

# AP8000

Dual Pentium® III Xeon™  
Corporate Server

## Hardware Reference Guide

# User's Notice

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|                  |                  |
|------------------|------------------|
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# FCC & DOC COMPLIANCE

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## ***Federal Communications Commission Statement***

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

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

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

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

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

## ***Canadian Department of Communications Statement***

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

# I. Introduction

You are reading the AP8000 Hardware Reference Guide. This hardware reference guide provides information and procedures on the various components used in this server. Some components shown in this reference guide are optional and may be individually purchased to complete the server. This guide is intended for experienced users and integrators with hardware knowledge of personal computers. You should also read all documentation and manuals included with this server and with your separately purchased components.

## • 1-1. How this Manual is Organized

There are only a few sections in this reference guide as follows:

### I. Introduction

This section gives general information and features for this server.

### II. Components

This is the main section which gives descriptions of each server component.

### III. Getting Started

This section gives information on getting started with the server.

### IV. Hardware Setup

This section gives information on setting up the server.

### V. Appendix

This section gives you additional information to help plan your server.

## Symbols

To complete certain tasks safely and completely, you should be aware of a few symbols used throughout this guide.

 **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:** Information that **MUST** be followed in order to complete a task.

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

 **PHILIP (CROSS) SCREW DRIVER:** Tools required to install or remove the components in this server.

 **STANDARD (FLAT) SCREW DRIVER:** Tools required to install or remove the components in this server.

 **STEP:** Actions to complete a task

# I. Introduction

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## • 1-2. Component Checklist

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If assembling this server by yourself, it is important to prepare all the server components before starting. This will save a great deal of time by not having to hunt down components. The following checklist provides a guideline as to the necessary components for a server.

### Standard components

- Motherboard: XG-DLS
- Chassis: AS-50
- Power Supply: ATX
- Processor (CPU): Pentium® II Xeon™
- Memory Modules: 8, 16, 32, 64, 128, 256, 512MB SDRAM
- Hard Drive: Ultra2, Ultra-wide
- Floppy Drive: 1.44MB
- CD-ROM Drive: 40X
- Expansion Cards: Ethernet, Graphics, Modem
- SCSI Terminator: Terminator for 68-pin SCSI cables
- User's Manuals: CD-ROM, SCSI, Motherboard, Hardware Reference Guide

### Optional components

- Ethernet Card: PCI-L101
- RAID Controller: PCI-DA2100 (UW), PCI-DA2200 (U2), DA-3000 (SCSI-SCSI U2)

# I. Introduction

## • 1-3. Features

AP8000 is a corporate server configured on the XG-DLS smart motherboard which uses the 440GX chipset from Intel and supports two Pentium® III/II Xeon™ processors and 100MHz front side bus in order to handle even the most complicated server tasks. The following are highlights to this server's many features. For additional features and details, read the motherboard User's Manual included with this server package.

- **Processor:** Supports dual Intel® Pentium® III Xeon™ processors (500MHz and faster) and Pentium® II Xeon™ (400MHz to 450MHz) processors for extreme processing speeds.
- **Memory:** Equipped with four DIMM sockets to support up to 2GB SDRAM with ECC.
- **AGP Slot:** Supports Accelerated Graphics Port cards for high performance, component level interconnect targeted at 3D graphical display applications. Using AGP will also free up a PCI slot.
- **Adaptec SCSI Chipset:** Features Adaptec AIC-7896 dual-channel Ultra2 SCSI chipset that supports any combination of 50-pin narrow or 68-pin wide/ultra2 devices through the onboard 50-pin and 68-pin SCSI connectors. Please refer to the SCSI cable limits in the appendix.
- **Device Bays:** Support one floppy, one CD-ROM, two additional fixed devices, and eight hot-swap hard disk drives.
- **SCSI Backplane:** Ultra2 SCSI backplane with remote SCSI ID dip switches and power to support up to 8 Ultra2 SCSI hard disk drives.
- **Onboard LAN:** Onboard Intel 10/100Base-TX Fast Ethernet.
- **Onboard IDE:** Up to 33MB/sec IDE transfer with UltraDMA/33.
- **Onboard Hardware Monitor:** Provides information for system and processor voltages, fan status, temperature, chassis intrusion, and provides automatic system restart.
- **SNMP Agent and Intel LDSM:** Provides server monitoring, management, and control.
- **RAID Controller:** Supports PCI-DA2100 (UW), PCI-DA2200 (U2), or DA3000 (SCSI-SCSI U2) to provide fault tolerant storage.

# I. Introduction

## • 1-4. Safeguards

Observe the following safety instructions any time you are connecting or disconnecting any devices.

### Operation Safety



#### IMPORTANT

- Any operation on this server must be conducted by certified or experienced persons.
- Before operating your 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.
- Before opening the chassis panels, make sure all power cables are unplugged.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.
- If the power supply is broken, do not try to fix it by yourself. Contact an authorized dealer.
- It is recommended that you wear gloves when assembling or disassembling the server to protect from cuts and scrapes.
- When the server is powered on, heat sinks and the surfaces of certain IC devices may be hot. Do not touch them. Check whether the fans are functioning properly.

### Tools Required

A Phillips (cross) screwdriver and a standard (flat) screwdriver are needed to install or remove the components in this server.

# I. Introduction

## • 1-5. Electrical Safety



### IMPORTANT

- 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 those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.



### CAUTION

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

## Static-Sensitive Devices



### IMPORTANT

Motherboards, adapters, and disk drives are sensitive to static electricity discharge. These devices are wrapped in antistatic bags to prevent this damage. Take the following precautions:

- If you have an antistatic wrist strap available, use it while handling the device.
- Do not remove the device from the antistatic bag until you are ready to install the device in the system unit.
- With the device still in its antistatic bag, touch it to a metal frame of the system.
- Grasp cards and boards by the edges. Hold drives by the frame. Avoid touching the solder joints or pins.
- If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before picking it up again, touch the antistatic bag and the metal frame of the system unit at the same time.
- Handle the devices carefully in order to prevent permanent damage.

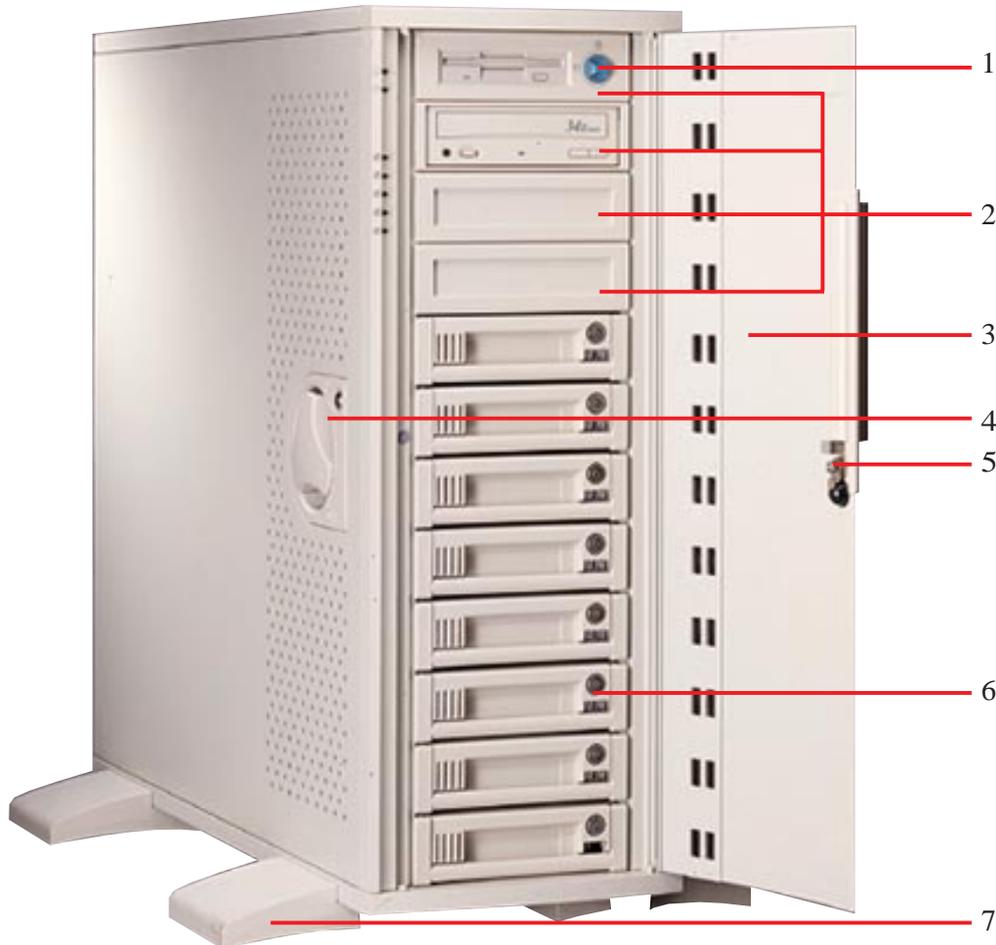
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## II. System Components

### • 2-1. Server Front Side

The front side of the server is provided to show the front exterior components of this server. The chassis is made of strong rust-resistant metal and covered with a protective ivory surfacing.



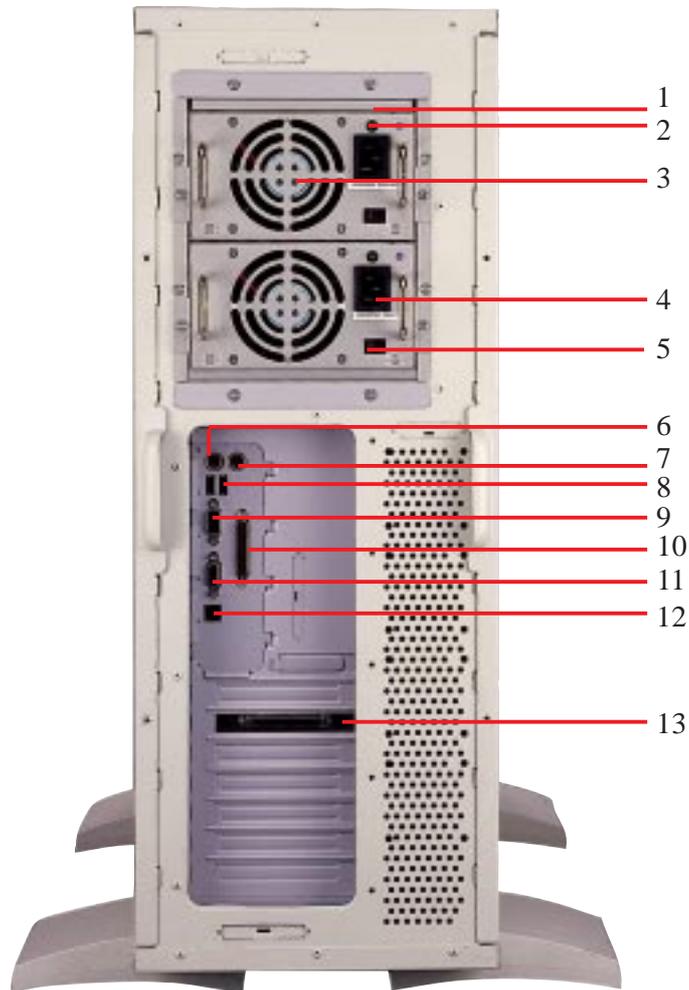
II. Components  
Front Side

1. ATX Power Button
2. Fixed Device Bays
3. Metal Security Door
4. Left Panel Knob
5. Metal Door Lock
6. Hot Swap Tray
7. Chassis Stabilizer with Wheel

