

AP6000
Dual Pentium® II Server
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:

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



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

Canadian Department of Communications Statement

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

I. Introduction

I. Introduction

You are reading the AP6000 server Hardware Reference Guide. The AP6000 is configured on the ASUS P2B-DS smart motherboard which uses the 440BX chipset from Intel which supports dual Pentium II processors and 100MHz front side Bus in order to accelerate even the most complicated server tasks.

This Reference Guide

This hardware reference guide provides information about the various components used in this server. All components in shown in this reference guide are optional and may be individually purchased to complete this server.

Server 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 corporate server.

- Motherboard: ASUS P2B-DS
- Chassis: ASUS AS-50
- Power Supply
- Pentium II Processor(s)
- DIMM memory modules
- Hard Disk Drives
- Floppy Drive
- CD-ROM Drive
- Ethernet Card
- RAID controller



I. Introduction

Server Features

Motherboard Features: ASUS P2B-DS

- **Processor:** (2) Intel Pentium II processors running at 66 or 100MHz Front Side Bus.
- **Memory:** (4) 168pin DIMM sockets for 8MB-1GB SDRAM/EDO with support for ECC and 100MHz SDRAM.
- **Super Multi-I/O:** (2) PCI Bus Master IDE Ports with Ultra DRAM-33 support, (2) floppy, (2) serial COM ports, (1) parallel, (1) PS/2 keyboard, (1) PS/2 mouse, (2) USB ports, and (1) IrDA connector.
- **SCSI:** Onboard Ultra-II SCSI controller and LVDS to single end converter with (2) wide SCSI connectors and (1) narrow SCSI connector.
- **Expansion Slots:** (4) PCI, (2) ISA slots, and (1) AGP port.

Chassis Features: AS-50

- **Chassis:** Tower server chassis with wheels
- **Backplane:** Wide-SCSI backplane with remote SCSI ID dip switches and power to support 8 wide SCSI hard disk drives.
- **Power:** ATX 350W/400W power supply with optional redundant power supply.
- **Device Bays:** Support for (1) 3.5inch floppy device, (3) 5.25inch devices, (8) hard disk drives in removable aluminum trays.

I. Introduction

Electrical Safety

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



DANGER: An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.

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.

During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communications lines.

To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.



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



WARNING: Adapters, planars, diskette drives, 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.

I. Introduction

Tools Required

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

Server Preparation

1. Unpack your server, do not connect the power cord.



IMPORTANT: Most servers use an AT power supply that has a fixed On and Off switch located on the front. This server uses an ATX power supply that is normally off until an electrical signal is given to the power supply through a *momentary* switch located on the front of the server. There is always a standby power in the power supply in order for ATX power supply features to work, therefore removing the power cord is necessary to prevent electrical shocks when working on the server components.

2. Unlock the keylocks if necessary. This server is equipped with three security locks to prevent unauthorized access. Turn the key counterclockwise to unlock and clockwise to lock the side panels or front door.
3. Open the front door and side panels to install final server components, such as CPU, Memory, Hard Disk Drives, expansion cards. Use this hardware reference guide along with your motherboard manual in order to make these installations.
4. Connect a Keyboard and Mouse (purchased separately)
5. Connect a VGA-compatible monitor (purchased separately)
6. Connect a printer to the parallel port if desired.
7. Connect server to network (an optional network card is needed)



WARNING: To prevent electrical shock or fire, be sure not to plug telecommunications/telephone cables into the network RJ45 connector in the server if one is installed.

8. Connect power cord to the server's power supply.
9. Connect Server to AC power - The power supply will automatically detect and adjust to 120VAC or 240VAC power.



WARNING: This server is designed for connection to a grounded (earthed) outlet. To reduce the risk of electrical shock or damage to your server, do not bypass the grounding plug.

I. Introduction

Starting the Server

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



When booting your server for the first time, hold the “Delete” key and enter BIOS setup in order to make settings. ISA cards requires that you set “IRQ XX Used by ISA : Yes” in BIOS PNP AND PCI SETUP in order for that IRQ to be reserved for your ISA expansion card. You need to set “Boot Sequence : A, C” in BIOS FEATURES SETUP in order to boot from a floppy diskette to setup your hard disk. Insert a bootable floppy diskette and select “Save & Exit Setup” from the BIOS main menu. Once your server has properly booted, an “A:\>” prompt will appear. Replace your boot disk with a RAID setup diskette and setup your RAID. Reboot your server with the operating system boot disk in order to install drivers for your devices (such as CD-ROM and SCSI devices) and install your server operating system. You may be prompted for manufacturer supplied driver diskettes for each device on your server if they are not included in the operating system setup drivers.



NOTE: Non-RAID hard disk drives can be setup using boot diskettes provided with the server operating system or with MSDOS “FDISK.EXE”. You must have the motherboard or other SCSI device driver diskettes when prompted by the operating system setup.

II. System Components

II. System Components

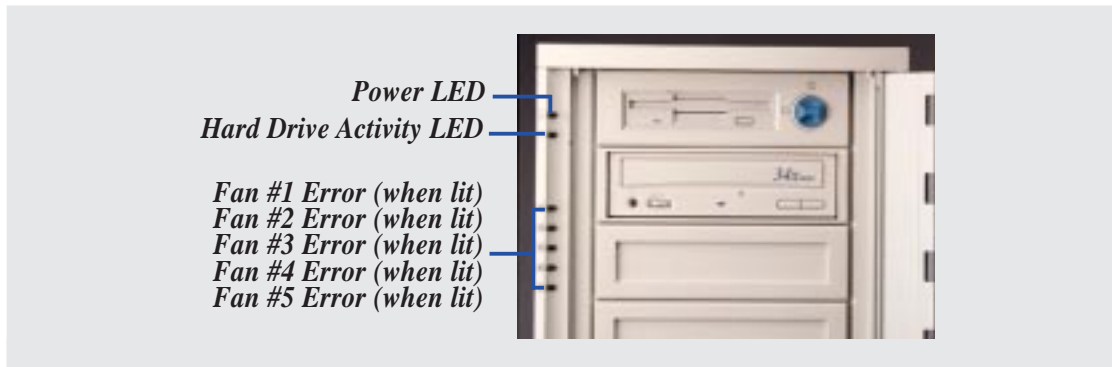
The front side of the server is provided to show the front exterior components of this server. The chassis is made of strong rust-resisting metal and covered with a protective ivory surfacing.

ATX Power Button

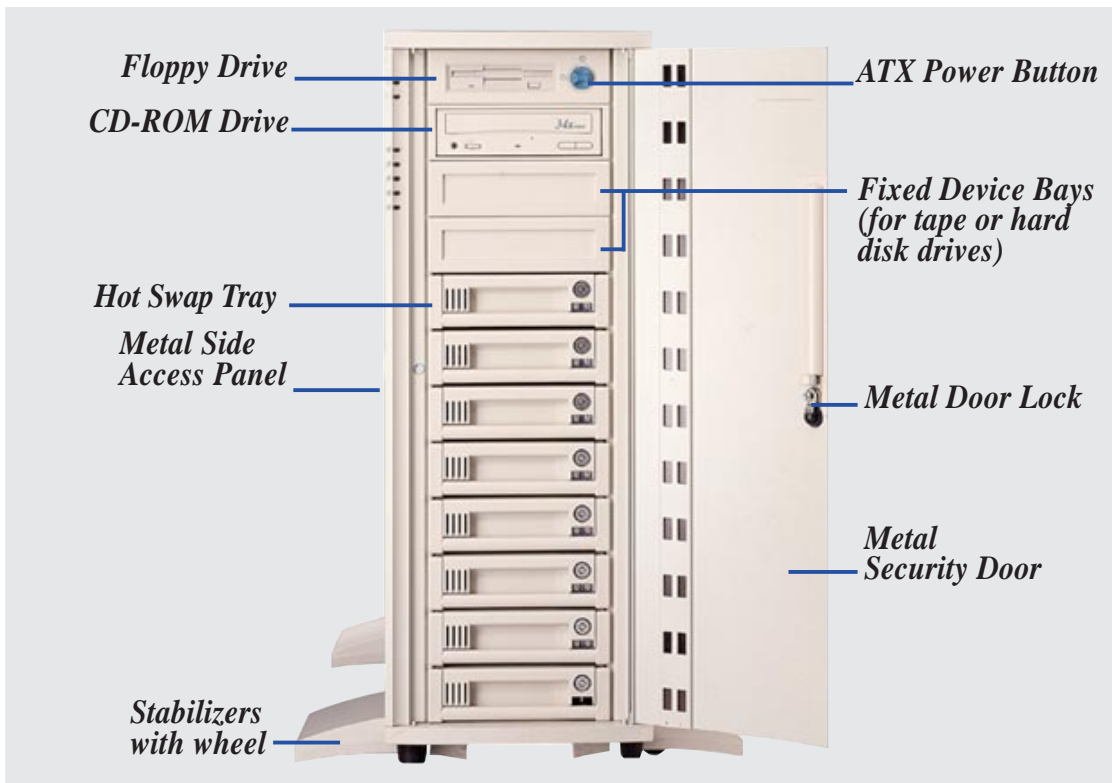
This server uses an ATX power supply. Turn the power switch clockwise and push in momentarily to turn on or turn off the power.

