AP2300
Dual Pentium® III Server Platform

Hardware Reference Guide

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FCC & DOC COMPLIANCE

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.

1. Introduction

You are reading the AP2300 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:

1. Introduction
This section provides general information and features of this server.

2. System Overview
This section provides a brief introduction to each server component.

3. Getting Started
This section provides information on getting started with the server.

4. Hardware Setup
This section provides detailed information on setting up the server.

5. 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.

1. Introduction

• 1-2   Component Checklist

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: CUR-DLS

☑ Chassis: AS-30

☑ Power Supply: ATX

☐ Processor (CPU):   Pentium® III

☐ Memory Modules: 8, 16, 32, 64, 128, 256, 512MB, 1GB SDRAM

☐ Hard Drive: Ultra160, Ultra2, Ultra-wide

☑ Floppy Drive: 1.44MB

☑ CD-ROM Drive: 40X/50X

☐ Expansion Cards

☑ SCSI Terminator: Passive terminator for 68-pin SCSI cables

☑ User's Manuals: CD-ROM, motherboard, hardware guide

Optional components

☐ RAID Controller: PCI-DA2200 or DA-3000 RAID controller

☐ S370 CPU Terminator

☐ Rack-mount Rails: AS-30 rail kit

1. Introduction

• 1-3   Features

The AP2300 is configured on the ASUS CUR-DLS smart motherboard which uses the ServerSet™ chipset from ServerWorks®, supporting dual Pentium III processors and 133MHz Front Side Bus in order to accelerate 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.

Motherboard: ASUS CUR-DLS

*   **Processor:** Dual Intel® Pentium III FC-PGA processors running at 133MHz or 100MHz Front Side Bus.

*   **Memory:** Four 168-pin DIMM sockets for 16MB-4GB PC133 registered SDRAM with ECC support.

*   **Onboard SCSI (optional):** LSI® Ultra160/Ultra2-Wide SCSI controller to support up to 30 SCSI devices on dual channels.

*   **Onboard LAN:** Intel® 82559 Fast-Ethernet LAN controller.

*   **Onboard VGA:** ATI® Rage XL VGA controller with 4MB PC100 SDRAM to support one VGA connector and one DFP (Digital Flat Panel) connector.

*   **Super Multi-I/O:** Two PCI Bus Master IDE Ports with Ultra DMA/33 support, one floppy, two serial COM ports, one parallel port, one PS/2 keyboard, one PS/2 mouse, one RJ-45 LAN port, two USB ports, and one IrDA connector.

*   **Expansion Slots:** Six or seven PCI slots (33 or 66MHz, depending on model), and one ASMC slot for IPMI (Intelligent Platform Management Interface) compliant management solution.

Chassis: AS-30

*   **Chassis:** Tower server chassis with rack-mount rail tracks.

*   **Backplane:** Wide-SCSI backplane board with LVDS support, remote SCSI ID DIP switches and power to support 5 SCSI SCA hard drives.

*   **Power:** ATX 300W redundant power supply with optional standard 400W power supply.

*   **Device Bays:** Support for one 3.5inch floppy device, three 5.25inch devices, five hot-swappable hard disk drives in removable aluminum trays.

1. 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 engineers.
> • 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 recommanded that you wear gloves when assembling or dissembling 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.

1. 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.

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.
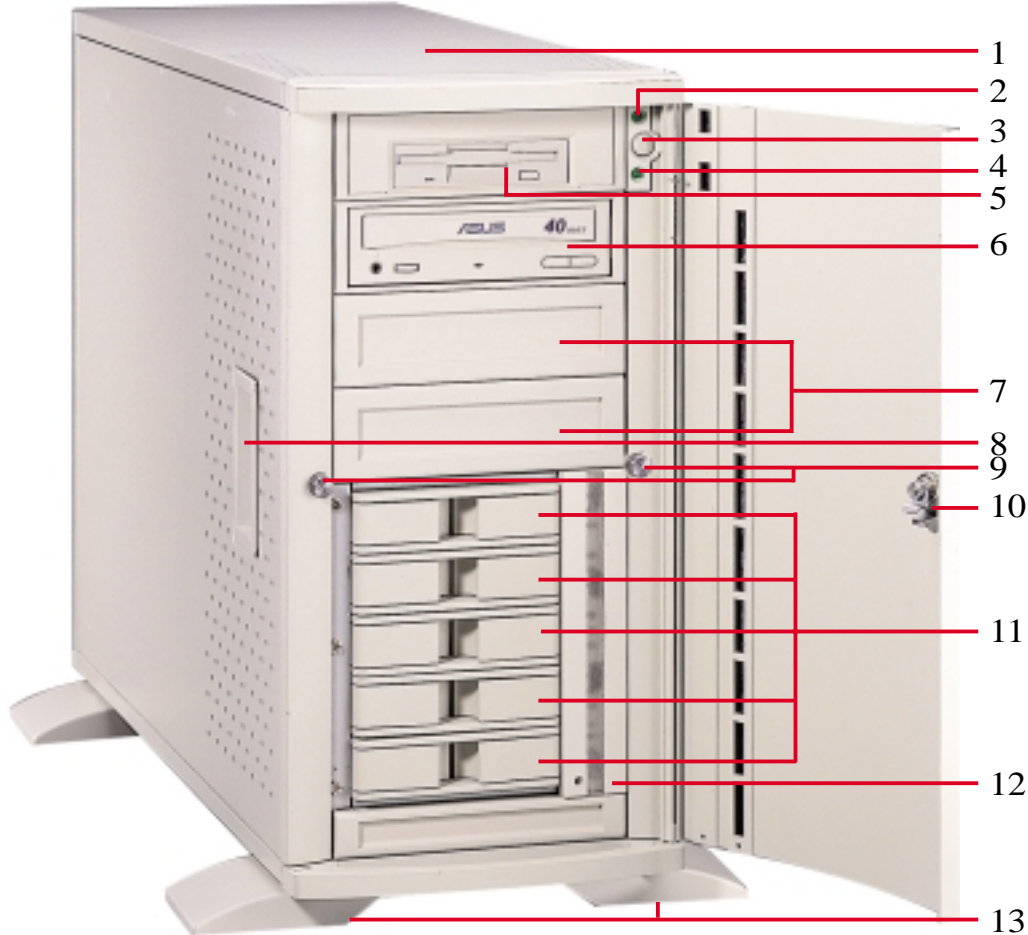
1. Introduction

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AP2300 Hardware Reference Guide

2. System Overview

• 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.
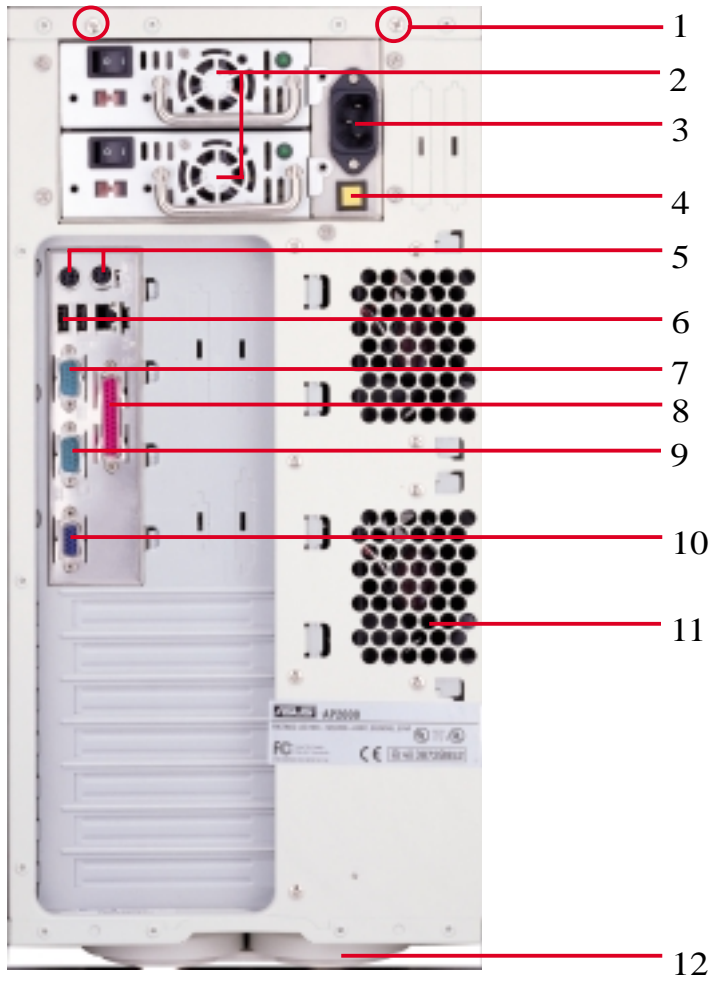
1. Top Panel
2. Power LED
3. ATX Power Button
4. Hard Drive Access LED
5. Floppy Disk Drive
6. CD-ROM Drive
7. Drive Expansion Bay
8. Side Panel Handle
9. Side Panel Screws
10. Metal Door Lock
11. Hot-Swap Trays
12. Hard Drive Fan Module
13. Chassis Stabilizers

Server Front Side

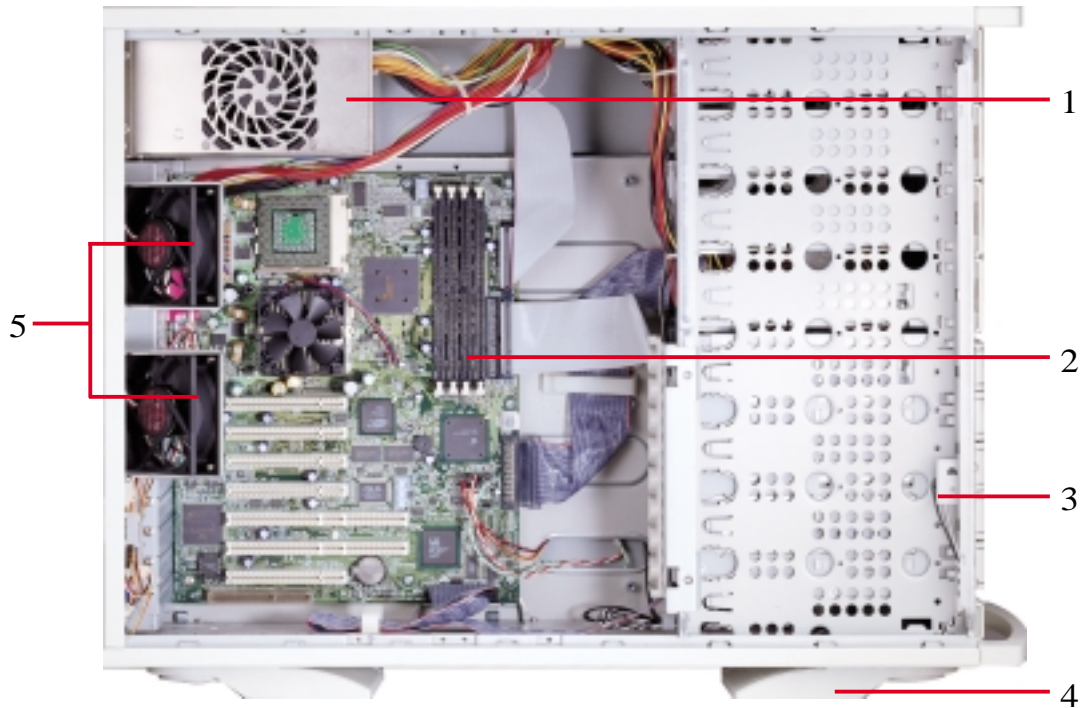## • 2-2   Server Back Side

1.   Top Panel Screws
2.   Power Supply Fan
3.   AC Power In Connector
4.   Alarm Reset Button
5.   PS/2 Keyboard, PS/2 Mouse
6.   USB Ports 1 and 2, RJ45 Port (LAN)
7.   Serial Port COM1
8.   Parallel Port
9.   Serial Port COM2
10. VGA Connector
11. Rear Fan Module
12. Chassis Stabilizer

Server Back Side

2. System Overview

• 2-3   Server Left Side

1.   Power Supply
2.   Motherboard
3.   Chassis Intrusion Micro Switch
4.   Chassis Stabilizer
5.   Rear Fans

Server Left Side

3. Basic Operation

• 3-1 Starting the Server

Turn ON the server by pushing the power button. 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 cord from the outlet.

