

**ASUS<sup>®</sup> AP100**

**Pentium<sup>®</sup> II Startup Server**

# **Hardware Reference Guide**

# User's Notice

---

No part of this manual, including the products and software described in it, may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form or by any means, except documentation kept by the purchaser for backup purposes, without the express written permission of ASUSTeK COMPUTER INC. ("ASUS").

ASUS PROVIDES THIS MANUAL "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL ASUS, ITS DIRECTORS, OFFICERS, EMPLOYEES OR AGENTS BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGES FOR LOSS OF PROFITS, LOSS OF BUSINESS, LOSS OF USE OR DATA, INTERRUPTION OF BUSINESS AND THE LIKE), EVEN IF ASUS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES ARISING FROM ANY DEFECT OR ERROR IN THIS MANUAL OR PRODUCT.

Product warranty or service will not be extended if: (1) the product is repaired, modified or altered, unless such repair, modification or alteration is authorized in writing by ASUS; or (2) the serial number of the product is defaced or missing.

Products and corporate names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies, and are used only for identification or explanation and to the owners' benefit, without intent to infringe.

- Intel, LANDesk, and Pentium are registered trademarks of Intel Corporation.
- IBM and OS/2 are registered trademarks of International Business Machines.
- MS-DOS, Windows, WindowsNT are registered trademarks of Microsoft Corporation.
- Adobe and Acrobat are registered trademarks of Adobe Systems Incorporated.

The product name and revision number are both printed on the product itself. Manual revisions are released for each product design represented by the digit before and after the period of the manual revision number. Manual updates are represented by the third digit in the manual revision number.

For previous or updated manuals, BIOS, drivers, or product release information, contact ASUS at <http://www.asus.com.tw> or through any of the means indicated on the following page.

SPECIFICATIONS AND INFORMATION CONTAINED IN THIS MANUAL ARE FURNISHED FOR INFORMATIONAL USE ONLY, AND ARE SUBJECT TO CHANGE AT ANY TIME WITHOUT NOTICE, AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY ASUS. ASUS ASSUMES NO RESPONSIBILITY OR LIABILITY FOR ANY ERRORS OR INACCURACIES THAT MAY APPEAR IN THIS MANUAL, INCLUDING THE PRODUCTS AND SOFTWARE DESCRIBED IN IT.

**Copyright © 1998 ASUSTeK COMPUTER INC. All Rights Reserved.**

Product Name:	<b>AP100</b>
Manual Revision:	<b>1.00 E270</b>
Release Date:	<b>September 1998</b>

# ASUS Contact Information

---

## ASUSTeK COMPUTER INC.

### *Marketing*

Address: 150 Li-Te Road, Peitou, Taipei, Taiwan 112  
Telephone: +886-2-2894-3447  
Fax: +886-2-2894-3449  
Email: info@asus.com.tw

### *Technical Support*

Fax: +886-2-2895-9254  
BBS: +886-2-2896-4667  
Email: tsd@asus.com.tw  
WWW: www.asus.com.tw  
FTP: ftp.asus.com.tw/pub/ASUS

## ASUS COMPUTER INTERNATIONAL

### *Marketing*

Address: 6737 Mowry Avenue, Mowry Business Center, Building 2  
Newark, CA 94560, USA  
Fax: +1-510-608-4555  
Email: info-usa@asus.com.tw

### *Technical Support*

Fax: +1-510-608-4555  
BBS: +1-510-739-3774  
Email: tsd-usa@asus.com.tw  
WWW: www.asus.com  
FTP: ftp.asus.com.tw/pub/ASUS

## ASUS COMPUTER GmbH

### *Marketing*

Address: Harkort Str. 25, 40880 Ratingen, BRD, Germany  
Telephone: 49-2102-445011  
Fax: 49-2102-442066  
Email: info-ger@asus.com.tw

### *Technical Support*

Hotline: 49-2102-499712  
BBS: 49-2102-448690  
Email: tsd-ger@asus.com.tw  
WWW: www.asuscom.de  
FTP: ftp.asuscom.de/pub/ASUSCOM

# Contents

---

<b>I. Introduction .....</b>	<b>7</b>
This Reference Guide .....	7
<i>Sections</i> .....	7
<i>Symbols</i> .....	7
This Server .....	8
Component Checklist .....	8
Features .....	9
<b>II. System Components .....</b>	<b>10</b>
Safety and Warning .....	10
<i>Static-Sensitive Devices</i> .....	10
Tools Required .....	11
Preparation .....	11
Front View .....	12
<i>Chassis Stabilization</i> .....	12
Back View .....	13
<i>Chassis Security</i> .....	13
Side View .....	14
Side Panel .....	15
<i>Stabilizing Link Bar</i> .....	15
Motherboard Mounting .....	16
Panel Connections .....	16
Front Panel .....	17
<i>Device Bay Covers</i> .....	17
Air Circulation System .....	18
<i>Fan Replacement</i> .....	18
System Speaker .....	18
Device Cage (3.5") .....	19
<i>Device Cage (3.5") Floppy Mounting</i> .....	19
<i>Floppy Disk Drive (1.44MB)</i> .....	20
Device Cage (5.25") .....	20
<i>CD-ROM Disk Drive</i> .....	21
Expansion Cards .....	21

# Contents

---

SCSI Information .....	22
<i>SCSI Connections</i> .....	22
<i>SCSI Termination</i> .....	22
<i>SCSI ID Jumpers</i> .....	22
<i>SCSI ID Priority</i> .....	22
Hard Disk Drive Mounting .....	23
<i>Top of the Power Supply</i> .....	23
<i>Ultra2 SCSI Disk Drive</i> .....	24
<i>External SCSI Terminator</i> .....	24
Device Connections .....	25
<i>Device Cable Connections</i> .....	25
<i>IDE Cabling</i> .....	25
Power Supply .....	26
<i>Power Supply On and Off</i> .....	26
<i>Power Supply Mounting</i> .....	26
Starting the Server .....	27
LED Indicators .....	27
<b>III. Power Information .....</b>	<b>28</b>
Power Supply (ST-251HR) .....	28
<i>Input</i> .....	28
<i>Output</i> .....	28
<i>Protection</i> .....	29
<i>Environment</i> .....	29
<i>Hi-Pole</i> .....	29
<i>Certifications</i> .....	29
SCSI Cable Limits .....	30
SCSI Connection Examples .....	31
Glossary .....	32

# 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.



**IMPORTANT!** 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

### This Reference Guide

You are reading the AP100 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 this 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.

### *Sections*

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

#### **I. Introduction**

This section gives general and startup information and features for this server.

#### **II. Components**

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

#### **III. Power Information**

This section gives specifications on the power supply used in this server.

#### **IV. Appendix**


This section gives you information to help plan your server.