LED Indicators

The front of the server provides several LEDs to show the server's power, hard disk drive, and fan statuses.



LED indicators

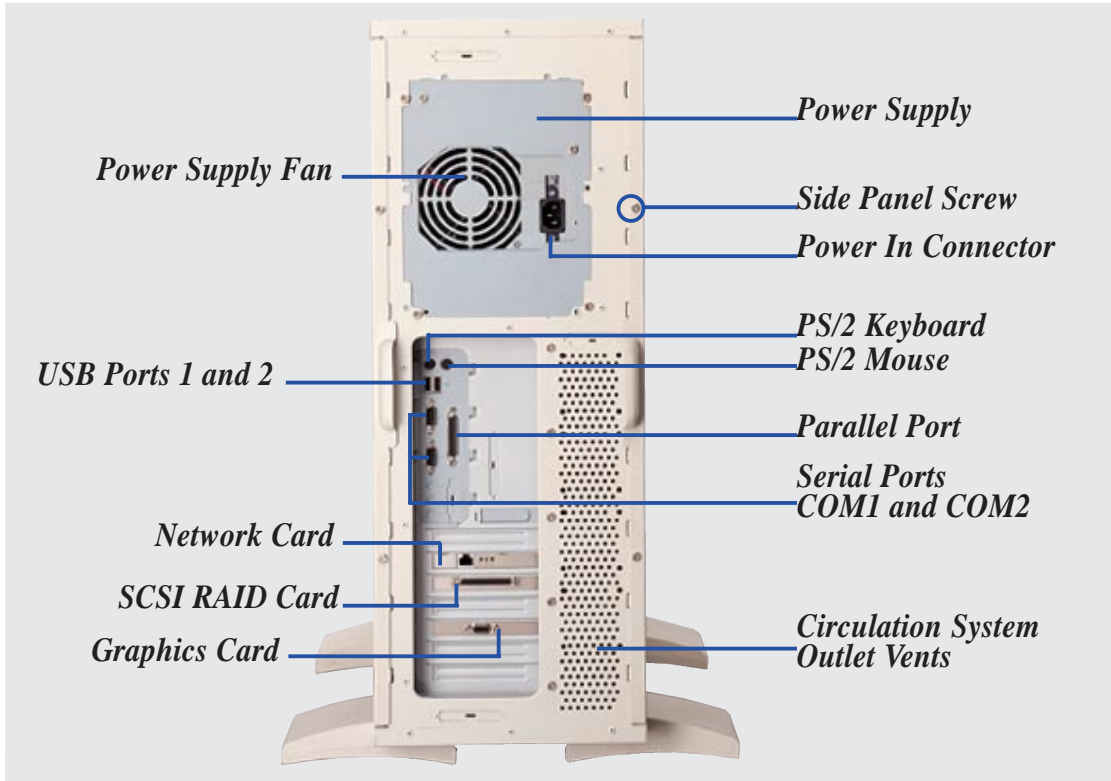


Server front side

II. System Components

Server Back Side

The back side of the server is provided to show the back exterior components of this server.

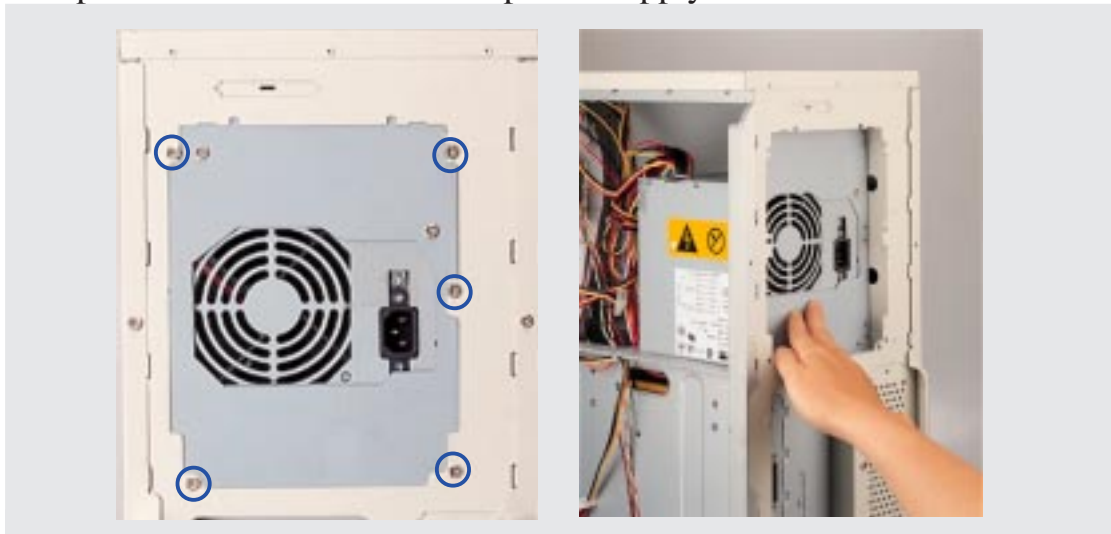


II. Components
Back Side

Server back side

Power Supply

The power supply must be inserted and removed from the right side of the chassis. Remove the right side panel in order to access the power supply. Several screws secure the power supply to the chassis as circled. A separate face plate is also mounted on the power supply.