• 3-2 LEDs

There are two LEDs on the top right-hand corner of the front panel. The upper one is the power LED and the lower one is the hard drive access LED. When the system is booted, the power LED is green. When the hard drive is being accessed, the hard drive access LED is green.

Power LED

Power Button

Hard Drive
Access LED
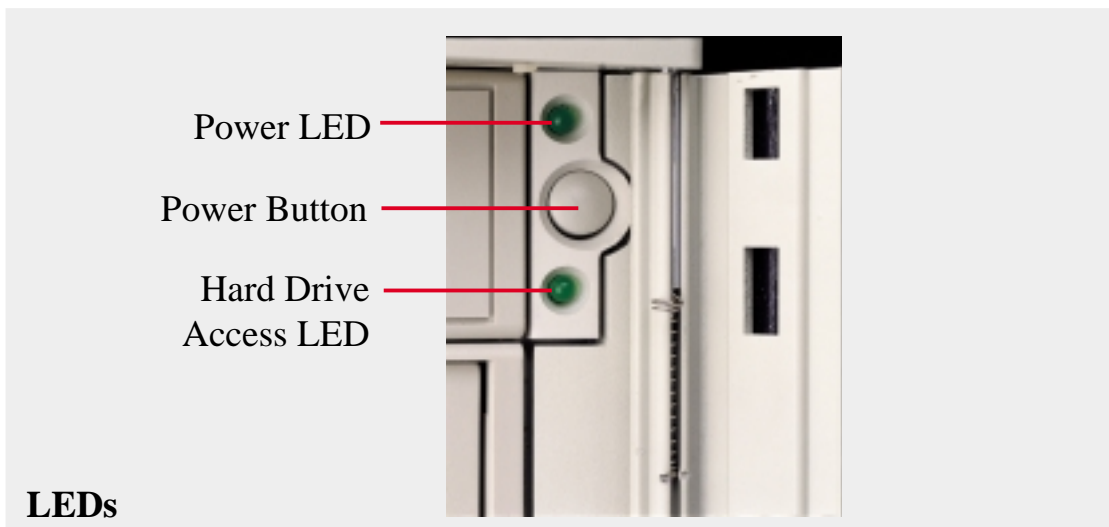
LEDs

• 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.

4. Hardware Setup

This section gives descriptions of how to install and remove components. When setting up devices on the server, perform the following steps.

• 4-1   Opening the Chassis
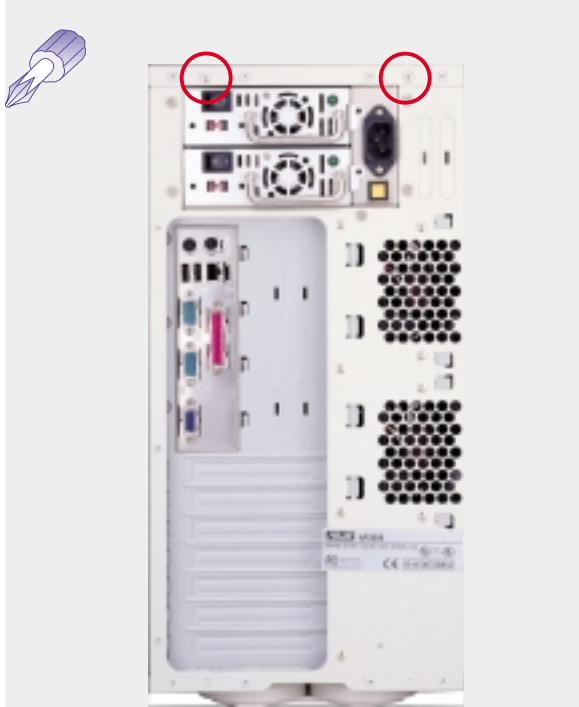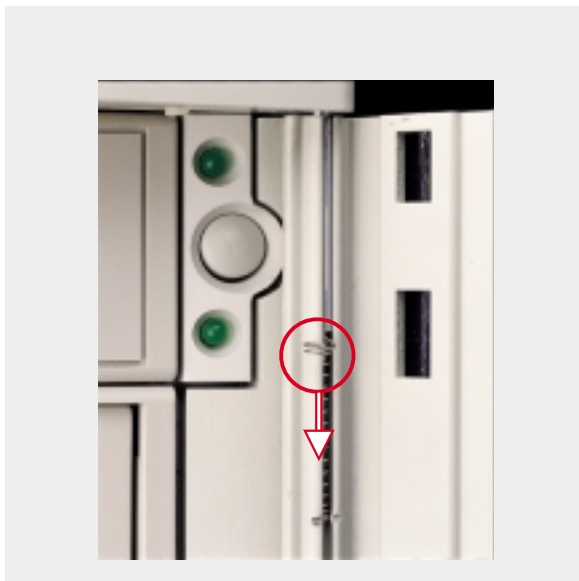
Panel Screws

The top panel on the chassis is secured by two screws on the back of the server. To open the top panel, remove the screws with a screw driver.

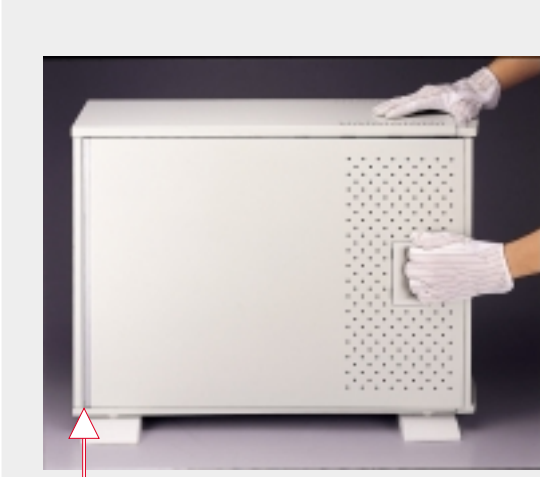NOTE: You do not have to open the top panel before removing the left panel.

The side panels are secured by two large thumb screws on the front of the server, which can be turned with your fingers.

Removing the Front Door

Push down on the hinge spring to remove the front door.
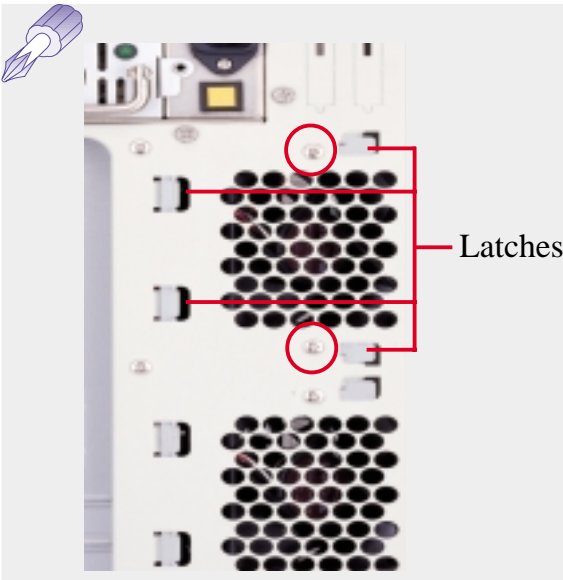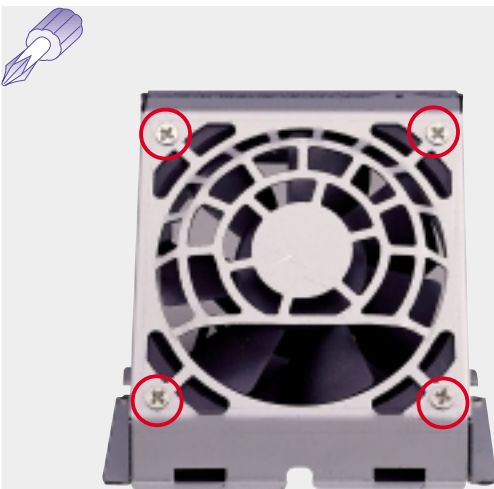
4. Hardware Setup

Opening the Side Panels

To open the left side panel (see the left view), remove the side panel screw and then pull the handle outward while pulling the panel forward. To open the right panel, remove the front door first.

Pulling the panel forward

Chassis Circulation System

Latches

The chassis air circulation system is comprised of two 3 inch (8 cm) fans. The fan modules are held by two screws and four latches on the inside rear of the chassis. To take out the fans, remove the screws.

Fan Modules

There are four screws used to secure the fan into the individual frames. To replace the fan, remove the screws.

✎ **IMPORTANT:** Usually, the rotation of the fan sends air toward the manufacturer's label on the center of the fan.

