



Sun SPARC™ Enterprise T2000 Server Installation Guide

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www.sun.com

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Preface

The *Sun SPARC Enterprise T2000 Server Installation Guide* provides instructions, background information, and reference material to help you install a SPARC™ Enterprise T2000 server.

Instructions for installation in this document assume that a system administrator is experienced with the Solaris™ Operating System (Solaris OS).

Note – All internal components except hard drives must be installed by qualified service technicians only.

How This Document Is Organized

This guide is organized as follows:

[Chapter 1](#) provides an installation overview for the server.

[Chapter 2](#) provides instructions for installing the server into a rack.

[Chapter 3](#) provides instructions for configuring and powering on the server and for installing additional software.

[Appendix A](#) provides instructions for updating the system controller firmware and the server firmware.

[Appendix B](#) provides instructions for selecting a boot device.

Shipping Kit Inventory List

Standard components of the server are installed at the factory. However, if you ordered options such as a PCI card and monitor, these are shipped to you separately.

Note – Inspect the shipping carton(s) for evidence of physical damage. If a shipping carton appears 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.

- **Verify that you have received all the parts of your server.**
 - SPARC Enterprise T2000 server
 - Slide rail assemblies
 - Package of mounting screws and nuts in assorted sizes to fit various types of equipment racks
 - Cable management assembly with six preinstalled cable clips
 - Manufacturer’s instruction sheet for the cable management assembly
 - Any optional components that were ordered with the server

Using UNIX Commands

This document might not contain information about basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at:

<http://docs.sun.com>

Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface*	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>% You have mail.</code>
AaBbCc123	What you type, when contrasted with on-screen computer output	<code>% su</code> <code>Password:</code>
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

* The settings on your browser might differ from these settings.

Related Documentation

The documents listed as online are available at:

<http://www.sun.com/documentation>

Title	Description	Part Number
<i>Sun SPARC Enterprise T2000 Server Site Planning Guide</i>	Site planning information for the server	819-7987
<i>Sun SPARC Enterprise T2000 Server Product Notes</i>	Late breaking information about the server. The latest notes are posted at: http://www.sun.com/documentation	819-7992
<i>Sun SPARC Enterprise T2000 Server Administration Guide</i>	How to perform administrative tasks that are specific to the server	819-7990
<i>Sun SPARC Enterprise T2000 Server Service Manual</i>	How to run diagnostics to troubleshoot your server and how to remove and replace parts in the server	819-7989
<i>Advanced Lights Out Manager (ALOM) CMT Administration Guide</i>	How to use the Sun Advanced Lights Out Manager (ALOM CMT) software on the server	(Varies based on version.)
<i>Sun SPARC Enterprise T2000 Server Safety and Compliance Guide</i>	Provides safety and compliance information that is specific to this server	819-7993

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Sun SPARC Enterprise T2000 Server Installation Guide, part number 819-7988-10

Preparing for Installation

This chapter provides background information about the server installation procedures that are provided in [Chapter 2](#).

This chapter contains these topics:

- [“Tools and Equipment Needed” on page 2](#)
- [“Optional Component Installation” on page 2](#)
- [“ESD Precautions” on page 2](#)
- [“Installation Overview” on page 3](#)
- [“Data Ports and Cabling Notes” on page 5](#)
- [“Slide Rail Assembly Notes” on page 7](#)
- [“Safety Precautions” on page 10](#)

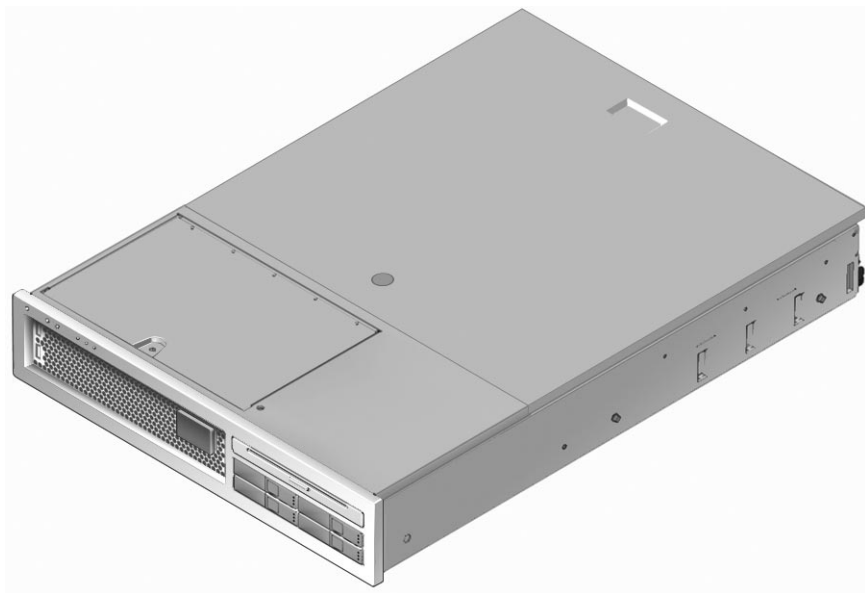


FIGURE 1-1 SPARC Enterprise T2000 Server

Tools and Equipment Needed

In order to install the system, you must have the following tools:

- #2 Phillips screwdriver
- ESD mat and grounding strap

In addition, you must provide a system console device, such as one of the following:

- ASCII terminal
- Sun workstation
- Terminal server
- Patch panel connected to a terminal server

Optional Component Installation

The standard components of the server are installed at the factory. However, if you ordered options such as additional memory or a PCI card, these will be shipped separately. If possible, install these components prior to installing the server in a rack.

If you ordered any options that are not factory-installed, see the *Sun SPARC Enterprise T2000 Server Service Manual* for installation instructions.

Note – The list of optional components can be updated without notice. See the web site for the most current list of components supported in the server.

ESD Precautions

Electronic equipment is susceptible to damage by static electricity. Use a grounded antistatic wriststrap, footstrap, or equivalent safety equipment to prevent electrostatic damage (ESD) when you install or service the server.



Caution – To protect electronic components from electrostatic damage, which can permanently disable the system or require repair by Sun service technicians, place components on an antistatic surface, such as an antistatic discharge mat, an antistatic bag, or a disposable antistatic mat. Wear an antistatic grounding strap connected to a metal surface on the chassis when you work on system components.

Installation Overview

This installation guide provides procedures which are to be performed in the following order.

1. Verify that you have received all of the components that ship with your server. See [“Shipping Kit Inventory List” on page xiv](#).
2. Gather configuration information for your system. See your system administrator for specific details, including these parameters:
 - Netmask
 - IP address for the system controller
 - Gateway IP address
3. Install any optional Sun™ components shipped with your system. If you have purchased other optional components such as additional memory, install them prior to mounting the server in a rack. See [“Optional Component Installation” on page 2](#).
4. Mount the server into a rack or cabinet. See [“Installing the Server in a Rack” on page 11](#).

Note – In the rest of this manual, the term *rack* means either an open rack or a closed cabinet.

5. Connect the server to a serial terminal or a terminal emulator (PC or workstation) to display system messages. See [“Powering On the System for the First Time” on page 33](#).



Tip – The serial terminal or a terminal emulator should be connected before you connect the power cables. As soon as AC power is connected to the system, the system controller immediately powers on and runs diagnostics. Diagnostic test failures will be printed on the serial terminal. For more information, refer to the *Advanced Lights Out Management (ALOM) CMT Guide*.

6. Connect the data cables to the server, but do not connect the AC power cable yet. See [“Connecting Cables to the Server” on page 25](#).
7. Connect the AC power cable to the server and examine the display for any error messages. See [“Powering On the System for the First Time” on page 33](#).



Caution – There is a potential for electric shock if the server and related equipment are not properly grounded.

Note – The system controller (SC) runs on the 3.3v standby voltage. As soon as AC power is connected to the system, the system controller immediately powers on, runs diagnostics, and initializes the ALOM CMT firmware.

8. After the system controller boots, access the ALOM CMT command line interface through the serial management port. See [“To Log Into the System Controller Using the Serial Management Port” on page 38](#).
9. Configure the SC network addresses. See [“To Configure the System Controller Network Management Port” on page 39](#).

Note – The SC network management port is not operational until you configure network settings for the system controller (through the SC serial management port).

10. Enable the new configuration by resetting the system controller. See [“To Reset the System Controller” on page 42](#).
11. Power on the server from a keyboard using the ALOM CMT software. See [“To Power On the System” on page 44](#).
12. Configure the Solaris™ OS. See [“Booting the Solaris Operating System” on page 46](#).

The Solaris OS is preinstalled on the server. When you power on, you are automatically guided through the Solaris OS configuration procedure.

13. Install any required patch or patches to the server.

Refer to the *Sun SPARC Enterprise T2000 Server Product Notes* for a list of the required patches.

14. Load additional software from the Solaris media kit (optional).

The Solaris media kit (sold separately) includes several CDs containing software to help you operate, configure, and administer your server. Refer to the documentation provided with the media kit for a complete listing of included software and detailed installation instructions.

Data Ports and Cabling Notes

Port Locations

See [FIGURE 1-2](#) and [FIGURE 1-3](#) for the locations of the ports on the server.

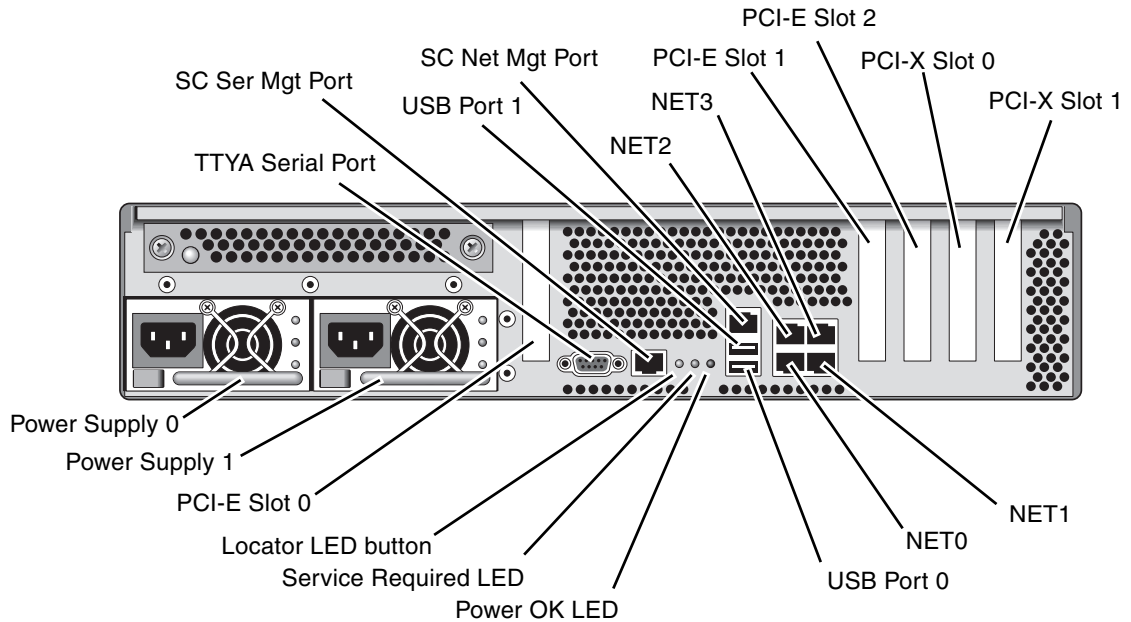


FIGURE 1-2 Rear Panel Features

USB ports 2 and 3 are located on the front panel ([FIGURE 1-3](#)).

