# Ultra™ Enterprise™ 6000/5000/4000 Systems Installation Guide

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# Contents

# Figures

# *Tables*

# *Preface*

The *Ultra™ Enterprise™ 6000/5000/4000 Systems Installation Guide* provides installation instructions for factory-configured 16-slot and 8-slot cabinet and standalone server systems. These instructions are for an experienced system administrator with networking knowledge.

## *UNIX Commands*

This document may not include specific software commands or procedures. Instead, it may name software tasks and refer you to operating system documentation or the handbook that was shipped with your new hardware.

The types of tasks that you might need to use references for includes:

- Shutting down the system
- Booting the system
- Configuring devices
- Other basic software procedures

The references you can use include:

- *Solaris 2.x Handbook for SMCC Peripherals* contains Solaris™ 2.x software commands.

- On-line AnswerBook™ for the complete set of documentation supporting the Solaris 2.x software environment.

- Other software documentation and *Platform Notes* that you received with your system.

## Typographic Conventions

The following table describes the typographic changes used in this book.

| Typeface or Symbol | Meaning | Example |
|---|---|---|
| `AaBbCc123` | The names of commands, files, and directories; on-screen computer output | Edit your `.login` file. Use `ls -a` to list all files. `machine_name% You have mail.` |
| **`AaBbCc123`** | What you type, contrasted with on-screen computer output | `machine_name% ` **`su`** `Password:` |
| *AaBbCc123* | Command-line placeholder: replace with a real name or value | To delete a file, type `rm` *filename*. |
| *AaBbCc123* | Book titles, new words or terms, or words to be emphasized | Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be root to do this. |

## Shell Prompts

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

| Shell | Prompt |
|---|---|
| C shell | `machine_name%` |
| C shell superuser | `machine_name#` |
| Bourne shell and Korn shell | `$` |
| Bourne shell and Korn shell superuser | `#` |

## Related Documents

The following documents contain topics that relate to the information in the *Ultra Enterprise 6000/5000/4000 Systems Installation Guide.*

| Application | Title | Part Number |
| --- | --- | --- |
| Safety/EMI | *Ultra Enterprise Server Regulatory Compliance Manual* | 802-3846 |
| Service | *Ultra Enterprise 6000/5000/4000 Systems Manual* | 802-3845 |
| Software | *SMCC SPARC Hardware Platform Guide* | 802-5341 |
| | *Solstice SyMON User's Guide* | 802-5355 |
| Options | *Expansion Cabinet Installation and Service Manual* | 802-6084 |
| | *Enterprise Systems Boards Installation Guide* | 802-5030 |
| | *UltraSPARC Module Installation Guide* | 802-5031 |
| | *Enterprise Systems Memory Modules Installation Guide* | 802-5032 |
| | *Enterprise Systems Peripheral Power Supply Installation Guide* | 802-5033 |
| | *Enterprise Systems Power/Cooling Module Installation Guide* | 802-6244 |
| | *Ultra Enterprise Cabinet Floor Brackets Mounting Guide* | 802-7543 |
| | *Ultra Enterprise Caster Base Installation Guide* | 802-5034 |

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## *Notes, Cautions, and Warnings*

**Warning** – This equipment contains lethal voltage. Accidental contact with centerplane, card cage, and drive areas can result in serious injury or death.

**Caution** – Improper handling by unqualified personnel can cause serious damage to this equipment. Unqualified personnel who tamper with this equipment may be held liable for any resultant damage to the equipment.

Individuals who remove any outer panels or open covers to access this equipment must observe all safety precautions and ensure compliance with skill level requirements, certification, and all applicable local and national laws.

Procedures contained in this document must be performed by qualified
service-trained maintenance providers.

**Note** – Before you begin, carefully read each of the procedures in this manual.
If you have not performed similar operations on comparable equipment, *do
not attempt* to perform these procedures.

# *Preparing for Installation* 1≡

This chapter describes how to prepare your site for these systems:

- Ultra Enterprise 6000 system — 16-slot cabinet server
- Ultra Enterprise 5000 system —  8-slot cabinet server
- Ultra Enterprise 4000 system —  8-slot standalone server

See Figure 1-1 on page 1-2 for diagrams of the cabinet and standalone servers.

The tasks for installing the systems are:

1. Unpacking the cabinet server — Chapter 1
2. Preparing the site — Chapter 1
3. Preparing the servers — Chapter 1
4. Cabling — Chapter 2
5. Powering on — Chapter 3
6. Using the software — Chapter 4

**Note** – For information about physical specifications, electrical specifications, and environmental requirements, refer to Appendix A, "Specifications," in the *Ultra Enterprise 6000/5000/4000 Systems Manual.*
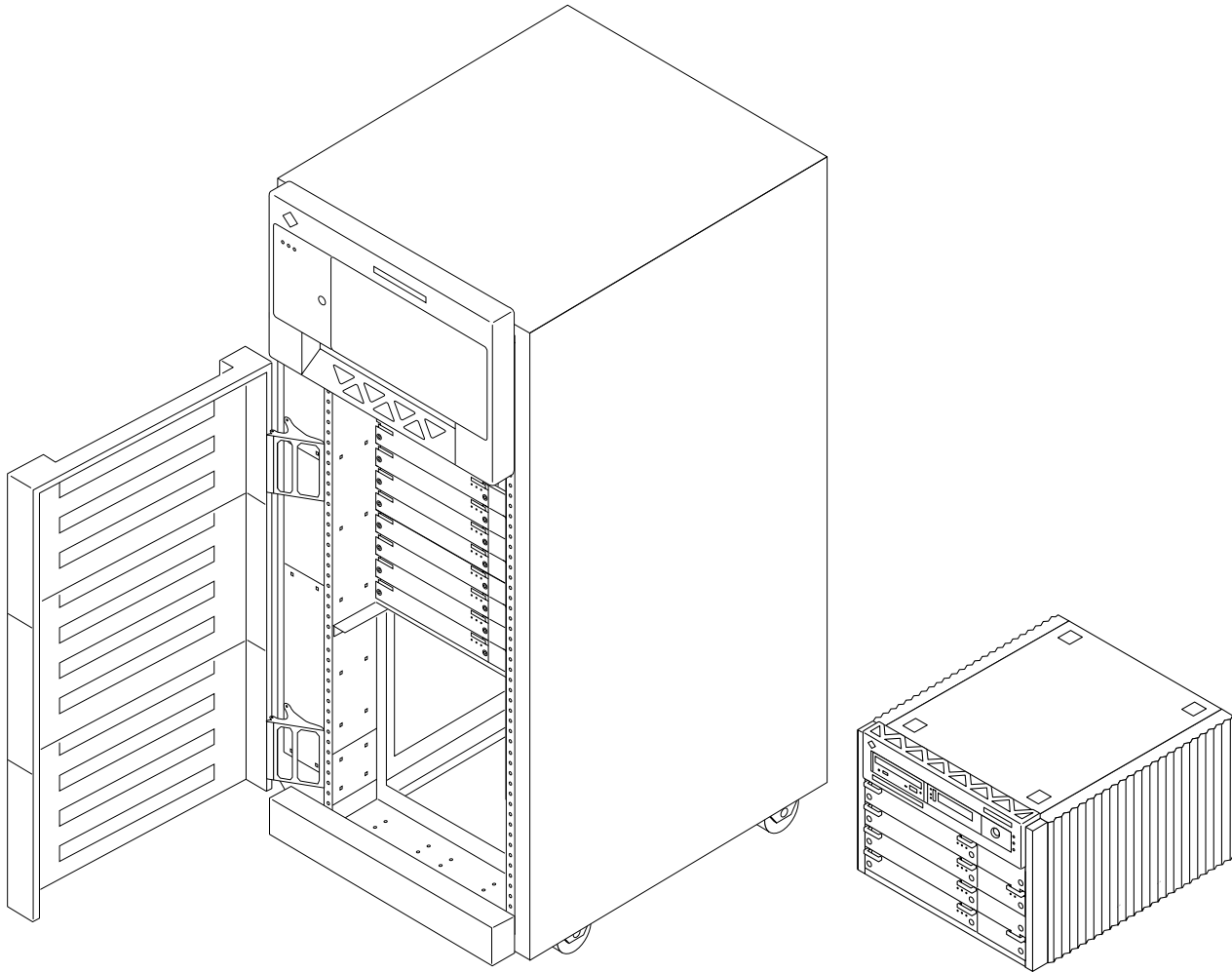
Enterprise 6000/5000 systems — 16-slot and
8-slot servers in data center system cabinets

Enterprise 4000 system —
8-slot standalone server

*Figure 1-1*    Ultra Enterprise 6000 ⁄ 5000 ⁄ 4000 Systems

## *1.1 Unpacking the Enterprise 6000/5000 Cabinet Systems*

**Note** – Inspect all shipping cartons for evidence of physical damage. If a shipping carton is damaged, request that the carrier's agent be present when the carton is opened. Keep all contents and packing material for the agent's inspection.

If you have a standalone Enterprise 4000 system, or the cabinet is already unpacked, go to Section 1.3, "Preparing the Electrical Circuits."

**Note** – Any unpacking instructions printed on the outside of the shipping carton take precedence over instructions in this section.

⚠ **Caution** – If your cabinet system is on a wooden pallet, extend the cabinet levelling pads so that the cabinet cannot roll. If the original shipping pallet has side rails, it is not necessary to lower the levelling pads.

1. **Cut the plastic or metal straps that are around the shipping container and lift off the corrugated top.**
   Store the shipping materials for future shipments.

2. **Remove the sides of the container.**
   The container is held together by six plastic clips. To unlock a clip, press the two inner tabs together and pull out the entire clip.

3. **Remove inner packing materials from the top and corners of the cabinet.**

4. **At the front of the pallet, lift the Velcro™ strip at each end of the wooden bar to detach the bar, then set it aside.**

5. **Slide out the two wooden ramps from under the cabinet.**

6. **Attach the wooden ramps to the pallet using the Velcro strip that is attached to each ramp.**
   Ensure both wheel guides (wooden strips) are to the outside. See Figure 1-2.

⚠ **Caution** – Three or more people are needed to move the server cabinet safely. Two people must push at the front of the cabinet to control the movement of the cabinet.

!

**Caution** – To prevent the cabinet from tipping over, push or pull only on the upper half of the cabinet.
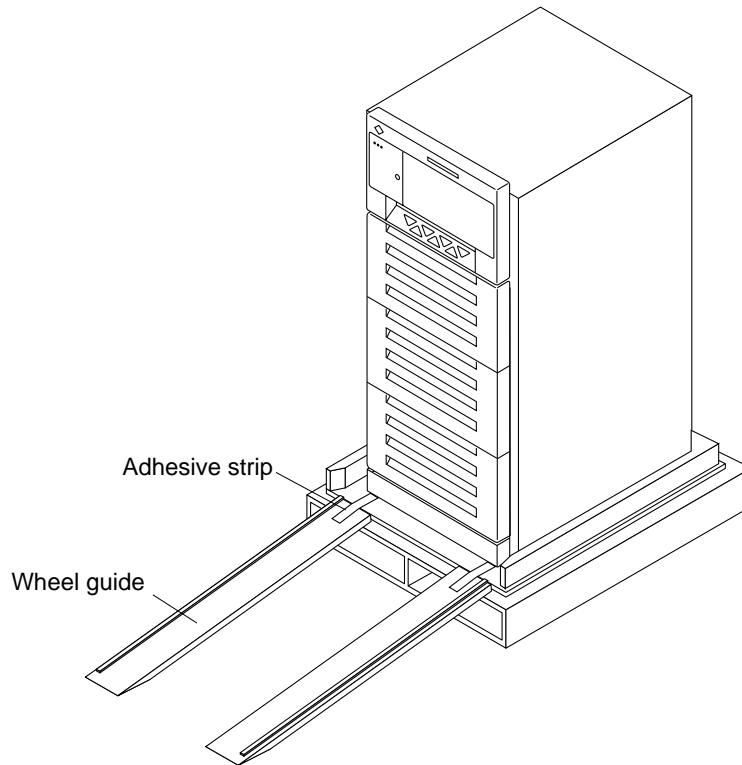


*Figure 1-2*     Attaching the Ramps to the Shipping Pallet

## *1.2 Shipping and Storing the System*

Save the original shipping containers and packing materials in case you need to store or ship your system.