4. Hardware Setup

• 4-2   Rear Cooling Fan Control Board

The rear fans are controlled and monitored by a control board. The fan control board requires power input from the power supply which allows the individual fans to obtain their power when connected to the control board. The ASMA software can monitor the fan status from the fan control board. The fan control board's cable connections are shown below.
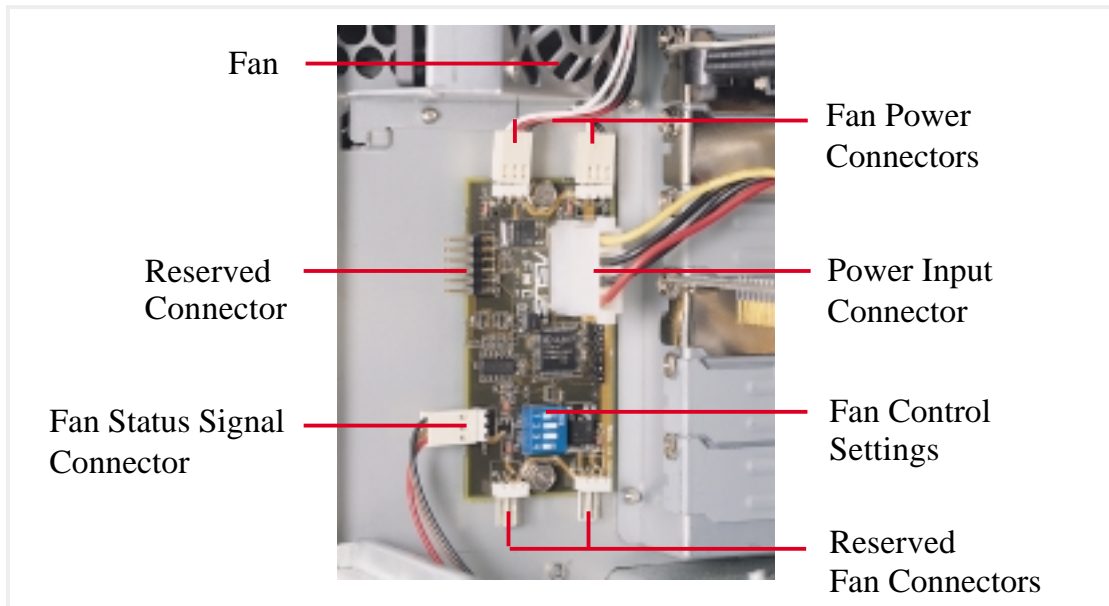
Rear Cooling Fan Control Board Settings

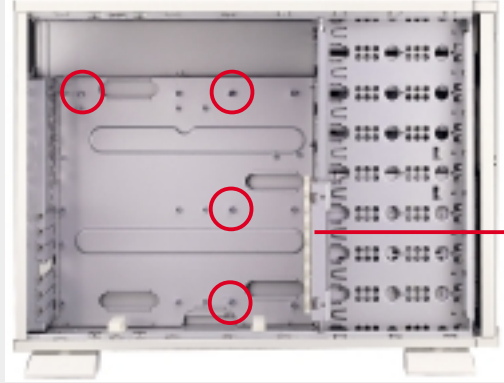The rear fan control board has DIP switches to allow controlling the control board status and the number of fans.

DIP Switch SET1	Fan Control Board Setting
ON (momentarily)	Reset Control Board
OFF	Normal (Default)

SET2	SET3	SET4	Number of Fans
ON	ON	ON	1
ON	ON	OFF	2 (Default)
ON	OFF	ON	3
ON	OFF	OFF	4
OFF	ON	ON	5
OFF	ON	OFF	6
OFF	OFF	ON	7
OFF	OFF	OFF	8

4. Hardware Setup

• 4-3   Motherboard Placement

You can remove the extended expansion card guide before installing or removing the motherboard. All screws are necessary to provide the needed stabilization to support all the motherboard expansion cards used in this chassis.
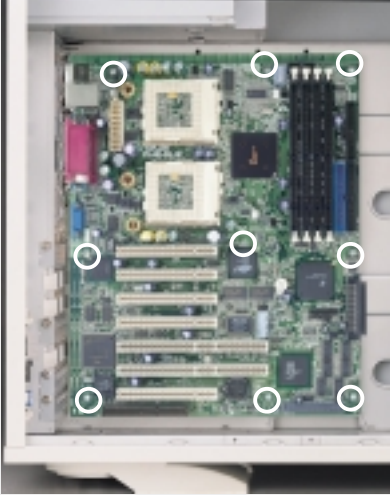

Motherboard Spacers

Place four spacers in the areas circled on the chassis.

Extended Expansion Card Guide

Spacer

Motherboard Screws

Place nine screws in the areas circled on the motherboard. The four screws used with the motherboard spacers are longer than the others. Be careful not to overtighten the screws. Doing so may damage your motherboard.

Chassis Intrusion Connector

Chassis Intrusion Connector

The two chassis intrusion switches are connected to the motherboard's chassis intrusion connector through a single connector.

4. Hardware Setup

Floppy Drive Cable

ATX Power Cable
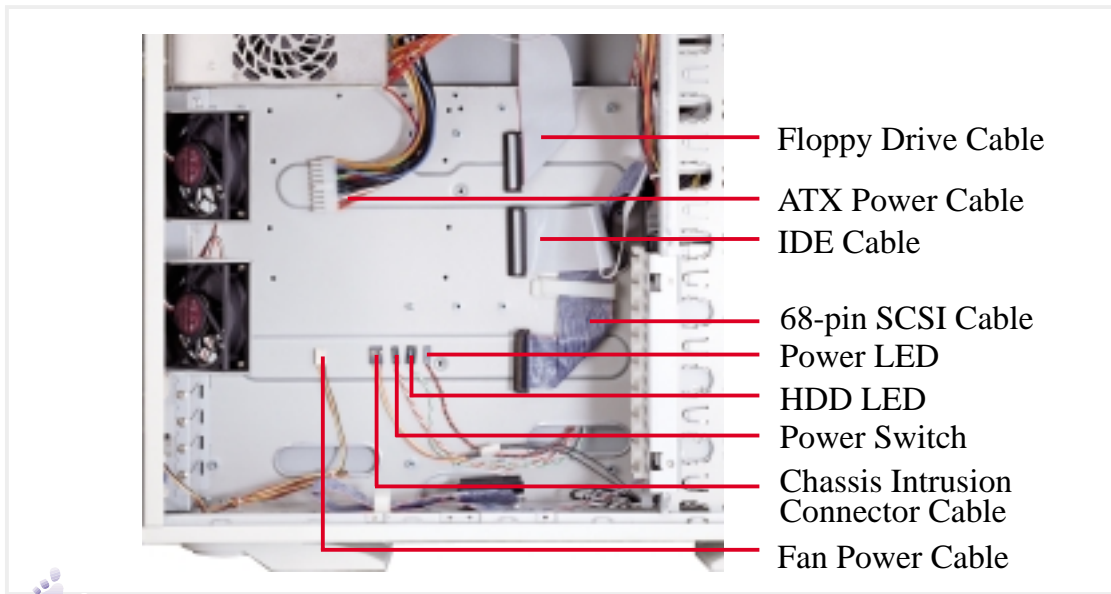
IDE Cable

68-pin SCSI Cable

Power LED

HDD LED

Power Switch

Chassis Intrusion
Connector Cable

Fan Power Cable

Device Cables

Several cables are used for connecting devices in this chassis. The picture above 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.

Floppy Drive Cable

IDE Cable

68-pin SCSI Cable
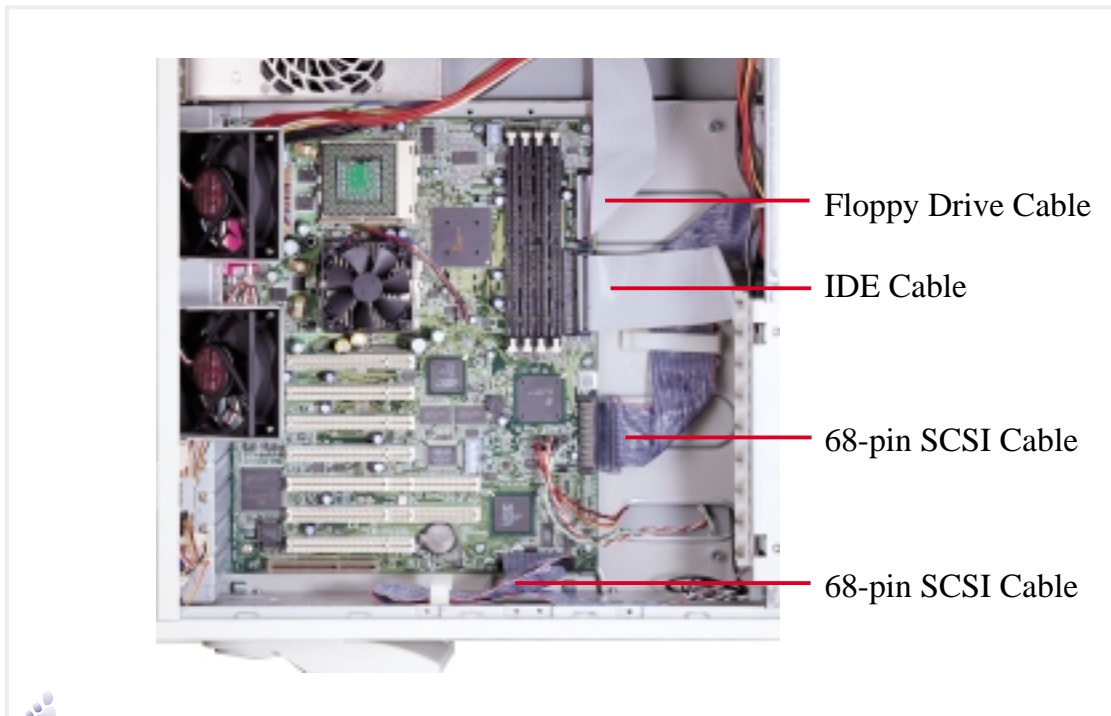
68-pin SCSI Cable

Cable Connections

The cables connect to the motherboard as shown. The motherboard includes onboard SCSI with two 68-pin SCSI connectors. RAID connections require a RAID card.

4. Hardware Setup

• 4-4 Central Processing Unit (CPU)

The CUR-DLS motherboard has two ZIF Socket 370 connectors. One connector can have one FC-PGA processor installed. Each processor must have a fan heatsink attached to it to prevent overheating.

When only one processor is used, the other S370 connector can be terminated with the optional S370 terminator to improve signaling.

For memory installation, refer to the motherboard User's Manual.

Installing S370 CPU

Locate the ZIF socket and open it by first pulling the lever sideways away from the socket then upwards to a 90-degree angle. Insert the CPU with the correct orientation. The notched corner should point towards the end of the lever. Because the CPU has a corner pin for two of the four corners, the CPU will only fit in the orientation as shown. Once completely inserted, close the socket's lever while holding down the CPU.

4. Hardware Setup

• 4-5   Fan Heatsink

The CPU must have a fan heatsink that covers the face of the CPU.

CPU Fan Power
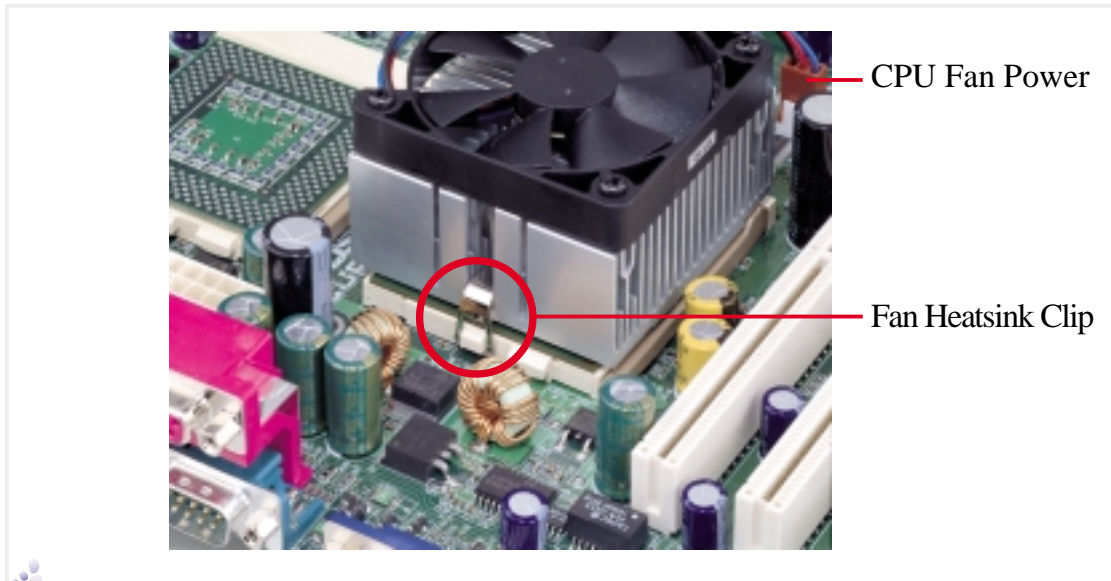
Fan Heatsink Clip

Fan Heatsink Attachment

To install the fan heatsink, first align the fan heatsink over the mounted CPU. Attach the heatsink clip over the clip attach point as shown above. Connect the fan power plug to the motherboard.