*Server Front Side*

## II. System Components

### • 2-2. Server Back Side

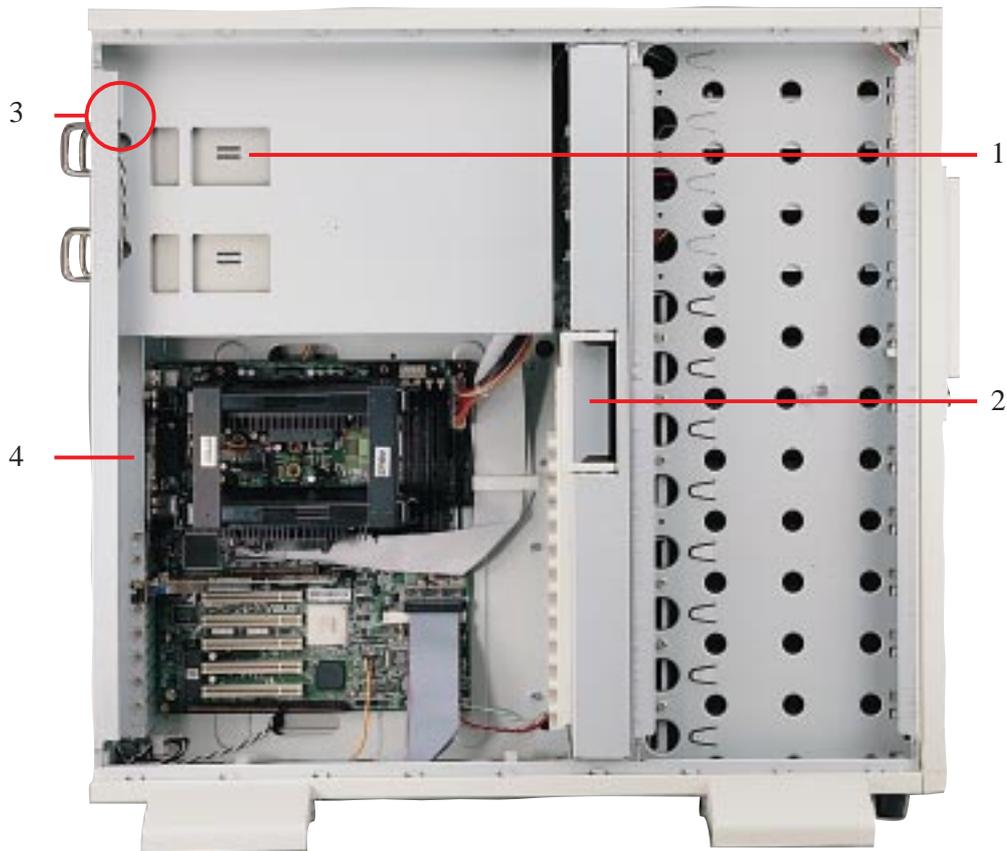


1. Power Supply
2. Power Supply LED
3. Power Supply Fan
4. AC Power In Connector
5. Voltage Input Switch
6. PS/2 Keyboard
7. PS/2 Mouse
8. USB Ports 1 and 2
9. Serial Port COM1
10. Parallel Port
11. Serial Port COM2
12. RJ45 Port (LAN)
13. RAID Controller (Optional)

*Server Back Side*

## II. System Components

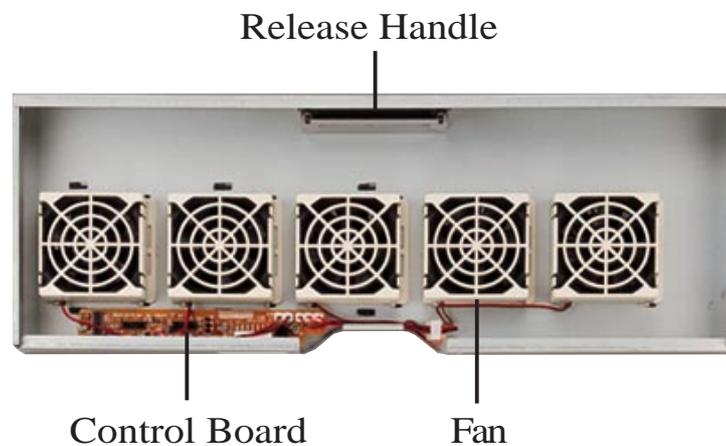
### • 2-3. Server Left Side



II. Components  
Left Side

1. Redundant Power Supply Frame
2. Fan Array Module
3. Chassis Intrusion Switch
4. I/O Device Panel

#### *Server Left Side*



#### *Fan Array Module*

## III. Basic Operation

### • 3-1. Starting the Server

Turn ON the server by turning the power knob clockwise and pushing inwards momentarily. The power button will snap back when released because ATX power systems have an electrical ON/OFF switch unlike AT systems which require a permanent ON or OFF position. If the Power On LED does not light, make sure the power cord is connected to the system unit and to a working grounded outlet.



#### IMPORTANT

The power switch only turns off DC power (power supply output). To turn off AC power (power supply input), you need to unplug the electrical cords from the redundant power supply.



### • 3-2. LED Indicators

The LED indicators are located on the top-left edge of the front panel. The Power LED lights when the motherboard receives power from the power supply. Activity LED lights when there is activity from IDE or SCSI devices connected to the motherboard. Fan #1-5 lights if the corresponding fan stops turning.



*LED Indicators on Front Panel*

### • 3-3. BIOS Setup

This server does not come with any pre-installed software. When booting your server for the first time, make BIOS settings by following the motherboard User's Manual.

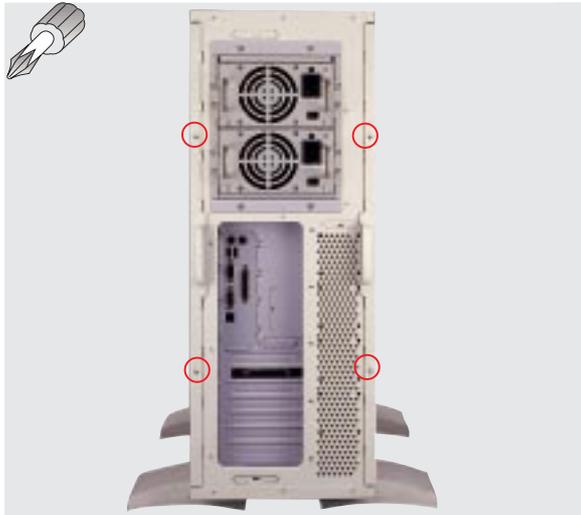


#### NOTE

When installing Windows NT 4.0, use the Windows NT installation disks. Installing from the CD will require you to pre-install SCSI drivers by pressing F6 before setup begins. You may need device drivers on a floppy disk in order to install devices during the Windows NT 4.0 setup. To use the onboard SCSI, you will need to copy Adaptec's SCSI driver (from the provided support CD) onto a floppy disk ("Winnt", "Disk1", "Txtsetup.oem").

# IV. Hardware Setup

## • 4-1. Opening the Chassis



### Chassis Panels

There are two identical side panels on the chassis, one on each side. Each panel is secured by two screws on the back of the server (as circled) and also by a CAM.



### Opening the Left Panel

The CAM has a rotating knob with its own keylock. Turn the knob counterclockwise to release and clockwise to secure. The keylock can be used to keep the knob from being turned by unauthorized people.



### Fan Replacement

The fan array module can be removed by pulling out the handle and using the handle to remove the entire module. The handle must be in the out position to insert the fan module. The individual fans are secured by two clips and two hooks. To release these clips, use a screw driver to push these clips in and then slide the fan out.



**NOTE:** The fan array module may be removed first for easier motherboard installation or removal.

# IV. Hardware Setup

## • 4-2. Motherboard



### Motherboard Spacers

Place four spacers in the areas circled on the chassis.



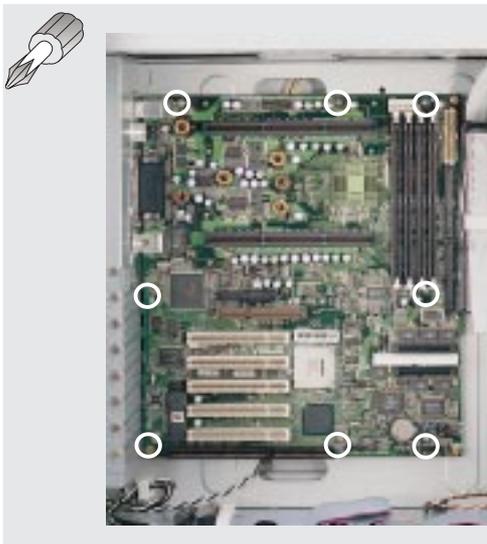
Spacer



### Install the Baseboard

A metal baseboard is required to add stability to the motherboard. A rubber pad is placed between the metal board and motherboard to prevent shorting. Align the rubber pad over the metal baseboard so that the holes match. Align the XG-DLS motherboard over the rubber pad and metal baseboard so that the screws match up with the motherboard's screw holes.

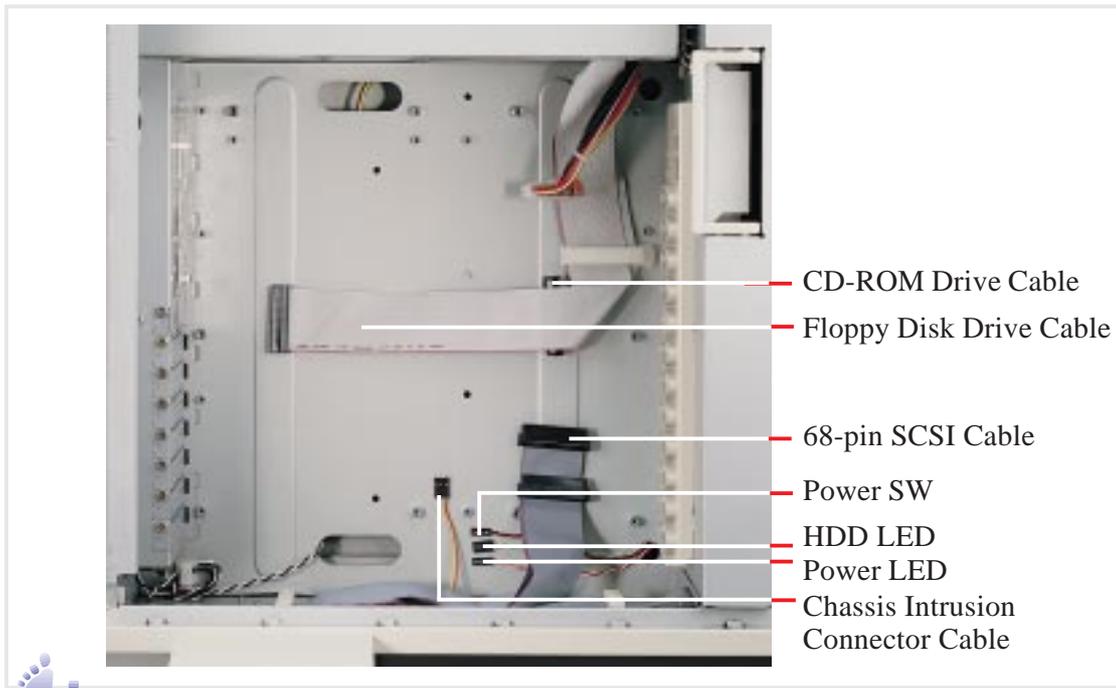
Place and tighten three captive nuts in the corner locations as circled.