If you cannot store the shipping materials, recycle or dispose of the materials properly. Consult your local recycling authority for information.

## 1.3   Preparing the Electrical Circuits

In planning where to place your equipment, remember that each of the following items require access (by way of a separate power cord) to a power outlet:

- Ultra Enterprise 6000/5000/4000 system
- External peripherals
- Monitor used for diagnostics

### 1.3.1   Enterprise 6000/5000 Cabinet Systems

The 16-slot and 8-slot system cabinets require a 30A circuit and a detachable cable.

The equipment relies on the protective device in the building installation; thus it requires a 30A circuit breaker.

⚠️ **Caution** – Do not attach other electrical equipment to the server AC circuit; server reliability may be affected.

Two AC connector plug types are available.

- The AC input power cable for 200-240V North American operation has a NEMA L6-30P connector that plugs into the AC source on one end (Figure 1-3). The other end, with metal housing, plugs into the sequencer.

- The AC input power cable for 200-240V international operation has a 32A, single-phase, IEC 309 connector that plugs into the AC source on one end (Figure 1-4). The other end, with metal housing, plugs into the sequencer.



*Figure 1-3*   NEMA L6-30P Electrical Connector
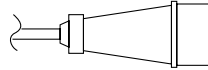
*Figure 1-4*    IEC 309 Electrical Connector

**Note** – If the appropriate mating receptacle is not available in your country, the plug may be removed from the cord. The cord can then be permanently connected to a dedicated branch circuit by a qualified electrician. Check local electrical codes for proper installation requirements.

**Warning** – The system cabinet has a high leakage current to ground. Strictly observe the following instructions to reduce the risk of electric shock.

The system requires an electrical circuit that is grounded to earth. The UL1950, CSA950, and EN60950 specify:

> An insulated earthing conductor that is identical in size, insulation material, and thickness to the earthed and unearthed branch-circuit supply conductors, except that it is green with or without one or more yellow stripes, is to be installed as part of the branch circuit that supplies the unit or system. The earthing conductor described is to be connected to earth at the service equipment or, if supplied by a separately derived system, at the supply transformer or motor-generator set.

> The attachment-plug receptacles in the vicinity of the unit or system are all to be of an earthing type, and the earthing conductors serving these receptacles are to be connected to earth at the service equipment.[1]

The power cord provides a ground path that will protect the drives and boards in the cabinet from static electricity damage.

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1. Information Technology Equipment — UL 1950, copyright 1989, 1991 by Underwriters Laboratories, Inc.

⚠️ **Caution** – Do not make mechanical or electrical modifications to the server cabinet. Sun Microsystems® is not responsible for the regulatory compliance if the cabinet is modified.

### 1.3.2 Enterprise 4000 System

The 8-slot Enterprise 4000 system uses nominal input voltages of 100-120 VAC or 200-240 VAC. Sun products are designed to work with single-phase power systems having a grounded neutral conductor.

To reduce the risk of electrical shock, do not plug Sun products into another type of power source. Contact your facilities manager or a qualified electrician if you are unsure what type of power is supplied to your building.

## 1.4 Preparing the Air Conditioning

For the most reliable system operation:

- The room should have sufficient air-conditioning capacity to support the cooling needs of the entire system.
- The air-conditioning system should have controls that prevent excessive temperature changes.

## 1.5 Preparing the Ethernet Network

The Enterprise 6000/5000/4000 systems follow the IEEE standard for 10/100BASE-T Ethernet (twisted-pair) or MII (Media Independent Interface).

Twisted-pair cables used with Sun Microsystems products have RJ-45 connectors that resemble the smaller RJ-11 connectors used for modular telephone cables. For twisted-pair cable length, see Chapter 2, Table 2-1 on page 2-9.

A MII to AUI converter cable, available from Sun, enables the 10/100 Mbps Ethernet interface to run over 10 Mbps coaxial Ethernet networks. Other MII Ethernet connectivity products are available from third parties.

Figure 1-5 and Figure 1-6 illustrate types of network cables and possible implementations of 10/100BASE-T Ethernet.

Set up the network using Sun or third-party components. To obtain the best results, read any applicable manufacturer instructions. Be aware that Sun Microsystems cannot guarantee the performance of any components that are not purchased from Sun.
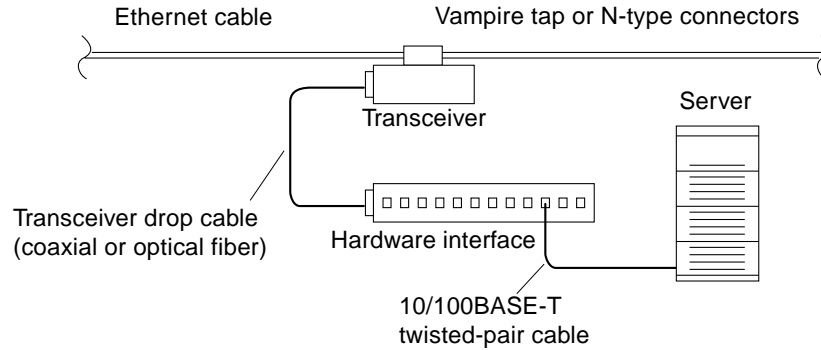


*Figure 1-5*    Types of Network Cables Used
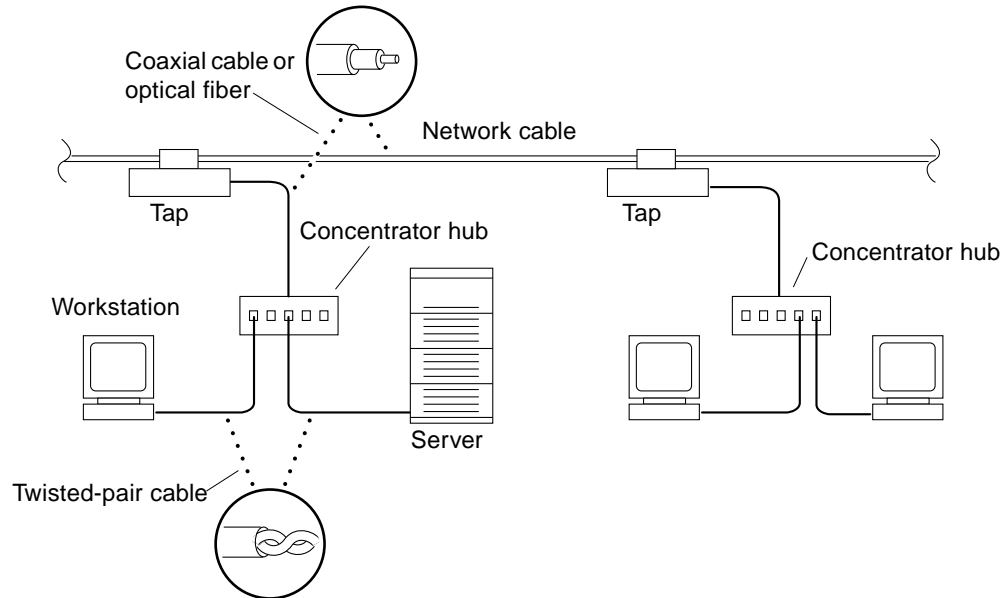


*Figure 1-6*    Example of 10⁄100BASE-T (Twisted-Pair) Ethernet

**Note** – Multiplexer boxes require a transceiver when used with the Ethernet applications described in this manual. Although these transceivers are compatible with Sun equipment, Sun Microsystems does not guarantee the performance of any component that was not purchased from Sun.

Many transceivers are compatible with both level-1 and level-2 Ethernet. To operate these transceivers with Sun equipment, set the device for level-2 operation following the manufacturer's instructions.

Sun equipment conforms to the Ethernet 10/100BASE-T standard, which states that the 10/100BASE-T Link Integrity Test function should always be enabled on both the host and the hub. If you have problems verifying connection between Sun equipment and your hub, verify that your hub also has the link test function enabled. See Section 3.4, "Failure of Network Communications," and refer to the manual provided with your hub.

## 1.6   Preparing the Area

### 1.6.1  Floorspace for the Enterprise 6000/5000 Cabinet Systems

- The server cabinets require approximately four feet (122 cm) of space in front and three feet (92 cm) in back for access by service personnel. See Figure 1-7.

- Allow two inches (5 cm) of space on the left for adequate air flow.

- Allow two inches (5 cm) of space on the right for adequate air flow.

- The server system (including expansion cabinets) should have a dedicated AC breaker panel. The server system should not share this breaker panel with other, unrelated equipment.

- Keep power and interface cables out of the way of foot traffic. Cables can be routed inside walls, floors, ceilings, or in protective channels. Interface cables should be routed away from motors and other sources of electric/magnetic or radio frequency interference.

3 feet access at rear

2 inches, left
and right sides

| Tape/disk EXP | Tape/disk EXP | Tape/disk EXP | System cabinet | ←→ | Tape/disk EXP | Tape/disk EXP | Tape/disk EXP |

4 feet access at front
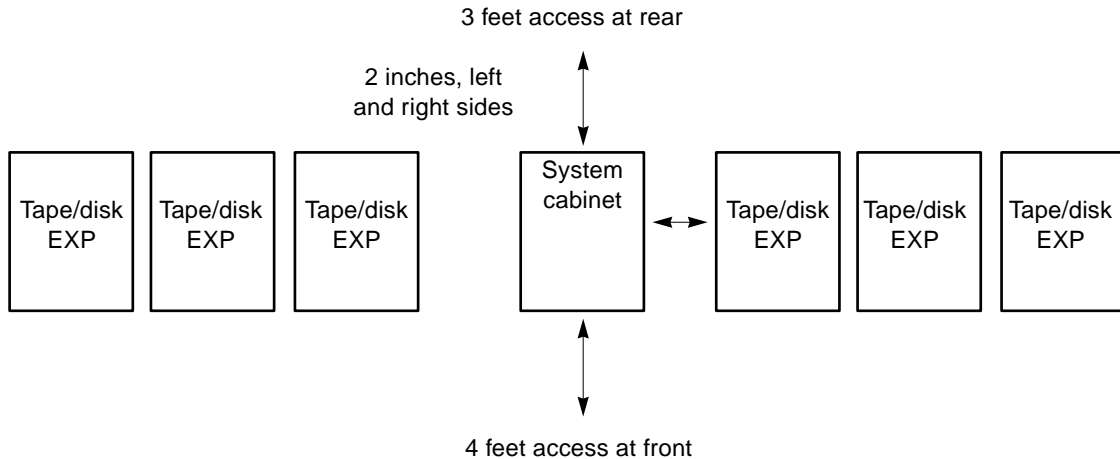
*Figure 1-7*    Cabinet Server Access Areas — Top View

## 1.6.2  Surface for the Enterprise 4000 System

The Enterprise 4000 system is designed to sit on the floor, on a caster base, or on a desk or table.

**Note** – Do not stack multiple Enterprise 4000 systems so that they sit directly on top of each other, resting on the top cover of the system below.

Use the following guidelines to prepare a location for your server.

- The server unit requires approximately 1.5 feet (47 cm) of space in the front and back for access by service personnel. See Figure 1-8.

- A minimum space of 6 inches (16 cm) is required on both sides of the server to afford adequate air flow.

- A minimum space of 3 feet (92 cm) is recommended to avoid exhaust air recirculation if systems are placed next to each other.

⚠ **Warning** – To avoid exhaust air recirculation, do not put systems or peripherals side by side with less than 3 feet of space between them.