### *Symbols*

A few symbols are used throughout this guide that you should be aware of in order to complete certain tasks safely and completely. These symbols give notes with different degrees of importance.

 **NOTE:** Notes give tips and information to aid in completing a task.

 **IMPORTANT:** Important notices give information that **MUST** be followed in order to complete a task.

 **CAUTION:** Caution notices give information to prevent damage to the components when trying to complete a task.

 **WARNING:** Warning notices give information to prevent injury to yourself when trying to complete a task.

# I. Introduction

---

## This Server

The AP100 is a startup server configured on the ASUS P2B-S smart motherboard which uses the 440BX chipset from Intel which supports the Pentium II processor and 100MHz front side bus in order to support any complicated task.

## 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

- Chassis: ASUS T-10 Tower
- Power Supply: 350W ATX
- Motherboard: ASUS P2B-S
- CD-ROM Drive: ASUS 34X
- Floppy Drive: 1.44MB
- Cables: Power, IDE, Floppy, 50&68pin SCSI, CD audio cable
- SCSI Terminator: Passive terminator for 68pin SCSI cables.
- User's Manuals: CD-ROM, SCSI, Motherboard
- Drivers/Utilities: SCSI, CD-ROM, Motherboard

### Required components (you may purchase from ASUS or from a third party)

- Processor (CPU): (optional Intel Pentium II 233MHz-450MHz)
- Memory Modules: (optional ASUS 16MB or 32MB SDRAM)
- Hard Disk Drives: (optional 4/9GB Ultra2 or Fast/Ultra-Wide SCSI)

### Optional components (you may purchase from ASUS or from a third party)

- Ethernet Card: (optional ASUS PCI-L101)



**NOTE:** Optional components are ordered on demand and may not always be available in the quantities desired.



# I. Introduction

## Features

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.

- Intel Pentium II processor provides the highest processing performance for your server up to 450MHz.
- Four onboard DIMM with up to 1GB EDO or SDRAM with ECC.
- Up to 33MB/Sec IDE transfers with UltraDMA/33 support.
- Intel 440BX supports up to 100MHz front side bus for fast data transfer.
- AGP slot supports an AGP graphics card for fast hardware 3D acceleration.
- Three onboard connectors to independently connect 68 pin Ultra2 SCSI devices, 68 pin Fast/Ultra-Wide SCSI devices, or 50 pin Fast/Ultra-Narrow devices.
- Onboard hardware monitor provides information for system and processor voltages, fan speed, temperature, chassis intrusion, and provides automatic system restart.
- SNMP Agent and Intel LDSM provides server monitoring, management, and control.



# II. System Components

---

## Safety and Warning

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



**WARNING:** 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.



**WARNING:** 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*



**CAUTION:** 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.

# II. System Components

---

## Tools Required

A few items are needed to install or remove the components in this server.

- Phillips (cross) screwdriver 
- Standard (flat) screwdriver 
- Antistatic wrist strap is also highly recommended.



## Preparation

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



**IMPORTANT:** Most servers uses 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 padlock if one is used. This server is equipped with a lockable panel to prevent unauthorized access. Open the side panel.
3. 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. Set the power supply input voltage to either 115V for 110V-120V areas or 130V for 120V-140V areas.



**CAUTION:** The voltage must be set correctly or damage may occur.

9. Connect the included power cord to the server's power supply.
10. Connect the server to a grounded (three pronged) AC power source such as a UPS or power strip (preferably with surge protection).



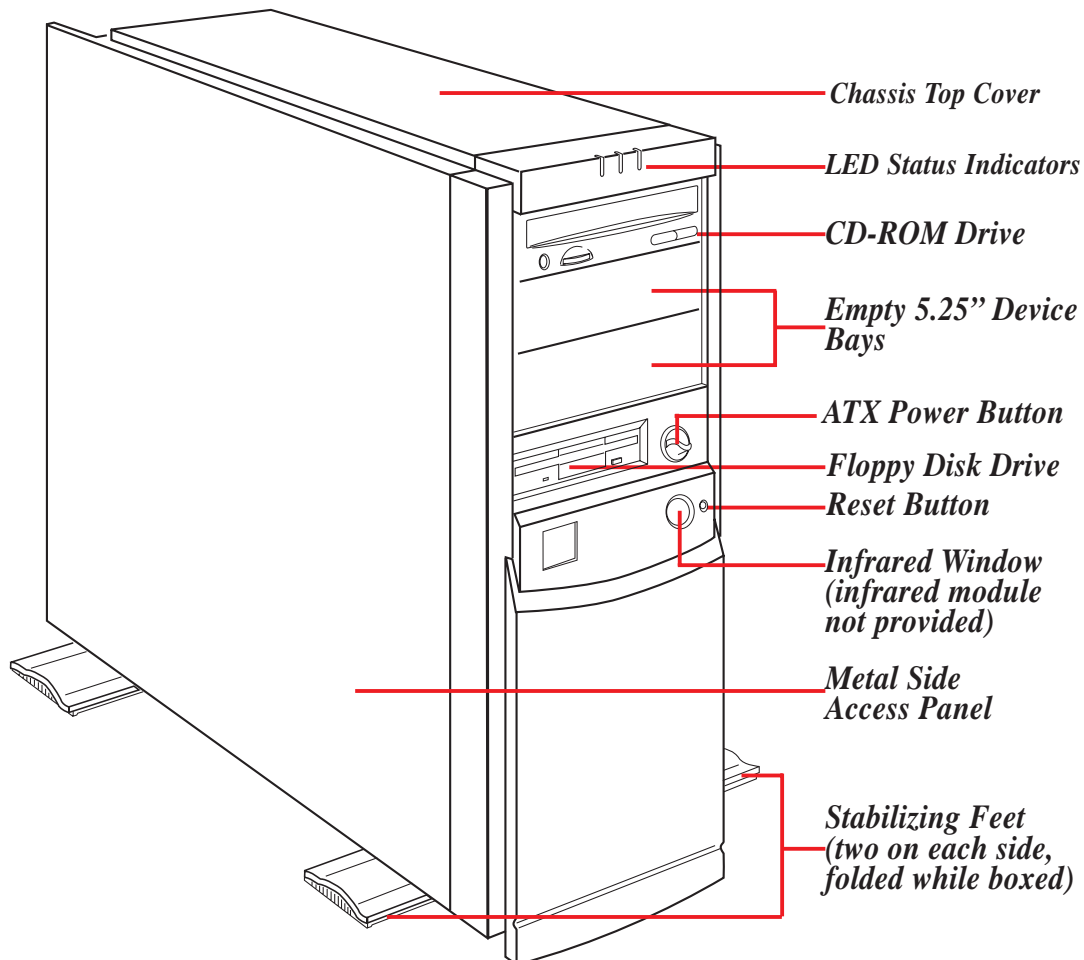
**WARNING:** This server is designed for connection to a grounded (earthed) outlet. To reduce the risk of electrical shock or damage to your server, do not bypass the grounding plug.

