dd** , then press <Enter>.
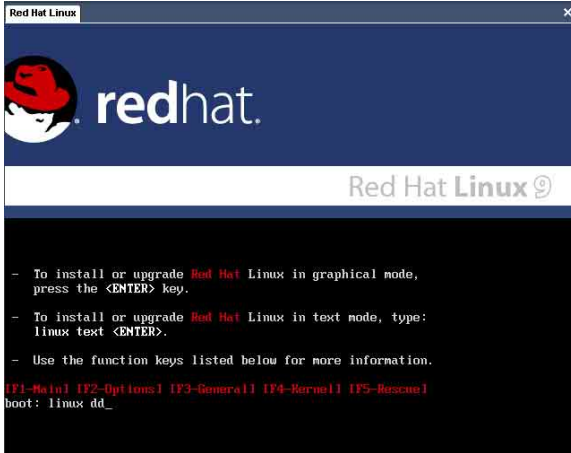
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>
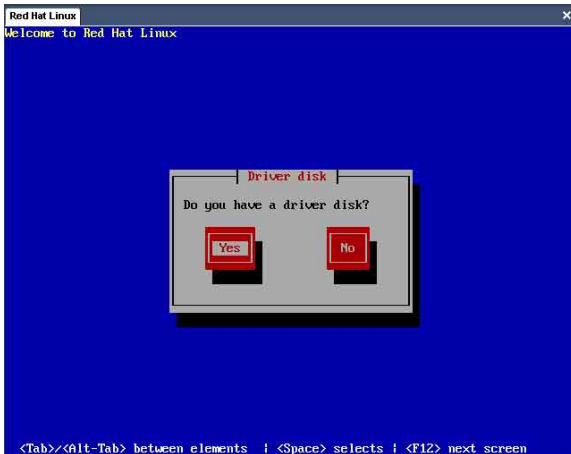
4. Select **fd0** using the <Tab> key when asked to select the driver disk source. Press <Tab> to move the cursor to **OK**, then press <Enter>.
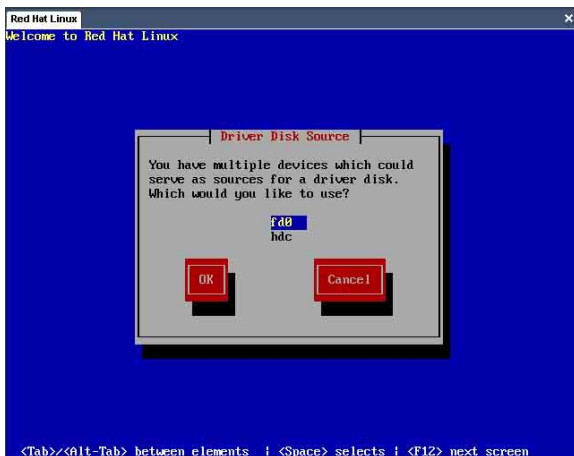
5. When prompted, insert the Intel® 6300ESB Red Hat® Linux 9.0 driver disk to the floppy disk drive, select **OK,** then press <Enter>.
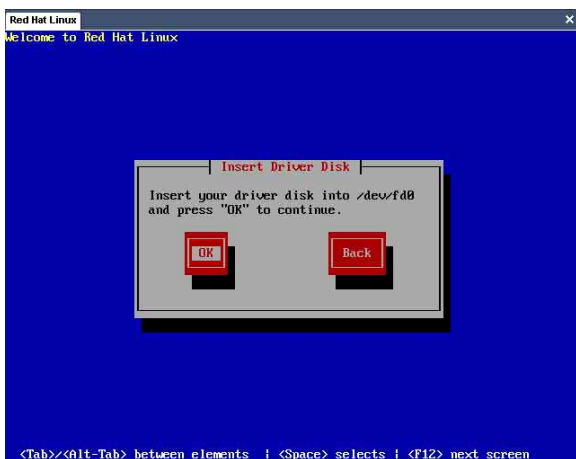
The drivers for the Intel® 6300ESB RAID controller are installed to the system.

6. When asked if you will load additional RAID controller drivers, select **No**, then press <Enter>; otherwise, select **Yes** if you need to install additional RAID controller drivers.
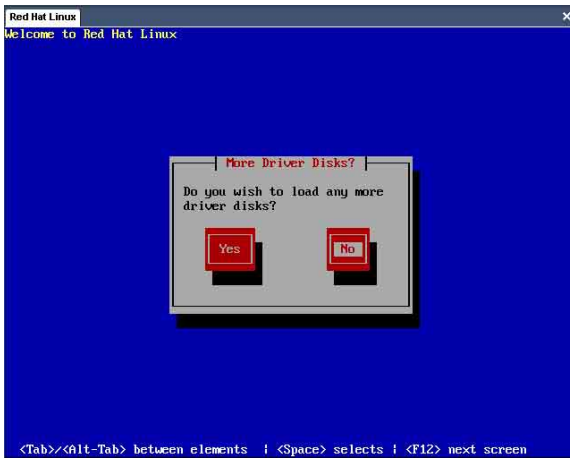
7. Follow screen instructions to continue the OS installation.