• Keep power and interface cables clear of foot traffic. Route cables inside walls, under the floor, through the ceiling, or in protective channels. Route interface cables away from motors and other sources of magnetic or radio frequency interference.
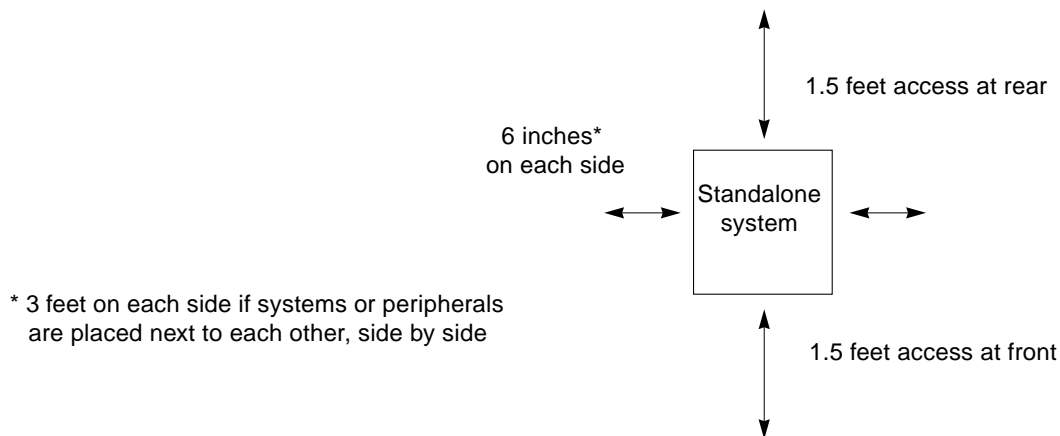


*Figure 1-8*    Standalone Server Access Areas — Top View

## 1.7   Preparing the Enterprise 6000/5000 Cabinet Systems

You need the following tools:

• #1 Phillips screwdriver
• Levelling wrench (packed inside the system cabinet)
• Front panel key (packed in a bag in the accessory box)

### 1.7.1  Moving the Server

The server may weigh $1/2$-ton/500 kilograms, or more, and can be unstable when rolling down ramps.

**Caution** – Three or more people are needed to move the server cabinet safely. Two people must push at the front of the cabinet to control the movement of the cabinet.

**Caution** – To prevent the cabinet from tipping over, push or pull only on the upper half of the cabinet.
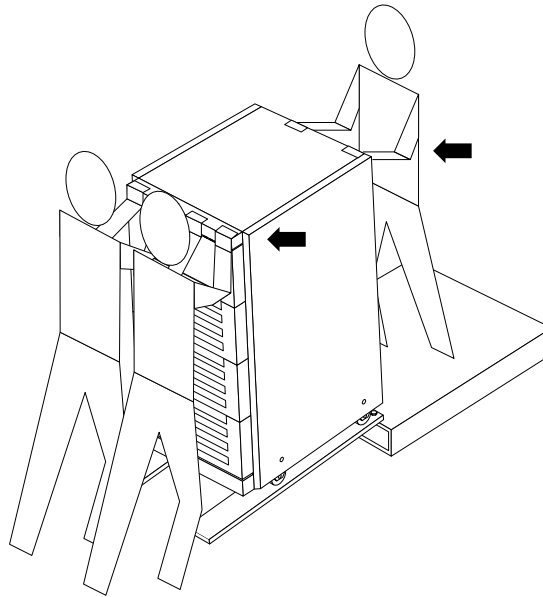


*Figure 1-9*    Moving the Server Safely Down the Ramps

## *1.7.2  Adjusting the Levelling Pads*

After moving the cabinet to its operating location, adjust the levelling pads.

**1. Take off the rear screen by removing the two screws shown in Figure 1-10.**

**Note** – If your system cabinet has a hinged rear door, use the sliding door latch to open the door.

**2. Remove the levelling wrench from inside the server cabinet.**
Press the plastic tab to unlock the plastic strap around the wrench, then slide part of the strap through the lock to loosen the wrench. Do not cut the strap.

3. **Extend the stabilizer bar fully from the bottom of the cabinet.**
   See Figure 1-11.

4. **Screw the two stabilizer bar levelling pads down until they are 1/8- to 1/4-inch (three to six millimeters) above the floor.**
   Make sure both pads are at equal heights above the floor. This clearance allows an extended stabilizer bar to stop the cabinet if it should begin to tilt.
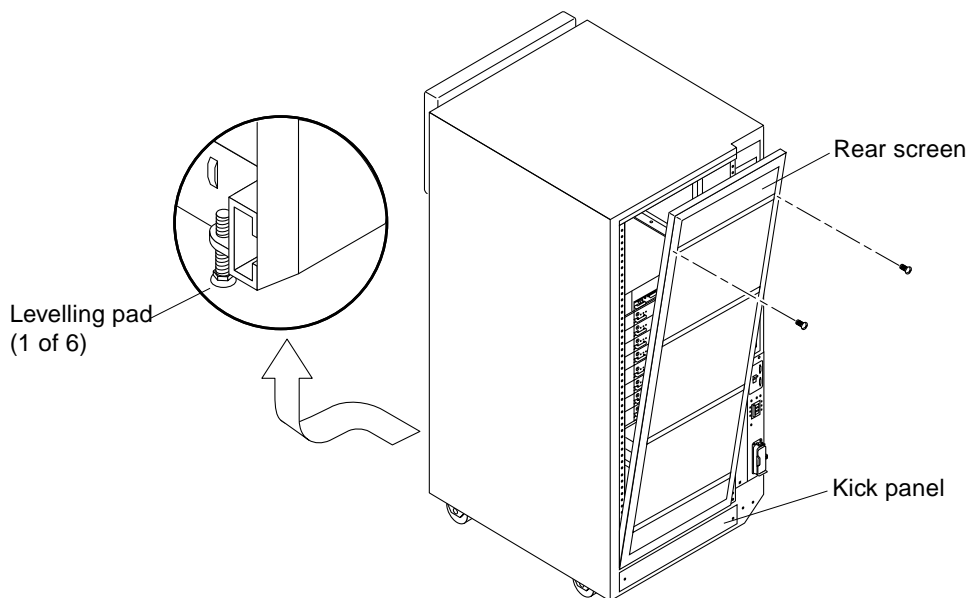


*Figure 1-10*   Rear Screen, Levelling Wrench, Kick Panel, and Levelling Pad

5. **Slide the stabilizer bar into the cabinet.**

**Warning –** Always extend the stabilizer bar before pulling the disk drive trays out for servicing.

6. **Adjust the four levelling pads on the cabinet frame. The four pads should press against the floor so that the cabinet does not move.**
   To adjust levelling pads on the cabinet rear, you may have to remove the kick panel. Two captive screws attach the panel to the cabinet (Figure 1-10).

This completes the first part of the system installation. If you are unable to continue the installation at this time, close the cabinet:

1. **Secure the levelling wrench inside the cabinet.**

2. **Replace the kick panel if the panel was removed.**

3. **Attach the rear screen.**
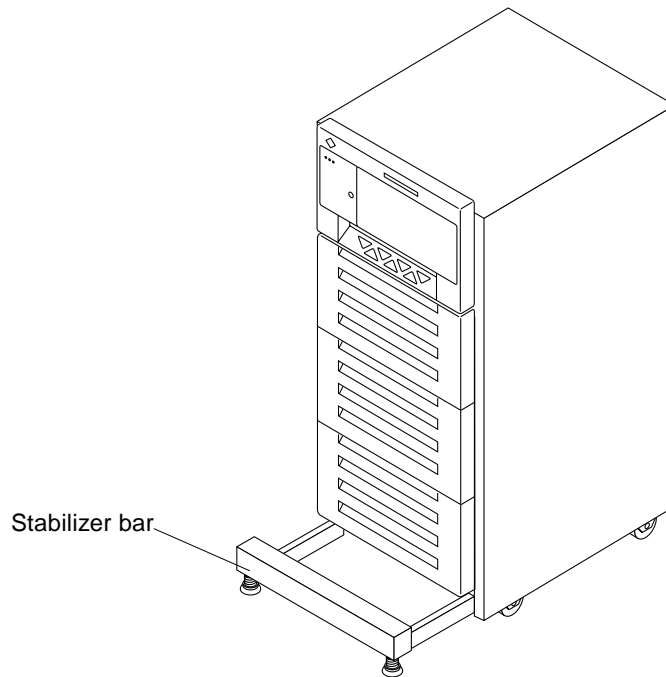


Stabilizer bar

*Figure 1-11*   Stabilizer Bar

## 1.8   Preparing the Enterprise 4000 System

⚠ **Warning** – The server weighs more than 150 lbs (68 kg). To prevent personal injury, two people are needed to lift the server safely.

You need the following tools:

- #1 Phillips screwdriver

- Front panel key (packed in a bag in the accessory box)

Follow the graphic instructions on the shipping container to remove the server from the container. Remove the front panel key and the power cord from the shipping container. These are needed to power on the system.

## *1.9   Using the User Naming Area*

To display the name of the server, IP address, owner, or other important information on the front of the machine:

1. **Remove the top front bezel.**
   Refer to Chapter 13, "Preparing for Service," in the *Ultra Enterprise 6000/5000/4000 Systems Manual.*

   - Enterprise 6000∕5000 systems: refer to Section 13.3.3, "Top Front Bezel."
   - Enterprise 4000 system: refer to Section 13.4.1, "Top Bezel."

2. **Snap out the narrow transparent window.**
   From the rear side of the bezel, gently squeeze the top and bottom edges together as you simultaneously push the transparent window out through the front of the bezel.

3. **Choose the information that will appear on the label.**
   Common items include the name of the server, IP address, name and contact information for the system administrator, and the group of users that the machine services.

4. **Use the colored paper provided with the system to make a label.**
   The available area for the paper label is 12 mm x 150 mm (0.5 in x   5.9 in). Print or write the desired information in an area this size and cut the label to fit the transparent window.

5. **Place the paper label inside the window, and snap the window back in place from the front side of the bezel.**

# Cabling the System 2

This chapter contains procedures for connecting the power cord to the AC power supply and instructions for cabling the system to the network.

## 2.1 Preparing the System for Cabling

Make sure the server is in an area that allows access to both the front and rear of the chassis. This site should conform to site preparation guidelines and specifications covered in Chapter 1.

## 2.2 Removing and Replacing the Enterprise 6000/5000 Cabinet Rear Screen and Kick Panel

*Removing the Rear Screen and Kick Panel*

1. **Locate the plastic key that is in the accessory box.**

2. **Open the door on the left side of the top bezel to access the key switch.**
   The door opens when you press on the recessed area.

3. **Turn the system key switch to ⏻ (the Standby position).**
   See Figure 2-1.

4. **Ensure that the AC power sequencer switch is set to Off.**
   This switch is at the rear of the cabinet. See Figure 2-2.
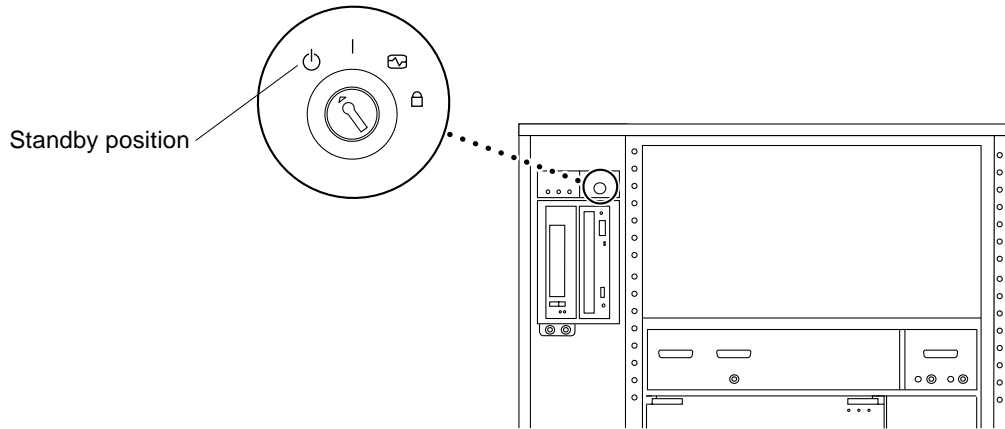
Standby position

*Figure 2-1*    Keyswitch Standby Position

**5. If the rear screen is still in place, remove it.**

---

**Note** – If your system cabinet has a hinged rear door, use the sliding door latch to open the door, and proceed to Step 6 and Step 7.