To remove the fan heatsink, reverse the installation procedure.
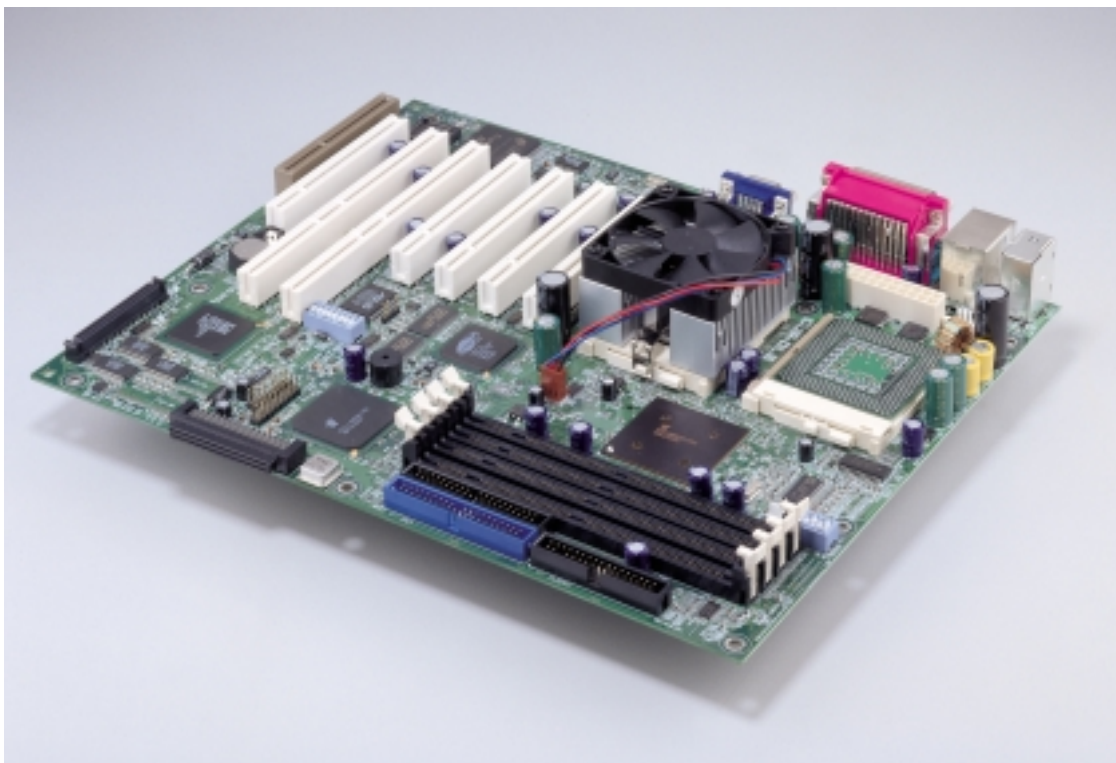
4. Hardware Setup

• 4-6   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.

Cable

Chassis Intrusion Switches
(one on each side)

from the two Chassis
Intrusion Switches

Motherboard's
Chassis Intrusion Lead

(No Connection)   GND

Chasis Signal
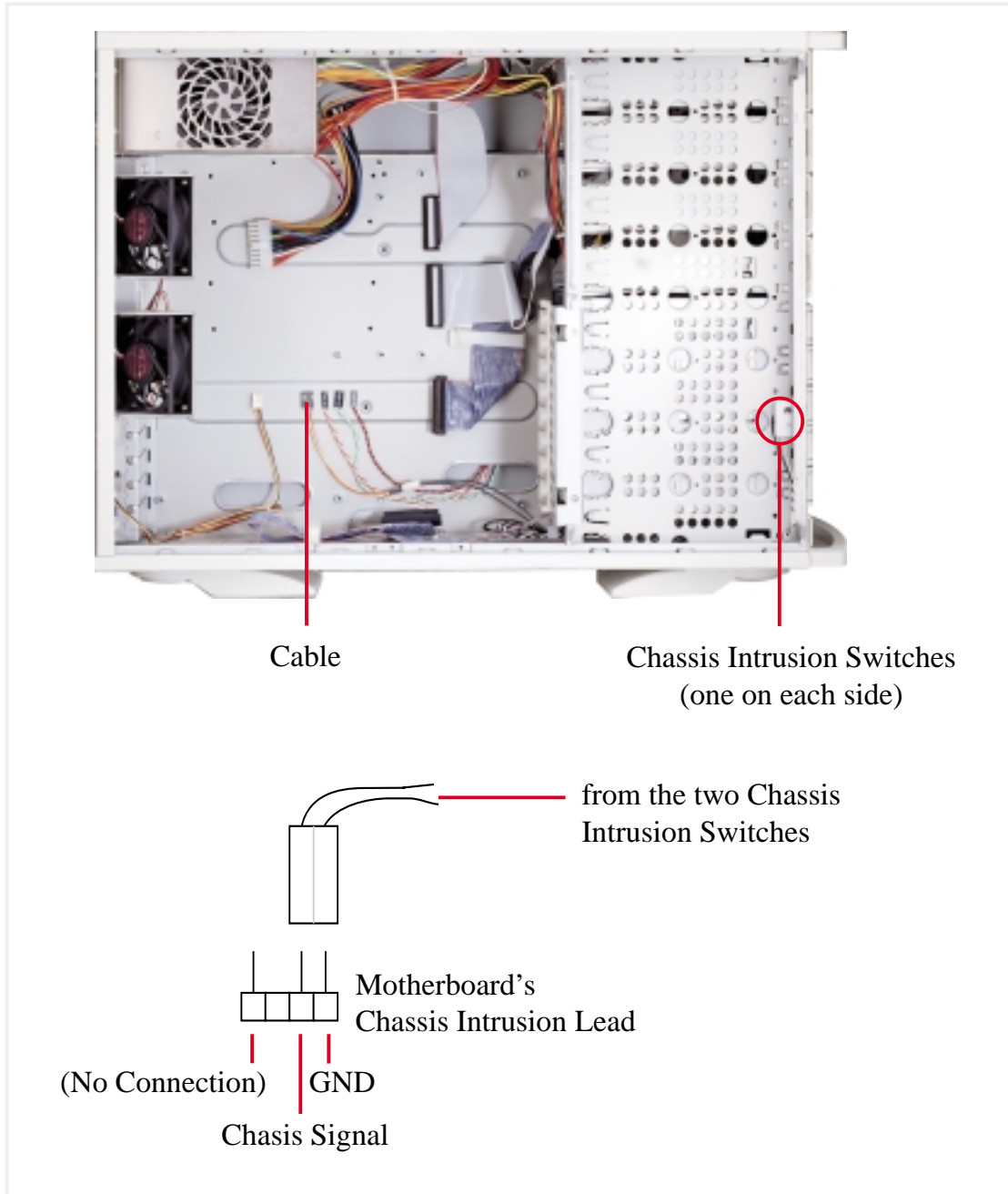
4. Hardware Setup

• 4-7   Expansion Cards

Expansion cards can be easily installed just like on any standard PC. Up to 7 PCI cards can be installed.

Contact

CAUTION

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

4. Hardware Setup

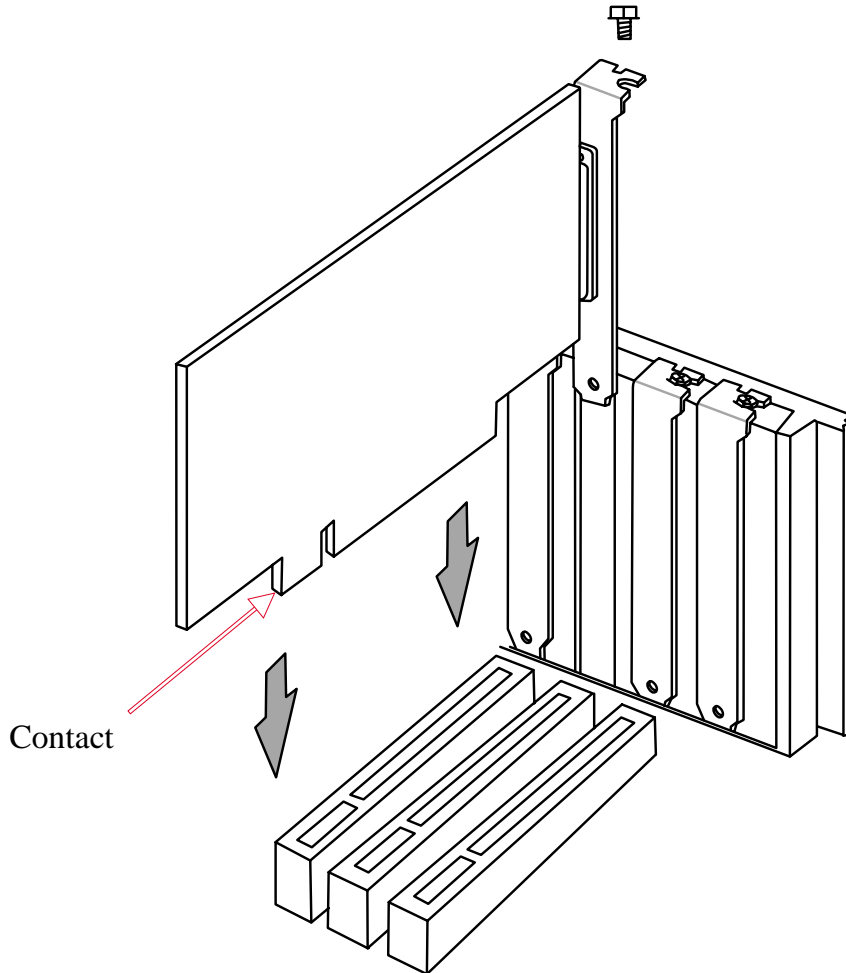## • 4-8   Fixed Storage Devices

Internal fixed storage devices are mounted on removable trays. There are four available, one for a floppy device and another three for full-size devices.

Floppy Drive and CD-ROM

The floppy drive fits in the top-most bay along with the power button. A CD-ROM can fit into either the second, third, or fourth bay from the top. 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.
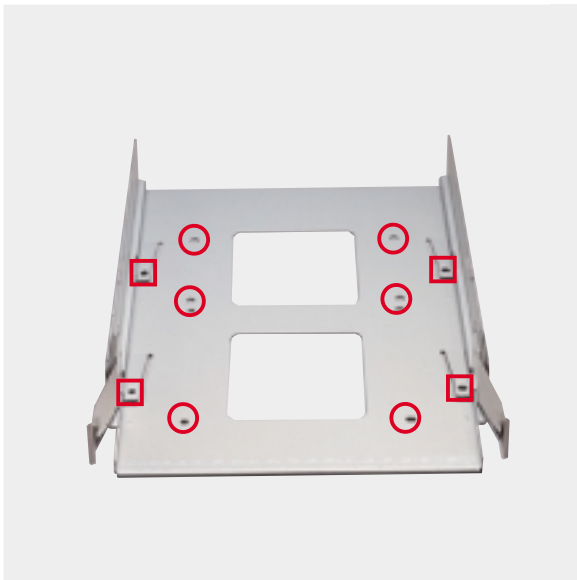
Fixed Storage Device Tray

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.