### Motherboard Screws

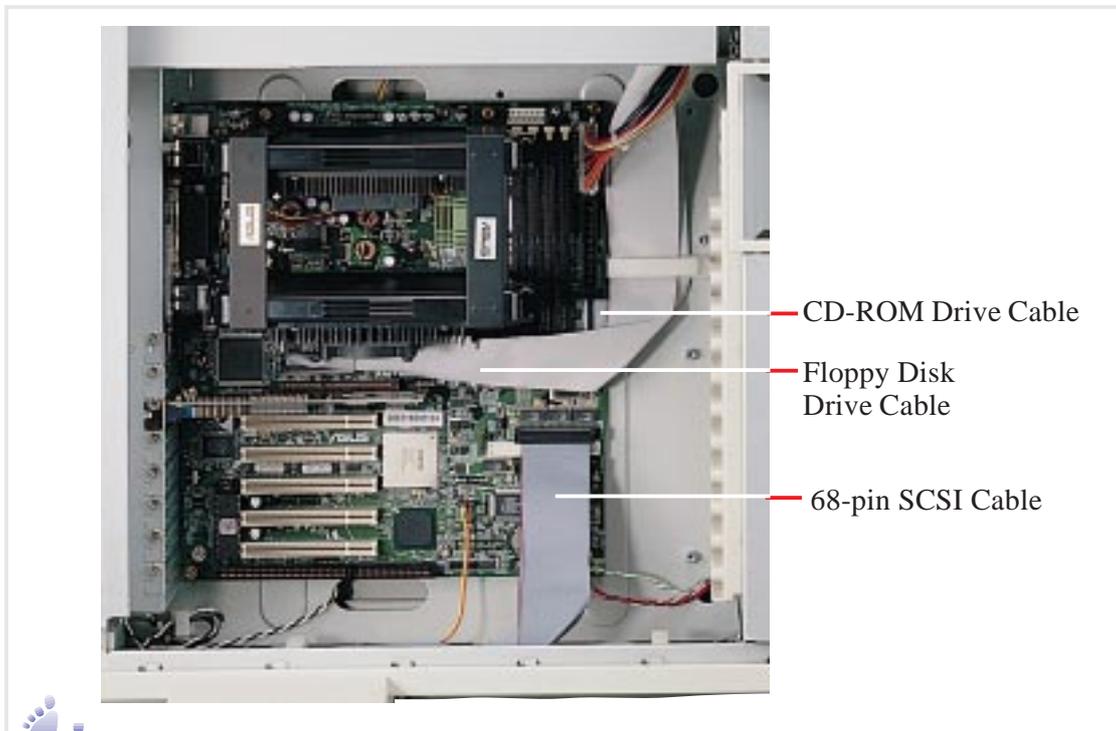
Place eight screws in the areas circled on the motherboard. The four screws used with the motherboard spacers are longer than the others. (See page 20 for samples.) Be careful not to over-tighten the screws. Doing so may damage your motherboard.

# IV. Hardware Setup



## Device Cables

Several cables are used for connecting devices in this chassis. The following picture points out the name of each cable and its suggested location. Plastic keepers protect the cables from contacting with the fans and other devices. Make sure that all cables are properly secured.



## Cable Connections

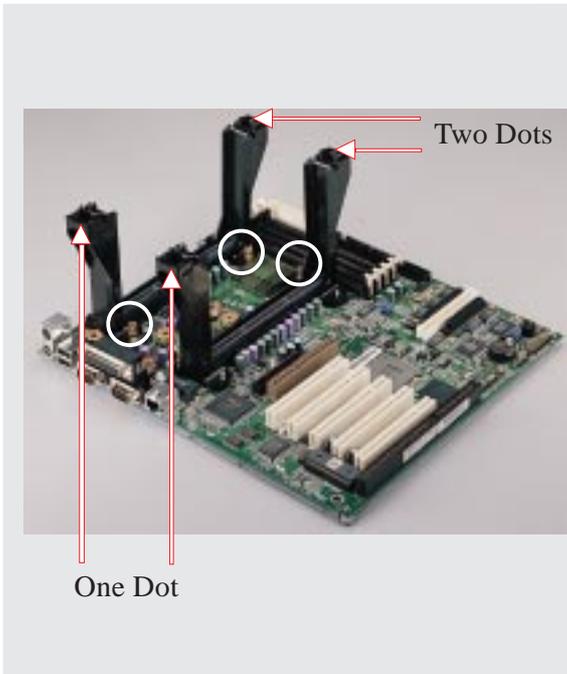
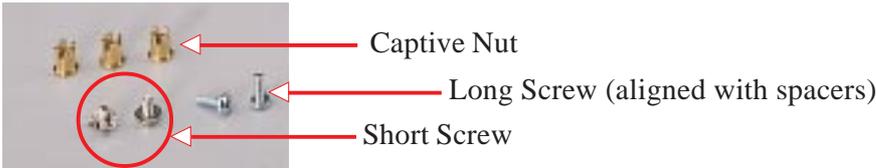
The cables connect to the motherboard as shown. The motherboard includes onboard SCSI with 68-pin and 50-pin SCSI connectors. RAID connections require an optional RAID card.

# IV. Hardware Setup

## • 4-3. Central Processing Unit (CPU)

This server supports two processors which requires one retention mechanism for each processor. Before installing the CPU, secure the motherboard on the rubber pad and metal baseboard. (See page 18.)

When only one processor is used, the other Slot 2 connector must be terminated with the provided front side bus termination module.



### Install Retention Mechanisms

The retention mechanism parts have a left and a right side. The left side has a single dot and the right side has two dots (when holding the motherboard with the ATX connectors to the left). Place the retention mechanisms' holes over the screws and the Slot2. Screw four captive nuts onto the inner screws (3 circled in the picture). Do not place the other captive nuts yet.



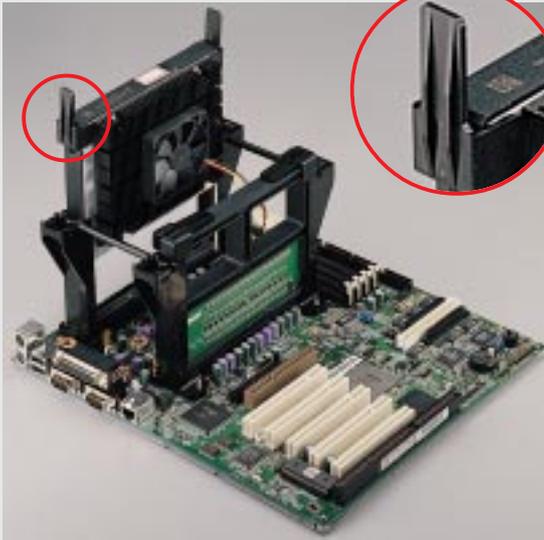
### Install Retention Mechanism Brace Bars

Place the retention mechanism brace bar into the groove on the top of the retention mechanism as shown.



Retention Mechanism Brace Bar

# IV. Hardware Setup

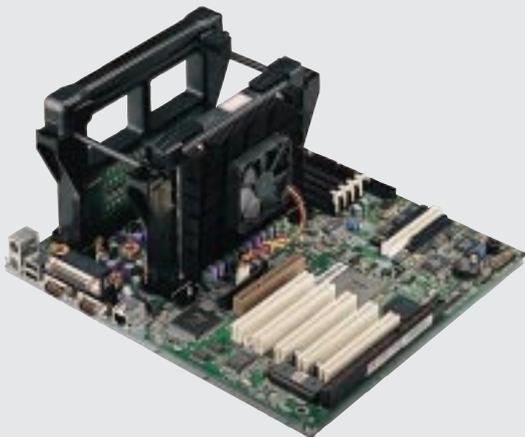


## Install Cartridge Lifters

Each Xeon processor requires two lifters in order to allow safe removal of the processor. The lifters clamp onto the top holes on the cartridge corners.

There is a left and a right side for the lifters. The left side has a single dot and the right side has two dots (when holding the motherboard with the ATX connectors to the left).

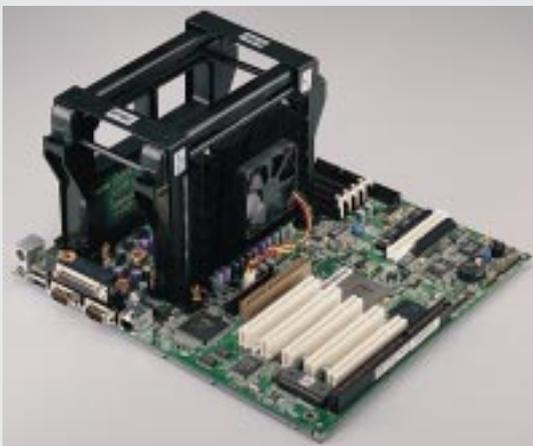
Single Dot 



## Install Retention Mechanism Cap

The cap must first be installed from the left side (with the ATX connectors to the left). The left side has one dot, while the right side has two dots.

The right end of the cap enters the retention mechanism and a click is heard as it snaps into place.