---

    **a. Remove two screws near the top of the screen.**
    See Figure 2-2.

    **b. Tilt the screen out and lift it free of the chassis.**
    Set the screen aside.

**6. Remove the AC power cord that is coiled inside the server cabinet.**
Set the power cord aside.

**7. Remove the kick panel by loosening the two screws.**
See Figure 2-3. Set the panel aside.
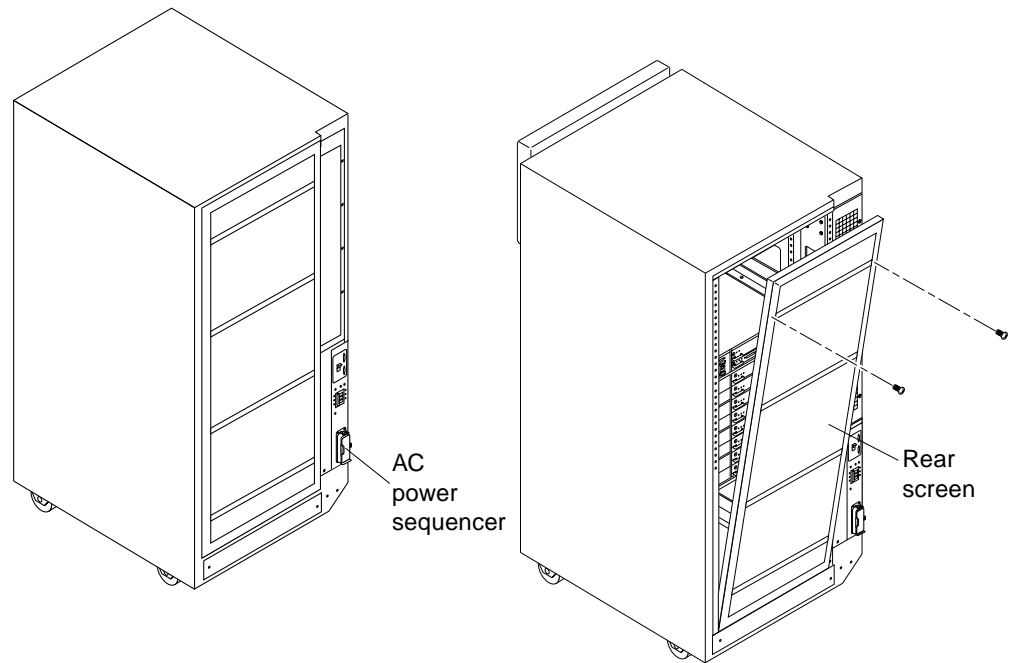
*Figure 2-2*    AC Power Sequencer Power Switch and Rear Screen

*Replacing the Rear Screen and Kick Panel*

1. **Tighten the two screws to secure the kick panel to the cabinet.**
   If cables are to be routed under the floor, the cables should be between the
   bottom panel and the kick panel. See Figure 2-3.

2. **Place the bottom of the rear screen on the flanges near the cabinet bottom.**

3. **Tilt the rear screen against the frame and install two screws to secure the
   screen in place.**
   See Figure 2-2.

4. **After all the cables are connected and the screen and panel have been
   replaced, power on the system.**

Bottom panel
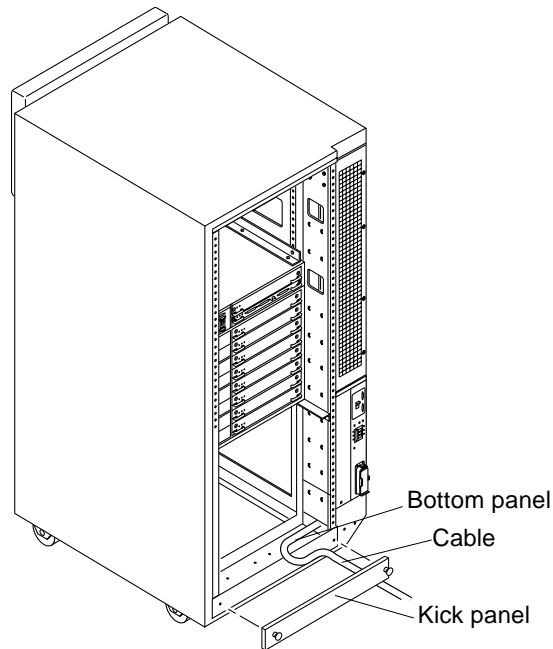
Cable

Kick panel

*Figure 2-3*    Routing Cables Under the Kick Panel

## 2.3   Connecting the Power Cords

### 2.3.1  Connecting the Enterprise 6000/5000 System Power Cord

1. **Remove the rear screen and the kick panel.**
   See Section 2.2, "Removing and Replacing the Enterprise 6000 ⁄ 5000 Cabinet
   Rear Screen and Kick Panel."

2. **Route the AC power cord and external interface cables along the bottom
   panel of the cabinet and over the edge of the bottom panel.**
   See Figure 2-3. The cables should be between the bottom panel and the kick
   panel when you replace the kick panel.

3. **Uncoil the AC power cord and plug it into a grounded wall outlet.**
   The outlet must be a 200-240 VAC 30A circuit, dedicated solely to the server
   cabinet, as described in the site preparation instructions in Chapter 1.

**Warning** – Risk of electric shock. Do NOT turn on AC power to the unit yet.

4. **Continue with Section 2.4 through Section 2.7 for further cabling instructions, and then see Section 2.2 to replace the rear screen and kick panel.**

## *2.3.2  Connecting the Enterprise 4000 System Power Cord*

1. **Insert the key provided with your system into the front panel key switch. Turn it to the Standby position (fully counterclockwise).**
   See Figure 2-4.

Standby
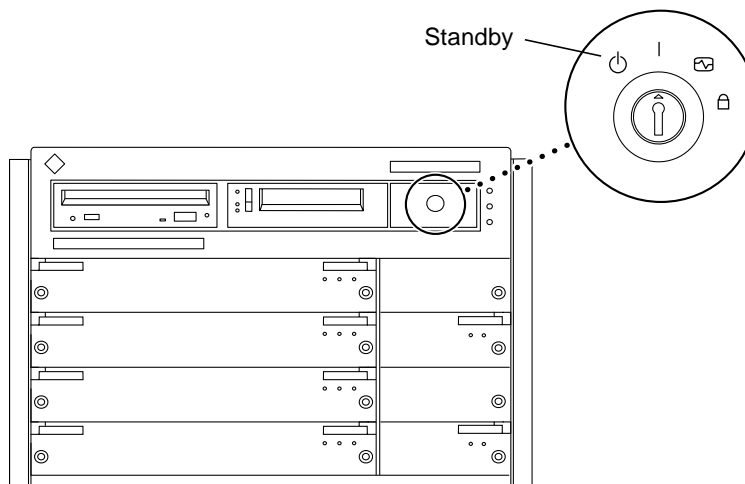
*Figure 2-4*    Key Switch Positions

2. **Turn the AC power switch to Off.**
   This switch is in the upper left corner of the system rear. See Figure 2-5.

3. **Connect the female end of the power cord into the AC connector.**
   This connector is to the left of the AC power switch on the system rear. See Figure 2-5.

4. **Connect the male end of the power cord into a grounded wall outlet.**
   The outlet must be a 100-240 VAC 15A circuit.

AC connector
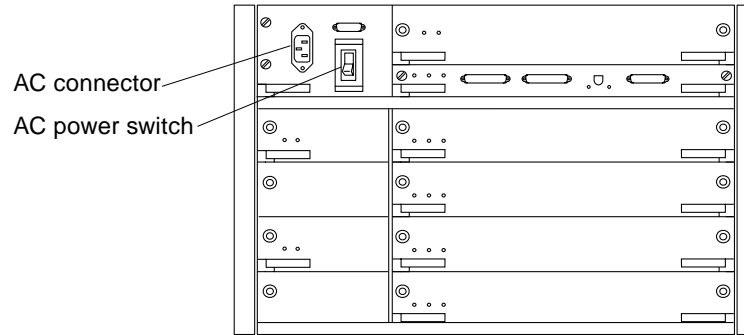
AC power switch

*Figure 2-5*    AC Power Switch and Power Receptacle

> **Caution** – Do NOT turn on power to the unit yet. Doing so could cause system damage to occur.

5. **Continue with Section 2.4 through Section 2.7 for further cabling instructions.**

6. **After all the cables are connected, power on the system.**

## 2.4   Connecting the Network Cable to the System

The locations specified in the following instructions assume the use of twisted-pair 10BASE-T or 100BASE-T Ethernet.

1. **Locate the network cable.**
   Figure 2-6 shows the twisted-pair Ethernet network cable.
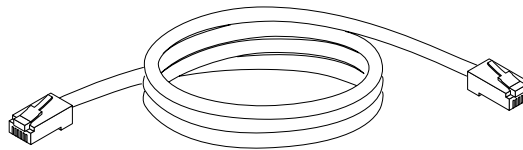


*Figure 2-6*    Network Cable

2. **Connect one end of the network cable into the RJ-45 twisted-pair network port.**
   For 10/100BASE-T Ethernet, the default interface port is the onboard connector on the I/O board in slot 1. See Figure 2-7.

Ethernet port
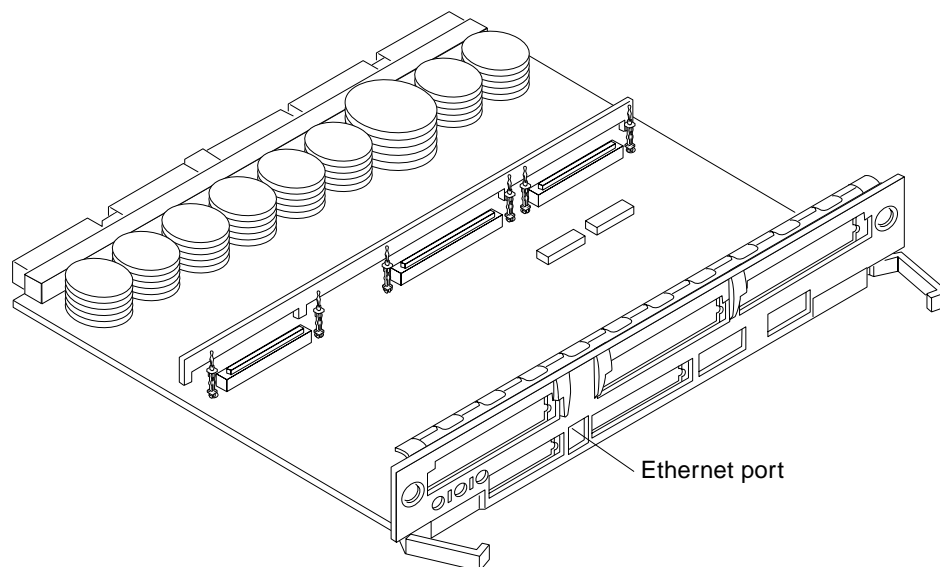
*Figure 2-7*    10/100BASE-T Ethernet Connection

3. **Enterprise 6000/5000 systems only: route the cable down along the right mounting rail of the chassis.**
   Use tie wraps to secure the cable to the rail.

## *2.5   Connecting the System to the Network*

1. **Connect the network cable to a twisted-pair-to-transceiver interface box.**

2. **Connect the interface box with an appropriate cable to a network transceiver.**
   Figure 2-8 shows a typical arrangement for connecting the system to an Ethernet network.

3. **For Ethernet cables, determine if the cable has N-type screw-on connectors at the ends.**

- If the Ethernet cable lacks N-type connectors at the ends, use a "vampire" tap to connect the cable to the transceiver. See Figure 2-8. To connect the cable to the transceiver, use instructions provided with the vampire tap.
- If the Ethernet cable has N-type connectors, connect the Ethernet cable to the transceiver:

 a. **Screw the Ethernet coaxial cable into one of the round screw-on type connectors on the transceiver.**
 Use either one of the transceiver connectors.

 b. **Screw the other Ethernet coaxial cable into the other round screw-on type connector on the transceiver.**

4. **Determine if a terminator should be installed. Table 2-1 lists the cabling limitations for Ethernet.**

5. **If termination is required, install a 50-ohm terminator in the unused transceiver N connector or at the end of the coaxial cable. Use a female double N-type connector.**

Figure 2-8 shows the elements used in the installation process.
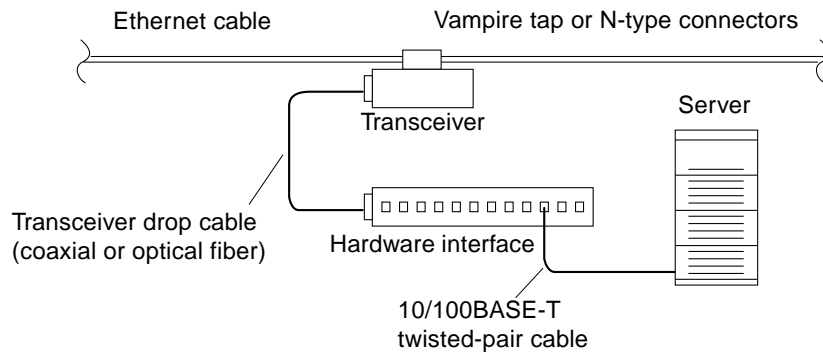


*Figure 2-8*    Connecting Twisted Pair Ethernet to N-type Coaxial Cable

Table 2-1 lists the cabling limitations for Ethernet.