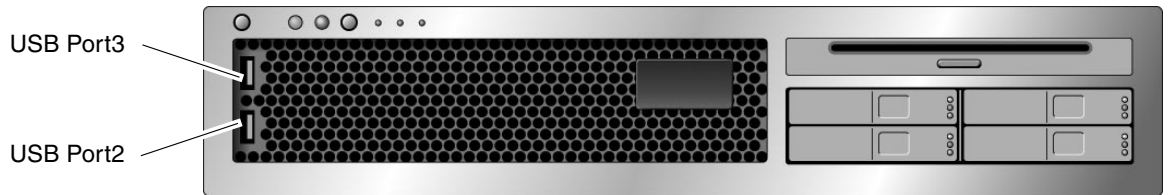


FIGURE 1-3 Front Panel USB Ports

Cabling Notes

- **Minimum cable connections for the server:**
 - At least one system on-board Ethernet network connection (NET port)
 - The system controller serial management port (SER MGT port)
 - The system controller network management port (NET MGT port)
 - Power cables for the two system power supplies
- **System controller (SC) management ports:** There are two SC management ports for use with the ALOM CMT system controller.
 - **The SC serial management port** (labeled SER MGT) uses an RJ-45 cable and is always available. This is the default connection to the ALOM CMT system controller.
 - **The SC network management port** (labeled NET MGT) is the optional connection to the ALOM CMT system controller. This port is not available until you have configured network settings for the system controller (through the SC serial management port). See [“Enabling the System Controller Network Management Port” on page 37](#). The SC network management port uses an RJ-45 cable for a 10/100 BASE-T connection. This port does not support connections to Gigabit networks.
 - See the *Sun SPARC Enterprise T2000 Server Overview* for more information.
- **Ethernet ports** are labeled NET0, NET1, NET2, and NET3. The Ethernet interfaces operate at 10 Mbps, 100 Mbps, and 1000 Mbps. The transfer rates for the Ethernet ports are given in [TABLE 1-1](#).

TABLE 1-1 Ethernet Connection Transfer Rates

Connection Type	IEEE Terminology	Transfer Rate
Ethernet	10BASE-T	10 Mbit/sec
Fast Ethernet	100BASE-TX	100 Mbits/sec
Gigabit Ethernet	1000BASE-T	1000 Mbit/sec

- **TTYA serial port:** Use the DB-9 connector with a null modem cable for serial devices. This port appears as `ttya` in Solaris OS and OpenBoot messages. This port is not connected to the SC serial management port.
- **USB Ports:** USB ports support hot-plugging. You can connect and disconnect USB cables and peripheral devices while the system is running, without affecting system operations.
 - You can only perform USB hot-plug operations while the OS is running. USB hot-plug operations are not supported when the system `ok` prompt is displayed or before the system has completed booting.
 - You can connect up to 126 devices to each of the two USB controllers, for a total of 252 USB devices per system.

- **AC power cables:** Do not attach power cables to the power supplies until you have finished connecting the data cables, and have connected the server to a serial terminal or a terminal emulator (PC or workstation). The server goes into standby mode and the ALOM CMT system controller initializes as soon as the AC power cables are connected to the power source. System messages may be lost after 60 seconds if the server is not connected to a terminal, PC, or workstation.

Slide Rail Assembly Notes

The rackmount kit has two *slide rail assemblies*. A slide rail assembly can be installed on either the right or left side of the rack.

Each slide rail assembly consists of a three-section slide rail and a removeable mounting bracket (FIGURE 1-4).

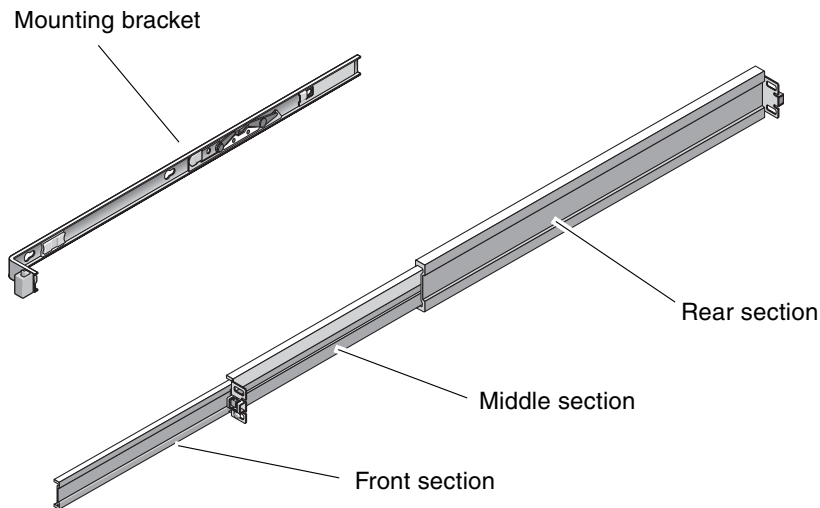


FIGURE 1-4 Sections of the Slide Rail Assembly

- The *front*, *middle*, and *rear* sections form the *slide rail*. The middle and rear sections have holes for mounting screws and adjust to fit rack depths from 24 in (61 cm) to 36.5 in (93 cm). The front section can be extended to allow movement of the server out of the rack.
- The removeable *mounting bracket* slides 14 in (36 cm) out of the slide rail, then locks in place. If you unlock the mounting bracket at this point, it slides an additional 12 in (30 cm) before separating from the slide rail. You can then mount the mounting bracket to the right or left side of the server chassis.

- Note that there are a total of five locks ([FIGURE 1-5](#)) in a slide rail assembly. Four are on the mounting bracket. One lock is on the front section of the slide rail. The uses of these locks are described in the installation procedure in [Chapter 2](#).

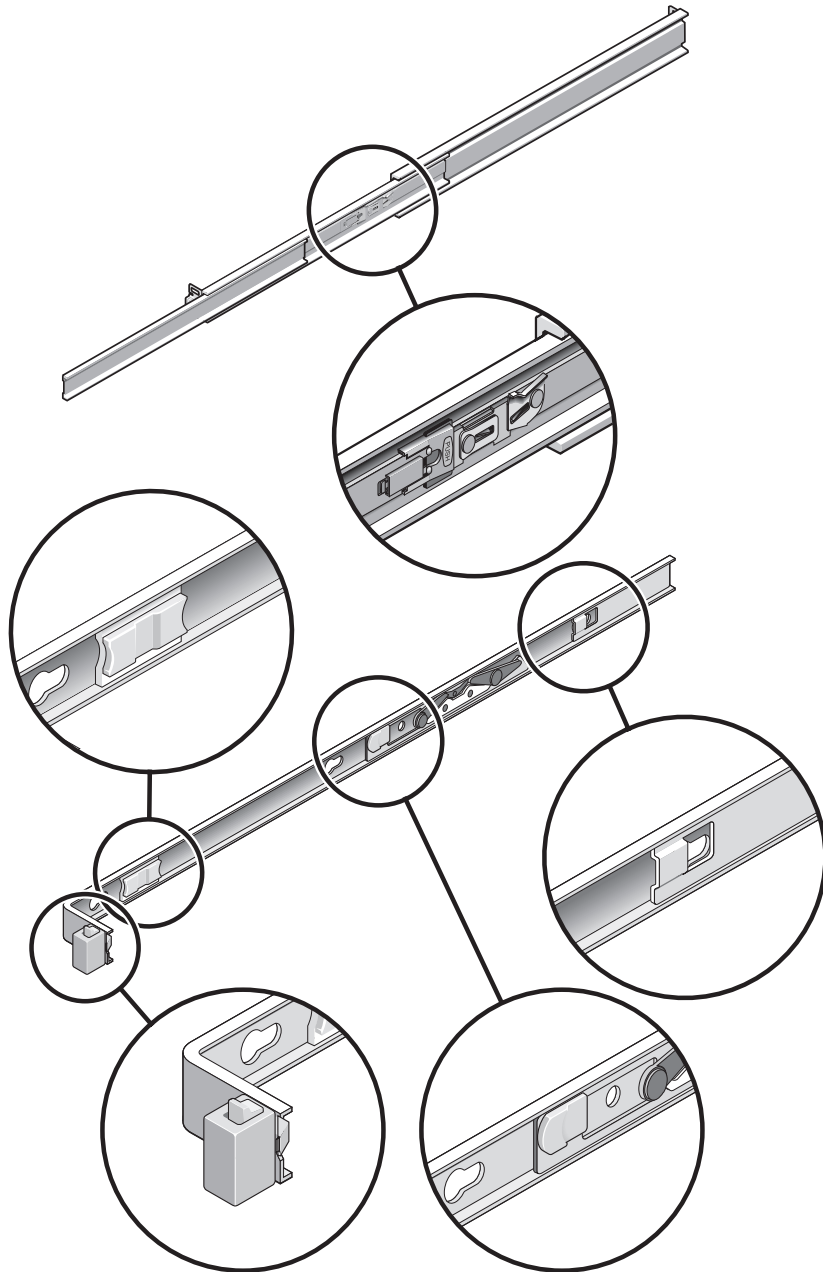


FIGURE 1-5 Locating the Locks on the Slide Rail Assembly

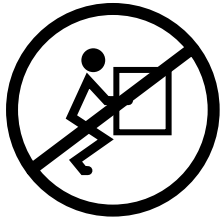
Safety Precautions



Caution – Deploy the anti-tilt bar on the equipment rack before beginning an installation.



Caution – The server weighs approximately 40 lb (18 kg). Two people are required to lift and mount the system into a rack enclosure when using the procedures in this chapter.



Caution – When completing a two-person procedure, always communicate your intentions clearly before, during, and after each step to minimize confusion.

Installing the Server

This chapter provides instructions for installing the server in an equipment rack.

Note – If your rackmount kit came with its own instructions, use the instructions in your rackmount kit instead of the instructions in this chapter. After performing the server installation, proceed to [Chapter 3](#) for first-time power on.

This chapter contains the following sections:

- [“Installing the Server in a Rack”](#) on page 11
- [“Connecting Cables to the Server”](#) on page 25
- [“Managing Cables With the CMA”](#) on page 30

Note – References to *left* and *right* are from your viewpoint as you face either the front or rear of the equipment.

Installing the Server in a Rack

Note – Ensure that you have all of the parts in the rackmount kit before you begin the installation of the server. See [“Shipping Kit Inventory List”](#) on page xiv.

The rackmount kit contains two slide rail assemblies. A slide rail assembly can be installed on either the right or left side of the rack.

A slide rail assembly consists of two parts: a slide rail and a removeable mounting bracket. The slide rail attaches to the rack posts. The mounting bracket attaches to the server chassis.

▼ To Install the Slide Rail Assemblies

1. Pull both mounting brackets completely out of their respective slide rails:
 - a. Simultaneously press and hold the upper and lower lock buttons of the slide rail lock (FIGURE 2-1).