## II. System Components

### II. System Components

#### Front View

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.



#### Chassis Stabilization

This four stabilizing feet provides added stability for the tower chassis. Rotate the stabilizing feet outward so that they are perpendicular to the sides of the chassis as shown above. If the chassis is supported by other structures such as tables, a wall, or cabinets then use the stabilizing feet that are not obstructed.

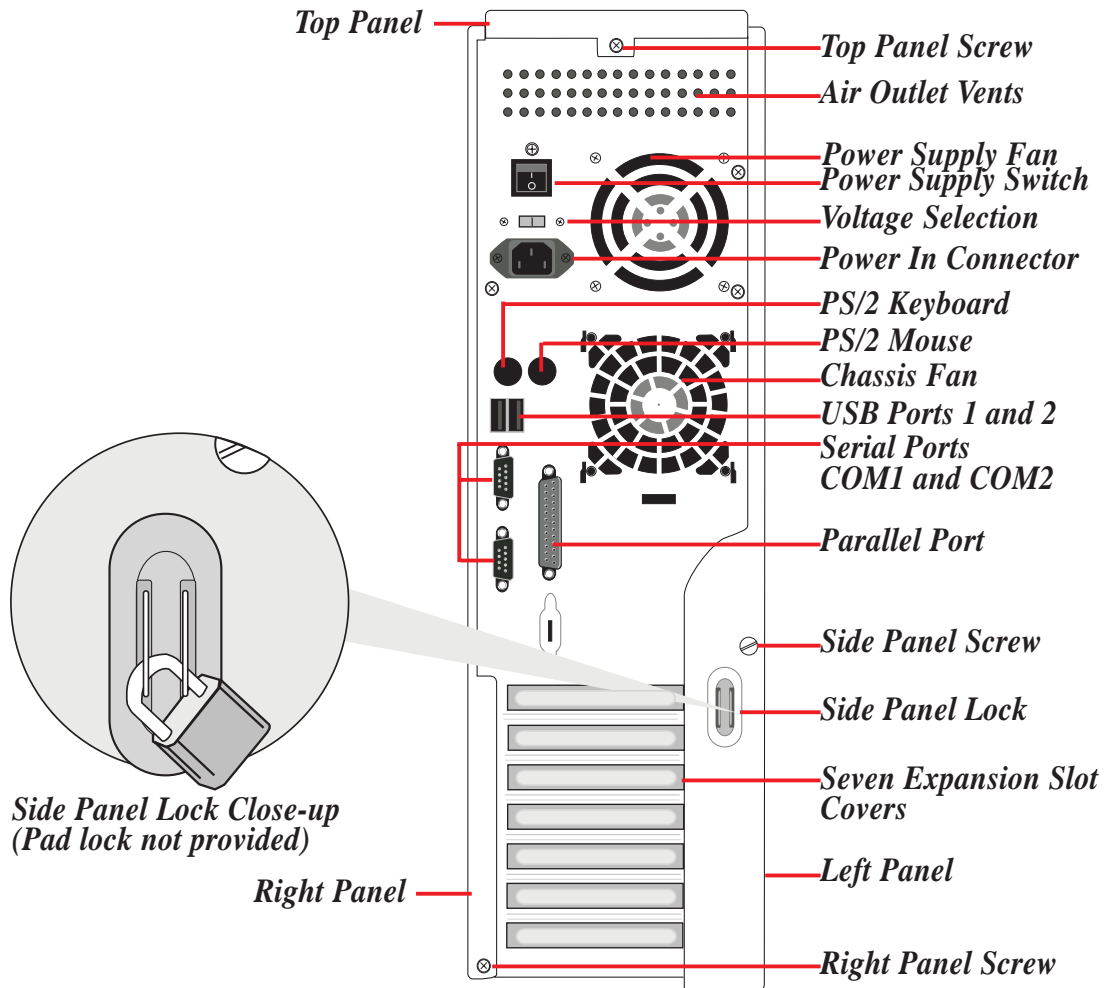


**WARNING:** Because servers contain many more components compared to personal computers, servers are much heavier. Stabilization is necessary at all times to prevent damage and injury from falling over.

# II. System Components

## Back View

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



II. Components  
Back View

### Chassis Security

To protect the server chassis from unauthorized intrusion, the chassis side panel is lockable using a standard padlock. An optional light detecting sensor connected to the motherboard’s “chassis” connector allows monitoring of the chassis panels’ open/close status. The motherboard’s onboard hardware monitor can provide alerting and logging that can be managed through the management software.