*Table 2-1*    Ethernet Cabling Limitations for N-type Coaxial Cable

| Cable Segment | Length in Meters |
|---|---|
| Allowed contiguous length of cable segments | 23.4 |
| | 70.2 |
| | 117.0 |
| | 500.0[1] |
| Distance between transceivers (multiples-of) | 2.5[2] |
| Minimum length of Ethernet coaxial cable segments | 23.4 |
| Maximum length of transceiver "drop" cable | 50.0 |
| Minimum length of twisted pair cable | no minimum |
| Maximum length of twisted pair cable | 110 |

1. Finite lengths (as constrained by transmission line phenomena). Minimum length = 23.4M; maximum = 500M. If cable falls shorter than one of these values, add cable to achieve next-highest value.

2. Transceivers are placed at intervals of 2.5 meters, or multiples of 2.5 meters along the Ethernet cable. Example: transceivers are connected 2.5 meters apart, not 2.0 meters. Example: transceivers are connected 15 meters apart (6 multiples of 2.5 meters), not 14.0 meters.

Figure 2-9 shows an example of a typical network setup. The Ultra Enterprise 6000/5000/4000 systems can be any server shown in this figure.
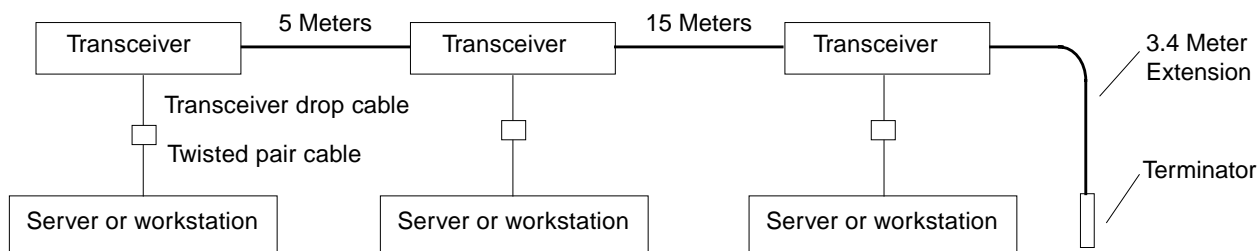


Note: 5 Meters + 15 Meters + 3.4 Meter Extension = 23.4 Meters minimum length allowed.

*Figure 2-9*    Ethernet Cabling Length — Example Using N-type Cable

> **Note** – Sun equipment conforms to the Ethernet 10/100BASE-T standard, which states that the 10/100BASE-T Link Integrity Test function should always be enabled on both the host and the hub. If you have problems verifying connection between Sun equipment and your hub, verify that your hub also has the link test function enabled. See Section 3.4, "Failure of Network Communications," and refer to the manual provided with your hub for more information about the Link Integrity Test function.

## *2.6   Connecting an ASCII Terminal*

An ASCII terminal (or workstation) must be attached to the server to display diagnostic messages produced by the firmware (power-on self test/POST or OpenBoot PROM/OBP) program. A terminal is not required for normal server operations, so it may be necessary to locate a terminal to connect to the server.

**1. Connect the terminal cable into serial port A on the clock board.**
   See Figure 2-10.



Serial port A
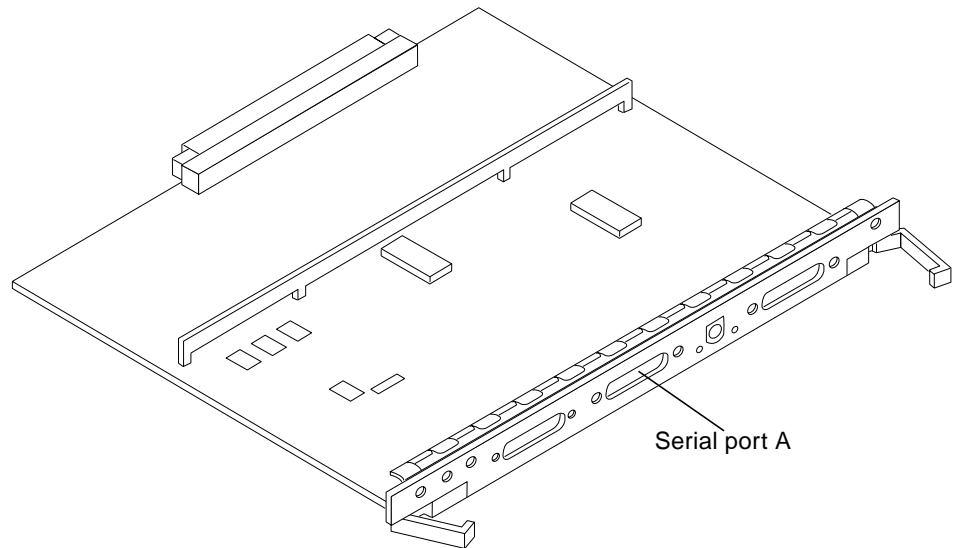
*Figure 2-10*   Clock Board

2. **Enterprise 6000/5000 systems only: route the terminal cable from the clock board down along the right mounting rail of the cabinet.**
Use tie wraps to secure the terminal cable to the mounting rail.

3. **Connect the terminal power cord into an AC wall outlet.**

4. **Configure the ASCII terminal as follows:**
   - 9600 bps
   - 1 stop bit
   - 8 data bits
   - Parity off
   - Full duplex

   Refer to the instruction manual shipped with the terminal for specific configuration instructions.

---

**Note** – The setup parameters listed in Step 4 may differ from the setup at the customer site. These parameters can be changed in the NVRAM. Refer to the `set-defaults` and `printenv` commands in the *OpenBoot Command Reference* manual, part number 802-3242.

---

## 2.7  Connecting the Fiber Cable to the I/O Board

1. **Remove the two plastic caps that cover the cable connector on the FC/OM module.**

2. **Remove the plastic cap covering the ends of the fiber cable.**

3. **Connect one end of the fiber cable into the FC/OM module installed on the I/O board.**
Align the notch in the cable connector with the key notch in the module connector. See Figure 2-11.

4. **Connect the other end of the fiber cable into the FC/OM connector on the SPARCstorage Array (or other storage device with fiber optics interface) rear panel.**
Align the notch in the cable connector with the notch in the connector on the storage device rear panel.
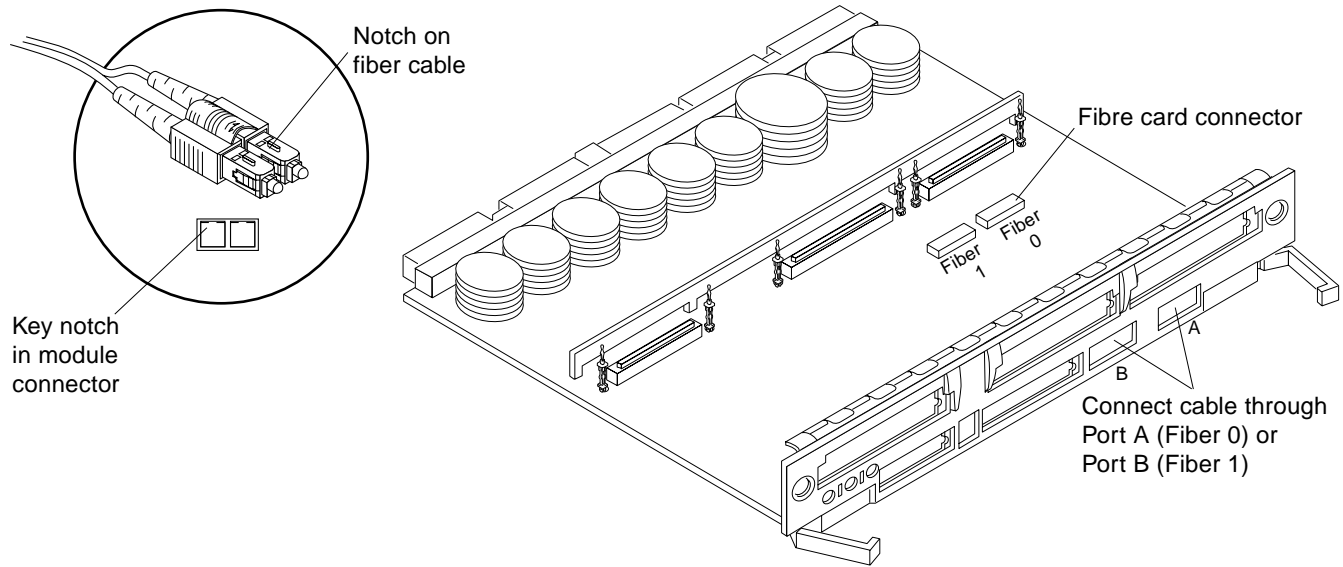
*Figure 2-11* Fiber Cable and Fibre Card Connectors and Ports on the I/O Board

## 2.8 Connecting External SCSI Devices

External SCSI-2 devices connect to your system through the built-in single-ended Fast/Wide SCSI-2 port on I/O boards (except for the board in slot 1), or through FSBE/S, DSBE/S, SWIS/S, or DWIS/S SBus cards installed on I/O boards.

**Note –** The onboard SCSI-2 bus on the I/O board in slot 1 controls internal SCSI tray devices. Therefore, the external SCSI connector on the I/O board in slot 1 must always have a terminator installed.

**Note –** The maximum combined length for a string of SCSI cables is six meters for non-differential cables. For differential SCSI cables, the maximum is 25 meters.
When calculating the total length of a SCSI string, include external cables, internal cables, and printed traces. Table 2-2 lists internal measurements for the Enterprise servers.

*Table 2-2*   Internal SCSI Lengths (Approximate)

| Location | Internal Length | Comments |
|---|---|---|
| Enterprise 6000 slot 1 | 3.7 meters | Includes I/O board traces and cables to SCSI tray |
| Enterprise 5000 slot 1 | 3.7 meters | Includes I/O board traces and cables to SCSI tray |
| Enterprise 4000 slot 1 | 1.4 meters | Includes I/O board traces and cables to SCSI tray |
| SBus I/O board | 0.43 meter | Includes board traces only |
| Graphics I/O board | 0.43 meter | Includes board traces only |
| Disk board | 0.64 meter | Includes board traces only |

For information on device addressing, priorities, and slot assignments, refer to Appendix D, "Rules for System Configuration" in the *Ultra Enterprise 6000/5000/4000 Systems Manual*, part number 802-3845.

**Caution** – Risk of equipment damage. Do not assign the same SCSI address to two devices sharing the same SCSI bus or SBus card.

To connect an external SCSI device to your system:

1. **Connect a SCSI cable to the appropriate SCSI-2 host on the I/O board.**
   - For the I/O board in slot 1, this is an SBus card installed in an appropriate SBus slot.
   - For I/O boards in slots 2 through 15, use the onboard SCSI-2 port or an SBus card installed in an appropriate SBus slot.

   Figure 2-12 shows the location of the onboard single-ended SCSI connector on the I/O board.