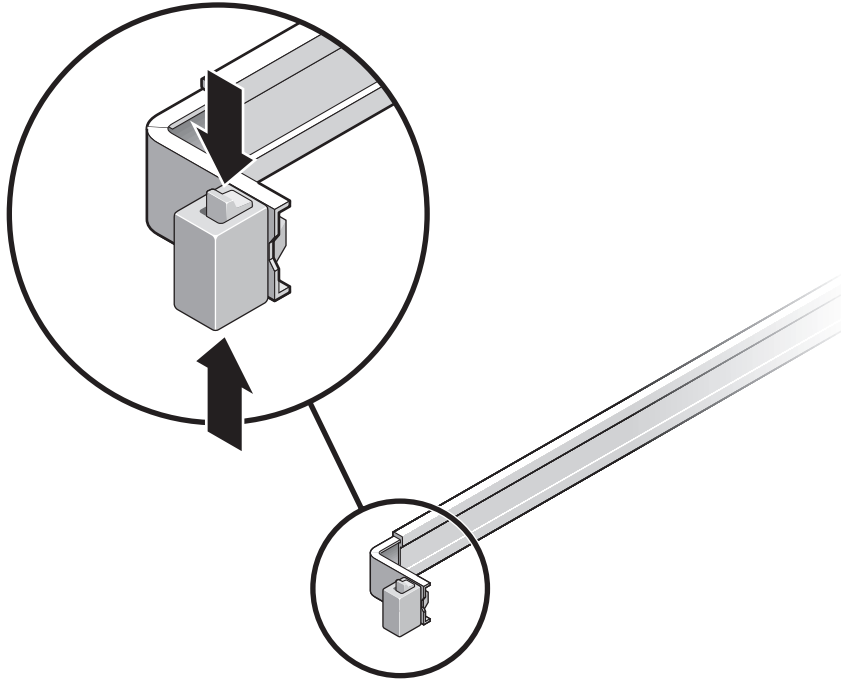


FIGURE 2-1 Unlocking the Slide Rail Assembly

- b. Pull the mounting bracket out until it locks in the extended position.
- c. Slide the mounting bracket release button in the direction shown in FIGURE 2-2, then slide the mounting bracket out of the slide rail.

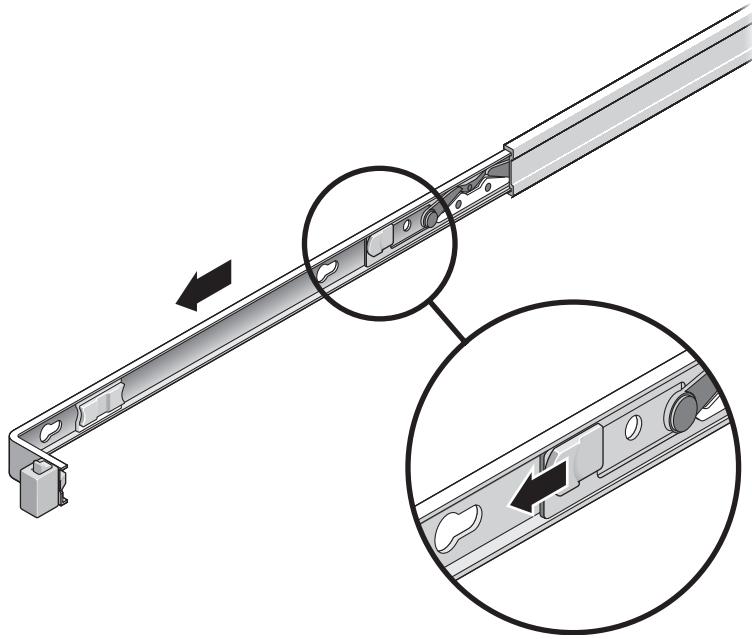


FIGURE 2-2 Location of the Mounting Bracket Release Button

- d. Press the metal lever (labeled Push) on the middle section ([FIGURE 2-3](#)) of the sliding rail, then push the middle section back into the rack.

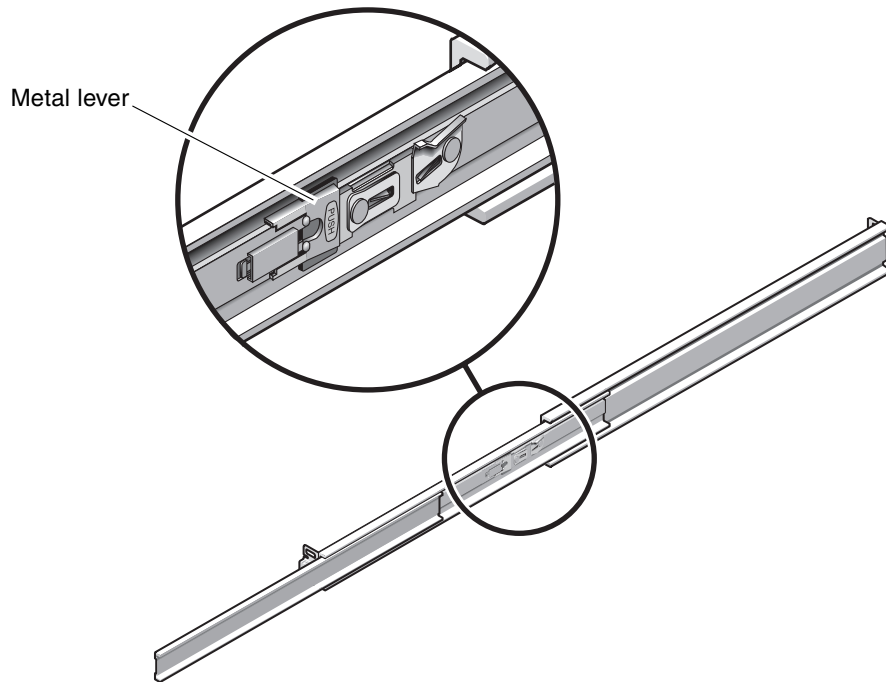


FIGURE 2-3 Unlocking the Slide Rail Middle Section

- 2. Attach a mounting bracket to the right side of the chassis.**
 - a. Position the mounting bracket against the chassis (FIGURE 2-4) so that the slide rail lock is at the front and the three keyed openings on the mounting bracket are aligned with the three locating pins on the side of the chassis.**

5. Determine which screws you will use to mount the slide rails.

If your rack has threaded mounting holes in the rack posts, determine whether the threads are metric or standard. Select the appropriate screws from the package included in the mounting kit.

If your rack does not have threaded mounting holes, the mounting screws are secured with a caged nut.

6. Attach a slide rail to the right front rack post.

- a. Loosely attach the front of a slide rail to the right front rack post (FIGURE 2-5) using two screws.**

Note – Do not tighten the screws yet.

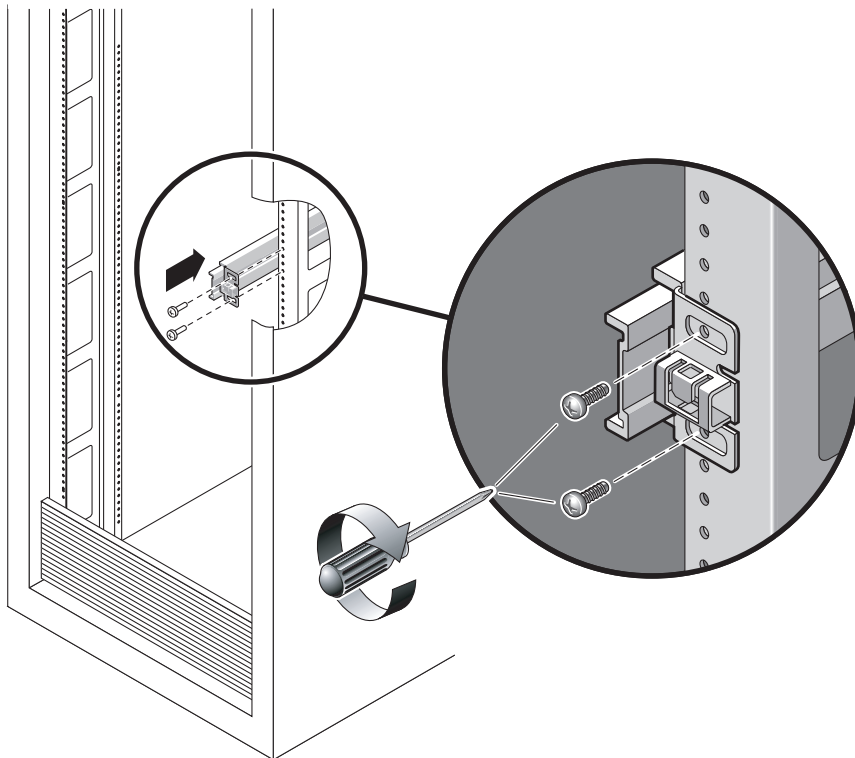


FIGURE 2-5 Mounting a Slide Rail

- b. Adjust the length of the slide rail by sliding the rear mounting flange to reach the outside edge of the rear rack post.**

- c. Loosely attach the rear of the slide rail to the rear rack post with two screws.
7. Attach the second slide rail to the left rack posts in a similar manner. Again, do not tighten the screws.
8. Use the slide rail spacing tool to adjust the distance between the slide rails:
 - a. At the front of the rack, plug the left side of the tool into slots at the end of the left rail (FIGURE 2-6).

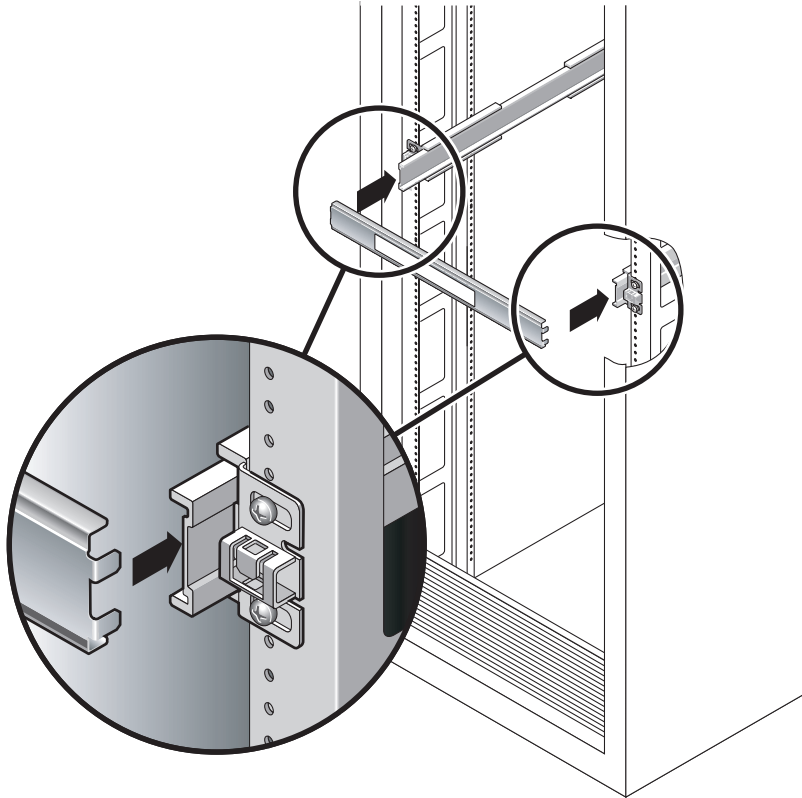


FIGURE 2-6 Using the Slide Rail Spacing Tool to Adjust the Distance Between the Slide Rails

- b. Insert the right side of the tool into the front end of the right rail, while sliding the end of the rail to the right or left as needed to allow the ends of the tool to enter the ends of both rails.