## Install Retention Mechanism Frame

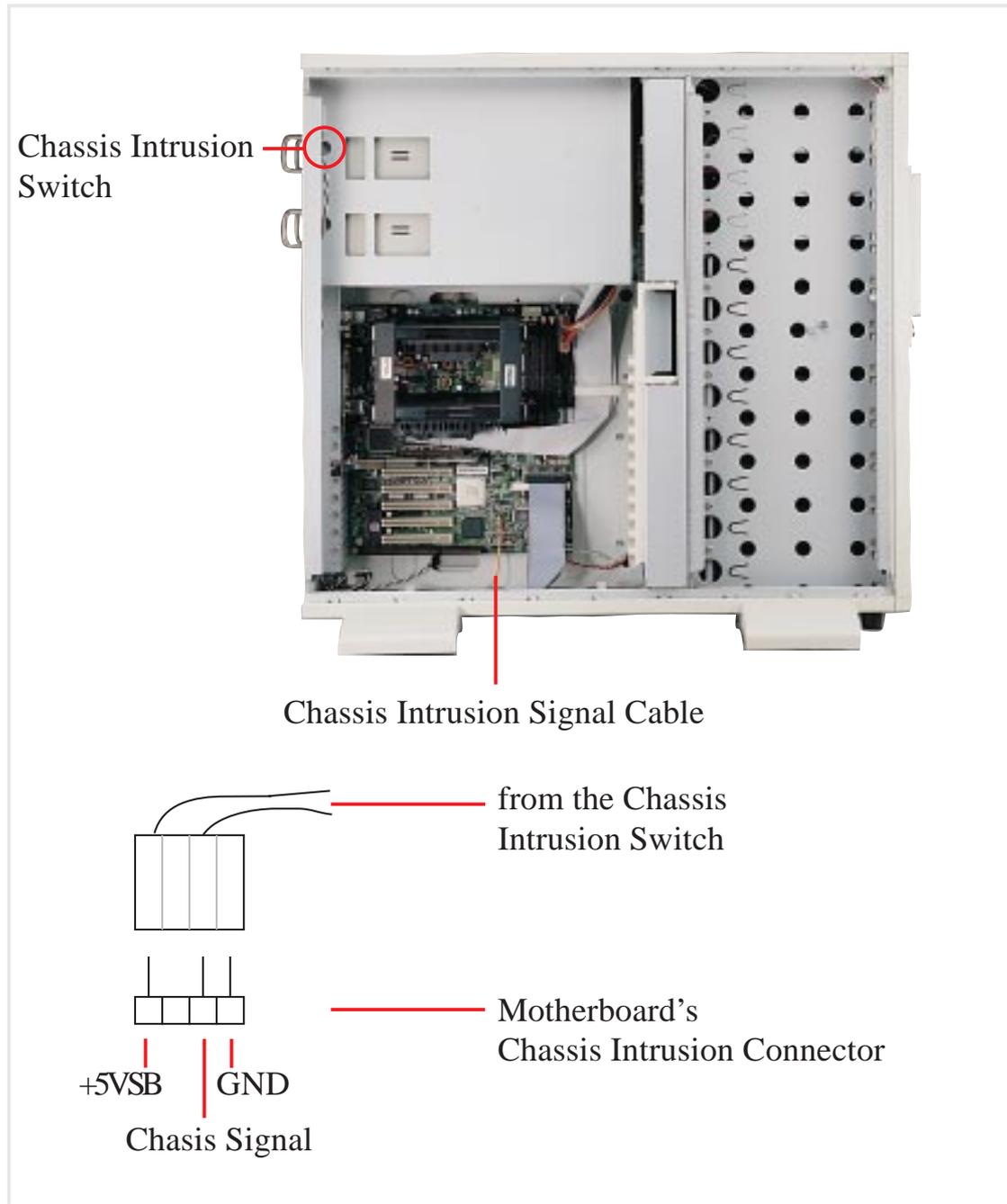
A metal frame is used across both retention mechanisms. After installing the frame, four captive nuts should be tightened on the feet of the frame to the screws protruding from the retention mechanisms.



# IV. Hardware Setup

## • 4-4. Chassis Intrusion Switch

The chassis provides a micro toggle switch that must be connected to the motherboard for the chassis intrusion detection to work. The motherboard will signal the ASMA software when the side panel is opened. The connection diagram is given here.



### IMPORTANT



To prevent misconnection, one pin is removed from the motherboard's chassis intrusion connector.

# IV. Hardware Setup



*Chassis Intrusion Connector*



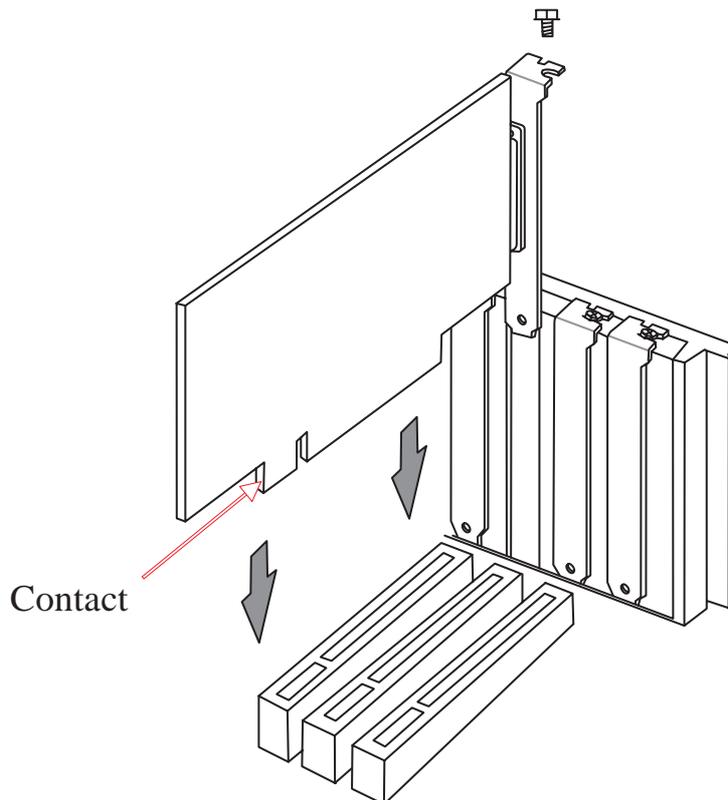
## Chassis Intrusion Connector

The chassis intrusion switch is connected to the motherboard's chassis intrusion connector through a single connector.

### • 4-5. Expansion Cards



Expansion cards can be easily installed just like on any standard PC. Up to 5 PCI or 1 ISA cards can be installed. One AGP slot is also available for an AGP graphics adapter to provide hardware 3D acceleration and free up an extra PCI slot.

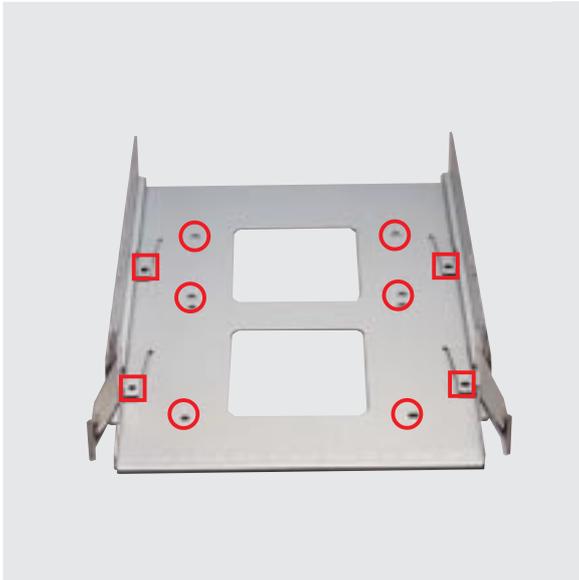


#### CAUTION

Make sure that the total amperage of your installed expansion cards does not exceed the system power specification.

# IV. Hardware Setup

## • 4-8. Fixed Storage Devices



### Fixed Storage Device Tray

There are six screws provided (as circled) for mounting a 4-inch device such as a floppy or hard disk drive. Four screws are provided (as boxed) for mounting a 6-inch device such as a CD-ROM or tape drive.



### Fixed Device Bay Cover Clips

The device bay panel is held by two plastic clips on each side. Press these clips in with a screwdriver to release.



### Fixed Device Bay Cover

After releasing the device bay cover clips, pry the cover away from the chassis using a screwdriver from the front.

# IV. Hardware Setup

## • 4-7. Floppy Disk Drive and CD-ROM



### Floppy Disk Drive

The floppy drive fits in the top-most bay along with the power button. A metal clip on each side of the device tray secures the tray in place. Press inward to release the clips. The tray slides in or out on the side rails.



Floppy Drive Spacer



### CD-ROM Drive

The CD-ROM drive can be installed as the floppy disk drive is installed.



CD-ROM Drive Spacer



### CAUTION

If using an IDE hard disk drive in this large chassis, it is recommended that only *one* is installed and with the shortest IDE cable possible. Long IDE cables will cause poor signal. Select "...PIO/DMA Mode : 3/1" in BIOS CHIPSET FEATURES SETUP for a more stable IDE operation.

# IV. Hardware Setup

## • 4-8. Hot-Swap Trays



### Removing Hot-Swap Trays

The main hard disks are mounted in internal hot-swap trays for easy replacement. A lock secures the handle and switches ON or OFF the power to the hard drive. To remove the tray, unlock the tray and pull on the handle.



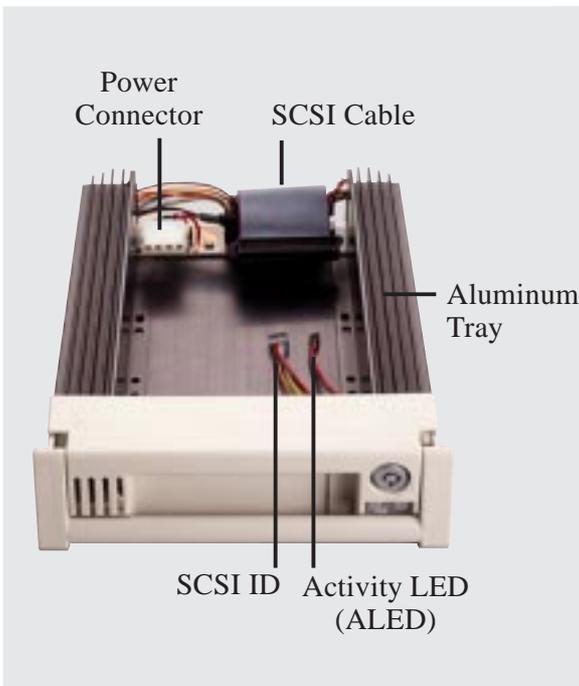
Lock/  
Power  
ON

Unlock/  
Power OFF



### NOTE

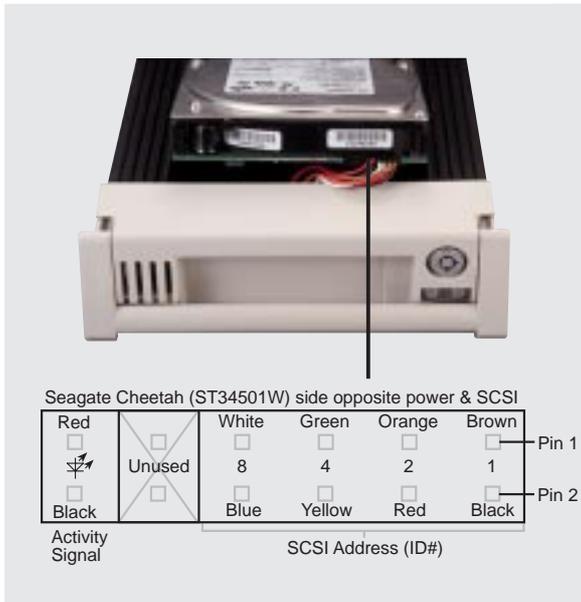
If using Ultra-wide devices, make sure the termination is disabled.