4. Hardware Setup

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 screw driver from the front.

Storage Device Spacers

A floppy drive spacer is used to cover the floppy drive and power button. A standard storage device spacer is used to cover the CD-ROM, tape drive, or additional CD-ROMs. You should purchase an extra spacer for each storage device.
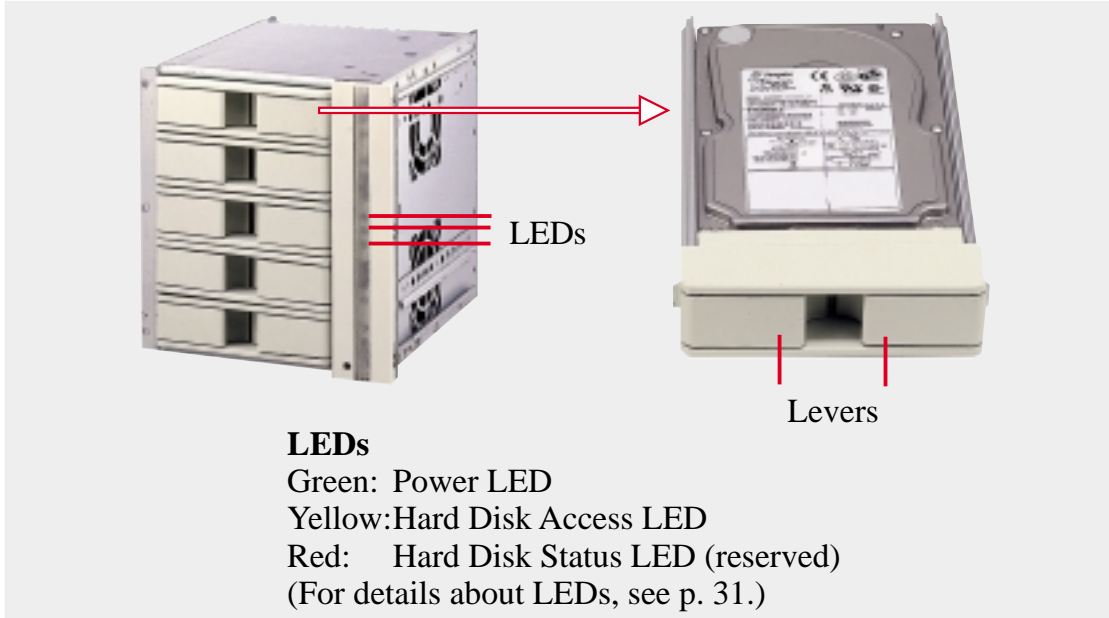
Floppy Drive Spacer

Fixed Device Spacer

• 4-9   Five-Tray Hot-Swap Bay

Maximum uptime in a server requires devices that can be easily replaced or "swapped." The main hard drives are mounted in internal hot-swap trays for easy replacement. The AP2300 hot-swap bay has two different models: Five-tray hot-swap bay and three-tray hot-swap bay. The 1.0 inch SCA hot-swap bay can accommodate five 1.0 inch hard disk drives.

LEDs

Levers

LEDs
Green: Power LED
Yellow: Hard Disk Access LED
Red: Hard Disk Status LED (reserved)
(For details about LEDs, see p. 31.)

• 4-10 Three-Tray Hot-Swap Bay

The 1.6 inch SCA hot-swap bay can accommodate three 1.6 or 1.0 inch hard disk drives.

LEDs
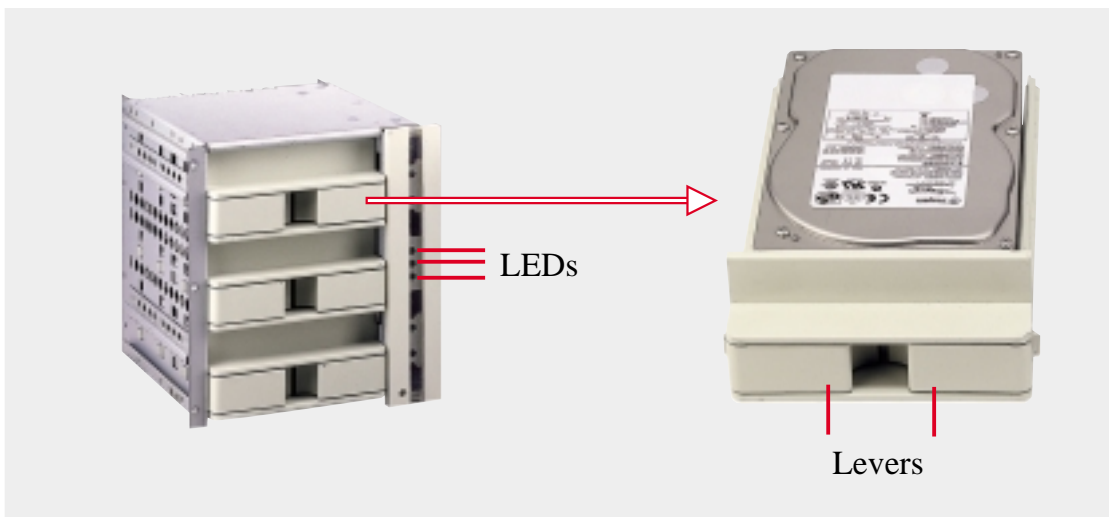
Levers

IMPORTANT

Each SCA hot-swap bay provides an aluminum carrier only for a single SCSI hard disk drive.
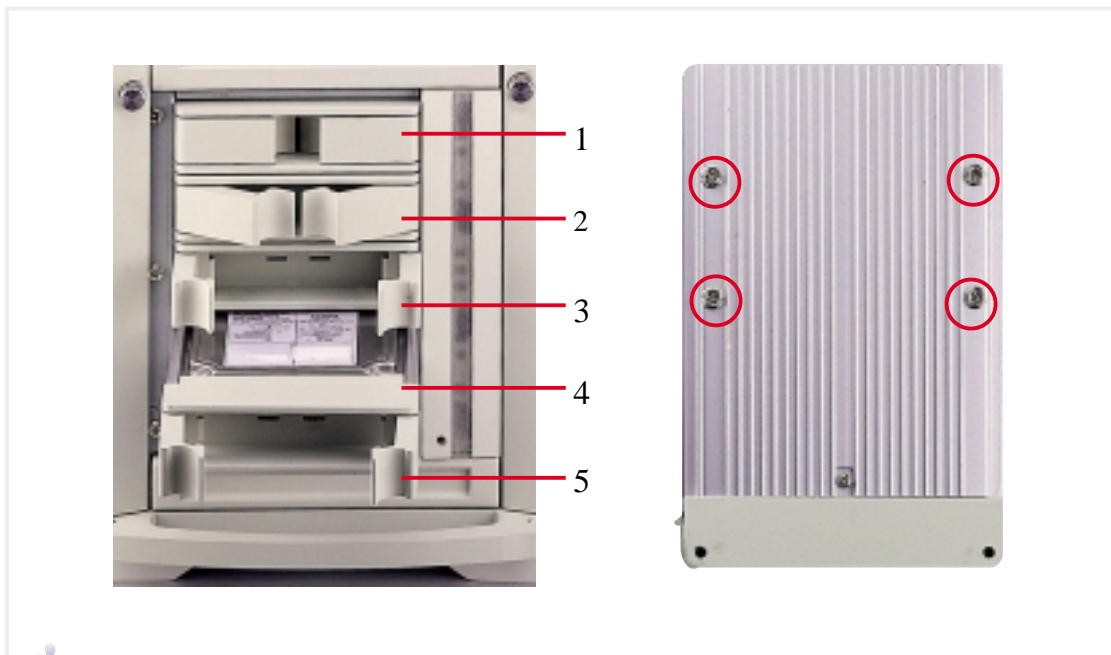
🦶 *Hot-Swap Tray*

There are two levers on the front of the hot-swap tray to help release or lock the tray. To remove the tray, extend both levers and pull on both levers. To install the tray, push the tray firmly into the bay with the levers extended, then close the levers.
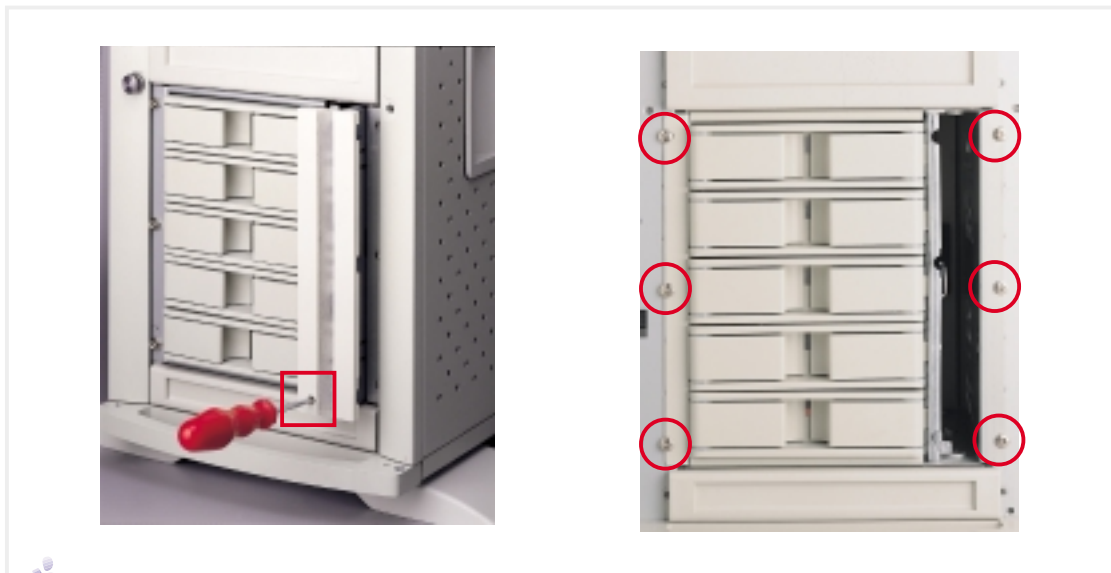
🦶 *Hot-Swap Bay*

To remove the hot-swap bay, release the front cooling fans first by pressing the eject mechanism with a small screwdriver. Remove the six retaining screws as circled above and then the entire hot-swap bay can be slid out of the chassis.

• 4-11 Front Cooling Fans

The front cooling fan module consists of a control board, a hard disk drive LED message LED board, and two cooling fans. The hard disk drive message LED board mounted in the front of the cooling fan module consists of five sets of LEDs to represent the status of up to five hard disk drives. Each set has three LEDs which can show the power, activity, and status of each hard disk drive.