6.2   LAN

This section provides instructions on how to install the Intel® 82547GI LAN controller drivers.

6.2.1   Windows® 2000 Server

To install the Intel® 82547GI LAN controller driver on a Windows® 2000 Server OS:

1.   Restart the computer, then log in with **Administrator** privileges.

2.   Insert the motherboard/system support CD to the optical drive, or the LAN controller driver disk to the floppy disk drive.

3.   Windows® automatically detects the LAN controller and displays a **New Hardware Found** window. Click **Cancel**.

4.   Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.

5.   Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.

6.   Right-click the **LAN Controller** item, then select **Properties**.

7.   Click the **Driver** tab, then click the **Update Driver** button.

8.   The **Intel® PRO Network Connections** window appears. Click the **Install Base Drivers** button.

The LAN controller drivers are automatically installed in the system.

To verify the Intel® 82547GI LAN controller driver installation:

1.   Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.

2.   Click the **Hardware** tab, then click the **Device Manager** button.

3.   Click the "+" sign before the item **Network adapters**.
      The **Intel(R) PRO/1000 CT Network Connection** item should appear.
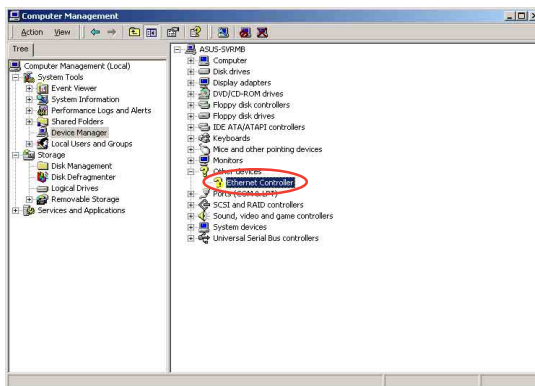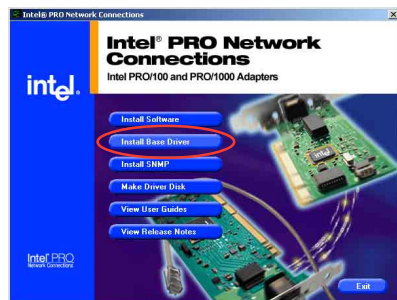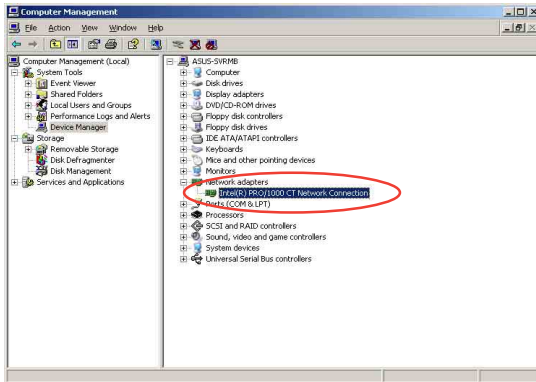

4.   Right-click the **Intel(R) PRO/1000 CT Network Connection** item, then select **Properties** from the menu.

5.   Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.

6.   Click **OK** when finished.

6.2.2 Windows® 2003 Server

To install the Intel® 82547GI LAN controller driver on a Windows® 2003 Server OS:

1. Restart the computer, then log in with **Administrator** privileges.

2. Insert the motherboard/system support CD to the optical drive, or the LAN controller driver disk to the floppy disk drive.

3. Windows® automatically detects the LAN controller and displays a **New Hardware Found** window. Click **Cancel**.

4. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.

5. Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.

6. Right-click the **LAN Controller** item, then select **Properties**.

7. Click the **Driver** tab, then click the **Update Driver** button.

8. The **Hardware Update Device Driver Wizard** window appears. Select the option "**Install the software automatically (Recommended)**, then click **Next**.

9. The **Intel® PRO Network Connections** window appears. Click the **Install Base Drivers** button.
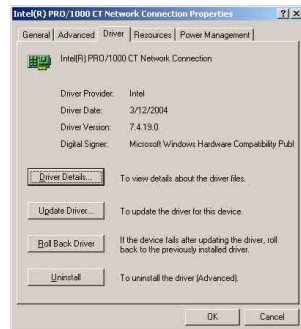

    The LAN controller drivers are automatically installed in the system.

To verify the Intel® 82547GI LAN controller driver installation:

1.   Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.

2.   Click the **Hardware** tab, then click the **Device Manager** button.

3.   Click the "+" sign before the item **Network adapters**.
     The **Intel(R) PRO/1000 CT Network Connection** item should appear.

4.   Right-click the **Intel(R) PRO/1000 CT Network Connection** item, then select **Properties** from the menu.

5.   Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.