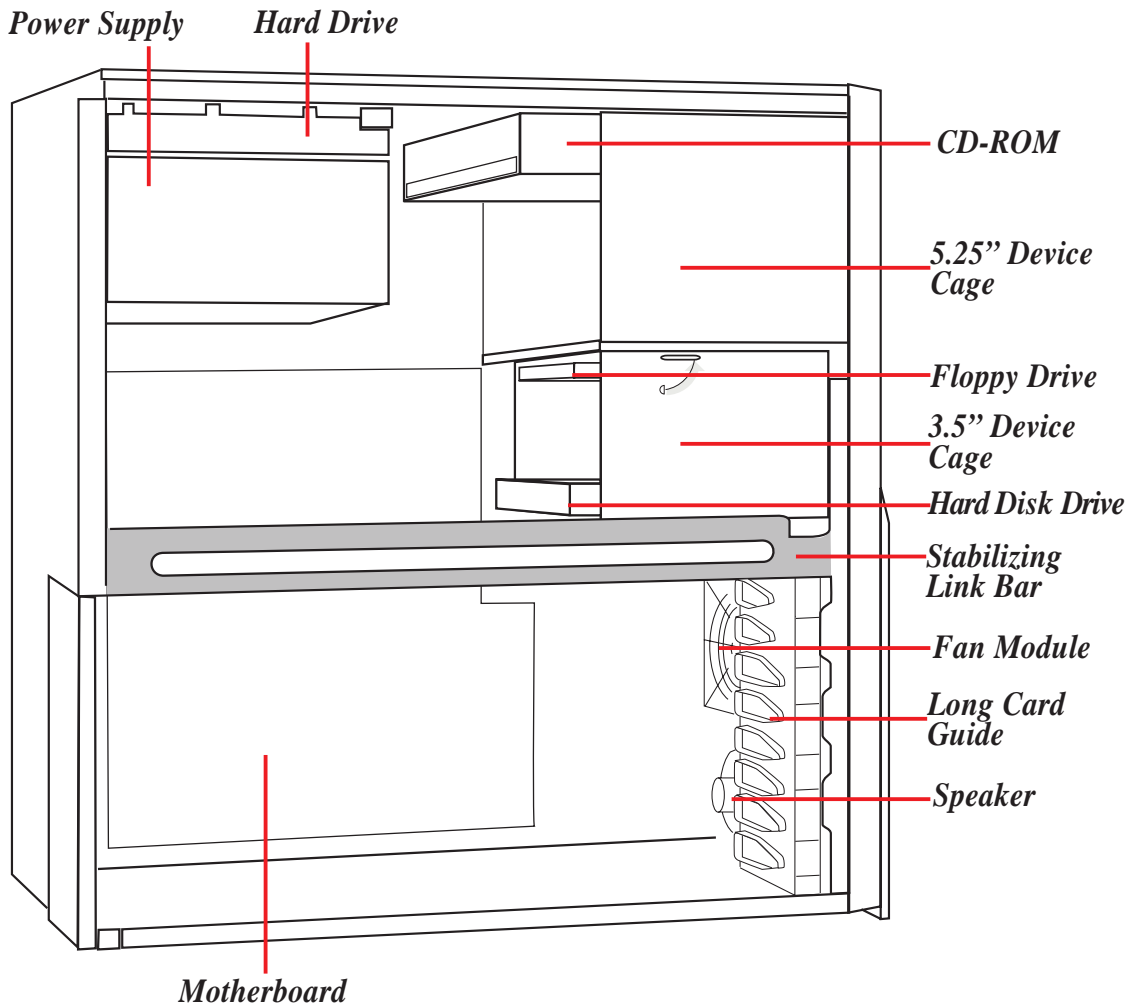


**NOTE:** The right and top panels do not provide access into the system so therefore this guide will refer to the left panel as “side panel.”

## II. System Components

### Side View

The side of the server is provided to show the interior components of this server. Some of the components illustrated are optional.



**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 that are plugged into an AC outlet always have standby power even when powered Off .

## II. System Components

### Side Panel

The side panel needs to be removed to gain access to the internal system.



#### Side Panel Removal Procedure:

1. Remove the padlock if one is used on the side panel.
2. Remove the thumb screw on the back of the side panel.
3. Pull the side panel away from the chassis from the back.
4. Pull the bottom of the side panel outward from the bottom.



*Removing side panel (Step 2)*



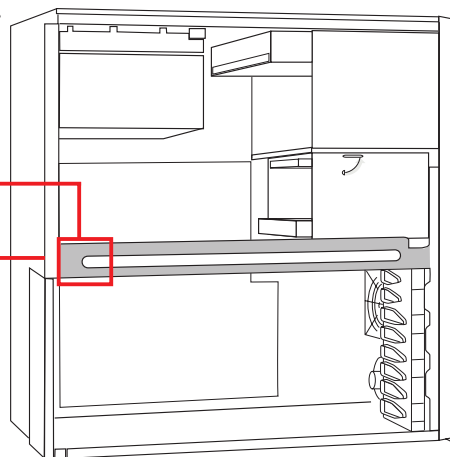
*Removing side panel (Step 3)*

### Stabilizing Link Bar

The stabilizing link bar needs to be removed in order to access the motherboard or remove the 3.5" device cage. To remove the stabilizing link bar, grasp the bar at the back end with the right hand and with the right thumb press the back of the chassis toward your fingers (or using the palm of your left hand, press on the back of the chassis). The bar then releases from the latch and swings outward.

*Grab here and pull bar outward*

*Press here with thumb or other hand*



*Chassis side interior*



# II. System Components

## Motherboard Mounting

Once the stabilizing link bar is removed, you can install or replace the motherboard but note the screw locations. All screws are necessary to provide the needed stabilization to support all the motherboard expansion items.

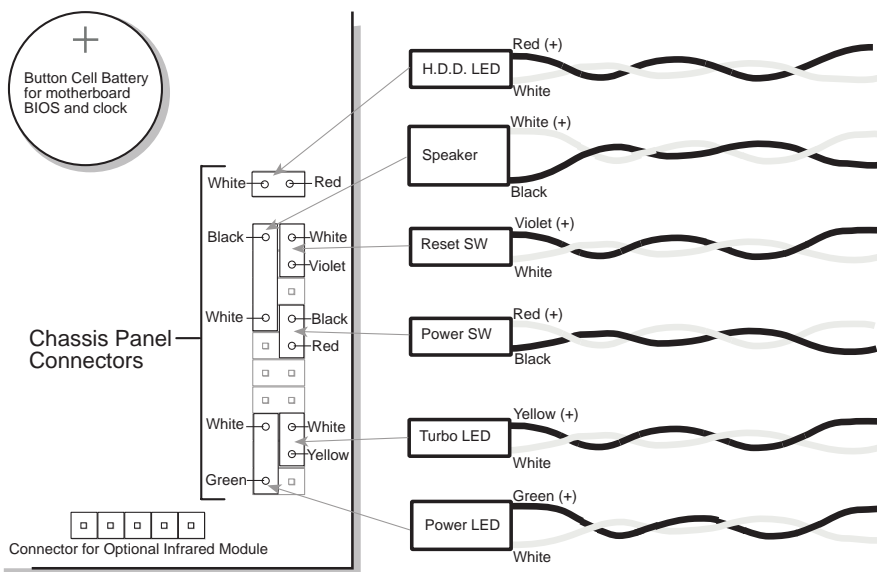
**NOTE:** The screw locations will vary with different motherboards.



*Motherboard screw locations*

## Panel Connections

Several wires should be connected to the motherboard for the IDE/SCSI activity, power, and message indicators on the front panel. Panel connections also allow for an ATX power button, reset switch, and speaker. Connect the chassis front panel wires as illustrated:



*Motherboard panel connector*



## II. System Components

### Front Panel

The front panel needs to be removed to install or remove the device cage covers for installing or removing devices mounted in the device cages. You can remove the front panel either in the upright position or flat on its right panel. Lean the front panel over the edge of a table or book if working upright. Reach your fingers up into the front panel and pull the front panel away from the chassis.



*Removing the front panel*

*Four of your fingers should fit behind the front panel*

### Device Bay Covers

With the front panel removed, the device bay covers can be removed or installed.



#### Device Bay Removal Procedure:

1. With your thumb, push the tab outward against the side of the front panel.
2. With your other hand, push the device cage cover inward from the front side.



*Device bay cover tab*

*Front panel backside*

## II. System Components

### Air Circulation System

The server's air circulation system is comprised of one 3 inch (8 cm) fan mounted on the inside rear of the chassis and another one mounted on the front of the chassis, as well as the power supply itself. The air circulation system cools the internal system by bringing fresh air in from the back and forcing the hot air out through the front. It is important to keep the air surrounding the hard disk drives below 122°F (50°C) to prevent hard disk failures.