The distance between the rails is now equal to the width of the server with mounting brackets.

- c. Tighten the screws to lock the ends of the rails in place.

d. At the rear of the rack, repeat [Step a](#) through [Step c](#). for the rear ends of the rails.

9. Deploy the anti-tilt bar, if the chassis or rack is so equipped.



Caution – The weight of the server on extended slide rails can be enough to overturn an equipment rack.



Caution – The server weighs approximately 40 lb (18 kg). Two people are required to lift and mount the system into a rack enclosure when using the procedures in this chapter.

10. Insert the ends of the mounting brackets into the sliding rails ([FIGURE 2-7](#)).

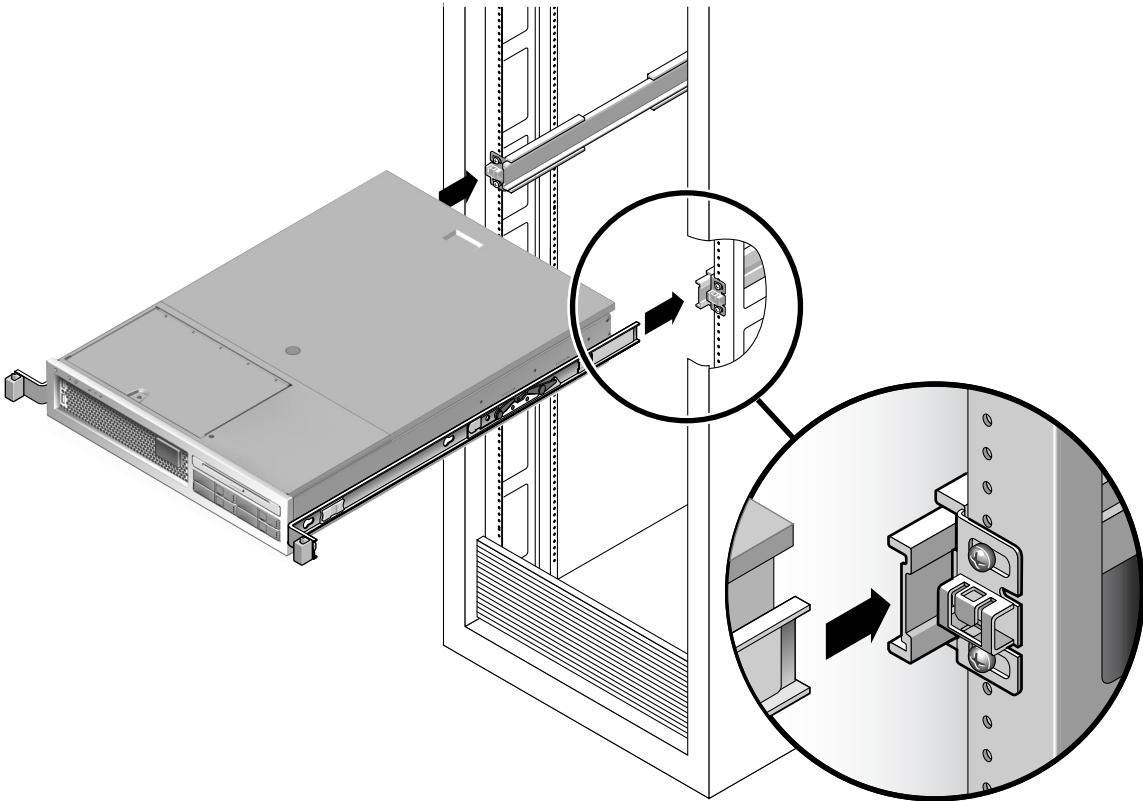


FIGURE 2-7 Mounting the Chassis on the Slide Rails

11. Slide the chassis into the rack.



Caution – Verify that the server is securely mounted in the rack, and that the slide rails are locked to the mounting brackets, before continuing.

▼ To Install the Cable Management Kit

The cable management assembly (CMA) clips into the ends of the left and right sliding rail assemblies. No screws are necessary for mounting the CMA.



Caution – Support the CMA during this installation. Do not allow the assembly to hang by its own weight until it is secured by all three attachment points.

1. At the rear of the rack, plug the CMA rail extension into the end of the left sliding rail assembly (FIGURE 2-8). The tab at the front of the rail extension will click into place.

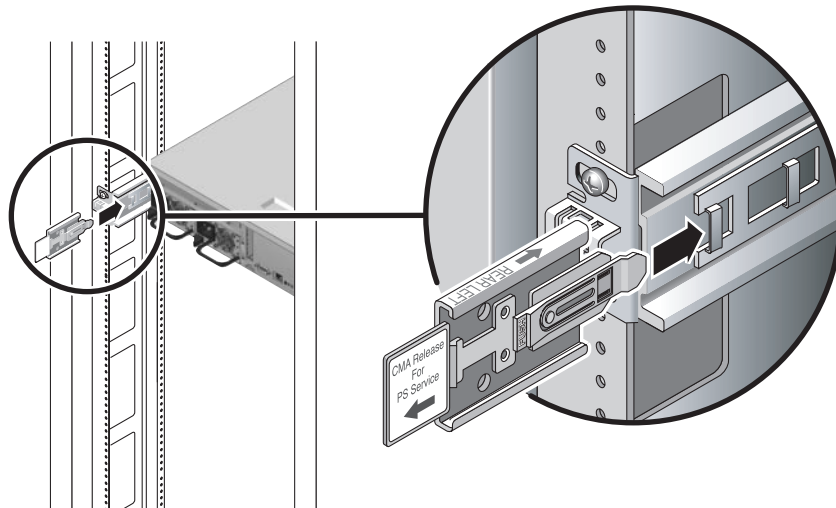


FIGURE 2-8 Inserting the CMA Rail Extension Into the Rear of the Left Slide Rail

The right sides of the two CMA arms have hinged extensions. On the manufacturer's instruction sheet, the smaller extension is called the CMA Connector for Inner Member. It attaches to the right mounting bracket. The larger extension is called the CMA Connector for Outer Member, and attaches to the right sliding rail.

2. Insert the smaller extension into the clip located at the end of the mounting bracket (FIGURE 2-9).

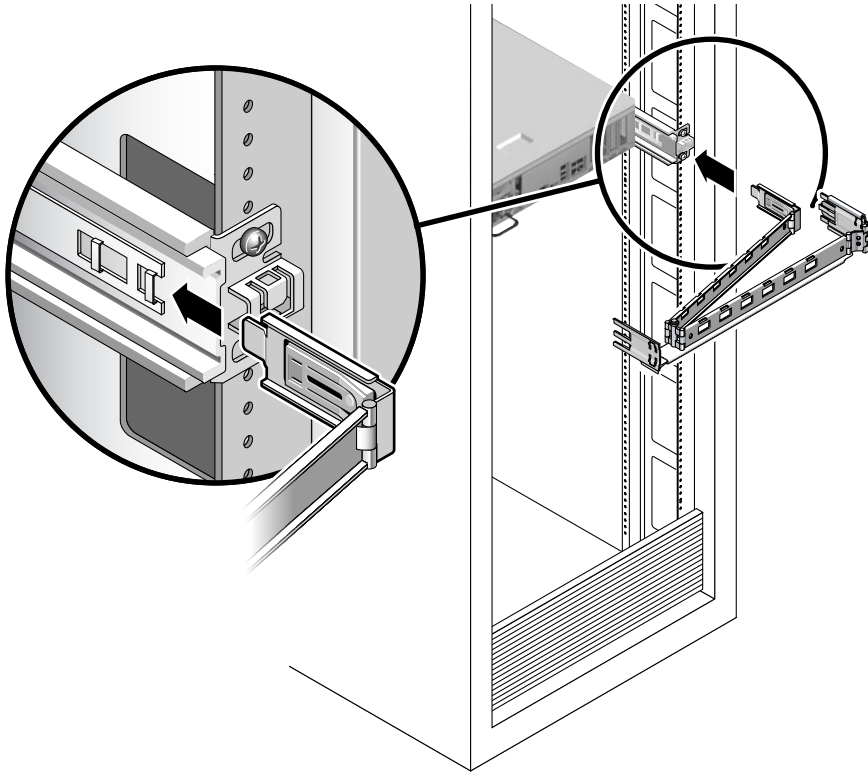


FIGURE 2-9 Mounting the Inner CMA Connector

3. Insert the larger extension into the end of the right sliding rail (FIGURE 2-10).

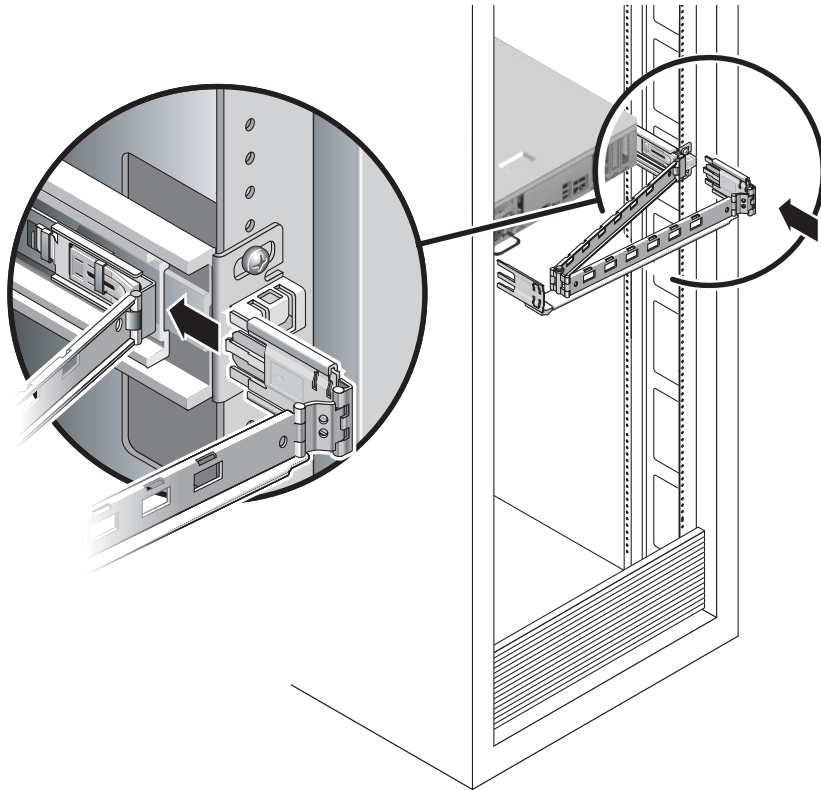


FIGURE 2-10 Attaching the Outer CMA Connector

- 4. Insert the hinged plastic connector at the left side of the CMA fully into the CMA rail extension (FIGURE 2-11).**

The plastic tab on the CMA rail extension locks the hinged plastic connector in place.