6.   Click **OK** when finished.

6.2.3 Red Hat® Linux 9.0

Follow these instructions when installing the Intel® 82547GI LAN controller base driver for the in Red Hat® Linux version 5.2.x operating system. The following procedures were tested for 2.4.x kernels through 2.4.20.

Building and installing the drivers

To build a binary RPM package of this driver, run

```
rpmbuild -tb <filename.tar.gz>
```

Replace <filename.tar.gz> with the specific filename of the driver.

> The currently running kernel must match the version and configuration of the installed kernel sources for the build to work properly, Reboot the system now if you have just recompiled the kernel. The RPM functionality has only been tested in Red Hat® distributions.

1. Move the base driver tar file to the directory of your choice. For example, `use /home/username/e1000 or /usr/local/src/e1000.`

2. Untar or unzip the archive.
    ```
    tar zxf e1000-x.x.x.tar.gz
    ```

3. Change to the driver src directory.
    ```
    cd e1000-x.x.x/src/
    ```

4. Compile the driver module.
    ```
    makenstall
    ```

    The binary is installed as:

    ```
    /lib/modules/[KERNEL_VERSION]/kernel/drivers/net/e1000.o
    ```

    The locations listed above are default install locations and might not be correct for some Linux distributions. For more information, see the ldistrib.txt file included in the driver tar.

5. Install the module.
    ```
    insmod e1000 <parameter>=<value>
    ```

6. Assign an IP address to the interface by entering the following:
    ```
    ifconfig ethx <IP_address>
    ```

    where x is the interface number.

7. To verify if the interface works, enter the following:
    ```
    ping <IP_address>
    ```

    where <IP_address> is the IP address of another system on the same subnet as the system being tested.

6.3 VGA

This section provides instructions on how to install the Intel® E7221 Super Video Graphics Adapter (SVGA) driver.

6.3.1 Windows® 2000 Server

You need to manually install the Intel® E7221 SVGA driver on a Windows® 2000 Server operating system.

To install the Intel® E7221 SVGA driver:

1. Restart the computer, then log on with **Administrator** privileges.

2. Insert the motherboard/system support CD to the optical drive. The support CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

> Windows® automatically detects the VGA controller and displays a **New Hardware Found** window. Click **Cancel** to close this window.

3. Click the item **Intel(R) E7221 Chipset (SVGA)** item from the **Drivers** menu.
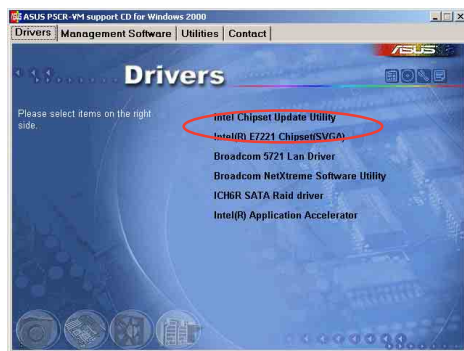
4. The **Intel(R) E7221 Graphics Driver Installer Software** window appears. Click **Next**. Follow screen instructions to complete installation.
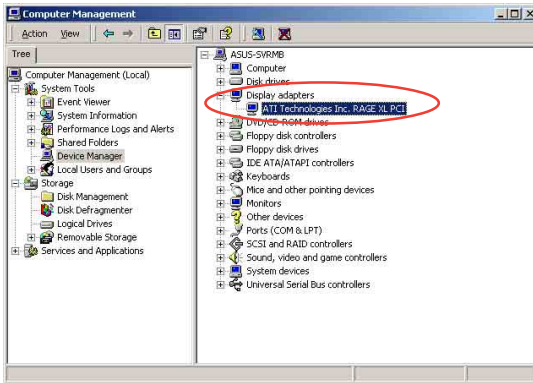
6.3.2 Windows® 2003 Server

The Windows® 2003 Server operating system automatically recognizes the Intel® E7221 SVGA driver during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

Verifying the VGA driver installation

To verify if the Intel® E7221 SVGA driver is properly installed in a Windows® 2000/2003 Server operating system:

1. Right-click the **My Computer** icon on the Windows® desktop, then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **Display adapters**.
   The **Intel® E7221 SVGA XXXXXXX** item should appear.

4. Right-click the **Intel® E7221 SVGA XXXXXXX** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the VGA drivers.
6. Click **OK** when finished.
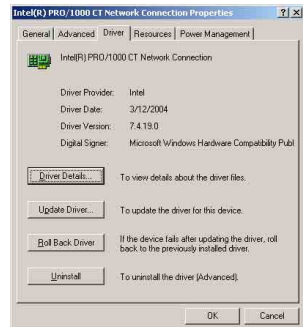
6.3.3 Red Hat® Linux 9.0

The Red Hat® Linux 9.0 (2.4.x kernels) operating system automatically recognizes the Intel® E7221 SVGA driver during system installation. There is no need to install an additional driver(s) to support the onboard VGA.