Power supply back and side

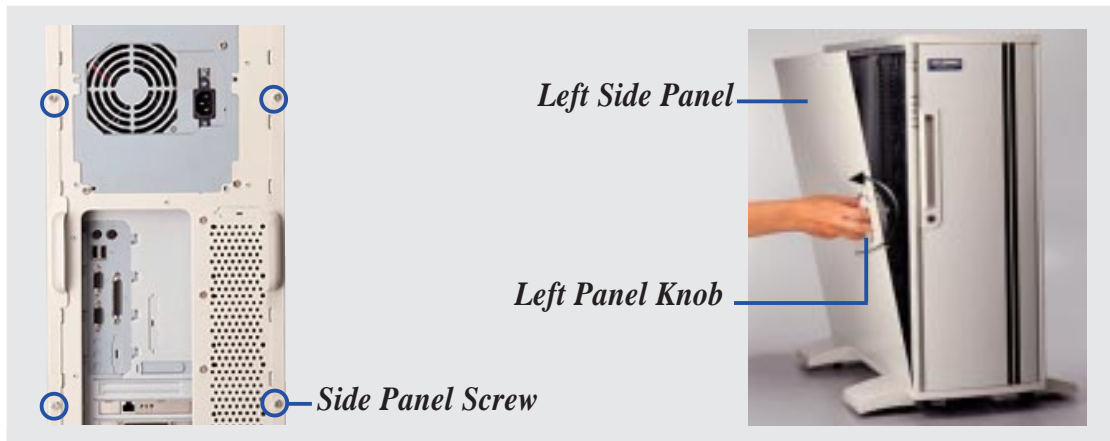
II. System Components

Chassis Panels

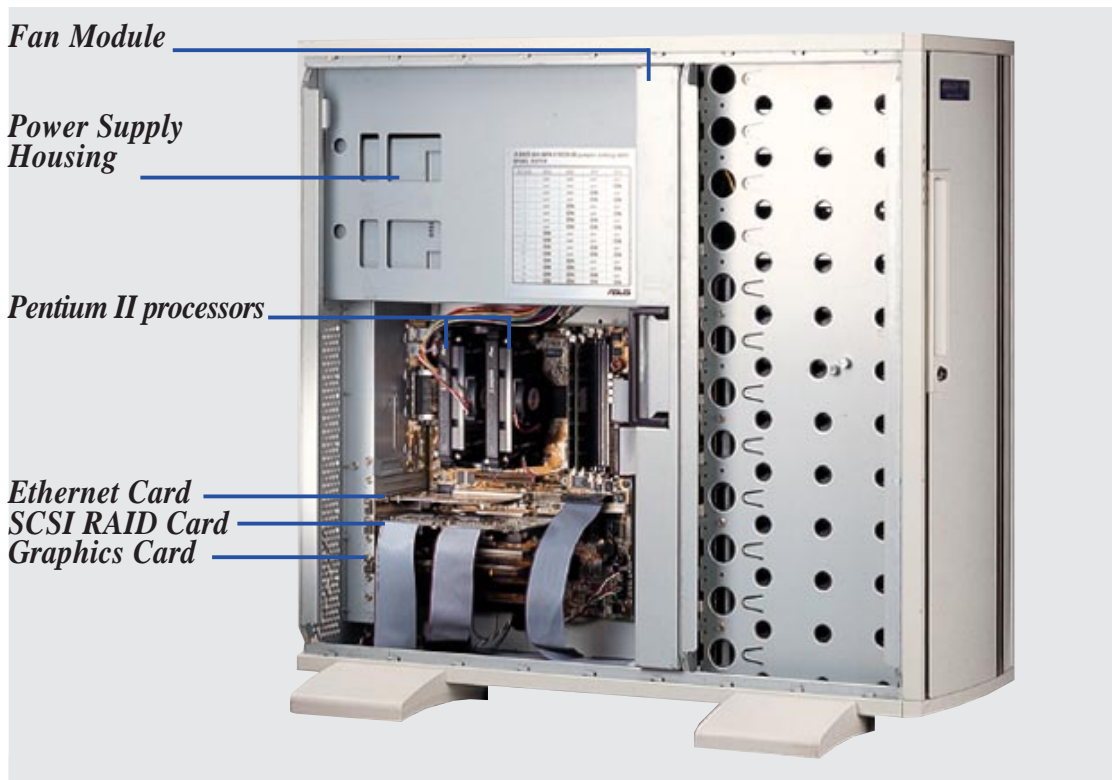
There are two panels on the chassis, one left side and one right side panel. Each panel is secured by two screws on the back of the server (as circled) and also by a CAM. The CAM has a rotating knob with its own keylock. Turn the knob counterclockwise to release and clockwise to secure. The keylock can be used to keep the knob from being turned by unauthorized people.



WARNING: Always remove the power cord when working on the server internal components to prevent electrical shocks or damage to electrical components. ATX power supplies always have standby power even when powered Off when plugged into an AC electrical outlet.



Left side panel



Server left side

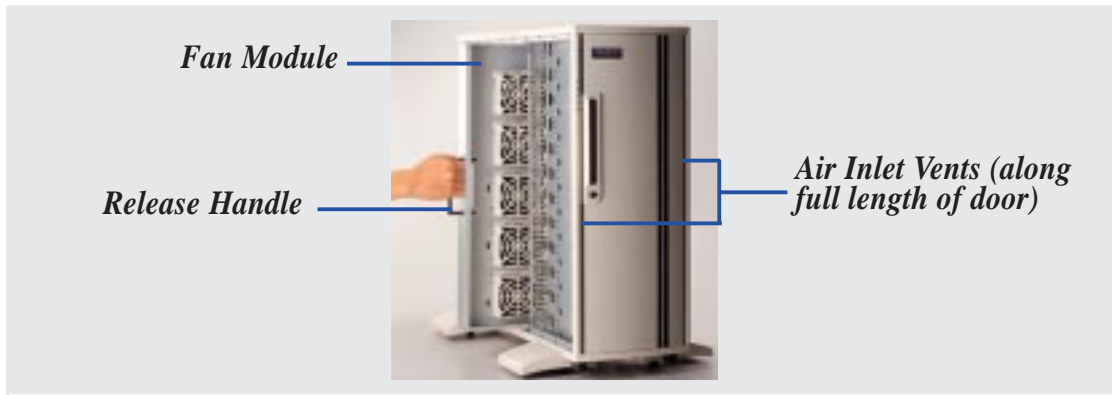
II. System Components

Circulation System

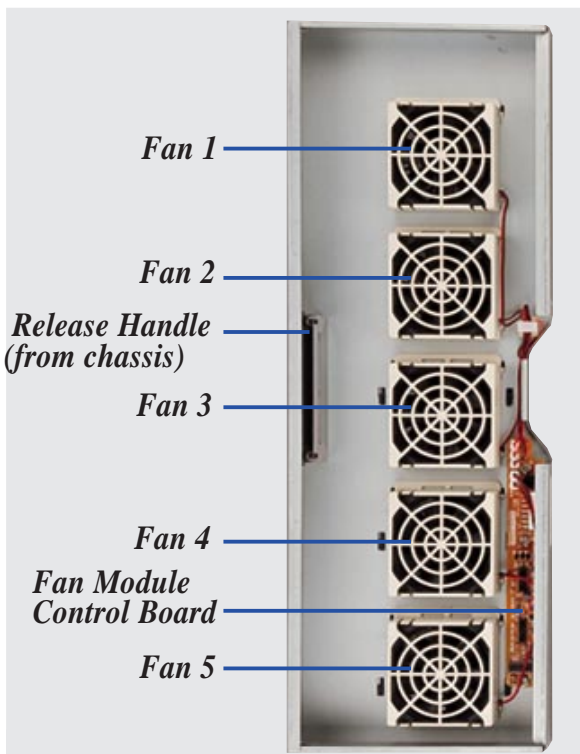
The server's air circulation system is comprised of five 3 inch (8 cm) fans mounted on a metal fan module. The circulation system cools the hard disk drives by bringing fresh air in from the front and forcing the hot air out through the back. It is important to keep the air surrounding the hard disk drives below 122°F (50°C) to prevent hard disk failures.

Fan Replacement

The fan module can be removed by pulling the handle and inserted by pushing. 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.



Removing or inserting the fan module



Fan module



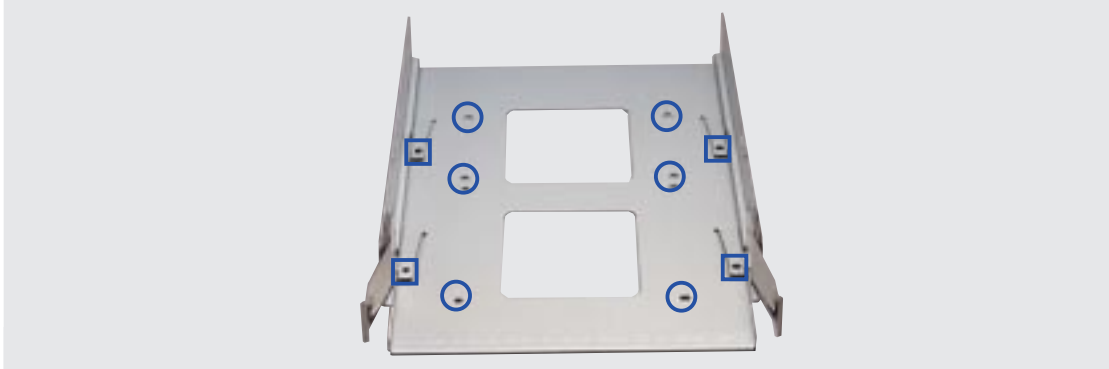
When replacing fans, be sure that the fan rotations are in the same direction. Use the manufacturer's sticker on one side of the fan as a reference as to the side. Air flows from the front of the server to the rear.