 **IMPORTANT:** The chassis panels must be installed for proper air flow.

### *Fan Replacement*

The two individual fans are secured by plastic housings. The fan housings can be removed by pressing in the clip and sliding the housing upward.

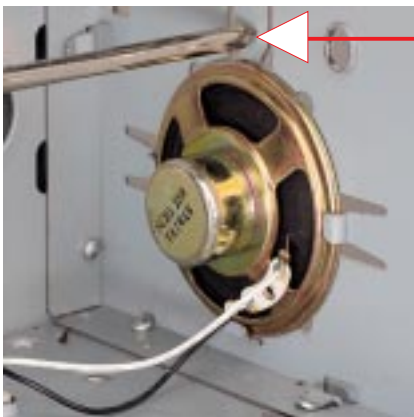


*Press clip with screw driver to release*

 **IMPORTANT:** When replacing the fans, be sure that both fans rotate in the same direction. Use the manufacturer's sticker on one side of the fan as a reference. The air should flow from the rear of the chassis to the front of the chassis.

### System Speaker

This server has a standard speaker for error notifications and other alerts. For computer audio capability, an audio card and external speakers are necessary. The standard system speaker mounts in the chassis as shown here. To remove the speaker, press the metal clip (or pry from front) with a screwdriver and lift the speaker upward.



*Press clip (or pry from front) with screwdriver to release*

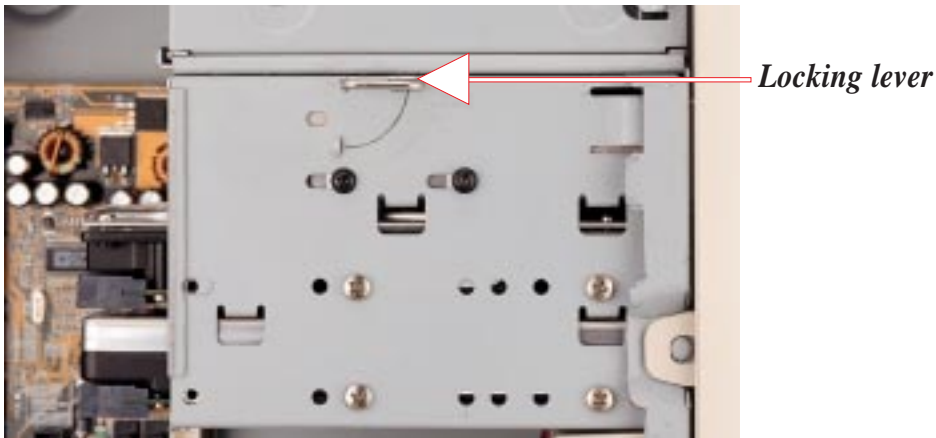
## II. System Components

### Device Cage (3.5")

The 3.5" device cage is used for mounting one 3.5" floppy device (such as a 1.44MB floppy, LS-120, MO, or ZIP disk drive) and two hard disk drives. Before devices can be installed or removed from the 3.5" device cage, you must remove the device cage from the chassis.

### 3.5" Device Cage Removal Procedure:

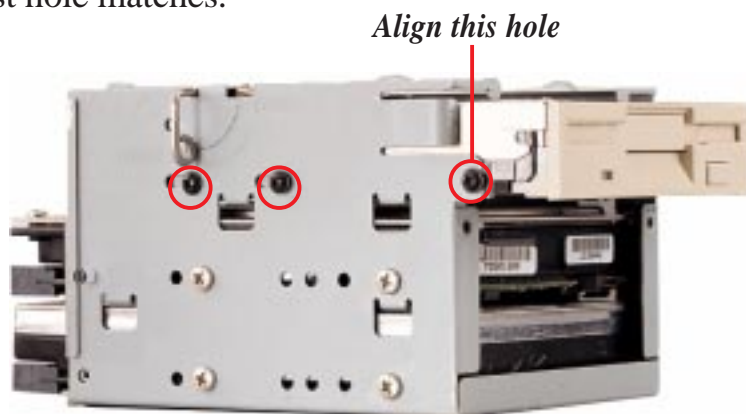
1. Remove the stabilizing link bar, if not already removed.
2. Rotate the locking lever clockwise using a screwdriver inserted from the top of the lever. (It is very difficult to turn it with your fingers, it requires that you pull the lever outward first before turning it.)
3. Slide backward to remove the 3.5" device cage.
4. Mount the 3.5" device cage using the reverse procedure. (Locking the lever is possible with your fingers.)



*Unlocking the 3.5" device cage*

### Device Cage (3.5") Floppy Mounting

The 3.5" device cage has a slot and three screw holes on each side for a 3.5" floppy device on the top most space. The floppy must be aligned so that the first hole matches.



*1.44MB floppy disk drive mounted in the 3.5" device cage*

## II. System Components

### *Floppy Disk Drive (1.44MB)*

The 1.44MB floppy disk drive requires signal and power connections. The power connection is easy since it only fits one way and a latch is available to secure it when fully inserted. The signal cable is tricky because the cable fits in both orientations as well as shifted one direction or the other. The signal cable also has no latch to determine when full insertion is made. Align the red stripes of the signal and power cables so that they face each other. Carefully insert the connector while visually watching the progress so that proper alignment and insertion is made. Be careful, bent pins are very difficult to straighten.



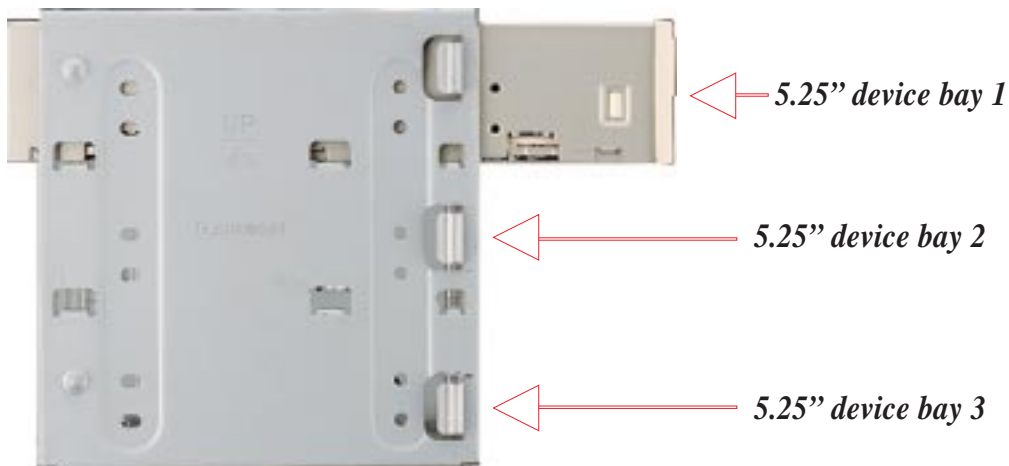
*Red stripe of signal cable*

*Red stripe of power cable*

*1.44MB floppy disk drive connections*

### **Device Cage (5.25")**

The 5.25" device cage is used for mounting three 5.25" devices (such as CD-ROM, tape, or hard disk drives). The 5.25" device cage can be removed for mounting or unmounting devices. With the 3.5" device cage and front panel removed, the 5.25" device cage can be pulled out from the chassis. For proper mounting of your 5.25" device, use this picture as a reference otherwise trial and error is necessary to make it flush with the front panel opening. Screw holes are available on each side for securing devices.