Fast/wide onboard SCSI-2, 68-pin connector
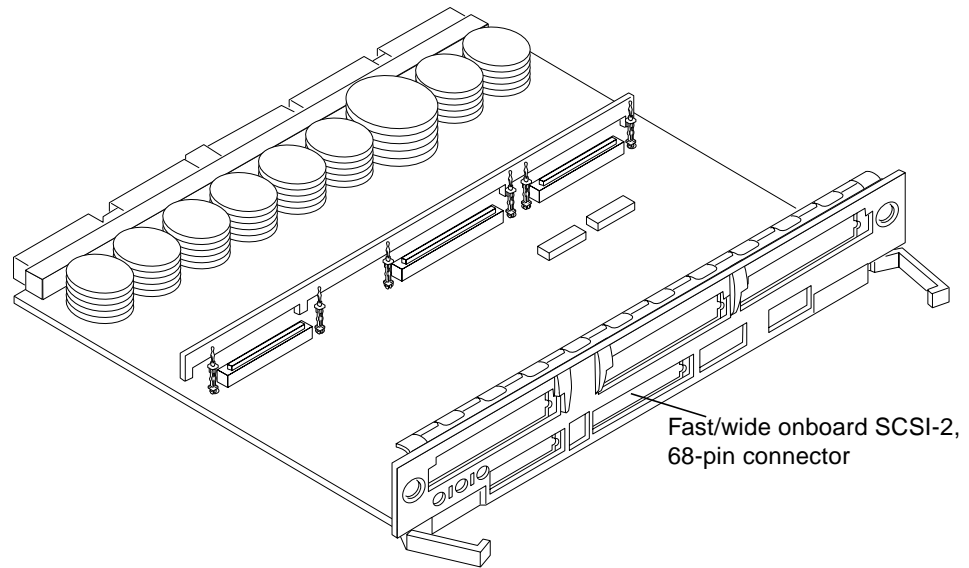
*Figure 2-12*   Onboard Single-ended SCSI Connector on the I/O Board

2. **Enterprise 6000/5000 systems only: route the cable from the I/O board down along the left mounting rail inside the cabinet.**
   Use tie wraps to secure the cable to the left mounting rail.

3. **Connect the other end of the SCSI cable to the external SCSI-2 device.**

4. **Enterprise 6000/5000 systems only: return to Section 2.2, "Removing and Replacing the Enterprise 6000/5000 Cabinet Rear Screen and Kick Panel" to replace the screen and panel. Then power on and test the server.**

This concludes the hardware installation for the standalone server. You can now power on the system and test the server.

*Powering the System On and Off*    *3*≣

This chapter contains information about powering the system on and off, reading boot messages, and interpreting system status by viewing the LEDs.

## 3.1   *Using JumpStart Automatic Installation*

The Ultra Enterprise 6000/5000/4000 systems can use the JumpStart™ automatic installation feature that is described in installation documents for Solaris software. The software that enables this feature is present on a hard disk in your system if the system was built at the factory with internal disk boards or disk trays. JumpStart software is not installed on SPARCstorage Array disks.

JumpStart will run only when the system is powered on for the first time.

⚠ **Caution** – JumpStart may incorrectly install the system as a standalone workstation. You should prevent JumpStart automatic installation from proceeding if the appropriate server-specific configuration information is not in place. Information about the JumpStart feature is on a card titled "JumpStart Installation Instructions" that is provided with the system documentation.

To prevent JumpStart installation from occurring unintentionally:

- Do not connect the system to a network when you power it on initially.
- Do not place a Solaris release CD-ROM in a drive when you first power on the machine.

> **Note** – If JumpStart automatic installation begins unintentionally, interrupt it by pressing "L1-A" (Stop-A) or "Break" (on ttya). Perform a manual installation when you are ready.

If JumpStart completes the installation incorrectly, you may need to reinstall Solaris 2.x manually.

## *3.2 Enterprise 6000/5000 Cabinet Systems*

### *3.2.1 Powering On the System*

> **Note** – It is advisable to connect an ASCII terminal to the system during installation.   See Section 2.6, "Connecting an ASCII Terminal," for terminal settings and connections.
> Observe the yellow (middle) LED on the front panel. It should go off when boot completes. If it remains lit, observe the terminal screen for boot messages produced by the firmware diagnostic program during power on.

To power on the cabinet system:

**1. Begin with a safety inspection of the system:**

    **a. Turn the system key switch to ⏻ (the Standby position).**
       See Figure 3-1.

> **Note** – The standby position (⏻) does not turn off any AC-powered drive trays in the lower part of the system cabinet. The key switch controls only the DC power supply and DC-powered devices in the main cabinet.

    **b. Turn the AC power sequencer power switch to Off.**
       The AC power sequencer is at the rear of the cabinet. See Figure 3-2.

    **c. Verify that the cabinet AC power cord is plugged into a wall socket.**

On

Standby

Diagnostics

Locked

Legend:

Standby = OFF; no DC power
On = Normal power ON
Diagnostics = Normal power ON with full
diagnostics
Locked = Normal power ON in secure mode
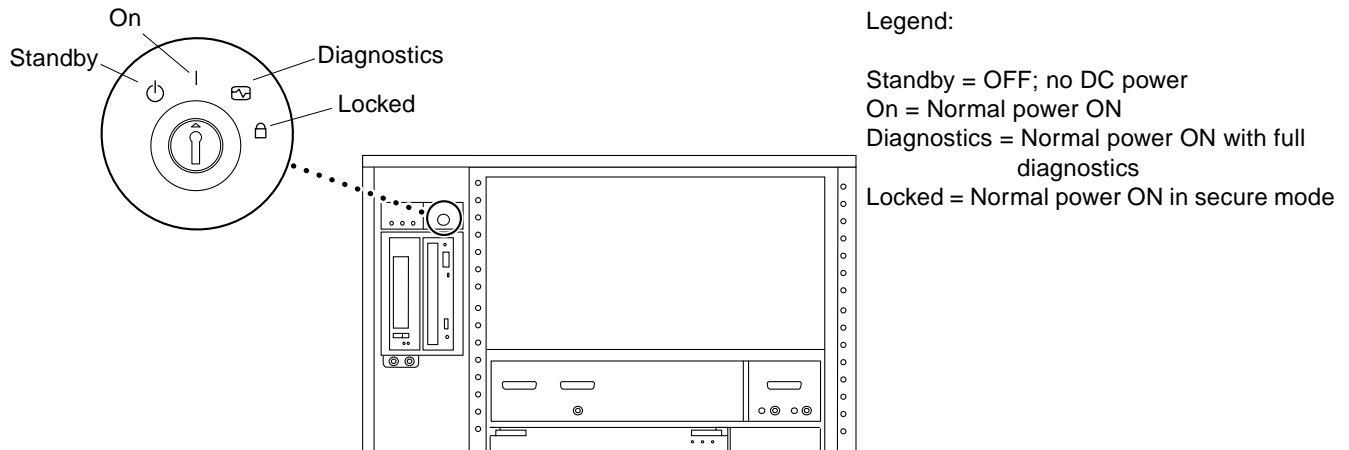
*Figure 3-1*    Key Switch Positions

**Caution** – The outlet must be a 200-240 VAC 30A circuit intended solely for use by the server cabinet. The electrical receptacles must be grounded, and the grounding conductors serving these receptacles must be connected to the earth ground at the service equipment.

**Caution** – Do not disconnect the AC power cord from the wall socket when you work on or in the server cabinet. This connection provides a ground path that prevents damage from electrostatic discharge.

**Warning** – Never move the system or expansion cabinets when system power is on. Excessive movement can cause catastrophic disk drive failure. Always power the system OFF before moving it.

2. **Turn on power to any expansion cabinets.**
   Read the documentation supplied with each type of expansion cabinet for specific instructions.
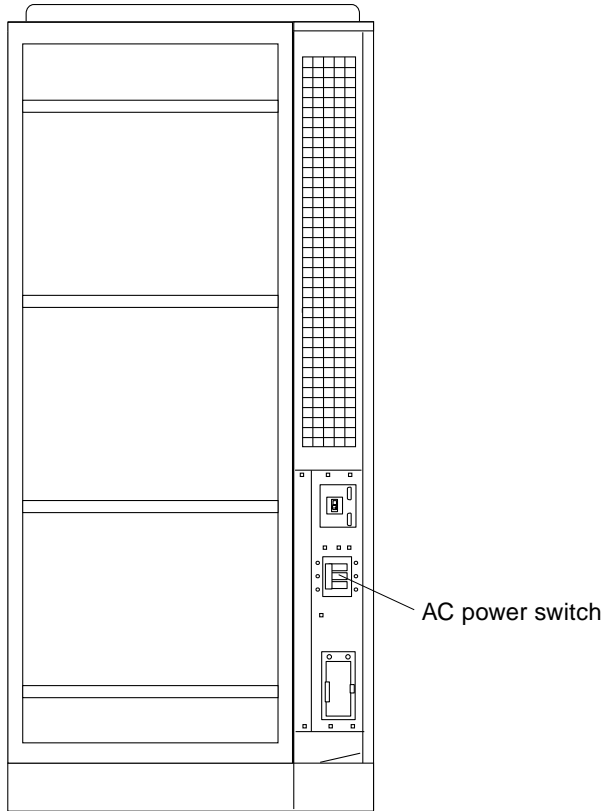
*Figure 3-2*   The AC Power Sequencer Power Switch

**3. Turn on power to the terminal (if applicable).**

**4. Set the system cabinet Local/Remote switch to Local.**
See Figure 3-3.

**5. Turn the AC power sequencer power switch to On.**
See Figure 3-2. Listen for the sound of AC-powered devices such as disk
drives and fans in the disk drive tray(s).

**Note** – The front panel keys for this switch are packed in the accessory box.



Local/remote switch
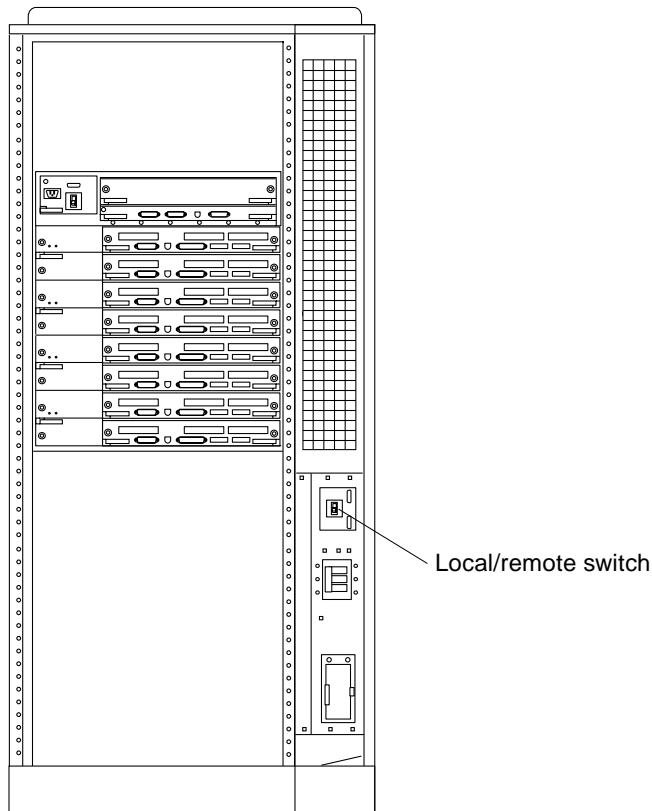
*Figure 3-3*    Local/Remote Switch

**6. Turn the key switch to the On position.**
The system will run firmware diagnostics for about one minute and then boot.

You should see and hear several things happen:

- The fans in the power supplies begin turning.
- The left LED (green) on the front of the cabinet turns on immediately to indicate the DC power supply is functioning.
- The middle LED (yellow) begins flashing.

- The right LED (green) flashes after firmware completes to denote that the operating system is running.
- The terminal screen lights up upon completion of the internal self test.

**7. Watch the terminal screen for any firmware error messages.**

---

**Note** – If the middle front panel LED remains lit after the system has booted, firmware has found (and deconfigured) failing hardware in the main cabinet.

---

POST (power-on-self test) tests subassemblies and some interface paths between subassemblies.

At the conclusion of testing, firmware automatically attempts to reconfigure the system, omitting any parts of the system that have failed diagnostics.

If there are no faults, or if firmware completes a successful reconfiguration in response to detected faults, the system boots.