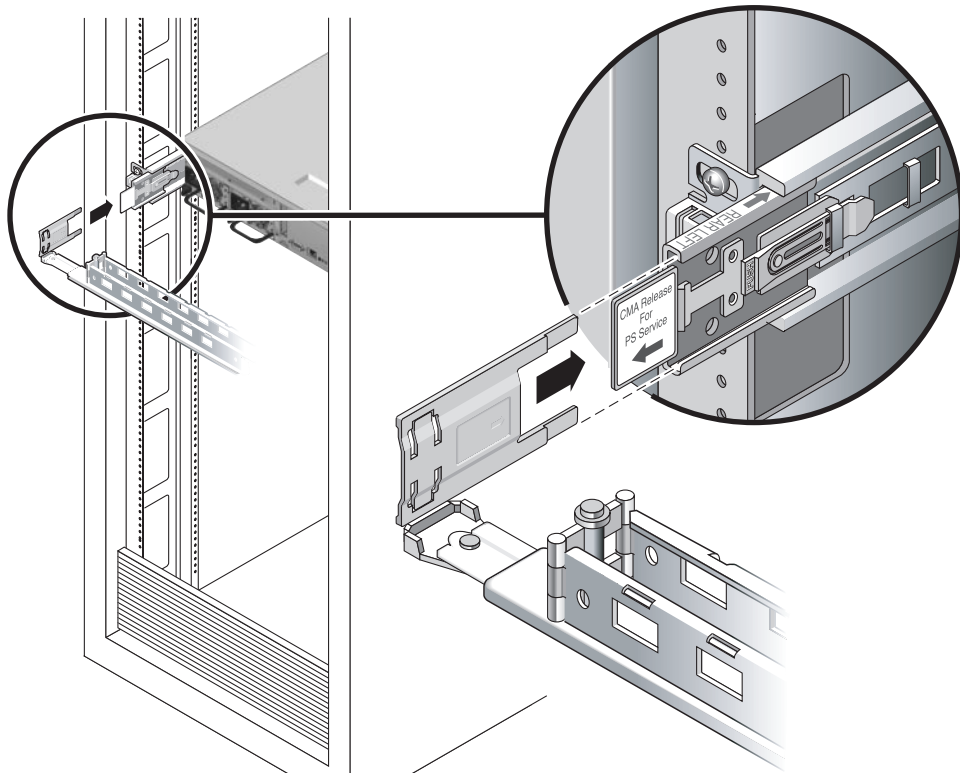


FIGURE 2-11 Mounting the Left Side of the Slide Rail

▼ To Verify the Operation of the Slide Rails and the CMA

Tip – Two people are needed this procedure: one to move the server in and out of the rack and one to observe the cables and CMA.

1. For a free-standing rack, deploy the anti-tilt bar.
2. Unlock the slide lock buttons (FIGURE 2-12) at the right and lefts sides of the chassis, and slowly pull the server out of the rack until the slide rails reach their stops.

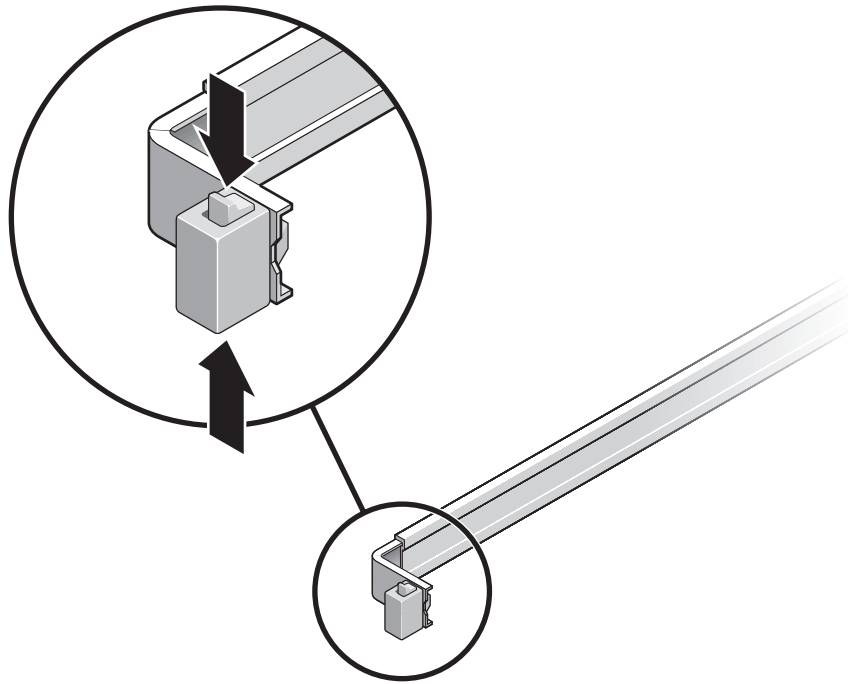


FIGURE 2-12 Unlocking the Slide Rail Assembly

3. **Inspect any attached cables for binding or kinks.**
4. **Verify that the CMA extends fully and does not bind in the slide rails.**
5. **Verify that the server extends fully and locks in the maintenance position.**
The server should stop after approximately 15 inches (40 cm) of travel.
6. **Pull both slide rail release buttons toward you simultaneously and slide the server back into the rack (FIGURE 2-13).**
The server should slide smoothly into the rack without binding.

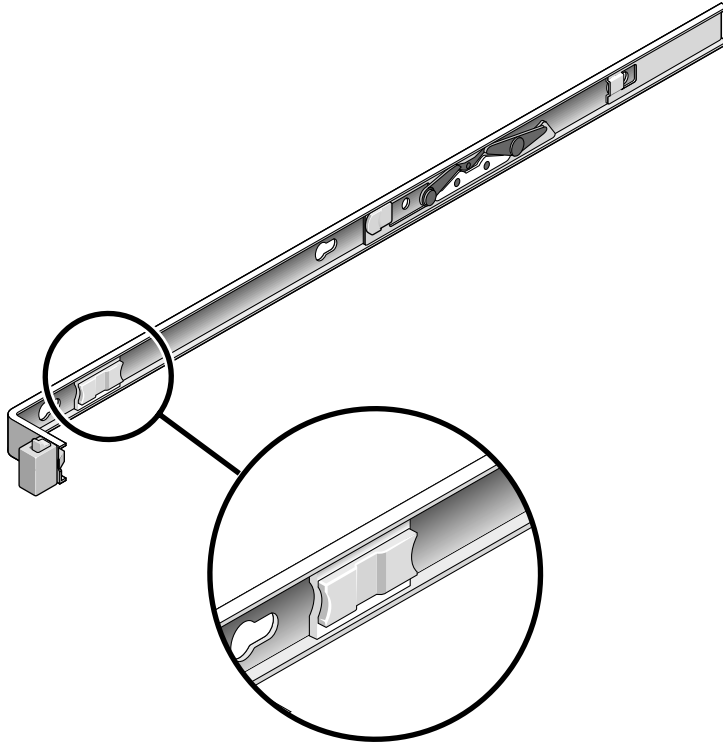


FIGURE 2-13 Slide Rail Release Button

7. Verify that the CMA retracted without binding.
8. Adjust the cable hangers and CMA as required.
See [“Managing Cables With the CMA”](#) on page 30.

Dismounting the Server

If it becomes necessary to remove the server from the rack, or to open the server case for maintenance or hardware upgrades, refer to the *Sun SPARC Enterprise T2000 Server Service Manual* for procedures.

Connecting Cables to the Server

- [“To Connect the Ethernet Network Cables” on page 26](#)
- [“To Connect the SC Network Management Port” on page 28](#)
- [“To Connect the SC Serial Management Port” on page 27](#)
- [“AC Power Cables” on page 29](#)

In addition, the SPARC Enterprise T2000 server has serial and USB ports available for connections to optional devices.

- [“TTYA Serial Port” on page 29](#)
- [“USB Ports” on page 30](#)

Note – When you are finished connecting the cables to the server, ensure that the server can slide smoothly in and out of the rack without binding or damaging the cables. See the section, [“To Verify the Operation of the Slide Rails and the CMA” on page 22](#).

Connector Locations

Use [FIGURE 2-14](#) to locate the connectors and power supplies on the back of the server.

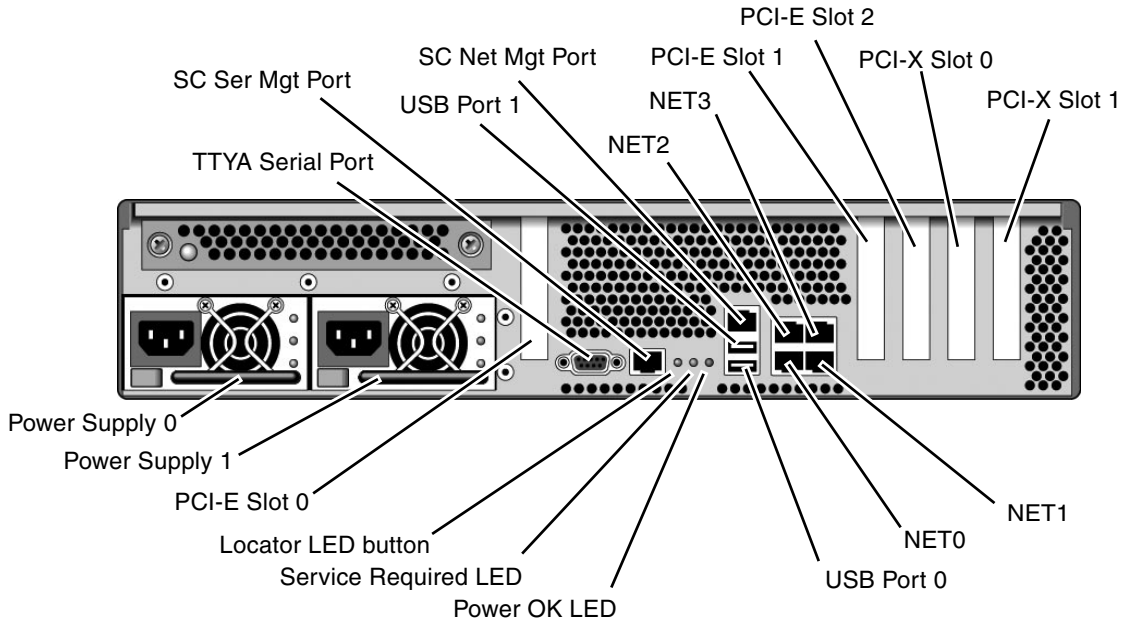


FIGURE 2-14 Rear Panel Features

USB ports 2 and 3 are located on the front panel ([FIGURE 2-15](#)).

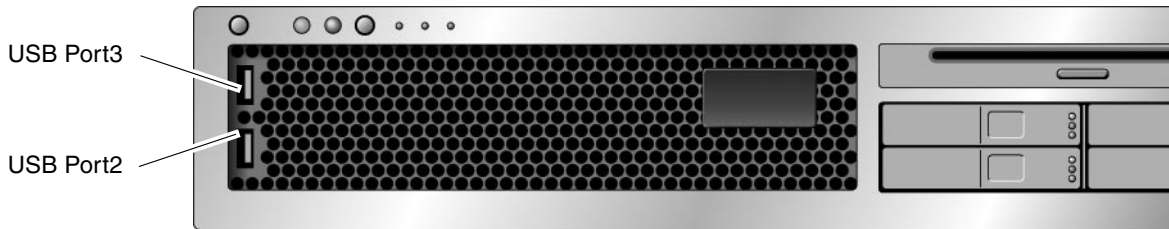


FIGURE 2-15 Front Panel USB Ports

▼ To Connect the Ethernet Network Cables

The server has four RJ-45 Gigabit Ethernet network connectors. They are marked NET0, NET1, NET2, and NET3 ([FIGURE 2-16](#)).