The front cooling fans' main purpose is to cool the hard disk drives. These fans can be removed by using a small screw driver to push the eject mechanism in the fan module. The eject mechanism is behind a small hole as boxed on **page 29**. There are two individual 2 1/4 inch (6cm) fans secured by four screws on each fan. The ASMA (ASUS Server Management Agent) software will report an error message when any of these two fans malfunctions.
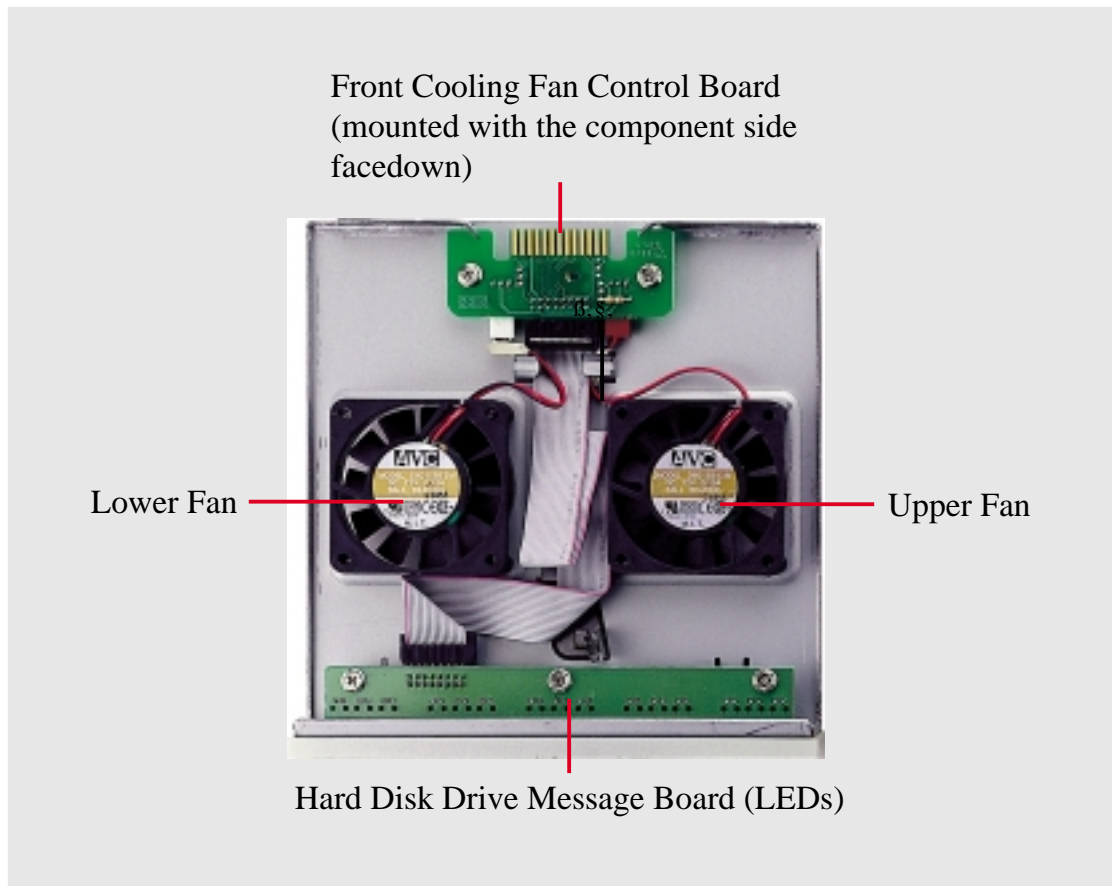
Front Cooling Fan Control Board
(mounted with the component side
facedown)

Lower Fan

Upper Fan

Hard Disk Drive Message Board (LEDs)

IMPORTANT

Usually, the rotation of the fan sends air toward the manufacturer's label on the center of the fan.

Connects to the SCSI
Back plane Board

8 1
16 9

LED Board Header
(connects to the LED
board through a
ribbon cable)

Pin 1

3-pin
Fan Header

3-pin
Fan Header
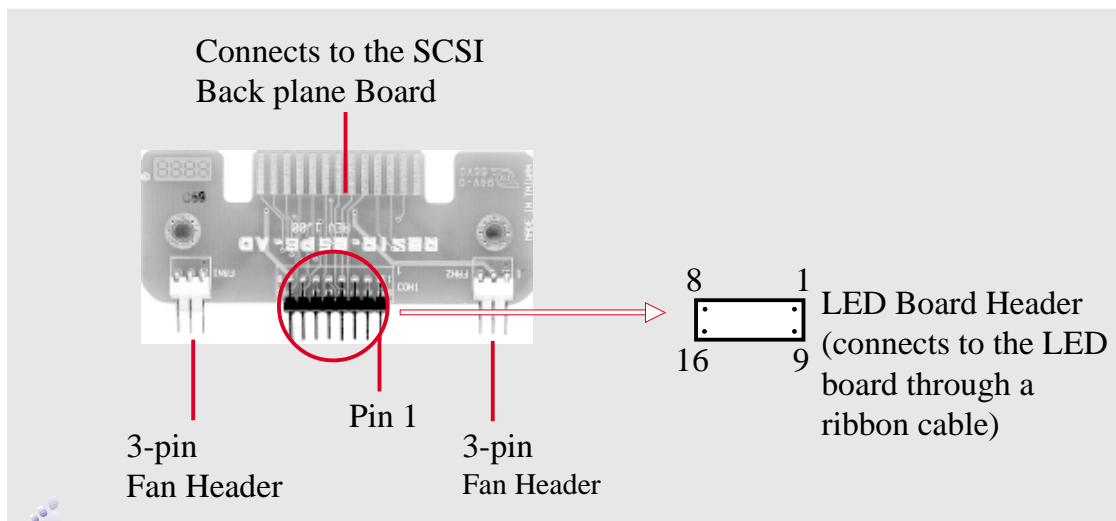
Front Cooling Fan Control Board

A cable connects the front cooling fan control board and the hard disk drive message board. Orient the red markings on each end of the cable to pin 1.

Pin 1

8 1
16 9

First Set
of LEDs
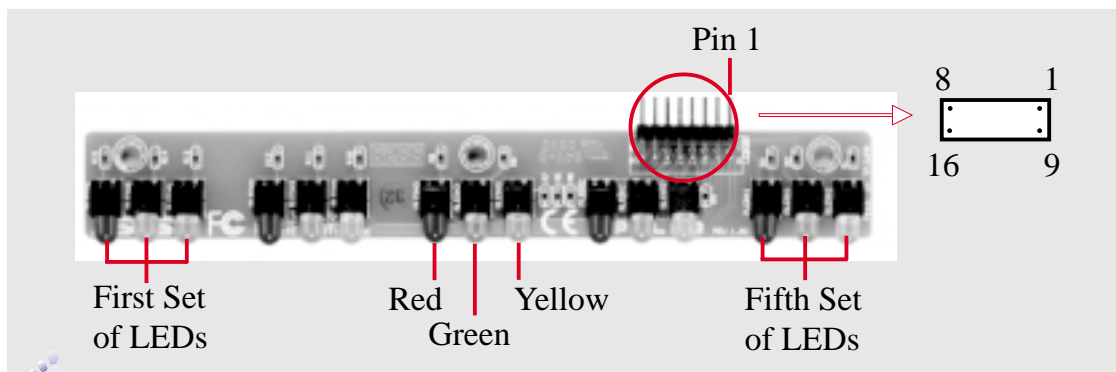
Red Yellow
Green

Fifth Set
of LEDs

Hard Disk Drive Message Board

Orient the red markings on the other end of the cable to pin 1.

Message LED Description
Red: Hard Disk Status LED
Green: Power LED
Yellow: Hard Disk Access LED

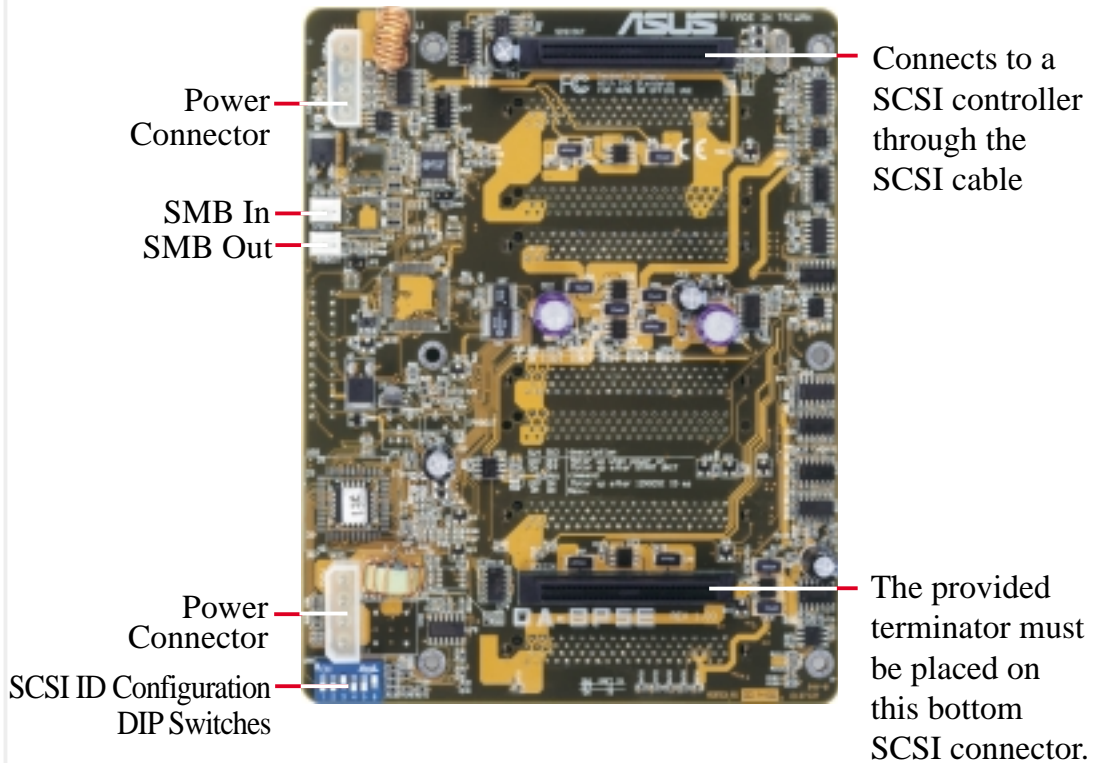| Power LED	Status LED	Description
Off	Off	Power subsystem OK and ready for hard drive insertion
On	Off	Hard disk drive is ready for operation
On	On	Hard disk drive failure (*)
On	Fast Flash	RAID is rebuilding (*)
On	Slow Flash	Hot-spare hard disk drive ready (*)
Fast Flash	On	Hard disk drive failure/short circuits