If the system is unable to communicate with the network, see Section 3.4, "Failure of Network Communications."

---

**Note** – POST does not test drives or internal parts of SBus cards. To test these devices, run OpenBoot PROM (OBP) diagnostics manually after the system has booted. Refer to the *OpenBoot Command Reference* for instructions.

---

---

**Note** – If faulty parts are detected and configured out of the working system, you and the system manager must decide whether to operate the system until replacement parts arrive, or to halt operation. Also, if a faulty component cannot be replaced in the field, the entire subassembly (like the system board) must be replaced.

---

**8. To restart firmware, or if the system hangs, press the CPU reset switch on the clock board.**
See Figure 3-4.
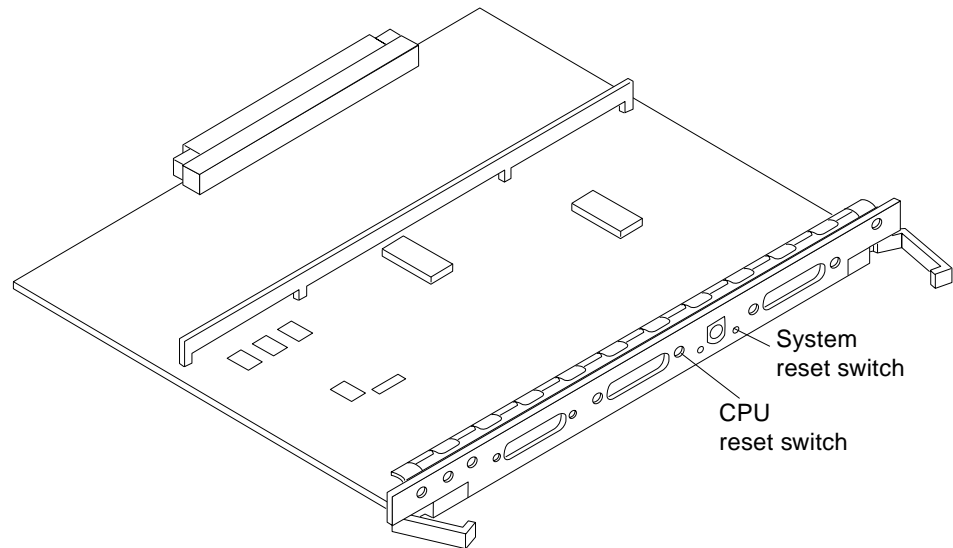
*Figure 3-4*     CPU Reset Switch on the Clock Board

## 3.2.2  Reading Boot Messages

Use the boot software messages to verify that all options are installed and recognized by the system. After firmware completes the system self test, a message similar to the following will appear on your screen. The message lists hardware detected in the system.

**Note** – This screen display is an example only. The actual message displayed on the screen will vary with the software running on the system.

```
16-slot Ultra Enterprise 6000, Keyboard Present
OpenBoot -.- FCS, --- MB memory installed, Serial #---.
Ethernet address -:-:--:-:--:--, Host ID: ------.
```

If firmware indicates a hardware problem at this time, refer to the *Ultra Enterprise 6000/5000/4000 Systems Manual*, Part 3, "Troubleshooting," for further instructions.

> **Note** – When the system finishes booting for the first time — if there is no appropriate server configuration file on the disk drive — it may be necessary to prevent the JumpStart automatic configuration program from running. See the caution in Section 3.1, "Using JumpStart Automatic Installation."

## *3.2.3 Interpreting Status LED Patterns*

If there is no terminal on the system, basic system status information is available on the front panel LEDs, as shown in Figure 3-5.
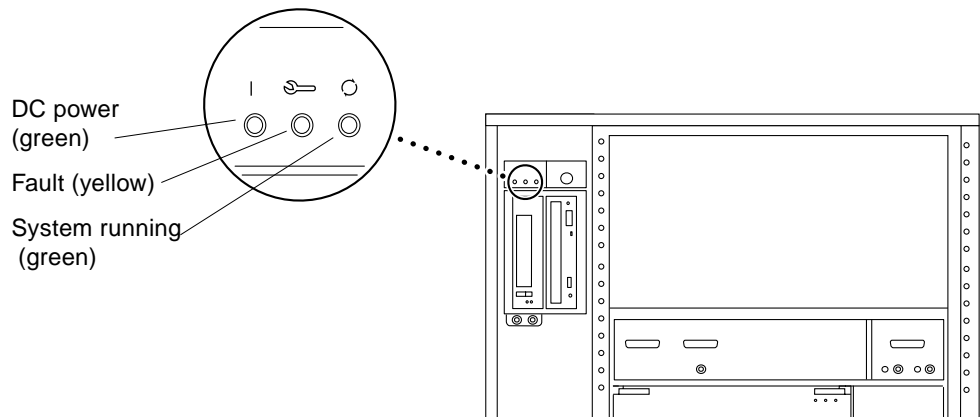


*Figure 3-5*    System Status LEDs (Cabinet Server)

Table 3-1 summarizes LED status indications.

*Table 3-1*    Front Panel LED Status Indicators

| LED Position | Condition |
| --- | --- |
| Left LED (green) | On — DC power supply is receiving AC current.<br>Off — There is no DC power. |
| Middle LED (yellow) | On Flashing — (first 60 seconds) Self tests are running.<br>Off — (after self tests end) No hardware failures.<br>On — (after self tests end) Hardware failure was detected. |
| Right LED (green) | Off — (first 60 seconds) Self tests are running.<br>On Flashing — (after self tests end) System is running.<br>Off — (after self tests end) System cannot run; repair is needed. |

## *3.2.4 Powering Off the System*

Before turning off the system power, you must halt the operating system. See the Preface, "UNIX Commands," to find references if you need help with the commands for this task or other system administration procedures.

**Note** – Failure to halt the operating system properly can cause the loss of disk drive data.

**Note** – Do not disconnect the terminal while the system is running.

**Caution** – To avoid damaging internal circuits, do not disconnect or connect any cable while power is applied to the system.

To shut down the system:

1. **Notify users that the system is going down.**

2. **Back up the system files and data to tape, if necessary.**

3. **Halt the system using the appropriate commands. Refer to the** *Solaris Handbook for SMCC Peripherals* **that corresponds to your operating system.**

4. **Wait for the system-halted message and the boot monitor prompt.**

5. **Turn the key switch on the front panel of the server to the Standby position (fully counterclockwise).**

6. **Turn off the system power in this order:**

   a. External drives and expansion cabinets (if any)

   b. System cabinet AC power switch

   c. Terminal

For more system administration information on methods for shut-down and backup, see the Preface, "UNIX Commands," for references to documentation that describes these procedures.

## *3.3  Enterprise 4000 System*

### *3.3.1  Powering On the System*

**Note** – It is advisable to connect an ASCII terminal to the system during installation.   See Section 2.6, "Connecting an ASCII Terminal," for terminal settings and connections.

Observe the yellow (middle) LED on the front panel. It should go off when boot completes. If it remains on, observe the terminal screen for boot messages produced by the firmware diagnostic program during power-on.

To power on the Enterprise 4000 system:

1. **Begin with a safety inspection of the system.**

   a. **Turn the system key switch to ⏻ (the Standby position).**
      See Figure 3-6.

   b. **Turn the AC power sequencer power switch to Off.**
      The AC power sequencer is at the rear of the enclosure. See Figure 3-6.

   c. **Verify that the AC power cord is plugged into a wall socket.**

**Caution** – Do not disconnect the power cord from the wall socket when working on the server. This connection provides a ground path that prevents damage from uncontrolled electrostatic discharge.

2. **Turn on power to any expansion cabinets.**
   Read the documentation supplied with each type of expansion cabinet for specific instructions.

3. **Turn on the terminal (if applicable).**

4. **Turn the AC power sequencer power switch to On.**
   See Figure 3-6.

5. **Turn the key switch on the front panel to the On position.**
   See Figure 3-6. You should see and hear several things happen:

Legend:

Standby = OFF; no DC power
On = Normal power ON
Diagnostics = Normal power ON with full
                diagnostics
Locked = Normal power ON in secure mode

On

Standby

Diagnostics

Locked

AC connector
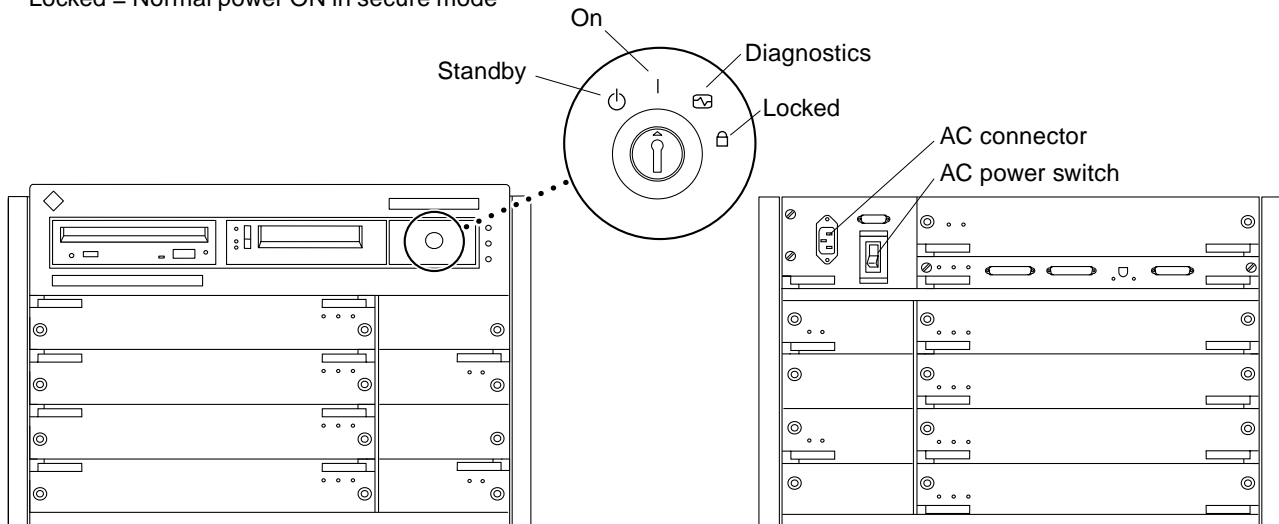
AC power switch

*Figure 3-6*    Key Switch Positions and AC Power Switch

- The fans in the power supplies begin turning.
- The top front panel LED (green) turns on immediately denoting the power supply is delivering DC power.
- The middle front panel LED (yellow) flashes while POST runs for approximately 60 seconds. After 60 seconds, this LED turns off if the tests pass. If the LED remains lighted after 60 seconds, a test has failed.
- The bottom front panel LED (green) flashes to show that booting is successful and the operating system is running. If this LED fails to turn on and the middle LED is on, a severe hardware fault exists.

⚠ **Warning** – Never move the system when the power is on. Failure to heed this warning may result in catastrophic disk drive failure. Always power the system off before moving it.

**6. Watch the terminal screen for error messages from the firmware diagnostic program.**
POST (power-on-self test) tests subassemblies and some interface paths between subassemblies.

At the conclusion of testing, firmware automatically attempts to reconfigure the system, omitting any parts of the system that have failed diagnostics.

If there are no faults, or if firmware completes a successful reconfiguration in response to detected faults, the system boots.

**Note** – If faulty parts are detected and configured out of the working system, you and the system manager must decide whether to operate the system until replacement parts arrive, or to halt operation. Also, if a faulty component cannot be replaced in the field, the entire subassembly (like the system board) must be replaced.