Fan Replacement (Reverse side)

II. System Components

Fixed Storage Device Tray

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



Fixed storage device tray

Fixed Device Bay Cover Clips

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



Removing the device bay cover clips

Fixed Device Bay Cover

After releasing the device bay cover clips, pry the cover open with a screw driver from the front.



Removing the device bay cover

II. System Components

Fixed Storage Devices

Floppy Drive and CD-ROM

The floppy drive fits in the topmost 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 inwards to release the clips. The tray slides in or out on the side rails.



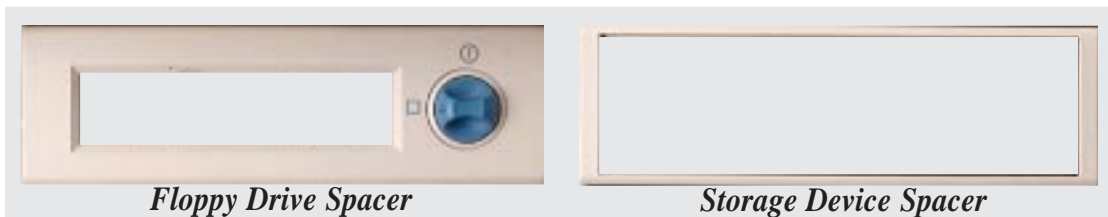
WARNING: If using an IDE hard disk drive in this large chassis, it is recommended that only *one* is installed and with the shortest IDE cable possible. Long IDE cables will cause poor signal. Select “...PIO/DMA Mode : 3/1” in BIOS CHIPSET FEATURES SETUP for a more stable IDE operation.



Removing Floppy and CD-ROM device

Floppy Drive and Storage Device Spacers

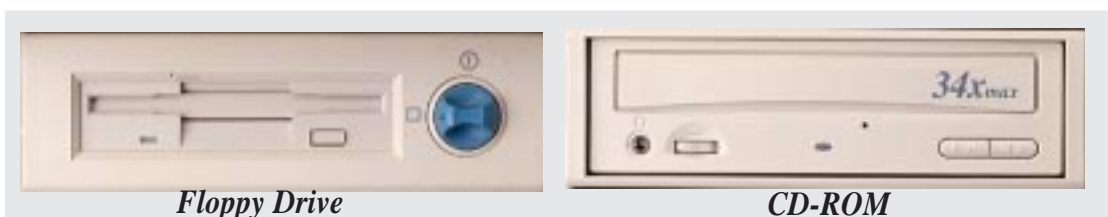
Spacers are required for cosmetics only. A floppy drive spacer is used to cover the floppy drive and power button. A standard storage device spacer is used to cover the CD-ROM, tape drive, or additional CD-ROMs. You should purchase an extra spacer for each storage device.



Floppy Drive Spacer

Storage Device Spacer

Floppy and CD-ROM drive spacers



Floppy Drive

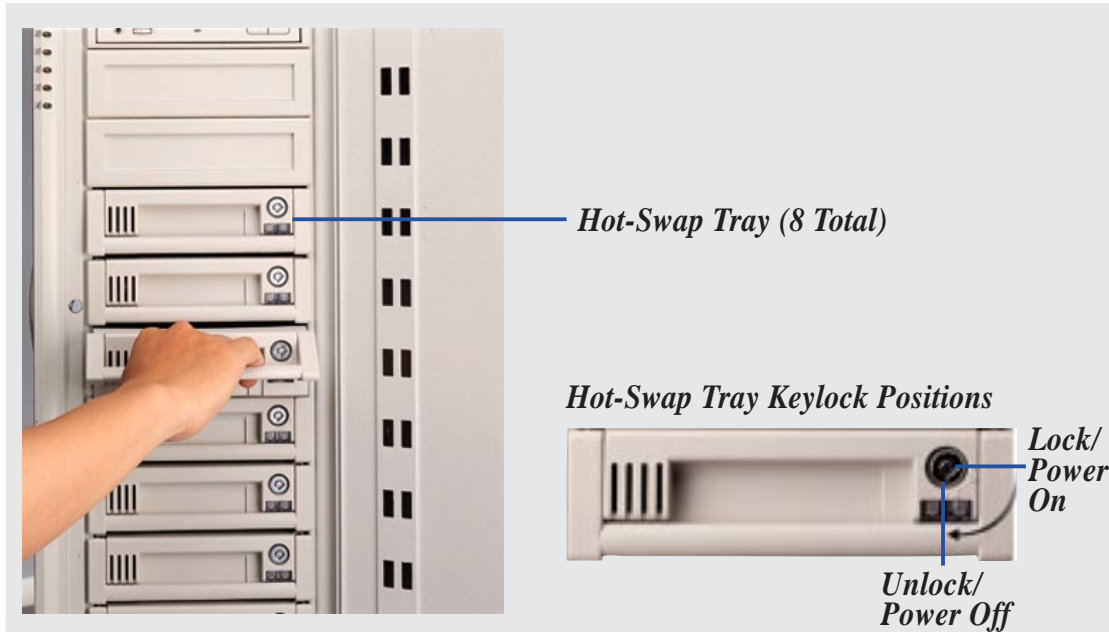
CD-ROM

Floppy and CD-ROM drives

II. System Components

Hot-Swap Trays

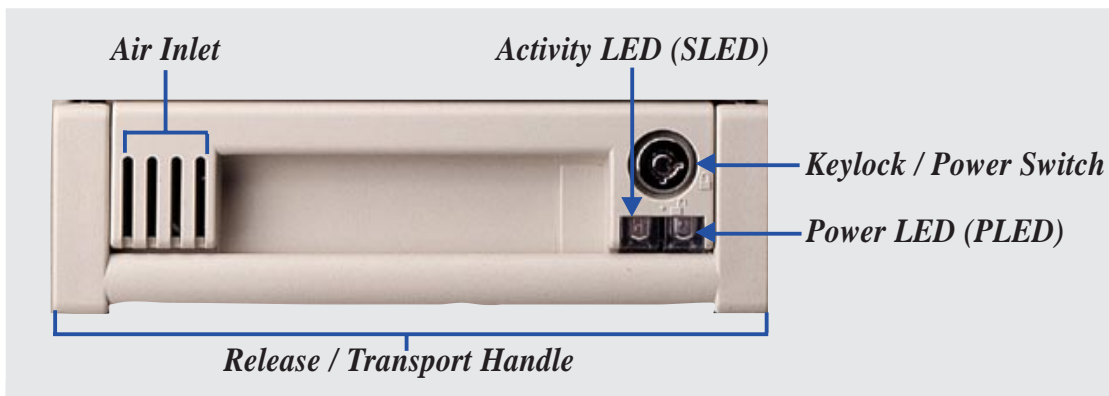
Maximum uptime in a server requires devices that can be easily replaced or “swapped.” The main hard disks are mounted in internal hot-swap trays for easy replacing. To remove the tray, unlock the tray and pull on the handle. A lock secures the handle and switches on or off the power to the hard drive.



Removing or inserting the hot-swap tray

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.