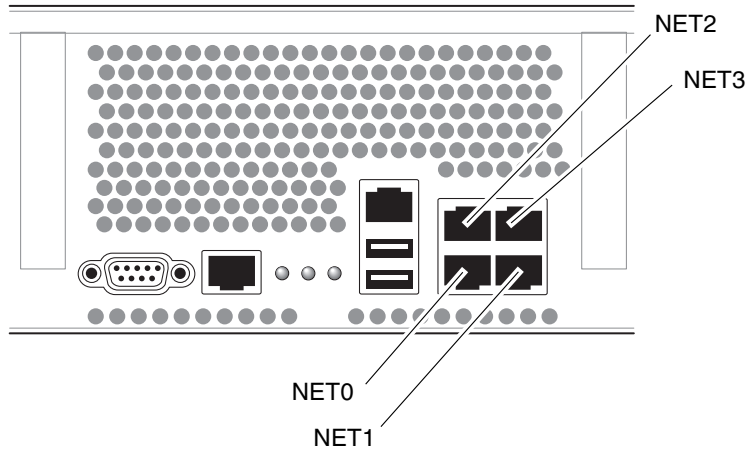


FIGURE 2-16 Ethernet Network Connections

1. Connect a Category 5 cable from your network switch or hub to Ethernet Port 0 (NET0) on the rear of the chassis.
2. As needed, connect Category 5 cables from your network switch or hub to the remaining Ethernet ports (NET1, NET2, NET3).

▼ To Connect the SC Serial Management Port

The SC serial management port is marked SER MGT. It is the leftmost RJ-45 port on the rear of the chassis ([FIGURE 2-17](#)).

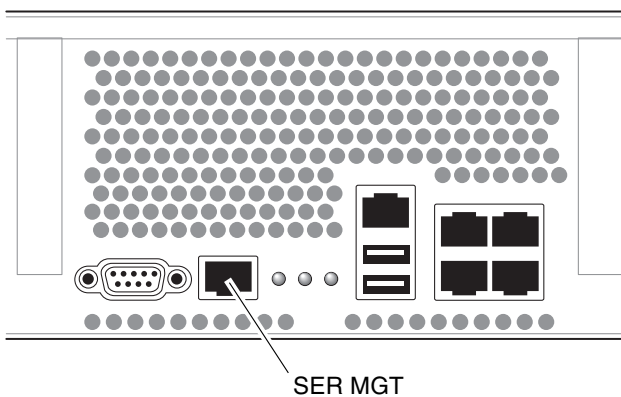


FIGURE 2-17 System Controller Serial Connection

Use this port for server management. This port is needed to set up the SC network management port, as detailed in [“Enabling the System Controller Network Management Port”](#) on page 37.

Note – Use the SC serial management port *only* for server management. It is the default connection between the system controller and a terminal or a computer.



Caution – Do not attach a modem to this port.

- **Connect a Category 5 cable from the SC serial management port to the terminal device.**

When connecting either a DB-9 or a DB-25 cable, use an adapter to perform the crossovers given for each connector.

▼ To Connect the SC Network Management Port

The SC network management port is marked NET MGT. It is the RJ-45 port above the rear USB ports.

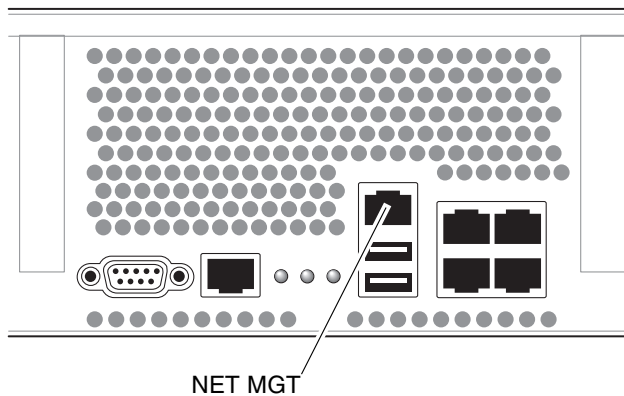


FIGURE 2-18 System Controller Network Connection

- **Connect a Category 5 cable from your network switch or hub to the Network Management Port.**

Note – This port is not operational until you configure the network settings (through the serial management port), as detailed in [“To Configure the System Controller Network Management Port”](#) on page 39.

Note – The SC network management port is configured by default to retrieve network settings via Dynamic Host Configuration Protocol (DHCP) and allow connections using Solaris Secure Shell (SSH®). You might need to modify these settings for your network. Instructions are given in [Chapter 3](#).

AC Power Cables

Note – Finish the hardware procedures in this chapter, but do not attach the AC power cables yet.

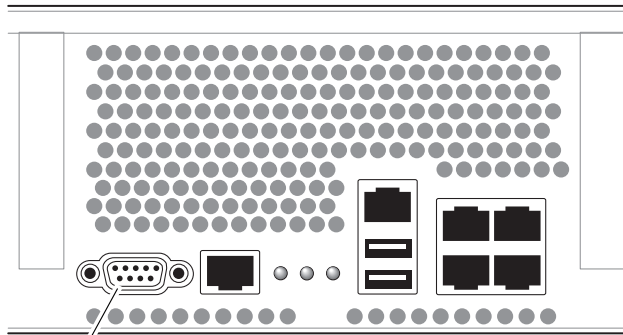
Powering on the system for the first time requires special preparation and procedures. For example, if you have not prepared a display before connecting the AC power cables, system messages may be lost. You will be instructed to connect the server to AC power in [“Powering On the System for the First Time”](#) on page 33.



Caution – The server goes into standby mode and the system controller initializes as soon as the AC power cables are connected to the power source.

TTYA Serial Port

The TTYA serial port connector uses a DB-9 connector (item 1 in [FIGURE 2-19](#)). Use this port for general purpose serial data transfers. This port is not connected to the SC serial management port.



Serial port (TTYA)

FIGURE 2-19 Serial Port

Use a null modem cable or an adapter to perform the crossovers given for each connector.

- If connecting to a serial port on a personal computer, you can use Sun adapter part number 530-3100-01.
- If connecting to a Sun workstation or server, you can use Sun adapter part number 530-2889-03.

USB Ports

Four Universal Serial Bus (USB) ports are provided on the server. USB ports 0 and 1 are located on the rear of the chassis ([FIGURE 2-14](#)). Ports 2 and 3 on the front of the chassis ([FIGURE 2-15](#)).

Managing Cables With the CMA

▼ To Open and Close a Cable Clip

1. To open a cable clip, press the front of the cable clip and lift the hinged top.
2. Route cables through the clip, then press the top of the cable clip to lock.

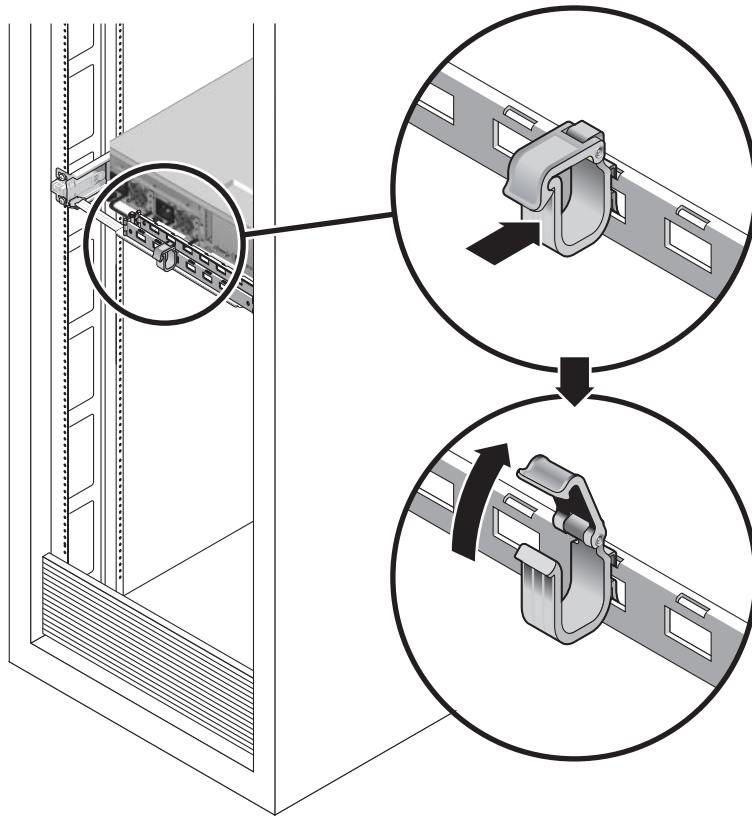


FIGURE 2-20 Opening a Cable Clip

▼ To Move a Cable Clip

1. To remove a cable clip from the CMA arm, lift the cable clip approximately $\frac{3}{8}$ in (10 mm) to free the lower clip lock, then rotate the entire clip about 90 degrees to free the upper clip lock.

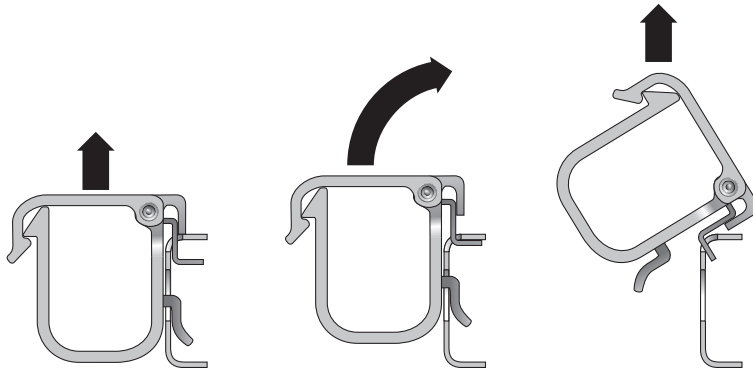


FIGURE 2-21 Removing a Cable Clip

2. To insert a cable clip, position the upper and lower clip locks in the slots of the CMA arm, then press the clip down approximately 3/8 in (10 mm).

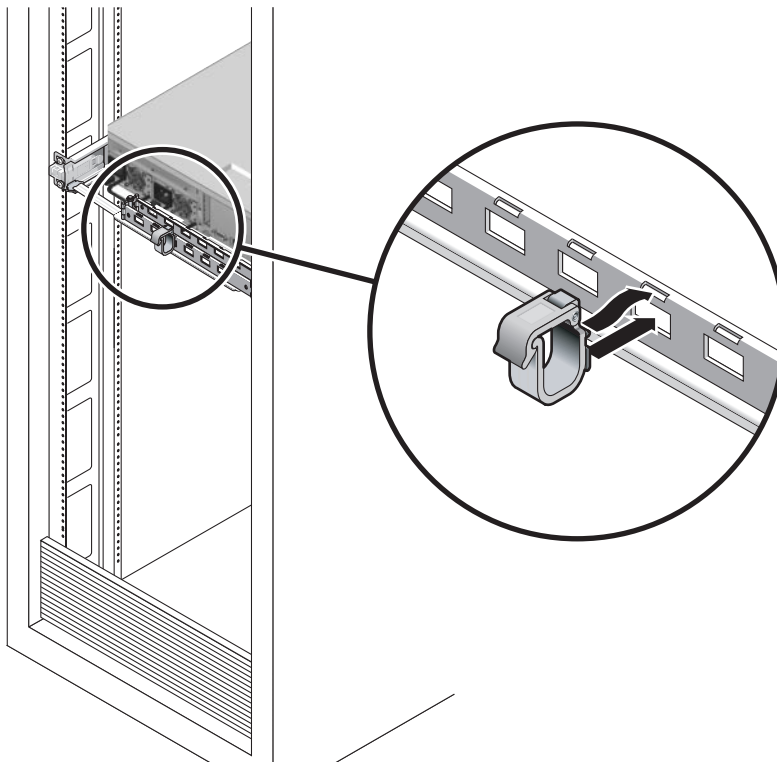


FIGURE 2-22 Mounting or Moving a Cable Clip

Powering On the System

This chapter includes instructions for booting the server and for enabling the system controller network management port.