### Hot-Swap Tray Usage

Each hot-swap tray provides an aluminum carrier for a single SCSI hard disk drive. The aluminum tray provides protection and maximum heat dissipation for almost all types of high speed SCSI disk drives. The provided cables and wires connect to the SCSI hard disk drive and screws are needed to secure the tray to the bottom of the SCSI hard disk drive.

# IV. Hardware Setup



## Hot-Swap Tray Front Connections

The hot-swap tray provides wires for connecting the activity LED, power LED, SCSI ID, power, and SCSI signal. Connect the 8-pin connector to the SCSI Address pins according to the colors shown. Connect the 2-pin connector to the activity signal pins according to the colors shown.

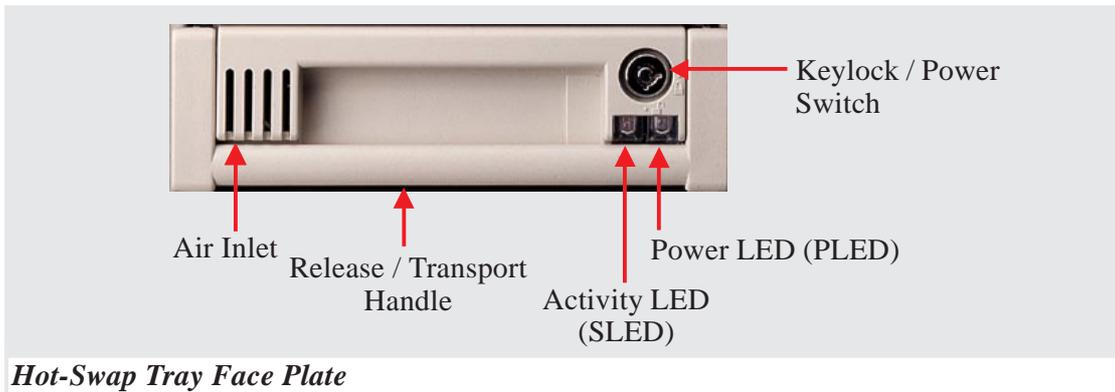


### NOTE

The above is only an example. Always consult your hard disk drive documentation or labels for the exact wiring specific to your hard disk drive make and model.

## Hot-Swap Tray Interface

The front of the hot-swap tray provides a keylock in order to switch the power on, which also locks the handle, and switch the power off, which also releases the handle. Two LEDs provide information on the power and activity status of the hard disk drive. When power is received by the hot-swap tray's connector board, the power LED will light. When data is written or read to or from the contained hard disk drive, the activity LED will flash proportional to the amount of data transferred.



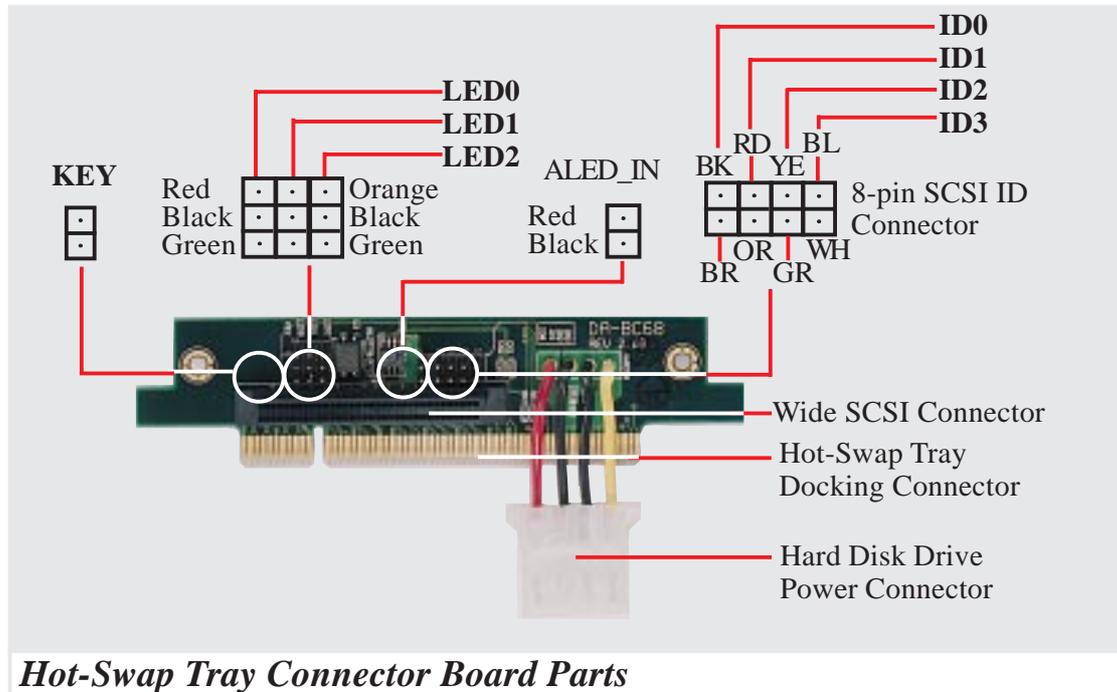
### IMPORTANT

To place the hot-swap tray into the device bay, you must lift the handle 45 degrees from rest position and then push the tray forcefully. If the tray is snapped in place, the handle can be lowered into place.

## IV. Hardware Setup

### • 4-9. Hot-Swap Tray Connector Board

The connector board is mounted on the hot-swap tray to interface with the SCSI backplane in the chassis. The connector board combines all the signal and power into one docking connector for a simple hot-swap unit.



*Hot-Swap Tray Connector Board Parts*

### Hot-Swap Tray Rear Connections

**KEY:** These 2 pins connect to the keylock on the tray's front panel to turn ON and OFF the drive's power.

**LED0:** These 3 pins connect to the hard drive access LED on the front of the tray to show when the hard disk drive accesses data.

**LED1:** (Reserved)

**LED2:** These 3 pins connect to the power LED on the front of the tray to show when the connector board receives power.

**ALED\_In:** These 2 pins connect to the hard drive access LED on the back of the hard drive to show when the hard drive accesses data.

**SCSI\_ID:** These 8 pins connect to the hard drive's SCSI address pins to set the SCSI ID number of the hard disk drive.

**Hot-Swap Tray Docking Connector:** Connects to the SCSI backplane board.

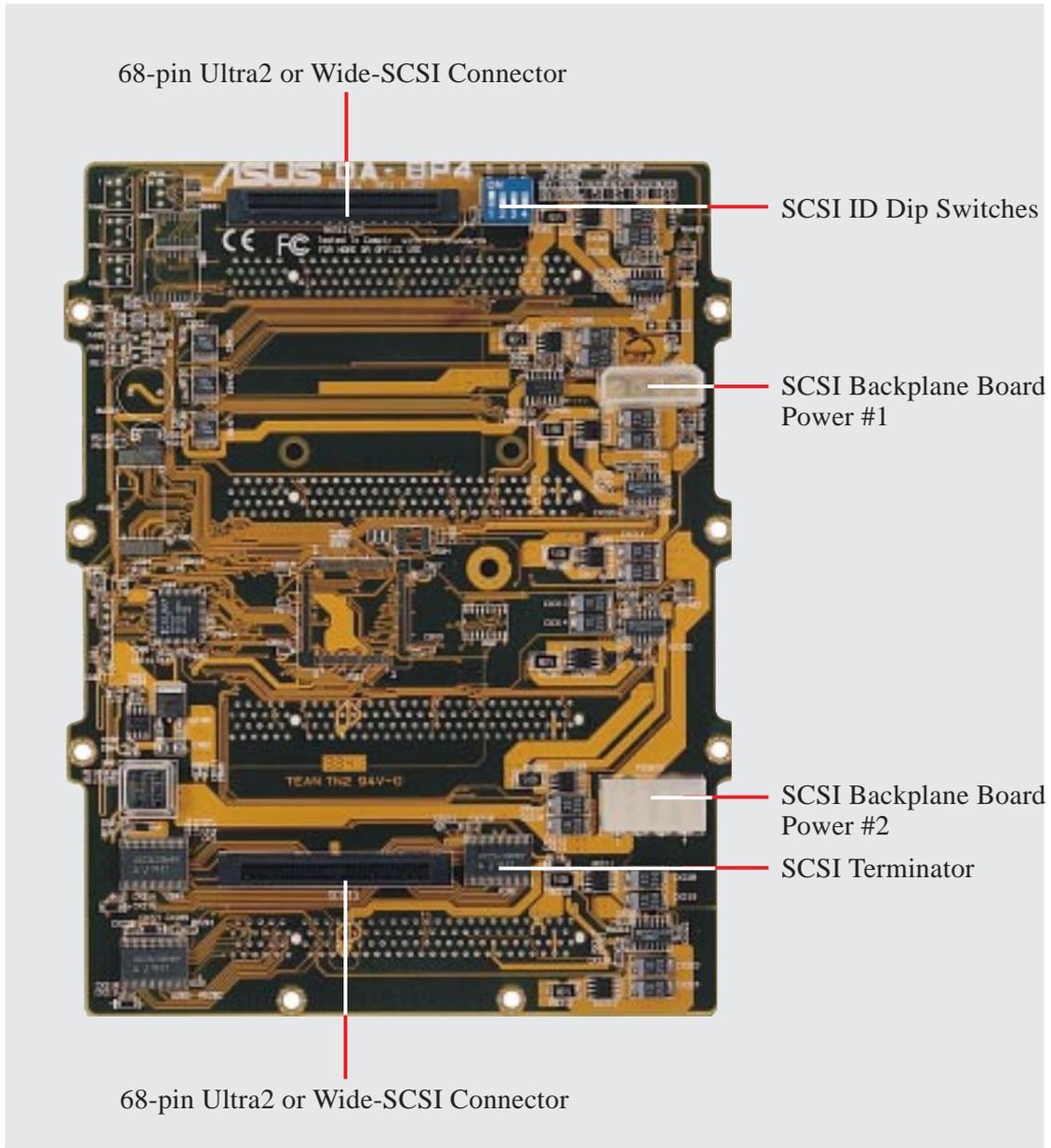
**Hard Disk Drive Power Connector:** Connects to the hard drive.

**68-pin SCSI Connector:** Connects to the hard drive's 68-pin SCSI connector.

# IV. Hardware Setup

## • 4-10. SCSI Backplane

The SCSI backplane of this server is comprised of two SCSI backplane boards with a 68-pin SCSI connector, power input, and SCSI ID dip switches on each SCSI backplane board. This configuration allows Ultra2 or Wide-SCSI hard disk drives to be docked into the server using a common connector. The female end is located on the SCSI backplane board, while the male end is located on the hot-swap tray.