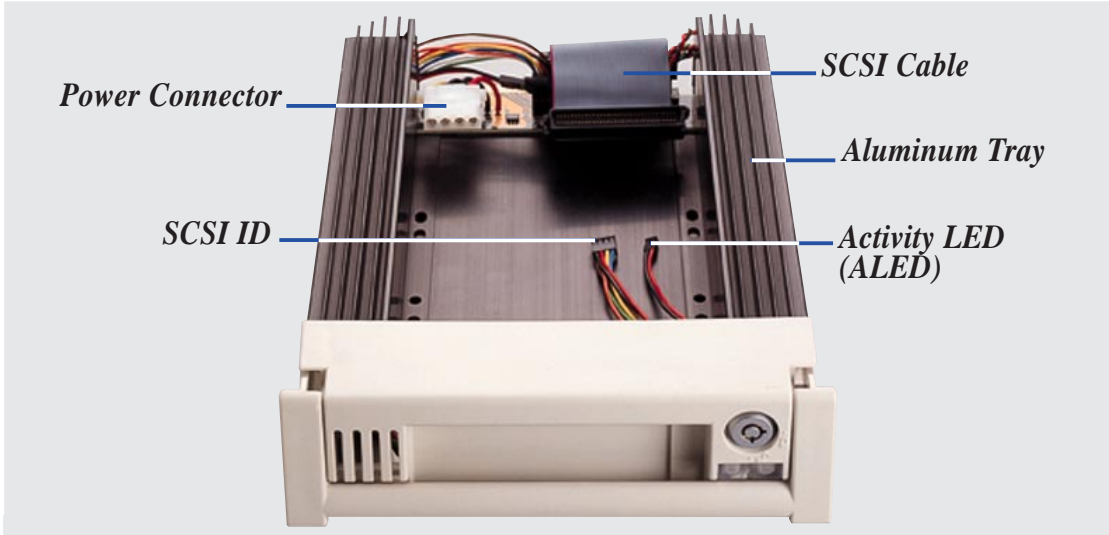


Hot-swap tray face plate

II. System Components

Hot-Swap Tray Usage

Each hot-swap tray provides an aluminum carrier for a single SCSI hard disk drives with a maximum height of 1 5/8 inch, width of 4 inches, and length of 6 inches. 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.



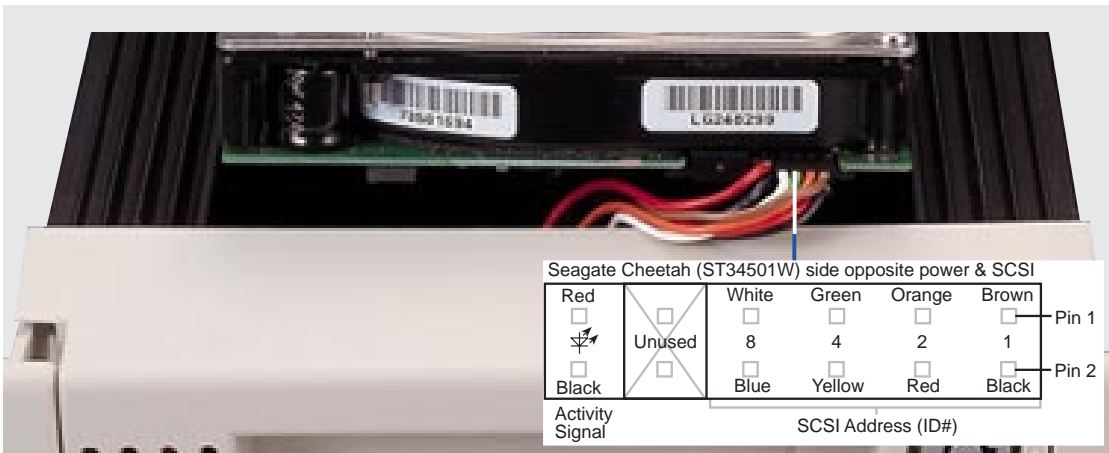
Hot-swap tray and its connectors

II. Components
Hot-Swap Trays

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.

IMPORTANT: The following 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.

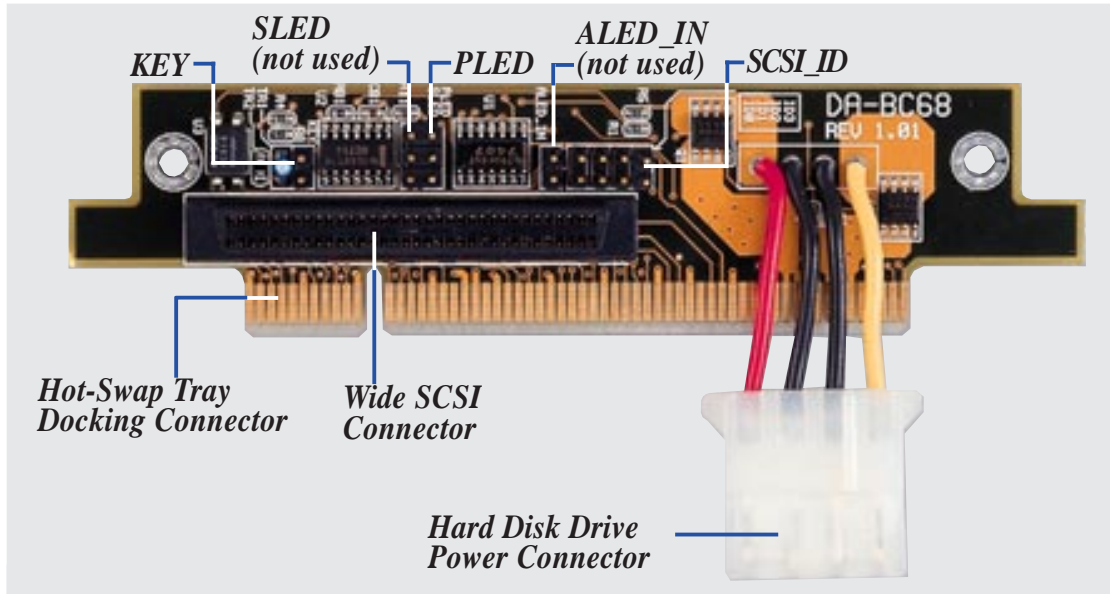


Hot-swap tray SCSI ID & activity LED wires connected (Seagate HD)

II. System Components

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 provides combines all the signal and power into one docking connector for a clean hot-swap unit.



Hot-swap tray connector board parts

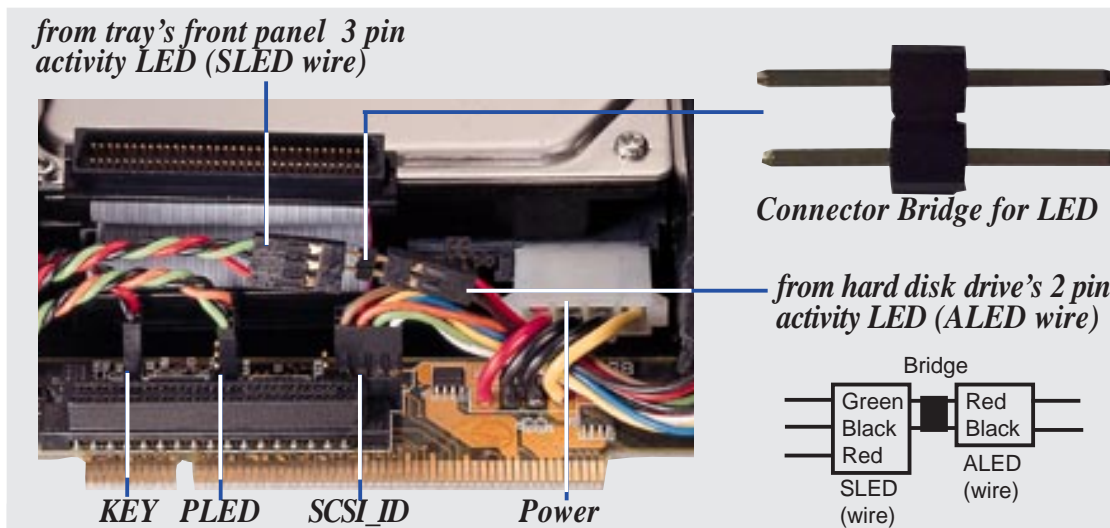
Hot-Swap Tray Rear Connections

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

PLED: These 2 pins connect to the power LED on the front of the tray to show when the connector board receives power.