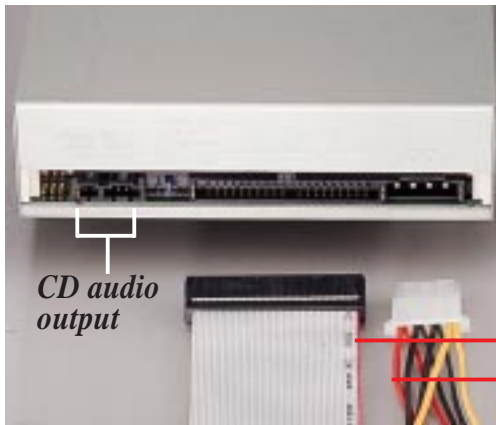


*5.25" device cage with a CD-ROM in its topmost bay*

## II. System Components

### CD-ROM Disk Drive

The CD-ROM disk drive mounts only in the 5.25" device cage and requires signal and power connections like that of IDE hard disk drives. The power and signal cable is straightforward with connectors designed to only fit correctly. The red stripe of the signal and power cables should face each other.



CD-ROM drive connections

**NOTE:** A CD-ROM audio cable is also provided in case you install an audio card. The only function of the audio cable is to allow you to direct the CD audio out signal to your audio card. Data signals travel through the IDE cable.

Red stripe of signal cable

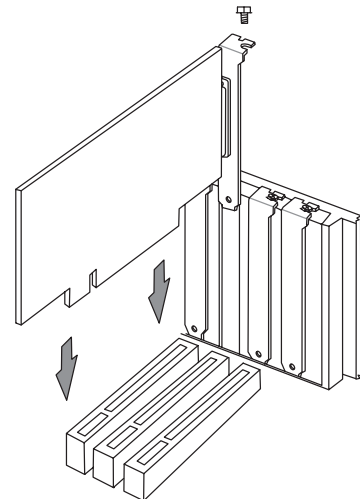
Red stripe of power cable

### Expansion Cards

Expansion cards can be easily installed just like any standard PC computer. Up to 4 PCI or 2 ISA (1 slot is shared allowing a maximum of 5 cards at one time) cards can be installed. One AGP slot is also available for a high-end graphics card.

#### Expansion Card Installation Procedure:

1. Follow the static precautions described in the front of this manual.
2. Switch off your system and all peripheral devices and remove the main power cord.
3. Remove the side panel to the chassis.
4. Find an unused expansion slot on the motherboard and unscrew the metal cover plate from the slot and put the screw to one side.
5. Ensure the jumpers (if any) are correctly set on your expansion card
6. Align the card's connector with the expansion slot on the motherboard and gently lower and push the card into the free slot.
7. Secure the card to the expansion slot with the screw you removed from the metal plate.
8. Attach cables or wires if necessary.
9. Reinstall the side panel if no other work is needed inside the chassis.





# II. System Components

---

## SCSI Information

### *SCSI Connections*

Your server can support up to 15 user installed single-ended 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. 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. SCSI devices normally come with its termination enabled by jumpers or dip switches. You must disable these termination for devices in between the SCSI chain. Ultra2 devices do not have a termination jumper and must be terminated using a terminator on the SCSI cable. The terminator must always be on the end of the cable which means that you cannot connect a device on the last connector.

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

## II. System Components

### Hard Disk Drive Mounting

Two hard disk drives may be mounted into the 3.5" device cage, a single hard disk drive may be mounted on top of the power supply, and two more may be mounted in the 5.25" device cage using hard disk drive carriages (not provided) designed for use in 5.25" device bays. The exception is Quantum's Bigfoot IDE hard disk drive which fits in the 5.25" device bays.



**CAUTION:** Adequate cooling cannot be made for high-speed SCSI hard disk drives mounted in the 5.25" device cage, therefore it is not recommended.

#### *Top of the Power Supply*



A small hard disk drive carrier plate on top of the power supply is used to hold a 1" hard disk drive. The underside of the hard disk drive mounts to the bottom of the carrier plate. There is nothing else to fasten since the side panel will hold the carrier plate in.



*Hard disk drive mounted on carrier plate*

*Carrier slides into the chassis in this direction*

*Handle faces upward*



*Hard disk drive carrier plate*

*1" (thick) hard disk drive*

*Inserting or removing a hard disk drive on top of the power supply*

## II. System Components

---

### *Ultra2 SCSI Disk Drive*

The Ultra2 SCSI disk drive has separate signal and power connections. The power connector is the same as standard hard disk drive power. The signal cable is different. For proper signal stability in Ultra2 speeds, a special twisted ribbon cable must be used. Each two wires are twisted for signal shielding like that of high speed (e.g. category 5) LAN cabling.

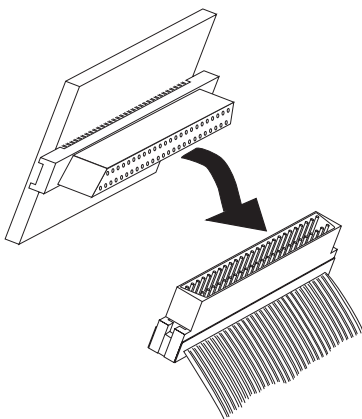


*Red stripe of signal cable*  
*Red stripe of power cable*

*Ultra2 SCSI hard disk drive connections*

### *External SCSI Terminator*

In order to prevent SCSI signal loss, the provided external SCSI terminator must be used at the end of the 68pin SCSI cable. 50 pin SCSI cables may also use terminators but usually use termination jumpers on the device itself. Currently Wide-SCSI devices have termination jumpers but Ultra2 devices do not. Some manufacturers ship SCSI devices with the terminator set, others do not. All termination jumpers must be removed when using the external SCSI terminator.



*Ultra2 SCSI ribbon cable terminator*



## II. System Components

---

### Device Connections

The following picture shows a completed server example with both standard and optional components.

#### *Device Cable Connections*

The cables connect to the motherboard as shown. The motherboard includes onboard SCSI with 68 pin and 50 pin SCSI connectors. The provided 68 pin SCSI cable is designed for Ultra2 SCSI speeds and may be used for both Wide-SCSI and Ultra2-SCSI devices.