IV. Hardware Setup  
SCSI Backplane

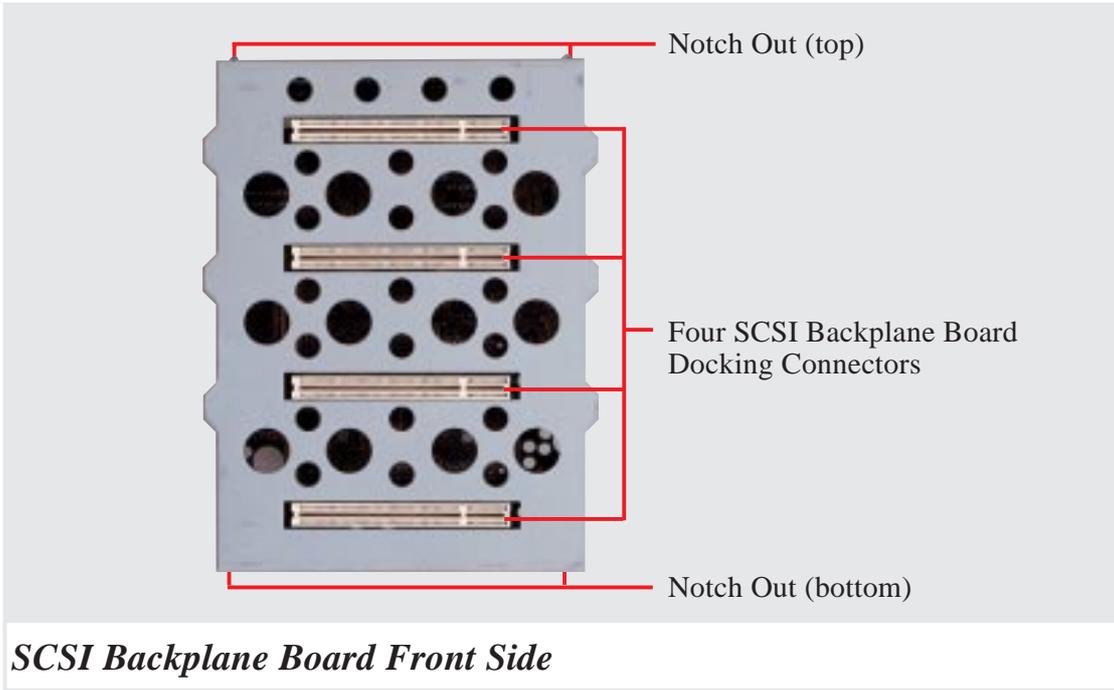
### *SCSI Backplane Board Back Side*



#### **IMPORTANT**

The DA-BP4 SCSI backplane board has automatic termination. If using Ultra-wide devices, make sure the termination on each device is disabled.

# IV. Hardware Setup



## • 4-11. SCSI ID Setting

All SCSI devices, including this motherboard with onboard SCSI, must have a SCSI identification number that is not in use by any other SCSI device. There are sixteen possible ID numbers, 0 through 15. SCSI ID settings are made through DIP switches located on the SCSI backplane board.



### Using the SCSI Backplane Boards Separately

Each SCSI backplane board supports four hard drives. If you are only installing four or less hard drives in the hot-swap bays, only one SCSI backplane board is needed. You may also use two SCSI channels and treat each SCSI backplane board separately. The SCSI ID for the hard drives used in each slot is determined by the SCSI ID DIP switch. The switch controls two sets of SCSI IDs so individual ID settings cannot be made. The following table shows the results when setting the SCSI ID switch to either the ON or OFF position.

#### SCSI ID Settings for Separate SCSI Backplane Boards

(SET2 is always OFF)

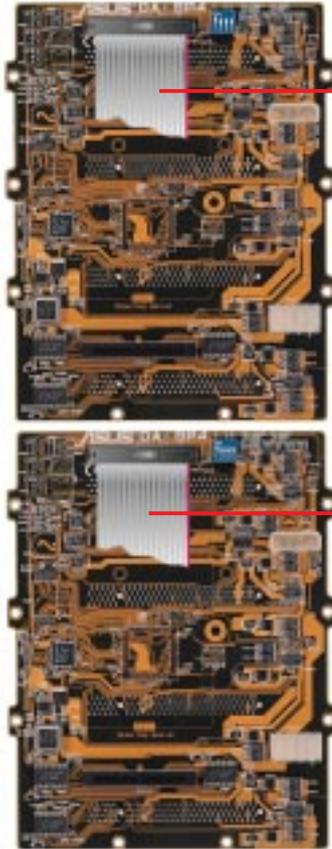
| SET1 | Slot0 | Slot1 | Slot2 | Slot3 |
|------|-------|-------|-------|-------|
| ON   | ID0   | ID6   | ID8   | ID12  |
| OFF  | ID1   | ID5   | ID9   | ID13  |

# IV. Hardware Setup

## Using Cascaded SCSI Backplane Boards

If installing five or more hard drives in the hot-swap bays, two SCSI backplane boards are required. A two-channel SCSI controller can combine two separate sets of hard drives through software RAID or by using a hardware RAID controller. Cascading the SCSI backplane boards can be done to use only a single channel on the SCSI controller.

### Separate Config.

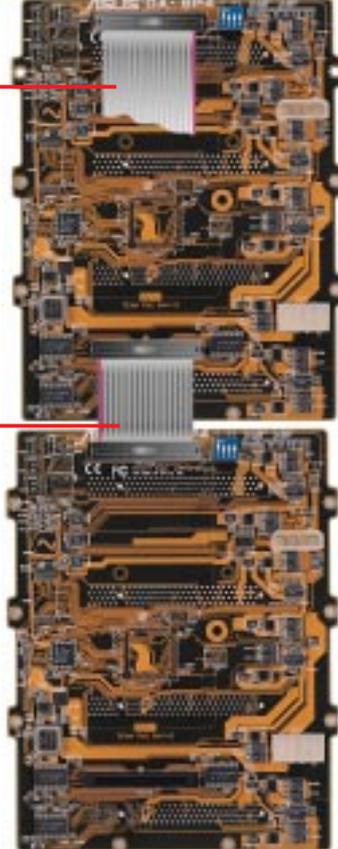


Connected to SCSI Controller  
Top (BP4-1)

Connected to SCSI Controller's Ch2 (or another controller)  
Bottom (BP4-2)

Automatic Termination (no terminator required)

### Cascade Config.



(68-pin SCSI) BP4 Cascade Cable

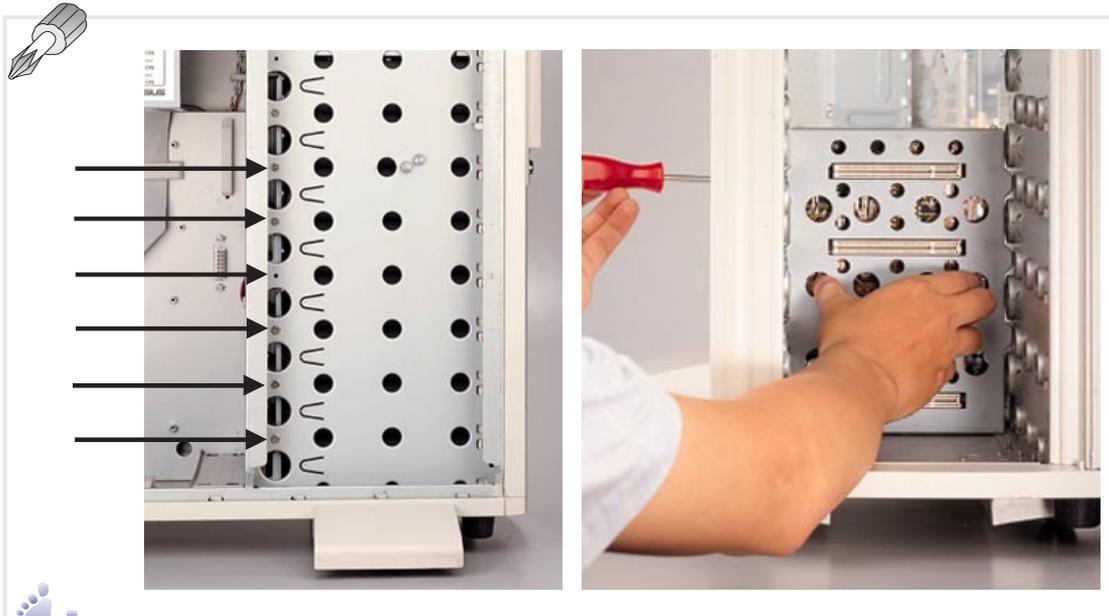
When using a cascade configuration, the top SCSI backplane board is referred to as BP4-1 and the bottom SCSI backplane board is referred to as BP4-2, but there are no physical differences. The SCSI hard drives connected on the top SCSI backplane board may select from two sets of SCSI IDs. The SCSI hard drives connected on the bottom SCSI backplane board may only have one set of SCSI IDs.

### SCSI ID Settings for Cascaded SCSI Backplane Boards

| Board  | SET1   | SET2 | Slot0 | Slot1 | Slot2 | Slot3 |
|--------|--------|------|-------|-------|-------|-------|
| Top    | ON     | OFF  | ID0   | ID6   | ID8   | ID12  |
| Top    | OFF    | OFF  | ID1   | ID5   | ID9   | ID13  |
| Bottom | ON/OFF | ON   | ID3   | ID4   | ID10  | ID11  |