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

SLED & ALED: These two wires are connected as illustrated below.



Hot-swap tray rear connections (Seagate HD)

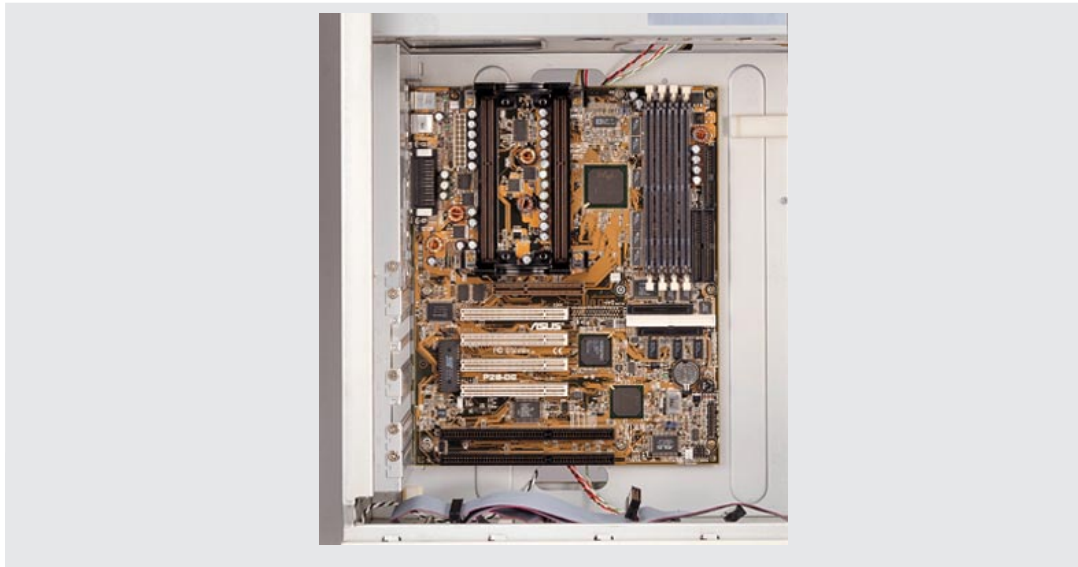
II. System Components

Motherboard Securing

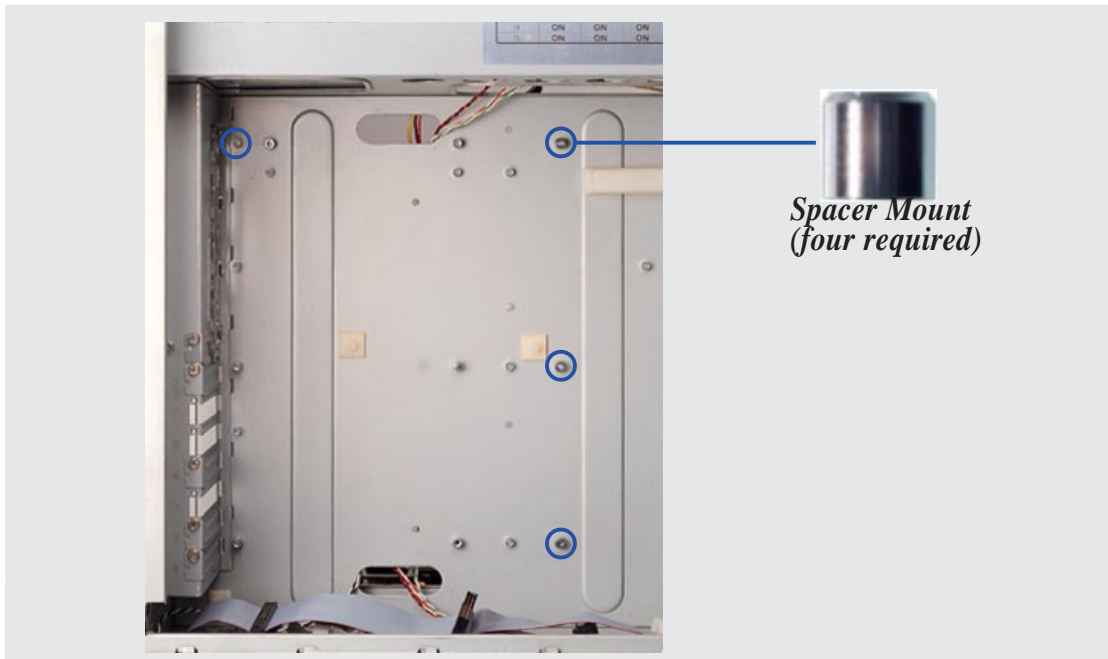
Remove the fan module before installing or removing the motherboard. All screws are necessary to provide the needed stabilization to support all the motherboard expansion items.

Spacer Mounts

These spacers are used to give added support to the motherboard. Make sure that these are placed in the exact locations shown here for the P2B-DS motherboard, do not place them in other locations or else damage may occur to the motherboard.



Installed P2B-DS motherboard



Motherboard spacer mounts

II. System Components

SCSI Backplane

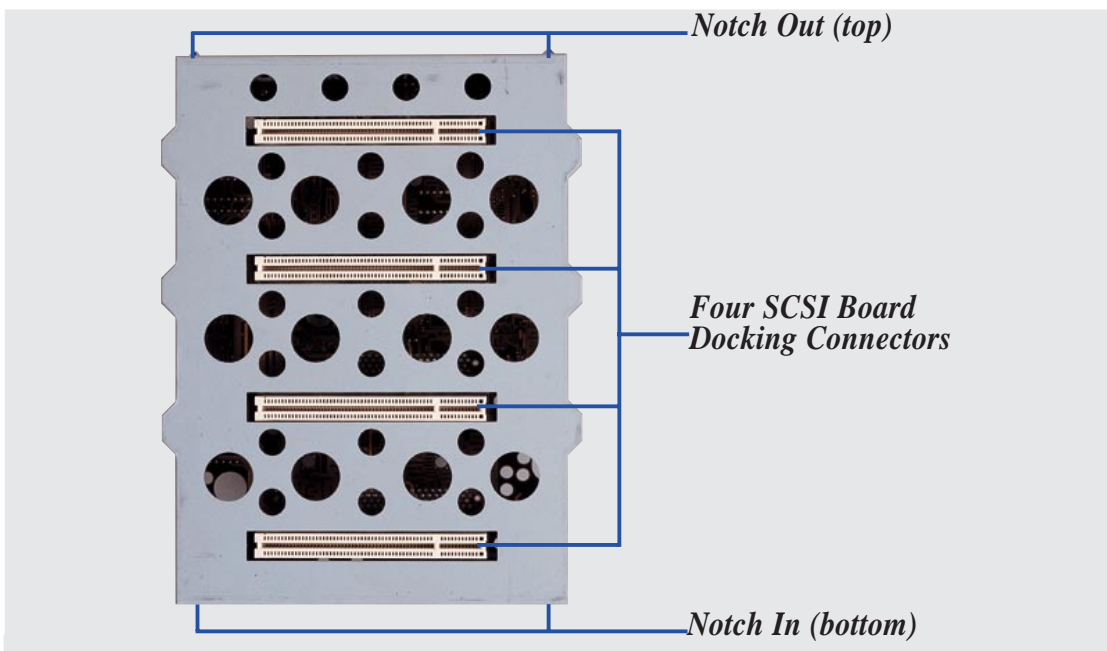
The SCSI backplane of this server is comprised of two SCSI boards with a Wide-SCSI connector, power input, and SCSI ID dip switches on each SCSI board. This configuration allows Wide-SCSI hard disk drives to be docked into the server using a common connector. The female end is located on the SCSI board,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