#### *IDE Cabling*

Proper IDE device operation requires that the cable does not exceed 18 inches. If only one IDE device is used, connect it to the end of the cable. Remove unused cables from the IDE connector for proper signal quality and strength.



**IMPORTANT:** You must use Ultra2 SCSI ribbon cables for Ultra2 devices. Ultra2 ribbon cables (may be colored red and white) are similar to wide-SCSI ribbon cables (normally colored gray) but each pair of wire is twisted to reduce signal interference.



*Device and cabling example*

## II. System Components

### Power Supply

This server has a standard power supply with specifications to meet this server's motherboard requirements. A clearly marked label gives detailed specifications of the power supply. A power switch is provided to shut off all voltages, including the standby power. Not all ATX power supplies provide a power switch and therefore it is normal practice to remove the power cord before opening the side panel. With the power cord removed, you can ensure there are no voltages which can cause shorts while installing or removing internal components.



**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.



**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 Supply On and Off*

Normal powering On and powering Off of the ATX power supply is done using the momentary ATX power switch located on the front panel which is connected to the motherboard, unlike AT power supplies which uses a permanent switch on the power supply or chassis. The power supply's main power switch must be turned on before the ATX power switch on the front panel will work.



### *Power Supply Mounting*

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

*Main Power switch*

*Voltage switch*



*Power supply unmounted*

## II. System Components

### Starting the Server

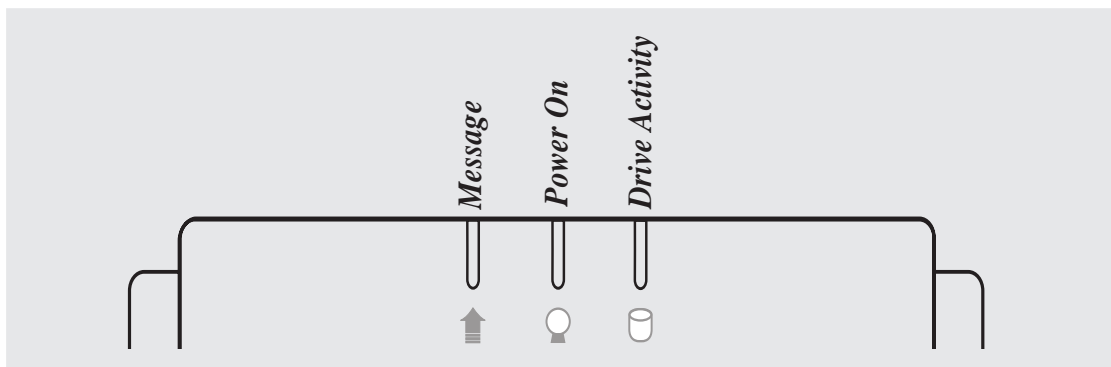
Turn on the system unit by turning the power knob clockwise and pushing inwards momentarily. The power button will snap back because ATX power systems have an electrical On/Off switch unlike AT systems which require a permanent On or Off position. If the Power On LED does not light, make sure the power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



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. Use the boot diskettes provided with the server operating system or with MSDOS “FDISK.EXE”. 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.

### LED Indicators

Three green LED indicators are located on the top of the front panel. When lit, the “Message” shows the status of the modem, fax, email, or voice mail as determined by your ACPI OS and software. “Power On” lights when the motherboard receives power from the power supply. “Drive Activity” lights when there is activity from IDE or SCSI devices connected to the motherboard.



*LED indicators on front panel*

# III. Power Information

## III. Power Information

### Power Supply (ST-251HR)

#### Input

<u>Voltage</u>	<u>Minimum</u>	<u>Nominal</u>	<u>Maximum</u>	<u>Frequency</u>
Low Range	100VAC	115VAC	132VAC	50Hz - 60Hz
High Range	180VAC	230VAC	264VAC	50Hz - 60Hz

#### Input Current

Input 115VAC/Max	6A (Full Load)
Input 230VAC/Max	4A (Full Load)

#### In-Rush Current Max.

Input 115VAC/Max	79A (Full Load)
Input 230VAC/Max	79A (Full Load)

#### Output

DC Output Cond.:	<u>Load (Amp)</u>	<u>Min</u>	<u>Nom</u>	<u>Max</u>	<u>Ripple(mV)</u>	<u>Noise(mV)</u>
	+3.3V*	1.5	7.50	15.0	50	100
	+5.0V*	2.0	10.0	20.0	50	100
	+12V	1.2	6.00	12.0	120	240
	-05V	0.0	0.25	0.50	100	200
	-12V	0.0	0.25	0.50	120	240
	+5VSB	0.0	0.50	1.00	50	100

(\* +3.3V and +5V Total Output Limit: 100W)

#### Output Rating:

	<u>+5V</u>	<u>+12V</u>	<u>+3.3V</u>	<u>-12V</u>	<u>-5V</u>
<b>Max</b>	+5.25V	+12.60V	+3.465V	-12.60V	-5.25V
<b>Min</b>	+4.75V	+11.40V	+3.135V	-11.40V	-4.75V
<b>Tolerance</b>	±5%	±5%	±5%	±5%	±5%

<b>Remote On/Off Control:</b>	PS-On	TTL Low/Close	DC Outputs are to be Enabled
	PS-Off	TTL High/Open	DC Outputs are to be Disabled

<b>Line Regulation:</b>	+3.3V:	1% Max
	+5.0V:	1% Max

<b>Load Regulation:</b>	+3.3V:	5% Max
	+5.0V:	5% Max

<b>Cross Regulation:</b>	+5V 20A: 4.75V Min and +12V 1.2A: 12.60V Max
	+5V 2A: 5.25V Max and +12V 12A: 11.40V Min

<b>Temperature Arrangements:</b>	1% Max
----------------------------------	--------

<b>Slow Start Time:</b>	5ms to 50ms
-------------------------	-------------

<b>Power Good Time:</b>	100ms to 500ms
-------------------------	----------------

<b>Hold up Time:</b>	20ms Min (at Nominal Input)
----------------------	-----------------------------

<b>Power Fail Time:</b>	1ms Min (at Nominal Input)
-------------------------	----------------------------

# III. Power Information

---

## Protection

**Over Power Protection (OPP):** 105% to 140%

**Over Voltage Protection (OVP):** +5V: 5.58V to 6.82V  
+12V: 12.8V to 14.50V  
+3.3V: 3.7V to 4.80V

**Short Protection:** All outputs shorted to ground are protected.

**Efficiency:** 70% Min

## Environment

**Ambient Operation Temperature:** 0°C to 50°C

**Ambient Operation Relative Humidity:** 20% to 80%

**Insulation Resistance:** Input to Ground 50M  
Input to Output 50M

**Dimension: LxWxH:** 150mm x 140mm x 86mm

**Weight:** 1.8Kgs

## Hi-Pole

**Input to Output** 1,800VAC 3Sec  
**Input to Ground** 1,800VAC 3Sec

## Certifications

<u>Approval Date</u>	<u>Safety Approval</u>	<u>Certificate Number</u>
1997-08-14	CE (Nemko)	9708001E
1997-08-28	CB	4052
1997-08-28	VDE	95325
199X-XX-XX	UL	(pending)
199X-XX-XX	CSA	(pending)
1997-08-27	Nemko	199734114
1997-09-08	Semko	9736061-06
1997-09-03	Demko	306976
1997-09-02	Fimko	197014-06



# IV. Appendix

## 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 mount properly.



### NOTES:

- Narrow refers to 50 pin and Wide refers to 68 pin. Don't get confused from 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. The following "Max Devices" are for individual connectors and do not take into account other SCSI devices.