* Must work with ASMA software.
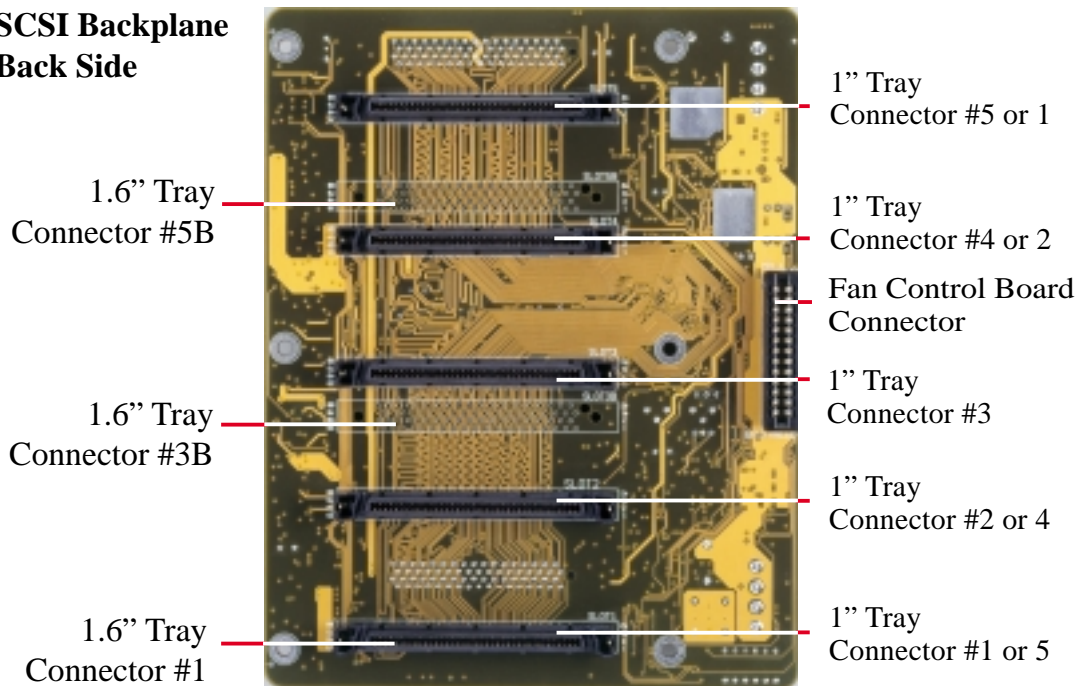
4. Hardware Setup

• 4-12 SCSI Backplane

The SCSI backplane of this server is comprised of one SCSI board (DA-BP5E) with Ultra2 SCSI connectors, power inputs, and SCSI ID DIP switches. This configuration allows Ultra2 SCSI SCA hard disk drives to be docked into the server. The SCSI board (DA-BP5E) does not have auto termination, therefore the included terminator block must be used on the end connector.

SCSI Backplane Front Side

Power Connector

SMB In
SMB Out

Power Connector

SCSI ID Configuration DIP Switches

Connects to a SCSI controller through the SCSI cable

The provided terminator must be placed on this bottom SCSI connector.

SCSI Backplane Back Side

1.6" Tray Connector #5B

1.6" Tray Connector #3B

1.6" Tray Connector #1

1" Tray Connector #5 or 1

1" Tray Connector #4 or 2

Fan Control Board Connector

1" Tray Connector #3

1" Tray Connector #2 or 4
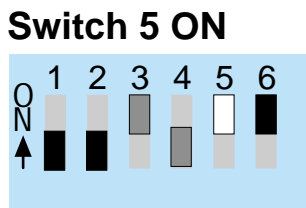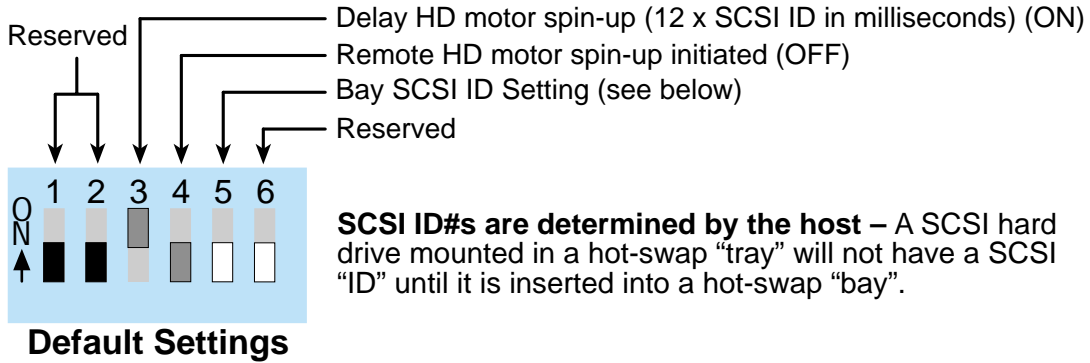
1" Tray Connector #1 or 5
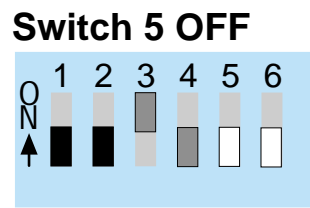
4. Hardware Setup

• 4-13 SCSI ID Setting

SCSI ID settings are made through DIP switches located on the SCSI backplane board. The SCSI backplane board has 6 DIP switches to set the hard drive's power-ON delay and SCSI ID.

Reserved

Delay HD motor spin-up (12 x SCSI ID in milliseconds) (ON)
Remote HD motor spin-up initiated (OFF)
Bay SCSI ID Setting (see below)
Reserved

ON
1 2 3 4 5 6

Default Settings

SCSI ID#s are determined by the host – A SCSI hard drive mounted in a hot-swap "tray" will not have a SCSI "ID" until it is inserted into a hot-swap "bay".

Switch 5 ON

ON
1 2 3 4 5 6

Resulting SCSI ID#s

Top Bay	ID
Tray5	13
Tray4	09
Tray3	05
Tray2	03
Tray1	01
Bottom Bay	

Switch 5 OFF

ON
1 2 3 4 5 6

Resulting SCSI ID#s

| Top Bay	ID
Tray5	12
Tray4	08
Tray3	04
Tray2	02
Tray1	00
Bottom Bay	

NOTE

All SCSI devices must have a SCSI identification number that is not in use by any other SCSI device. SCSI devices vary in how they set the ID number. Refer to the product manual for any additional devices that you may install for details on how to set its ID number.

4. Hardware Setup

• 4-14 SCSI Termination

Terminating the SCSI bus "chain" is necessary for SCSI devices to work properly. If the last device on the SCSI bus chain does not have termination jumpers, you must terminate it using a male or female terminator as illustrated below.
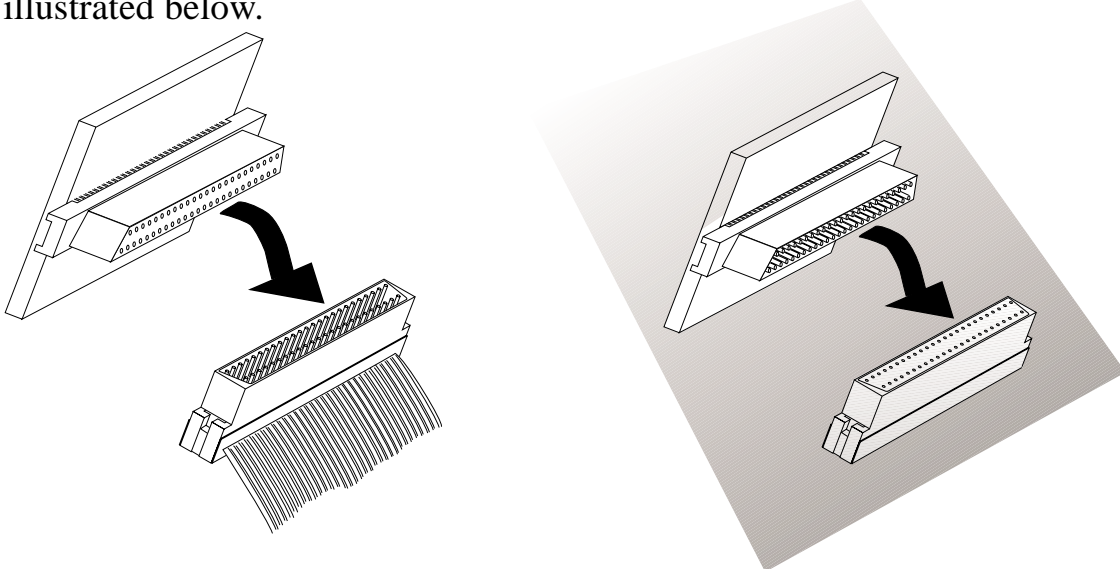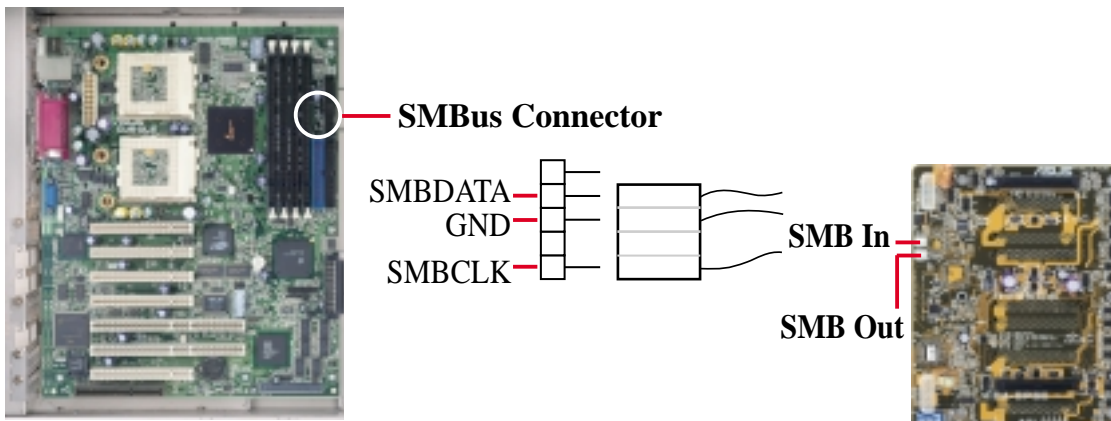

Female Terminator for SCSI cable

Male Terminator for SCSI Backplane

• 4-15 SMBus Connector

To use SMBus devices, connect the motherboard's SMBus connector to the SMB In connector on the DA-BP5E SCSI backplane board. Another SMBus device can be connected to the SMB Out connector on the backplane board.
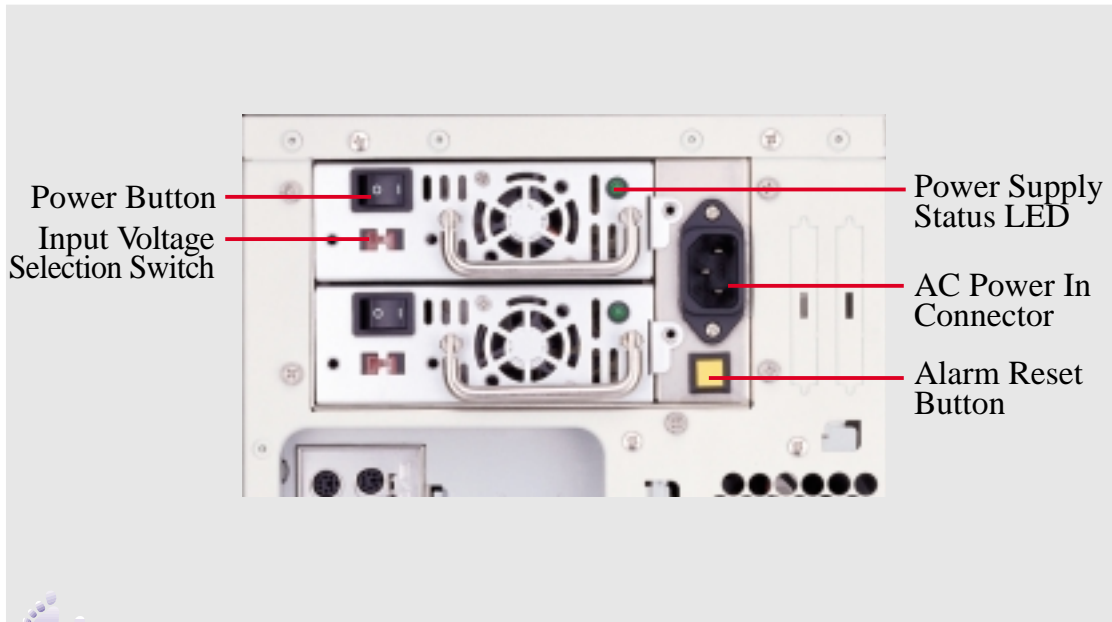

SMBus Connector

SMBDATA
GND
SMBCLK

SMB In

SMB Out

CUR-DLS Motherboard

DA-BP5E SCSI Backplane Board

4. Hardware Setup

• 4-16 Redundant Power Supply

Power Button

Input Voltage
Selection Switch

Power Supply
Status LED

AC Power In
Connector

Alarm Reset
Button

Power Supply Components

The redundant power supply consists of two identical ATX power modules. The LED indicators light when both the input and output voltages are stable, and dim when either the input or output voltage fails. A button located on the bottom-right corner of the power supply disables the sounding of the audible alarm.