SCSI Board Placement

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



SCSI board placement

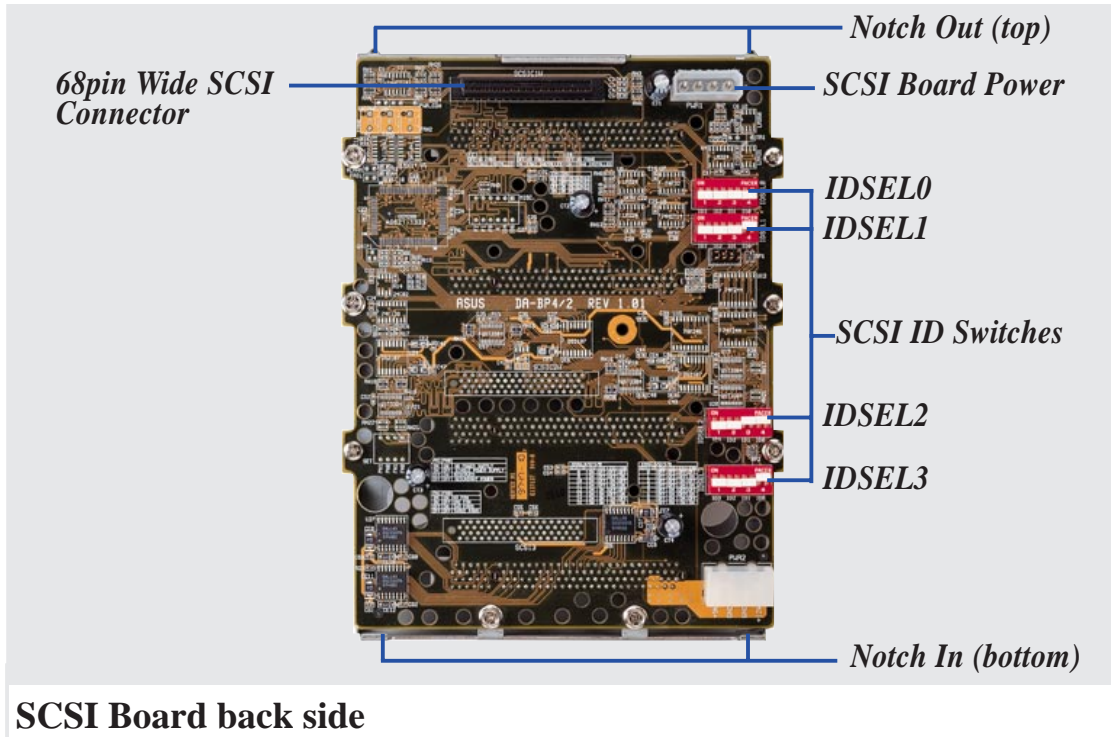


SCSI board front side

II. System Components

SCSI ID Setting

SCSI ID settings are made through DIP switches located on the SCSI board. Each SCSI board IDSEL switch has default settings as labeled below. The default settings were set for use with a 2-channel SCSI card. Each channel may repeat the SCSI ID numbers of another channel. Make sure that each IDSEL switch (on each channel) has its own unique setting if making changes to these switches. See next page for more information on SCSI ID settings.



II. Components
SCSI ID

SCSI ID Dip Switches

The following illustrates the different possibilities using the dip switches.



II. System Components

SCSI Connections

Your server can support up to 15 user installed SCSI devices. Be sure to include both internal and external SCSI devices in your device setup. Each SCSI device (both internal and external) must have a unique address (or SCSI ID). Check your SCSI device documentation for instructions. Be sure to record all SCSI addresses so that you can prevent SCSI address conflicts.

SCSI Termination

SCSI devices are connected together in a “chain” by cables. Internal devices connect to the motherboard with a 50 pin or 68 pin flat ribbon cable. A converter may be used to connect 50 pin devices to the 68 pin cable but not vice versa. External SCSI devices may be connected using an external SCSI connector or SCSI card with an external connector. If there are more than one internal or external devices, additional devices are connected with cables to form a “daisy chain.” Terminating the devices on the ends of the SCSI Bus “chain” is necessary for SCSI devices to work properly. Devices normally come with its termination enabled by jumpers or dip switches. You must disable these termination for devices in between the ends.

SCSI ID Jumpers

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. The SCSI ID serves two purposes:

- It uniquely defines each SCSI device on the bus.
- It determines which device controls the bus when two or more devices try to use it at the same time.

SCSI IDs on one channel do not interfere with the IDs on another channel. You can connect up to 15 SCSI devices to this motherboard. You must set a SCSI ID number (ID 0 to ID 15) for each device. Note that the onboard SCSI chipset is also a SCSI device and will also require a SCSI ID number. SCSI devices vary in how they set the ID number. Some use jumpers, others have some kind of selector switch. Refer to the manual for any device you install for details on how to set its ID number.

SCSI ID Priority

The P2B-DS motherboard has an onboard 16bit single-channel SCSI chipset. SCSI ID 15 has the highest priority, and SCSI ID 0 has the lowest priority.

RAID card connections

See your SCSI card’s User’s Manual.