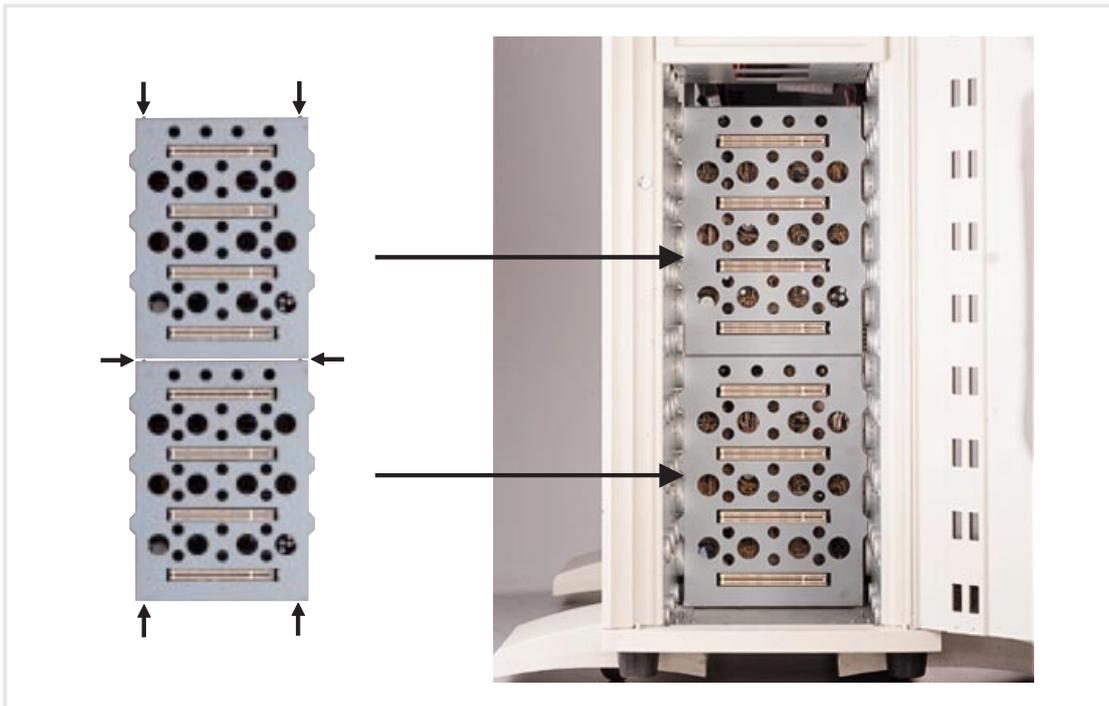
# IV. Hardware Setup

## • 4-12. SCSI Backplane Board Placement

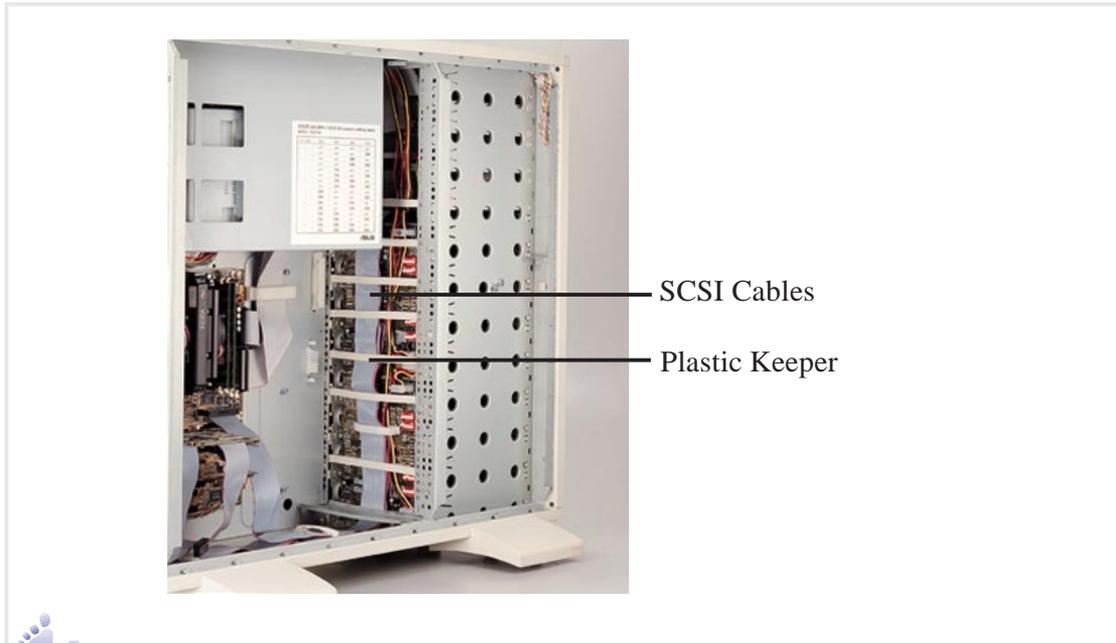


### Installing & Removing SCSI Backplane Boards

There are three screws on each side of the SCSI backplane board as shown by the arrows. Both sides of the chassis side panels must be removed to access these screws. Please note that notches on the top and bottom of the SCSI backplane board must be placed as shown in order to properly seat the SCSI backplane boards into the chassis. The SCSI backplane boards will only fit in one orientation but may be interchanged between the top and bottom half. Check the SCSI ID DIP setting of each SCSI backplane board before using.



# IV. Hardware Setup



## SCSI Hard Disk Connections

The above picture gives an example of how the SCSI backplane looks with all its cables connected.

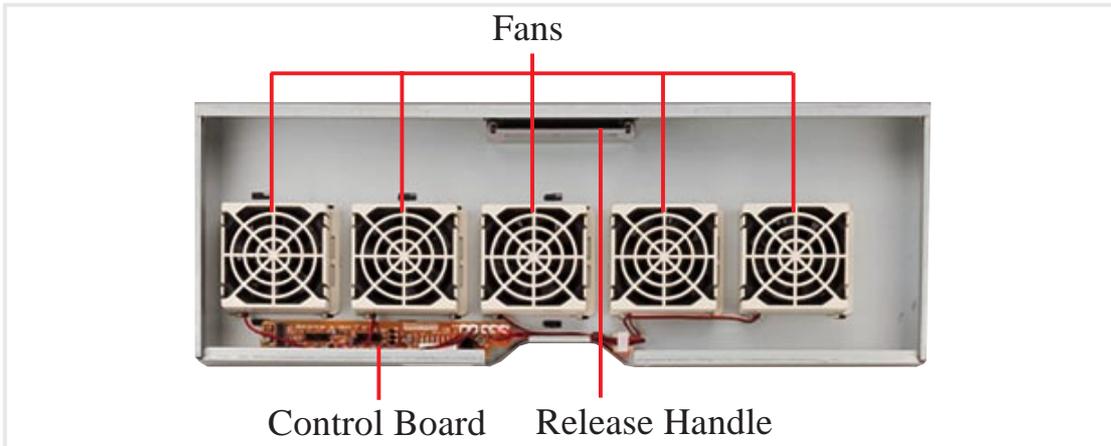


### IMPORTANT

Make sure all SCSI cables are fixed with plastic keepers. If any SCSI cable is not flat, you may have trouble installing or removing the fan array module.

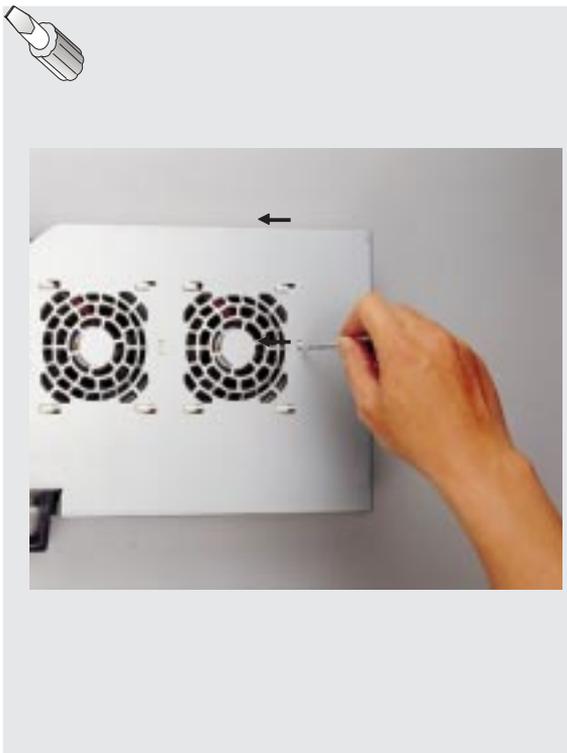
# IV. Hardware Setup

## • 4-13. Circulation System



### Fan Module

The server's fan module is comprised of five 3-inch (8 cm) fans. The circulation system cools the hard disk drives by bringing fresh air in from the front and forcing the hot air out through the back. If an individual fan fails, the corresponding LED on the front of the server lights.



### Fan Replacement

The fan module can be removed by pulling the handle out. The handle must be in the out position to insert the fan module. The individual fans are secured by two clips and two hooks. To release these clips, use a screw driver to push these clips in and then slide the fan out. If an individual fan fails, remove the fan and send it back to the vendor for replacement. If all five fans fail, it may be that the fan control board needs replacing. Remove the control board and send it back to your vendor for replacement.

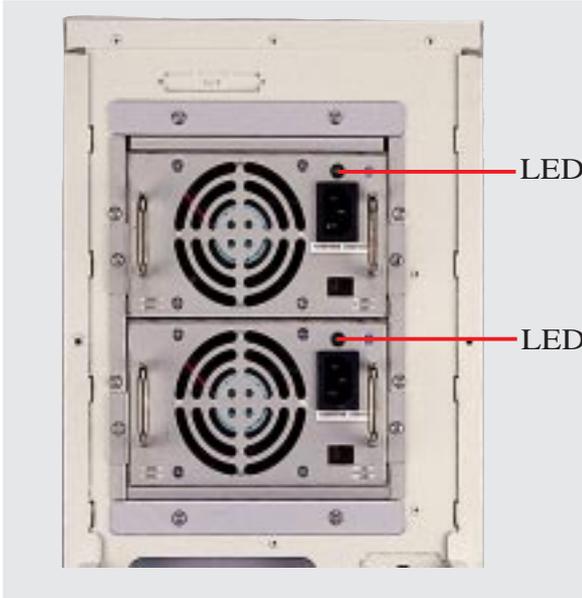


### IMPORTANT

When replacing fans, be sure that the fan rotations are in the same direction. Use the manufacturer's sticker on one side of the fan as a reference as to the correct side. Air should flow from the front of the server to the rear.

# IV. Hardware Setup

## • 4-14. Power Supply



### Redundant Power Supply

This server has a special redundant power supply with specifications to handle this server's requirements. A clearly marked label gives detailed specifications of the power supply. A power switch is not provided; therefore, it is necessary to remove the power cords before opening the side panel in order to turn OFF the standby power.



### Power Supply Mounting

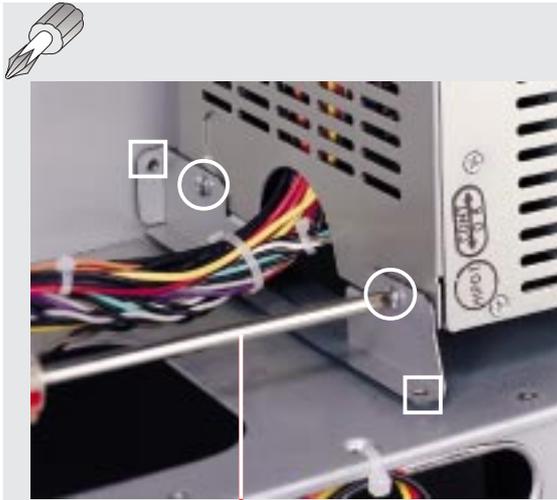
The redundant power supply is swappable within its own frame. The entire frame can also be unscrewed for servicing if necessary. A support brace must be used to support the frame under the inner edge. There are four screws securing the power supply support brace as circled.



### Removing One Power Supply Module

If any of the power modules fails, the power module's LED will turn OFF. If this happens, remove the power cord to the failed power module. Then remove the two screws and slide the failed power module out.

# IV. Hardware Setup



Screwdriver



Power Supply Frame



## Removing the Entire Power Supply Unit

Remove the two boxed screws, slide out the power supply modules with the support brace to the insertion position and then remove the two circled screws.



**NOTE:** A long screwdriver is required to reach into the chassis.

After the support brace is removed, the power supply modules and the frame can be removed from the chassis.

### IMPORTANT



When installing the power supply, reverse the steps: Insert the power supply modules halfway into the chassis, secure the circled screws, push the power supply modules in place, secure the boxed screws as well and the 8 screws on the back of the chassis, and then connect the power cord.

# IV. Hardware Setup

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## Power Module Rating

The redundant power supply consists of one frame and two identical ATX power modules. The power supply must be turned on or off through an ATX power switch connected to the motherboard's panel connector. The power modules are rated at 400W each and have passive current sharing on all outputs. Each power module supplies up to 400W to share the load but two modules combined do not provide 800W. If one power module fails, 400W load is supported using one power module.