The following topics are discussed:

- [“Powering On the System for the First Time” on page 33](#)
- [“Enabling the System Controller Network Management Port” on page 37](#)
- [“Logging Into the System Controller” on page 38](#)
- [“Using the System Controller for Common Operations” on page 44](#)
- [“Bootting the Solaris Operating System” on page 46](#)
- [“Verifying System Functionality” on page 49](#)

Powering On the System for the First Time

Power On Overview

System Console

When you power on the system, the boot process begins under the control of the system console. The system console displays status and error messages generated by firmware-based tests during system startup.

Note – To see these status and error messages, connect a terminal or terminal emulator to the serial management port (SERIAL MGT). For a basic procedure to connect a terminal or terminal emulator, see [“To Power On the System for the First Time” on page 35](#).

For a more detailed discussion on configuring the system console and connecting terminals, refer to the *Sun SPARC Enterprise T1000 Server Administration Guide*.

ALOM CMT System Controller

After the system console finishes its low-level system diagnostics, the ALOM CMT system controller initializes and runs a higher level of diagnostics. When you access the ALOM CMT system controller using a device connected to the serial management port, you see the output of the ALOM CMT diagnostics.

By default, the network management port is configured to automatically retrieve network configuration using Dynamic Host Configuration Protocol (DHCP) and to allow connections using Secure Shell (SSH).

Note – If you are unable to use DHCP and SSH on your network, you must connect to the ALOM CMT system controller using the serial management port to reconfigure the network management port. See [“To Configure the System Controller Network Management Port” on page 39](#).

Once the network management port (NET MGT) has been assigned an IP address, you can connect to the ALOM CMT system controller using Telnet or SSH.

Passwords

There is no default password when connecting to the ALOM CMT system controller for the first time using the serial management port. To set the admin password, see [“To Log Into the System Controller Using the Network Management Port” on page 43](#).

When connecting to the ALOM CMT system controller using the network management port for the first time, the default password is the last eight digits of the chassis serial number. The serial number is located on the rear of the server. It is also printed on the system information sheet that shipped with the server.

▼ To Power On the System for the First Time



Tip – The serial terminal or a terminal emulator should be connected before you connect the power cables, or you will not see the system messages. The server goes into standby mode and the ALOM CMT system controller initializes as soon as the AC power cables are connected to the power source.

Note – If you are not logged in, ALOM CMT times out after 60 seconds and reverts to the system console. Type **#.** to return to the ALOM CMT system controller prompt. For more information, refer to the *Advanced Lights Out Manager (ALOM) CMT Administration Guide*.

The system controller runs on the 3.3v standby voltage. As soon as AC power is connected to the system, the system controller powers on, runs diagnostics, and initializes the ALOM CMT firmware.

1. **If you have not already done so, connect a terminal or a terminal emulator (PC or workstation) to the SC serial management port.** Configure the terminal or terminal emulator with these settings:
 - 9600 baud
 - 8 bits
 - No parity
 - 1 Stop bit
 - No handshaking

Note – When you power on the server for the first time and you do not have a terminal or terminal emulator (PC or workstation) connected to the SC serial management port, you will not see system messages. The display times out and disappears after about 60 seconds. After connecting to the server with a terminal or terminal emulator, type **#.** to get to the system controller console.

2. **Turn on the terminal or terminal emulator.**
3. **Connect the AC power cables to Power Supply 0 and Power Supply 1, and watch the terminal for system messages.**

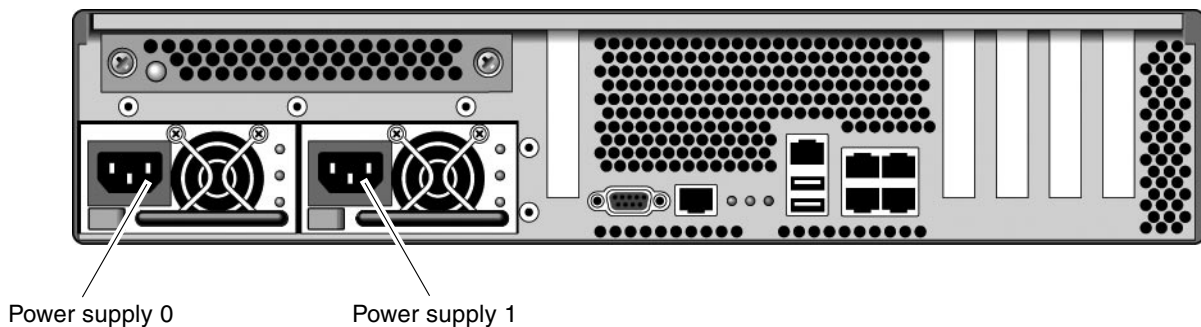


FIGURE 3-1 Rear Panel Power Connectors

After the system controller boots, the system controller login prompt is displayed on the serial console. The following example shows a partial output from the system controller boot sequence leading to the login prompt.

CODE EXAMPLE 3-1 Sample System Controller Output

```
ALOM POST 1.x

Dual Port Memory Test, PASSED.

TTY External - Internal Loopback Test
      TTY External - Internal Loopback Test, PASSED.

TTYC - Internal Loopback Test
      TTYC - Internal Loopback Test, PASSED.

TTYD - Internal Loopback Test
      TTYD - Internal Loopback Test, PASSED.

.....

Full VxDiag Tests - PASSED

      Status summary - Status = 7FFF

      VxDiag - - PASSED
      POST - - PASSED
```

CODE EXAMPLE 3-1 Sample System Controller Output (*Continued*)

```
LOOPBACK - - PASSED

I2C - - PASSED
EPROM - - PASSED
FRU PROM - - PASSED

ETHERNET - - PASSED
MAIN CRC - - PASSED
BOOT CRC - - PASSED

TTYD - - PASSED
TTYC - - PASSED
MEMORY - - PASSED
MPC885 - - PASSED

Please login:
```

Note – If it receives no user input within 60 seconds, the ALOM CMT system controller console automatically connects to the system console.

Enabling the System Controller Network Management Port

The system controller network management port is not operational until you configure network settings for the system controller. Configure the system controller in this order:

1. After the system controller boots, access the ALOM CMT command line interface through the serial management port. See [“To Log Into the System Controller Using the Serial Management Port”](#) on page 38.
2. Configure the system controller. See [“To Configure the System Controller Network Management Port”](#) on page 39.
3. Enable the new values by resetting the system controller. See [“To Reset the System Controller”](#) on page 42.

You can now use the SP network management port at any time to access the system controller. See [“To Log Into the System Controller Using the Network Management Port”](#) on page 43.

Logging Into the System Controller

If you are powering on the system for the first time after installation, use the system controller serial port to power on the system and run POST. See [“To Log Into the System Controller Using the Serial Management Port”](#) on page 38.

If the network management port has already been configured, you can use it instead of the serial management port. See [“To Log Into the System Controller Using the Network Management Port”](#) on page 43.

▼ To Log Into the System Controller Using the Serial Management Port

After the system controller boots you can access the ALOM CMT command line interface to configure and manage the system.

The `sc` prompt is displayed at the first time the system controller is booted. The default configuration provides an ALOM CMT user account called `admin`. There is no default password, so you must create a password using the system controller (`sc`) `password` command.

1. **If this is the first time the system has been powered on, use the `password` command to set the `admin` password.**

```
.....
TTYD - - PASSED
TTYC - - PASSED
MEMORY - - PASSED
MPC885 - - PASSED
sc> password
password: Changing password for admin
Setting password for admin.
New password: new_password

Re-enter new password: new-password

sc>
```


After the admin password has been set, on subsequent reboots, the sc login prompt is displayed.

2. Enter admin for the login name followed by your password.

```
TTYD - - PASSED
TTYC - - PASSED
MEMORY - - PASSED
MPC885 - - PASSED
Please login: admin
Please Enter password: password
                    (Press Return twice)
sc>
```

▼ To Configure the System Controller Network Management Port

Note – If your network allows the use of DHCP and SSH, this configuration is performed automatically at the first time you boot the system.

Use this procedure only if:

- If you are unable to use DHCP and SSH on your network.
- If you need to modify the SC network management port settings.

In this procedure you connect to the ALOM CMT system controller using the serial management port to manually reconfigure the network management port.

Note – For more information on configuring ALOM CMT, refer to the *Advanced Lights Out Management (ALOM) CMT Guide*.

You set these network parameters according to the specific details of your network configuration:

- `if_network` – Specifies whether the SC is on the network or not
- `netsc_ipaddr` – IP address of the system controller
- `netsc_ipgateway` – IP address of the gateway for the subnet
- `netsc_ipnetmask` – Netmask for the system controller subnet

To configure these parameters, use the `setsc` command. The usage is:

```
sc> setsc parameter
```

1. Set the `if_network` parameter to `true`.

```
sc> setsc if_network true
```

2. Set the `if_connection` parameter to the connection type, either `telnet` or `ssh`.

```
sc> setsc if_connection value
```

where the value can be one of the following:

- `none`
- `telnet`
- `ssh`
- `netsc_dhcp` (The system controller obtains its network interface configuration through a DHCP server.)

See the *Advanced Lights Out Management (ALOM) CMT Guide* for more information about SSH support in ALOM CMT.

3. Choose one of these methods to configure the system controller using information from your network administrator:

- Use DHCP to retrieve the network settings. Go to [Step 4](#).
- Configure a static IP configuration. Go to [Step 5](#).

4. If you choose to use DHCP, set `netsc_dhcp` to `true`.

```
sc> setsc netsc_dhcp true
```

Go to [Step 6](#).

5. If you choose to use a static IP configuration, set the parameters `netsc_ipaddr`, `netsc_ipgateway`, and `netsc_ipnetmask`, as follows.

- a. Set the IP address for the system controller.

```
sc> setsc netsc_ipaddr service-processor-IPAddr
```

- b. Set the IP address for the system controller gateway.

```
sc> setsc netsc_ipgateway gateway-IPAddr
```

c. Set the netmask for the system controller.

```
sc> setsc netsc_ipnetmask 255.255.255.0
```

This example uses 255.255.255.0 to set the netmask. Your network environment subnet might require a different netmask. Use a netmask number most appropriate to your environment.