Power Module Rating

The power modules are rated at 300W each and have passive current sharing on all outputs. Each power module supplies up to 300W to share the load but two modules combined do not provide 600W. If one power module fails, 300W load is supported using one power module.

> **IMPORTANT**
>
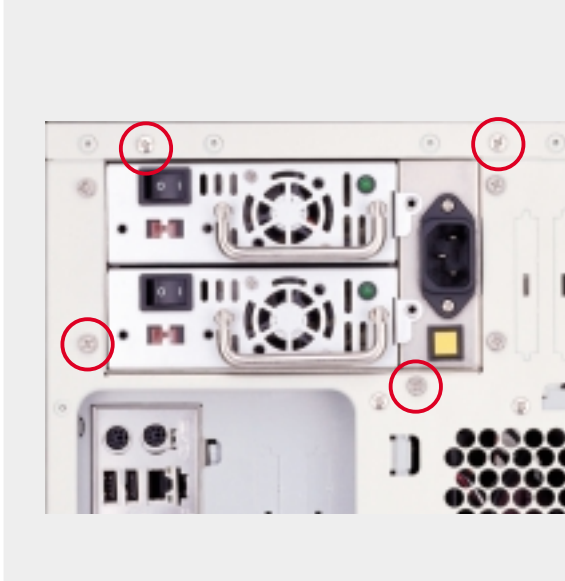> Before turning on the server, make sure the power input voltage is set to comply with the standard used in your country (220V-240V or 110-120V).

> **NOTE**
>
> An optional 400W standard power supply module may be ordered on demand.

4. Hardware Setup

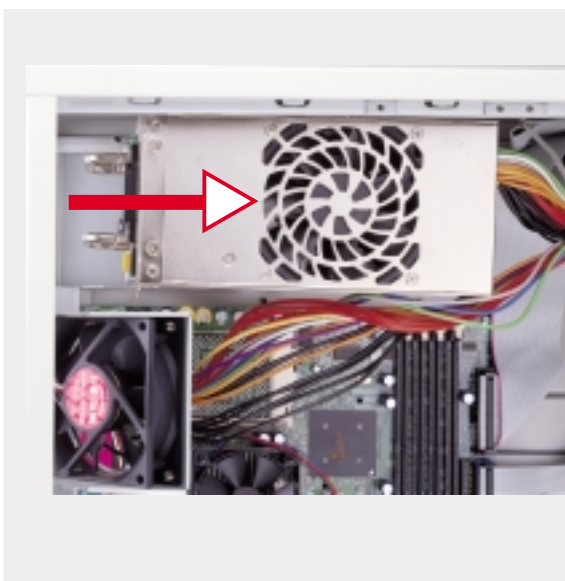

Power Supply Mounting

Located in the back of the chassis, the power supply unit is secured by 4 screws.

Removing One Power Supply Module

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

Removing the Entire Power Supply Unit

Unplug all power cords. Remove the four screws securing the power supply unit, and then slide the power supply unit toward the front of the chassis (as pointed).

4. Hardware Setup

Power Supply Information

Input Voltage

Range	Min (V)	Nom (V)	Max (V)
Range 1	90	120	137
Range 2	180	230	265

DC Output Characteristics

Output Voltage	+5V	+3.3V	+12V	-5V	-12V	+5Vsb
Max Load	35A	15A	15.0A	0.5A	0.8A	1.5A
Min Load	2.5A	0.5A	0.5A	0A	0A	0A
Max Power	175W*		105W*	2.5W	9.6W	7.5W
Max Power	280W*			2.5W	9.6W	7.5W
Load Reg. %	±5%	±5%	±5%	±5%	±10%	±5%
Cross Reg. %	±5%	±5%	±5%	±5%	±10%	±5%
Line Reg. %	±1%	±1%	±1%	±1%	±1%	±1%
Ripple %	50mV	50mV	120mV	100mV	120mV	50mV
Ripple & Noise	100mV	100mV	200mV	200mV	200mV	100mV

* Total output power for 5V and 3.3V combined should not exceed 175Watts.
  Maximum 12V output is 105Watts. Total output power for 5V and 3.3V
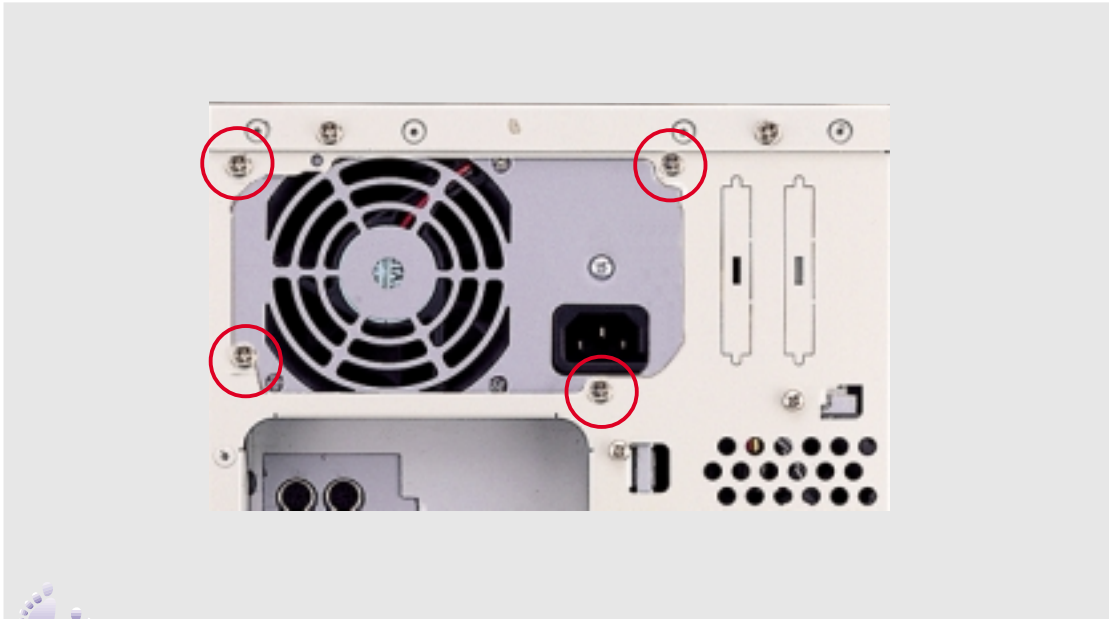 combined should not exceed 280Watts.

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.

4. Hardware Setup

•4-17 Standard Power Supply (Optional)

Power Supply Mounting

Mounting and unmounting the power supply must be done from the inside. Four screws are used to secure the power supply to the chassis back side.

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$_{p-p}$
2	4.80V	5.00V	5.25V	50mV$_{p-p}$
3	11.40V	12.00V	12.60V	120mV$_{p-p}$
4	-4.50V	-5.00V	-5.50V	120mV$_{p-p}$
5	-10.92V	-12.00V	-13.20V	120mV$_{p-p}$
6	4.75V	5.00V	5.25V	50mV$_{p-p}$

Output Current Capacity

Output	Nom (Vdc)	Max (A)	Min (A)
1	3.3V	*20.0	1.0
2	5.0V	*45.0	2.0
3	12.0V	12.0	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 should not exceed 210W.

Input Voltage

Range	Min (V)	Nom (V)	Max (V)
Range 1	90	120	137
Range 2	180	230	265

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.

4. Hardware Setup
Standard Power Supply

4. Hardware Setup

• 4-18 Power Supply Requirement

Power Supply Requirement Calculation Table

Item	Volts	Amp	x	Qty.	=	Total Amp	Total Watts
Motherboard*	3.3V						54.78
	5.0V						147.40
	12.0V						4.00
Hard Drive	5.0V		x		=		
	12.0V		x		=		
CD-ROM	5.0V		x		=		
	12.0V		x		=		
Tape Drive	5.0V		x		=		
	12.0V		x		=		
Floppy Drive	5.0V		x		=		
	12.0V		x		=		
System Fans	5.0V		x		=		
	12.0V	0.3	x		=	0.6	7.2
Other	3.3V		x		=		
	5.0V		x		=		
	12.0V		x		=		
Total Power							

* With 2GB SDRAM memory and 2 CPU fans (each consuming about 2Watts on 12.0Volts) installed.

5. Appendix

• 5-1   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.

Cable Limits	Max Data Transfer Rates	Max Devices
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 lenghts, 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.

5. Appendix

• 5-2 Glossary

ASMA (Asus Server Management Agent)
ASUS Server Management Agent is an SNMP software that provides hardware monitoring information to the Network Management Station (NMS). ASMA can report the computer fan speeds, working voltage, system temperature, and chassis intrusion events to the NMS. It can also enable or disable Automatic Server Restart (ASR) function from the NMS.

Hot-Swap
A hot-swap is the replacement of a connected device such as a hard drive without shutting down the computer system.

LVDS (Low Voltage Differential Signaling)
LVDS sends each data bit with two wires instead of one, reducing noise susceptibility and electromagnetic interference, allowing greater device connectivity and higher transmission frequencies.

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).

RJ-45
An 8-pin connector used in many computer networking devices. Female connectors are found on hardware devices, whereas male connectors are found on twisted pair cabling used to connect two networking devices.

SCA (Single Connector Attachment)
SCA is a technology that incorporates both power and signal into an 80-pin interface. The SCA interface is designed to facilitate hardware installation and to support hot-swapping.

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.

Ultra160 (Ultra3)
A new generation of high performance SCSI technology, Ultra160 provides data transfer rates of up to 160MB/sec.

UPS (Uninterruptible Power Supply)
A battery system that can provide short-term 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 as well as short-term power outages.

5. Appendix
Glossary

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