### CAUTION

Before turning ON your server for the first time, set the power supply's voltage. Some products may have auto voltage switching to accommodate 220V-240V or 110-120V but this power supply must be set manually. The factory default should be on 230V to accommodate the higher voltage but it is safer to visually inspect the switch yourself in case it is not. Using the power modules set on 115V in 230V environments may cause damage to the power modules.



### IMPORTANT

For countries using 110V-120V, you must slide the switch to 115V or else power up is not possible (but no damage will occur).

## Power Module Failure

If any of the power modules fails to provide a voltage on any of its outputs, an audible alarm (located in the frame) will sound and the failed power module's LED will turn OFF. The power module's status LED lights when both input and output voltages are stable and darkens if either the input or output voltages fail. If the alarm sounds, perform the following steps:

1. Remove the power cord to the failed power module (with dark LED).
2. Remove the two screws and slide the failed power module out. The alarm should stop. If not, there may be a problem with the other module or with the redundant power supply frame (very unlikely).
3. Reinsert the failed power module and plug in the AC cord to confirm.
4. If the alarm sounds again, remove the failed power module and replace it with a good one as soon as possible.

# IV. Hardware Setup

## Power Supply Information

### Output Voltage Regulation, Ripple, and Noise

| Output Voltage Limits (Vdc) |         |         |         | Ripple/Noise         |
|-----------------------------|---------|---------|---------|----------------------|
| Output                      | Min     | Nom     | Max     | Maximum              |
| 1                           | 3.17V   | 3.30V   | 3.46V   | 50mV <sub>p-p</sub>  |
| 2                           | 4.80V   | 5.00V   | 5.25V   | 50mV <sub>p-p</sub>  |
| 3                           | 11.40V  | 12.00V  | 12.60V  | 120mV <sub>p-p</sub> |
| 4                           | -4.75V  | -5.00V  | -5.25V  | 120mV <sub>p-p</sub> |
| 5                           | -11.40V | -12.00V | -12.60V | 120mV <sub>p-p</sub> |

### Output Current Capacity

| Output | Nom (Vdc) | Max (A) | Min (A) |
|--------|-----------|---------|---------|
| 1      | 3.3V      | *30.0   | 0.0     |
| 2      | 5.0V      | *40.0   | 3.0     |
| 3      | 12.0V     | 15.0    | 0.5     |
| 4      | -5.0V     | 0.5     | 0.0     |
| 5      | -12.0V    | 0.5     | 0.0     |

\* Total output power for 3.3V and 5V combined shall be 210W

### Input Voltage

| Range   | Min (V) | Nom (V) | Max (V) |
|---------|---------|---------|---------|
| Range 1 | 90      | 120     | 132     |
| Range 2 | 180     | 230     | 264     |

### Input Current

| Input Voltage | Max In Cur. | Max Inrush Cur. |
|---------------|-------------|-----------------|
| Range 1       | 10          | 100Ap-p         |
| Range 2       | 5           | 200Ap-p         |

### Safety

The power system meets all applicable clauses for UL 1950 2nd edition without D3 deviations. The power system passes all tests for CUL and TUV safety.

### EMI

The power system, operating with resistive load, meets FCC class B and CISPR 22 class B conducted limits.

# IV. Hardware Setup

## Power Supply Requirement

**Power Supply Requirement Calculation Table**

| Item                    | Volts | Amp | x | Qty. | = | Total Amp | Watts (5V) | Watts (12V) |
|-------------------------|-------|-----|---|------|---|-----------|------------|-------------|
| Total Motherboard Power |       |     |   |      |   |           | 230        | 120         |
| Hard Drive              | 5.0V  | 1.3 | x |      | = |           |            |             |
|                         | 12V   | 1.5 | x |      | = |           |            |             |
| CD-ROM                  | 5.0V  |     | x |      | = |           |            |             |
|                         | 12V   |     | x |      | = |           |            |             |
| Tape Drive              | 5.0V  |     | x |      | = |           |            |             |
|                         | 12V   |     | x |      | = |           |            |             |
| Floppy Drive            | 5.0V  |     | x |      | = |           |            |             |
|                         | 12V   |     | x |      | = |           |            |             |
| System Fans             | 5.0V  |     | x |      | = |           |            |             |
|                         | 12V   | 0.3 | x |      | = | 0.6       |            | 7.2         |
| Other                   | 3.3V  |     | x |      | = |           |            |             |
|                         | 5.0V  |     | x |      | = |           |            |             |
|                         | 12V   |     | x |      | = |           |            |             |
| <b>Total Power</b>      |       |     |   |      |   |           |            |             |

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# V. Appendix

## i. SCSI Cable Limits

SCSI cables have a limit to the length that it may have. Exceeding the length may cause problems mounting or using any one of the SCSI devices.

### CAUTION



Exceeding the SCSI cable limits may cause unreliable data transfers even if all the devices are mounted properly.

| <u>Cable Limits</u> | <u>Max Data Transfer Rates</u>      | <u>Max Devices</u> |
|---------------------|-------------------------------------|--------------------|
| 1) 12m (29.4ft)     | Ultra2-SCSI (68 pin 80MB/Sec)       | 15                 |
| 2) 3m - 1.5m        | Wide Ultra-SCSI (68 pin 40MB/Sec)   | 4 - 8              |
| 3) 3m (9.8ft)       | Wide-SCSI (68 pin 20MB/Sec)         | 15                 |
| 4) 3m - 1.5m        | Narrow Ultra-SCSI (50 pin 20MB/Sec) | 4 - 7              |
| 5) 3m (9.8ft)       | Narrow Fast-SCSI (50 pin 10MB/Sec)  | 7                  |

### IMPORTANT



- Narrow refers to 50 pin and Wide refers to 68 pin. Don't get confused by the width of the connector or cable.
- The SCSI ID for devices on one connector cannot be the same as the SCSI ID for devices on the other connectors. None of the devices on any connector can use ID7, which is reserved for the SCSI controller.
- A maximum of **15** devices may be connected to the motherboard (three connectors) at one time.

### NOTE



- A total of **15** "Ultra2-SCSI" devices (ID0-ID15) may be connected to the 68-pin Ultra2 connector on the motherboard.
- If connecting Fast/Ultra devices with Ultra2 devices on the Ultra2 connector, the entire SCSI bus will be limited to the Ultra SCSI conditions listed above. Mixing SCSI devices is highly not recommended.
- A total of **8** "Wide Ultra-SCSI" devices (ID0-ID15) may be connected to the 68-pin Wide connector if using a 1.5m (4.9ft) cable, but only **4** "Wide Ultra-SCSI" devices if using a 3m (9.89ft) cable. Ultra-SCSI technology is unstable over long lengths, therefore stability will depend on they quality of your cable and devices.
- A total of **15** "Wide-SCSI" devices (ID0-ID15) may be connected to the 68-pin Wide connector.
- A total of **7** "Narrow Ultra-SCSI" devices (ID0-ID6) may be connected to the 50-pin Narrow connector when using 1.5m (4.9ft) cable but only 4 devices when using 3m (9.8ft) cable. Ultra-SCSI technology is unstable over long lengths, therefore stability will depend on the quality of your cable and devices.
- A total of **7** "Narrow Fast SCSI" devices (ID0-ID7) may be connected to the 50-pin Narrow connector.

# V. Appendix

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## ii. Glossary

### **Byte (Binary Term)**

One byte is a group of eight contiguous bits. A byte is used to represent a single alphanumeric character, punctuation mark, or other symbol.

### **CHKDSK (Check Disk)**

An MS-DOS command that gives you information such as disk space, files, and directories on your hard disk drive.

### **COM Port**

COM is a logical device name used to designate the computer serial ports. Pointing devices, modems, and infrared modules can be connected to COM ports. Each COM port is configured to use a different IRQ and address assignment.

### **CPU (Central Processing Unit)**

The CPU, sometimes called “Processor,” actually functions as the “brain” of the computer. It interprets and executes program commands and processes all the data stored in memory. Currently, there are socket 7, slot 1, and slot 2 CPUs. Intel Pentium Processors fit on socket 7, Intel Pentium II fit on slot 1, and Intel Xeon fit on slot 2.

### **Endian**

Endian is a byte order system used in data transfers. In big-endian architectures, the lower addresses are most significant. In little-endian architectures, the higher bytes are most significant. Mainframe computers, such as those by IBM, use a big-endian architecture. Modern PCs use the little-endian system.

### **FDISK (Fixed Disk Setup Program)**

An MS-DOS program used to partition the hard disk drive. FDISK is required to setup a new non-RAID hard disk drive before formatting and installing an operating system.

### **IDE (Integrated Drive Electronics)**

IDE devices integrate the drive control circuitry directly on the drive itself, eliminating the need for a separate adapter card (in the case for SCSI devices). UltraDMA/33 IDE devices can achieve up to 33MB/Sec transfer.

### **LPT Port (Line Printer Port)**

Logical device name reserved by DOS for computer parallel ports. Each LPT port is configured to use a different IRQ and address assignment.

# V. Appendix

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## **PCI Bus (Peripheral Component Interconnect Local Bus)**

PCI bus is a specification that defines a 32-bit data bus interface. PCI is a standard widely used by expansion card manufacturers.

## **Peripherals**

Peripherals are components on the outside of the computer such as a monitor, printer, keyboard, or mouse. Peripherals are attached to the computer via I/O ports. Peripheral devices allow your computer to perform an almost limitless variety of specialized tasks.

## **POST (Power On Self Test)**

When you turn on the computer, it will first run through the POST, a series of software-controlled diagnostic tests. The POST checks system memory, the motherboard circuitry, the display, the keyboard, the diskette drive, CPU, and other I/O devices.

## **PS/2 Port**

PS/2 ports are based on IBM's Micro Channel Architecture. This type of architecture transfers data through a 16-bit or 32-bit bus. A PS/2 mouse and/or keyboard may be used on ATX motherboards.

## **RAID (Redundant Array of Inexpensive Disks)**

RAID can be set up to provide mirroring (for fault tolerance), parity (for data guarding), or striping (for data distribution over several drives for increased performance). A RAID card is required to setup a RAID system.

## **RAM (Random Access Memory)**

There are several different types of RAM such as DRAM (Dynamic RAM), EDO DRAM (Extended Data Out DRAM), SDRAM (Synchronous DRAM).

## **ROM (Read Only Memory)**

ROM is nonvolatile memory used to store permanent programs (called firmware) used in certain computer components. Flash ROM (or EEPROM) can be reprogrammed with new programs (or BIOS).

## **SCSI (Small Computer System Interface)**

High speed parallel interface defined by the X3T9.2 committee of the American National Standards Institute (ANSI) for connecting many peripheral devices.

## **UPS (Uninterruptible Power Supply)**

A battery system that can provide power to an electronic device or computer when power fails in the building. A passive UPS only provides power. An active UPS provides power conditioning that offers protection against transient power conditions and short-term power outages.

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