<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



### Notes for the above chart:

- 1) A total of **15** "Ultra2-SCSI" devices (ID0-ID15) may be connected to the 68 pin Ultra2 connector on the motherboard.

**NOTE:** 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.

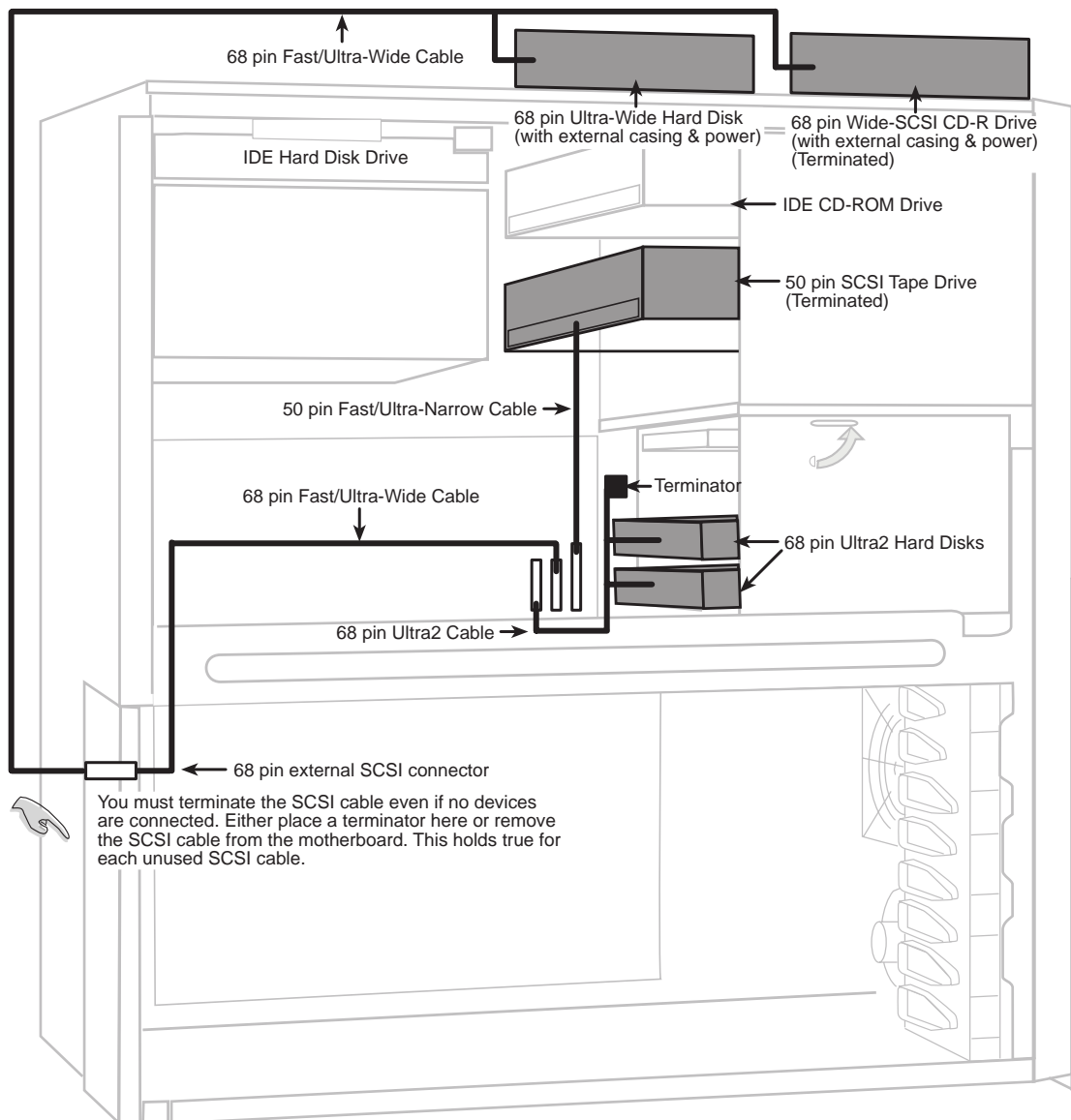
- 2) A total of **8** "Wide Ultra-SCSI" devices (ID0-ID15) may be connected to the 68 pin Wide connector if using a 1.5m (4.9ft) cable, but only **4** "Wide Ultra-SCSI" devices if using a 3m (9.89ft) cable. Ultra-SCSI technology is unstable over long lengths, therefore stability will depend on they quality of your cable and devices.
- 3) A total of **15** "Wide-SCSI" devices (ID0-ID15) may be connected to the 68 pin Wide connector.
- 4) 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 they quality of your cable and devices.
- 5) A total of **7** "Narrow Fast SCSI" devices (ID0-ID7) may be connected to the 50 pin Narrow connector.

# IV. Appendix

## SCSI Connection Examples

This is an example of how SCSI devices can be connected to your server.

- Two 9GB Ultra2-SCSI hard disks in the 3.5" cage can be connected to the Ultra2 connector on the motherboard for 18GB of main storage.
- One Ultra-SCSI tape drive in the 5.25" cage is connected to the 50 pin narrow connector on the motherboard for routine backups.
- The Wide-SCSI connector on the motherboard can be extended (using an optional SCSI cable with external bracket) to the chassis slot opening for connection of an external 4GB Ultra-Wide Hard disk drive and a Wide-SCSI CD recorder for archives.



*Example of SCSI connections*

IV. Appendix  
SCSI Examples

# IV. Appendix

---

## 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.

### **COM Port**

COM is a logical device name used by 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.

### **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 the computer parallel ports. Each LPT port is configured to use a different IRQ and address assignment.

### **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 devices 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, and other I/O devices.

### **PS/2 Port**

PS/2 ports are based on IBM 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.