**7. To restart firmware, or if the system hangs, press the CPU reset switch on the clock board. See Figure 3-7.**



System reset switch
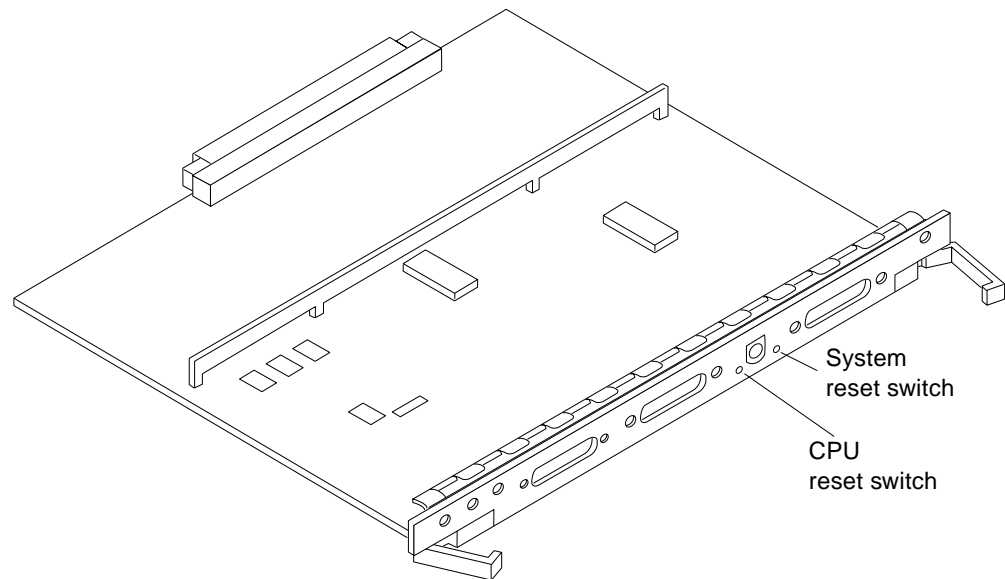
CPU reset switch

*Figure 3-7* CPU Reset Switch on Clock Board

## *3.3.2 Reading Boot Messages*

Use the boot software messages to verify that all options are installed and recognized by the system. After firmware completes the system self test, a message similar to the following will appear on your screen. The message lists hardware detected in the system.

**Note** – This screen display is an example only. The actual message displayed on the screen will depend on the software running on your system.

```
8-slot Ultra Enterprise 5000/4000, Keyboard Present
OpenBoot -.- FCS, --- MB memory installed, Serial #---.
Ethernet address -:-:--:-:--:--, Host ID: ------.
```

If firmware indicates a hardware problem at this time, refer to the *Ultra Enterprise 6000/5000/4000 Systems Manual*, Part 3, "Troubleshooting," for further instructions.

Boot the system using the procedure that is appropriate for your operating system. See the Preface, "UNIX Commands," for a reference to documentation that describes this procedure.

## *3.3.3 Interpreting Status LED Patterns*

If there is no terminal on the system, basic system status information is available on the front panel LEDs, as shown in Figure 3-8.
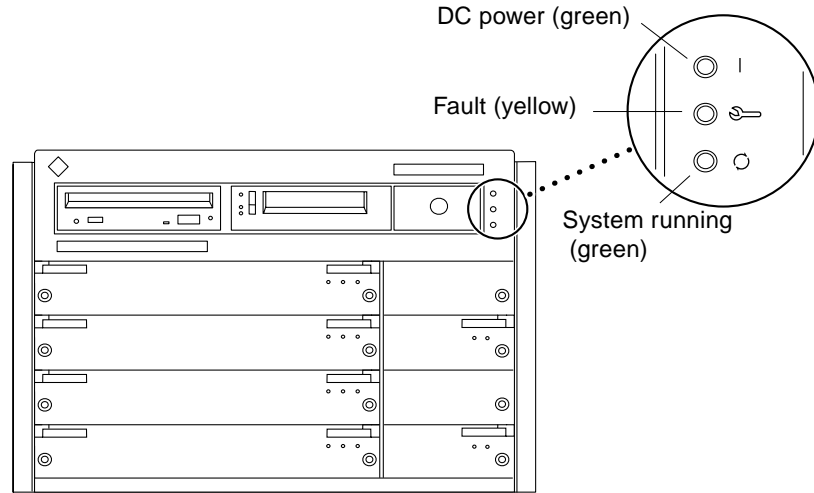
*Figure 3-8*    System Status LEDs (Standalone Server)

Table 3-2 summarizes LED status indications.

After boot, check the status of the system by inspecting system status LEDs on the front panel. See Table 3-2 and Figure 3-8.

*Table 3-2*    Front Panel LED System Status

| LED Position | Condition |
| --- | --- |
| Top LED (green) | On — The power supply is delivering DC power. |
| Middle LED (yellow) | Flashing — (first 60 seconds of AC power) Self tests are running. Off — (after self tests end) No hardware failures detected. On — (after self tests end) Hardware failure was detected. |
| Bottom LED (green) | Off — (first 60 seconds of AC power) Self tests are running. Flashing — (after self tests end) System is running. Off — (after self tests end) System cannot run; repair is needed. |

Ideally, when self test completes, both top and bottom LEDs are on. Less ideal is if all LEDs are on (system needs service, but is able to run). The worst condition is if the top and middle LEDs are on (system cannot boot), or if no LED is on.

## *3.3.4  Powering Off the System*

Before turning off the system power, you must halt the operating system. See the Preface, "UNIX Commands," to find references if you need help with the commands for this task or other system administration procedures.

**Note** – Failure to halt the operating system properly can cause the loss of disk drive data.

**Note** – Do not disconnect the terminal while the system is running.

**Caution** – To avoid damaging internal circuits, do not disconnect or plug in any cable while power is applied to the system.

To shut down the system:

1. **Notify users that the system is going down.**

2. **Back up the system files and data to tape, if necessary.**

3. **Halt the system using the appropriate commands. Refer to the** *Solaris Handbook for SMCC Peripherals* **that corresponds to your operating system.**

4. **Wait for the system-halted message and the boot monitor prompt.**

5. **Turn the key switch on the front panel of the server to the Standby position (fully counterclockwise).**

6. **Turn off the system power in this order:**

    a. External drives and expansion cabinets (if any)

    b. System AC power switch

    c. Terminal

For more system administration information on methods for shut-down and backup, see the Preface, "UNIX Commands," for references to documentation that describes these procedures.

## *3.4 Failure of Network Communications*

*Description of the Problem*

The system cannot communicate with a network if the system and the network hub are not set in the same way for the Ethernet link integrity test. This problem particularly applies to 10BASE-T network hubs, where the Ethernet link integrity test is optional. This is not a problem for 100BASE-T networks, where the test is enabled by default.

If you connect the system to a network and the network does not respond, use the OpenBoot command `watch-net-all` to display conditions for all network connections:

```
ok watch-net-all
```

For SBus Ethernet cards, the test can be enabled or disabled with a hardware jumper, which you must set manually. For the TPE and MII onboard ports on the I/O board, the link test is enabled or disabled through software, as shown below.

Remember also that the TPE and MII ports are not independent circuits and as a result, both ports cannot be used at the same time.

---

**Note** – Some hub designs do not use a software command to enable/disable the test, but instead permanently enable (or disable) the test through a hardware jumper. Refer to the hub installation or user manual for details of how the test is implemented.

---

*Determining the Device Names of the I/O Boards*

To enable or disable the link test for an onboard TPE (`hme`) port, you must first know the device name for the I/O board. To list the device names:

1. **Shut down the system and take the system into OpenBoot.**

2. **Determine the device names of the I/O boards:**

    **a. Type:**

```
ok show-devs
```

    **b. In the** `show-devs` **listing, find the node names.**
        Node names take the general form `/sbus@3,0/SUNW,hme@3,8c00000`.

*Solution 1*

Use this method while the operating system is running:

**1. Become superuser.**

**2. Type:**

```
# eeprom nvramrc="probe-all install-console banner apply disable-link-pulse device-name "
  (Repeat for any additional device names.)
# eeprom "use-nvramrc?"=true
```

    **3. Reboot the system (when convenient) to make the changes effective.**

*Solution 2*

Use this alternate method when the system is already in OpenBoot:

**1. At the monitor OpenBoot prompt, type:**

```
ok nvedit
0: probe-all install-console banner
1: apply disable-link-pulse device-name
(Repeat this step for other device names as needed.)
(Press CONTROL-C to exit nvedit.)
ok nvstore
ok setenv use-nvramrc? true
```

    **2. Reboot to make the changes effective.**

# *Using the Software* $4\equiv$

This chapter contains information about software for your Enterprise 6000/5000/4000 systems.

## *4.1  Operating System Software*

Refer to the operating system documentation that came with your system.

## *4.2  Solstice SyMON Software*

Solstice™ SyMON™ features a graphical user interface (GUI) display that shows various graphs reflecting system status.

Solstice SyMON, intended to complement network-wide and enterprise-wide system management tools, is accessible through an SNMP interface from network tools such as Solstice SunNet Manager™.

Refer to the online *Solstice SyMON User's Guide,* part number 802-5355, for starting and operating instructions.

# *Index*

## A

AC switch, 2-6, 3-2, 3-10
adjust, levelling pads, 1-12
air conditioning needs, 1-7
ASCII terminal
    cabling and setup, 2-10
    removal, 3-9, 3-15
automatic installation, JumpStart, 3-1

## B

bar, stabilizer, 1-13
boot messages, 3-7, 3-13

## C

cabling
    ASCII terminal, 2-10
    ethernet, length, 2-9
    fiber, 2-11
    network, 2-6
    power, 2-4
    preparing for, 2-1
    SCSI, 2-12
    twisted-pair, 1-7
cautions
    notes, warnings, xiv
    SCSI bus, SBus, 2-13

clearance, system, 1-10
connecting, power cord, 2-5
cord, power, 1-15

## D

disk drive
    tray, use stabilizer bar, 1-13
drive
    disk, caution
        improper shutdown, 3-9
        moving with power on, 3-3
    test, 3-6
    tray, safety, 1-13
duplicate addresses, caution, 2-13

## E

error messages
    POST, 3-2, 3-10
    terminal, 3-2, 3-10
ethernet
    cable
        length, 2-9
        limitations, 2-9

## F

fiber cable, 2-11

floorspace, 1-9

## H

halting the system, 3-9, 3-15

## I

installation, preparing for, 1-1

## J

JumpStart installation program, 3-1

## K

key
    location in container, 1-15
    switch
        positions, 2-5
kick panel
    replace, 2-1

## L

LEDs
    interpretation, 3-6
    status, 3-14
leveling
    wrench, 1-14
levelling
    pads, adjust, 1-12
lifting the server, 1-14
limitations, cable, ethernet, 2-9
link test function, 1-9, 2-10
local/remote switch, 3-4

## M

messages
    boot, 3-7, 3-13
    error, 3-2, 3-10
MII connector, 1-7

## N

network
    cabling, 2-6 to 2-7
    site preparation, 1-7
    transceiver, 1-9
notes, cautions, warnings, xiv

## P

panel
    replace
        kick, 2-1
        rear screen, 2-1
POST
    error messages, 3-2, 3-10
    LED interpretation, 3-6
    program, 2-10
    reconfiguration of system, 3-6, 3-12
    restart, 3-6
    SBus card, 3-6
power
    cabling, 2-4
    cord, location, 1-15
    off the system, 3-9, 3-15
    on the system, 3-2 to 3-7
power-on self-test *See* POST
precaution, automatic installation
    JumpStart, 3-1
preparing
    for cabling, 2-1
    for installation, 1-1

## R

rear screen
    replace, 2-1
reconfiguration, system, POST, 3-12
remove
    ASCII terminal, 3-9, 3-15
replace
    panel
        kick, 2-1
        rear screen, 2-1
reset switch, 3-6

usage of, 3-12

restart, POST, 3-6

## S

SBus
    card
        POST, 3-6
        test, 3-6
    caution, 2-13

SCSI
    bus, caution, 2-13
    cabling, 2-12

server, lifting, 1-14

shipping and storing, 1-4

site preparation
    air conditioning, 1-7
    floorspace, 1-9
    network, 1-7

software, using, 4-1

stabilizer bar, 1-13

status LEDs, 3-6, 3-14

switch
    AC, 2-6, 3-2, 3-10
    key, 3-3
    local/remote, 3-4
    reset, 3-6

system clearance, 1-10

## T

test
    drives, 3-6
    link test, 2-10
    SBus cards, 3-6

tools list, 1-11, 1-14

transceiver, network, 1-9

tray, stabilizer bar, 1-13

TTY terminal, *See* ASCII terminal

twisted-pair cable, 1-7

## U

unpacking, 1-3

## W

warnings, notes, cautions, xiv

wrench, leveling, 1-14

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