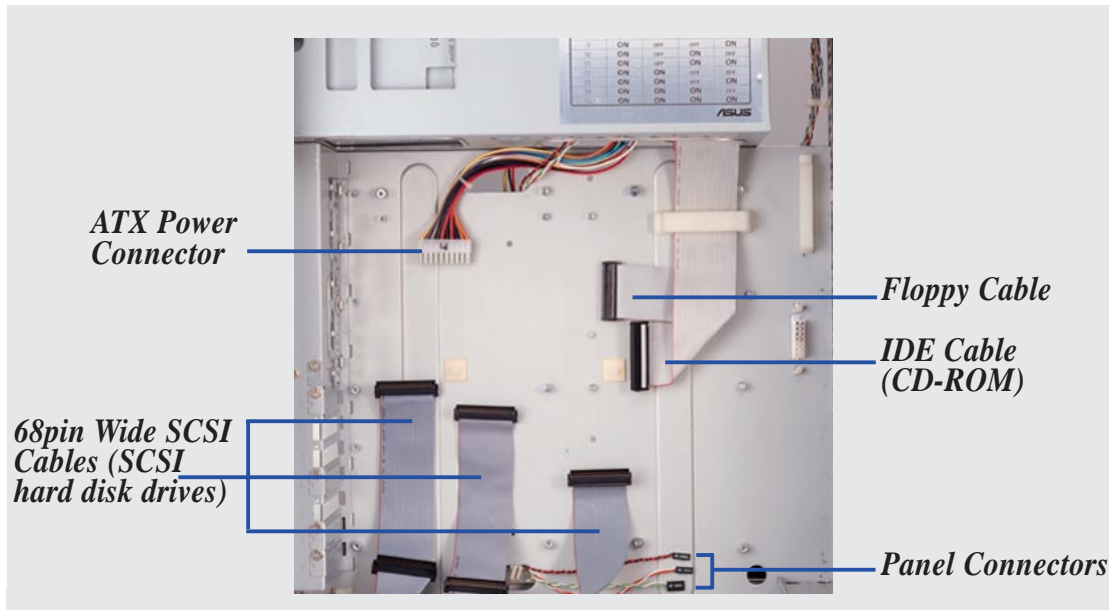
II. System Components

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II. System Components

Cables

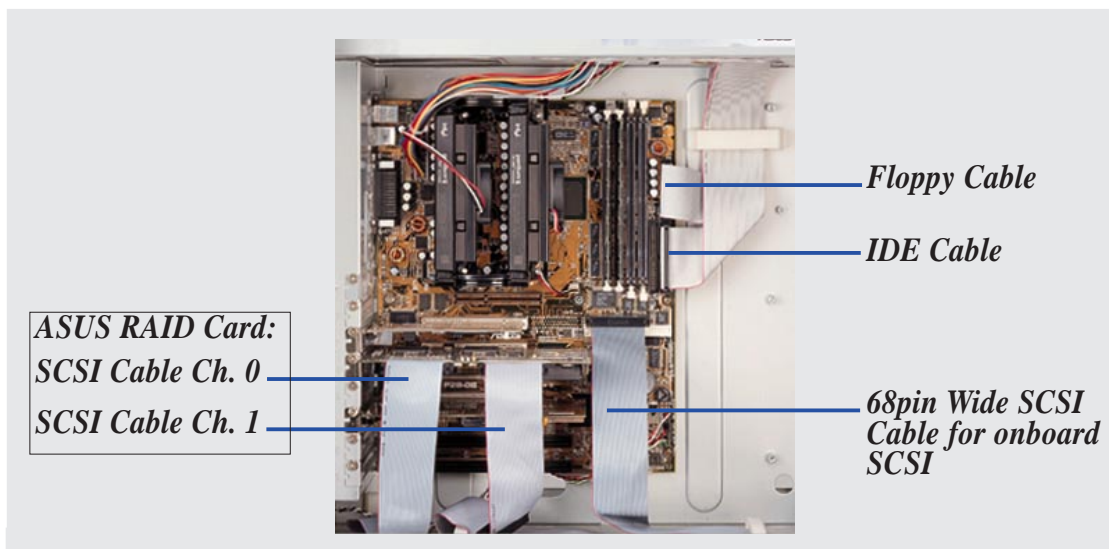
The cables in this server is just like that of any standard PC expect that 68 pin Wide-SCSI cables are provided for 50 pin or 68 pin SCSI devices used in server systems. Your PC may use SCSI devices but are typically 50 pins. Because signals become weaker over distance, cable quality is more important in large chassis such as the one used in this server.



Cables from devices

Cable Connections

The cables connect to the motherboard as shown. The P2B-DS includes onboard SCSI with 68 pin and 50 pin SCSI connectors. RAID connections require the ASUS PCI-DA2100A RAID card.

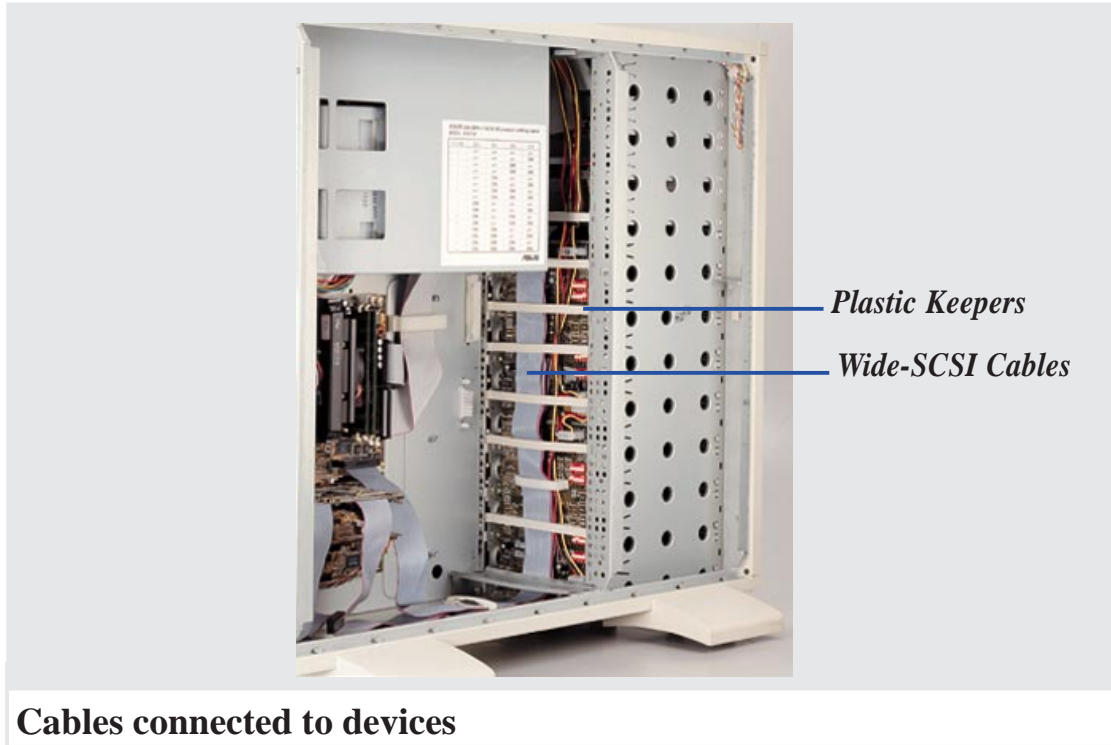


Motherboard with all its cables connected

II. System Components

Device Connections

The cables should be connected to the devices as shown. Plastic keepers protect the cables from contact with the fans; make sure that they are properly secured.



III. Power Information

III. Power Information

Output Regulations

Voltage Out	Min(V)	Nominal	Max(V)
+5.0V	4.800	5.000	5.250
+12.0V	11.400	12.00	12.600
-5.0V	-4.500	-5.000	-5.500
-12.0V	-10.800	-12.00	-13.200
+3.3V	3.168	3.300	3.432
+5.0V sb	4.750	5.000	5.250

DC Load Requirements

Voltage Out	Min(V)	Max(V)
+5.0V	1.5	42.00
+12.0V	0.2	10.00
-5.0V	0.0	0.50
-12.0V	0.0	0.75
+3.3V	0.0	18.00
+5.0V sb	0.0	0.50

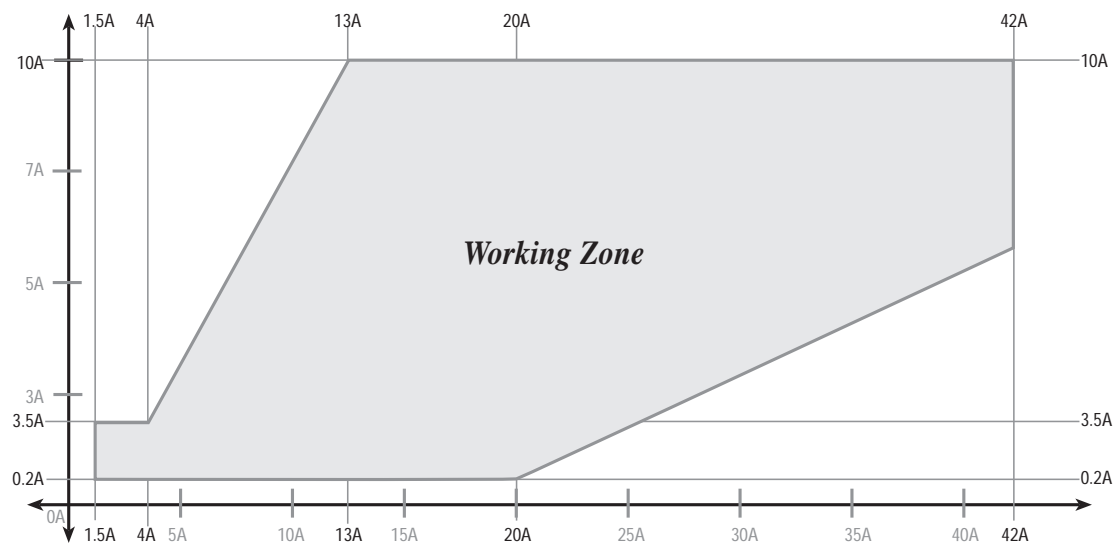
The maximum combined power of:

- 5.0V and 3.3V is 236W
- 5.0V and 3.3V + 12.0V is 339W
- -5.0V and -12.0V is 9W

III. Power Info.
Power Load Tables

Minimum Cross-Loading & Load Range Graph

- For +5V output loads < 4A, the +12V max load shall be limited to 3.5A.
- When the +12V output is at minimum load, the combination of +5V and +3.3V load will not exceed 100W.
- When +12V output is at the maximum load of 11A, +5V minimum load should be greater than 8A and 3.3V minimum load should be greater than 3A.



III. Power Information

Power Supply Requirement Calculation Table

Item	Volts	Amp	x	Qty.	=	Total Amp	Watts (5V)	Watts (12V)
Total Motherboard Power							209.55	3.6
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		=			
Total Power								

III. Power Info.
Power Req. Table

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