6. Use the `showsc` command to verify that the parameters were set correctly.

```
sc> showsc  
Advanced Lights Out Manager CMT v1.x  
  
parameter                value  
-----                -  
if_network                true  
if_connection             ssh  
if_emailalerts            false  
netsc_dhcp                true  
netsc_ipaddr              xxx.xxx.xxx.xxx  
netsc_ipnetmask           255.255.255.0  
netsc_ipgateway           0.0.0.0  
mgt_mailhost  
mgt_mailalert  
sc_customerinfo  
sc_escapechars            #.  
sc_powerondelay           false  
sc_powerstatememory       false  
sc_clipasswdecho          true  
sc_cliprompt              sc  
sc_clitimeout             0  
sc_clieventlevel         2  
sc_backupuserdata         true  
diag_trigger              power-on-reset error-reset  
diag_verbosity            normal  
diag_level                max  
diag_mode                 normal  
sys_autorunonerror        false  
ser_baudrate              9600  
ser_parity                none  
ser_stopbits              1  
ser_data                  8  
netsc_enetaddr            xx:xx:xx:xx:xx:xx  
sys_enetaddr              yy:yy:yy:yy:yy:yy
```

Note – After setting the configuration parameters, you must reset the system controller for the new values to take affect. See [“To Reset the System Controller” on page 42.](#)

▼ To Reset the System Controller

After all of the configuration parameters are set, you must reset the system controller for the new values to take affect.

- **Issue the `resetsc` command.**

You are prompted to confirm that you want to reset the system controller. Reply **y** when prompted.

```
sc> resetsc
Are you sure you want to reset the SC [y/n]? y
User Requested SC Shutdown
```

Note – You can specify the `-y` flag to the `resetsc` command and bypass the confirmation message.

The system controller resets, runs diagnostics, and returns to the login prompt.

```
ALOM POST 1.x

Dual Port Memory Test, PASSED.

TTY External - Internal Loopback Test
      TTY External - Internal Loopback Test, PASSED.

TTYC - Internal Loopback Test
      TTYC - Internal Loopback Test, PASSED.

TTYD - Internal Loopback Test
      TTYD - Internal Loopback Test, PASSED.

.....
Full VxDiag Tests - PASSED
```

```
Status summary - Status = 7FFF

VxDiag - - PASSED
POST - - PASSED
LOOPBACK - - PASSED

I2C - - PASSED
EPROM - - PASSED
FRU PROM - - PASSED

ETHERNET - - PASSED
MAIN CRC - - PASSED
BOOT CRC - - PASSED

TTYD - - PASSED
TTYC - - PASSED
MEMORY - - PASSED
MPC885 - - PASSED

Please login:
```

▼ To Log Into the System Controller Using the Network Management Port

Note – You must configure the system controller parameters shown in [“To Configure the System Controller Network Management Port”](#) on page 39 before you can use the network management port.

1. **Open a telnet session and connect to the system controller by specifying its network address.**

```
% telnet x.x.x.x.
Trying x.x.x.x...
Connected to x.x.x.x.
Escape character is '^]'.
Copyright 2003 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.
Sun(tm) Advanced Lights Out Manager 1.x
Please login:
```

2. Login as `admin` using the password you previously set.

```
Please login: admin
Please Enter password: password
sc>
```

Using the System Controller for Common Operations

▼ To Power On the System

Powering on the system requires you to use the `poweron` command at the SC console.

- **To initiate the power-on sequence, issue the `poweron` command.**

You will see an `sc>` alert message on the system console. This indicates that the system has reset.

```
sc> poweron
SC Alert: Host System has Reset
sc>
```

▼ To Connect to the System Console

Output from POST, OpenBoot, and the Solaris OS is displayed in the system console using the network console on the system controller.

- **Execute the `console` command, and use the `-f` option to force the console to be attached to your session.**

Multiple users can be connected to the console, but only one can be attached.

```
sc> console -f
Enter #. to return to ALOM.
```

Note – For more information about POST output, see the *Sun SPARC Enterprise T2000 Server Service Manual*.

▼ To Perform a Normal System Initialization

After you issue the `poweron` command, the CPU and memory controllers initialize, and eventually OpenBoot initializes. After a number of system console messages, you will see the `ok` prompt, or the system will boot into the Solaris OS.

Note – System behavior depends on how the `auto-boot` variable is set. See the *Sun SPARC Enterprise T2000 Server Service Manual* for more information.

The example output below is a small section of the complete output.

```
Find dropin, Copying Done, Size 0000.0000.0000.1110
Find dropin, (copied), Decompressing Done, Size
0000.0000.0006.06e0 ^Qcpu cpu cpu cpu cpu cpu cpu cpu cpu cpu
cpu cpu cpu cpu cpu cpu cpu cpu cpu cpu cpu cpu cpu cpu
cpu vpci mem32base, mem64base, cfgbase: e800000000 e000000000
e900000000
pci /pci@780: Device 0 pci pci
/pci@780/pci@0: Device 0 Nothing there
/pci@780/pci@0: Device 1 pci pci

.....

/pci@7c0/pci@0: Device a Nothing there
/pci@7c0/pci@0: Device b Nothing there
/pci@7c0/pci@0: Device c Nothing there
/pci@7c0/pci@0: Device d Nothing there
/pci@7c0/pci@0: Device e Nothing there
/pci@7c0/pci@0: Device f Nothing there
Probing I/O buses

SPARC Enterprise T2000, No Keyboard
...

{0} ok
```

To understand the various devices and their path names as represented in the OpenBoot device tree, refer to [TABLE 3-1](#). The table identifies each of the devices, their full path name and their location or NAC name used to identify their physical location.

TABLE 3-1 Map of Devices, OpenBoot Path Names, and Locations

OpenBoot Device Path Name	Device	Location Name
/pci@780	Fire IO Bridge Bus A	IOBD/PCIEa
/pci@780/pci@0	PLX 8532 PCI-E Switch A (U0901)	IOBD/PCI-SWITCH0
/pci@780/pci@0/pci@1	Intel Ophir GBE Chip (U2401)	IOBD/GBE0
/pci@780/pci@0/pci@8	PCI-E Slot 0 (J2100)	PCIE0
/pci@780/pci@0/pci@9	LSI 1064-E SAS Controller (U3401)	IOBD/SASHBA
/pci@7c0	Fire IO Bridge Bus B	IOBD/PCIEb
/pci@7c0/pci@0	PLX 8532 PCI-E Switch B (U1501)	IOBD/PCI-SWITCH1
/pci@7c0/pci@0/pci@2	Intel Ophir GBE Chip (U2601)	IOBD/GBE1
/pci@7c0/pci@0/pci@1	Intel 41210 Bridge Chip (U2901)	IOBD/PCI-BRIDGE
/pci@7c0/pci@0/pci@1/pci@0,2	PCI-X Slot 0 (J3301)	PCIX0 (J3301)
/pci@7c0/pci@0/pci@1/pci@0,2	PCI-X Slot 1 (J3201)	PCIX1 (J3201)
/pci@7c0/pci@0/pci@1/pci@0	ULI Southbridge Chip (U3702)	IOBD/PCIX-IO
/pci@7c0/pci@0/pci@8	PCI-E Slot 1 (J2202)	PCIE1 (J2202)
/pci@7c0/pci@0/pci@9	PCI-E Slot 2 (J2201)	PCIE1 (J2201)

Booting the Solaris Operating System

The Solaris OS is preinstalled on server on the disk in slot 0. The Solaris OS is not configured (that is, the `sys-unconfig` command was run in the factory). If you boot the system from this disk, you will be prompted to configure the Solaris OS for your environment.

▼ To Boot the Solaris Operating System

- 1. At the `ok` prompt, boot from the disk that contains the Solaris OS.**

If you know which disk to boot from, skip [Step a](#) and perform [Step 2](#).

- a. If you need to determine which disk to boot from, issue the `show-disks` command at the `ok` prompt to see the path to the configured disks, similar to the following:

```
ok show-disks
a) /pci@7c0/pci@0/pci@2/pci@0,2/LSILogic,sas@4/disk
q) NO SELECTION
Enter Selection, q to quit: q
ok
```

2. Type the `boot` command at the `ok` prompt.

Use the value from [Step 1](#) to construct the boot command. You will need to append the target to the disk path. In the following example, the system is being booted from disk 0 (zero), so `@0,0` is appended to the disk path.

```
ok boot /pci@7c0/pci@0/pci@2/pci@0,2/LSILogic,sas@4/disk@0,0
Boot device: / pci@7c0/pci@0/pci@2/pci@0,2/LSILogic,sas@4/
disk@0,0
File and args:
Notice: Unimplemented procedure 'encode-unit' in
/pci@7c0/pci@0/pci@2/pci@0/LSILogic,sas@4
Loading ufs-file-system package 1.4 04 Aug 1995 13:02:54.
FCode UFS Reader 1.12 00/07/17 15:48:16.
Loading: /platform/SUNW,Ontario/ufsboot
Loading: /platform/sun4v/ufsboot
SunOS Release 5.10 Version
/net/spa/export/spa2/ws/pothier/grlks10-ontario:12/01/2004 64-bit
...

DEBUG enabled
misc/forthdebug (159760 bytes) loaded
/platform/sun4v/kernel/drv/sparcv9/px symbol
intr_devino_to_sysino multiply defined
...
os-tba FPU not in use
configuring IPv4 interfaces: ipge0.
Hostname: wgs94-181
The system is coming up. Please wait.
NIS domain name is xxx.xxx.xxx.xxx
starting rpc services: rpcbind keyserver ypbind done.
Setting netmask of lo0 to 255.0.0.0
Setting netmask of bge0 to 255.255.255.0
Setting default IPv4 interface for multicast: add net 224.0/4:
gateway wgs94-181
```

```
syslog service starting.  
volume management starting.  
Creating new rsa public/private host key pair  
Creating new dsa public/private host key pair  
The system is ready.  
wgs94-181 console login:
```

▼ To Reset the System

- If it is necessary to reset the system, use the `init 6` command.

```
# init 6
```

To simply reset the system, it is not necessary to power the system off and on.

▼ To Power Cycle the System

If a simple reset does not clear a system problem, you can power the system off and on with this procedure.

1. Shut down the Solaris OS.

At the Solaris OS prompt, issue the `init 0` command to halt the Solaris OS and to return to the `ok` prompt.

```
# init 0  
WARNING: proc_exit: init exited  
syncing file systems... done  
Program terminated  
ok
```

2. Switch from the system console prompt to the SC console prompt by issuing the `#` escape sequence.

```
ok #.  
sc>
```

3. Using the SC console, issue the `poweroff` command.

```
sc> poweroff -fy  
SC Alert: SC Request to Power Off Host Immediately.
```

4. Issue the `poweron` command.

```
sc> poweron  
sc> SC Alert: Host System has Reset
```

5. Reconnect to the system console using the `console` command.

```
sc> console -f  
Enter #. to return to ALOM.
```

The systems displays various messages, followed by the `ok` prompt.

Verifying System Functionality

After powering on the system for the first time, you can use the SunVTS™ software to verify the functionality and performance of any installed components, as well as its network connections. Refer to the SunVTS documentation for more information.

Updating the Firmware

The `flashupdate` command updates both the system controller firmware and the server firmware.

The flash image consists of the following components:

- System controller firmware
- OpenBoot
- POST
- Reset/Config
- Sequencer
- Partition description

Updating the Firmware

To use the features and fixes in subsequent firmware releases, perform this procedure.

▼ To Update the Firmware

1. **Ensure that the ALOM CMT system controller network management port is configured.**

This is required to access the new flash image over the network. See [“To Configure the System Controller Network Management Port” on page 39](#).

2. Open a Telnet or SSH session and connect to the system controller.

The following example is for Telnet.

```
% telnet xxx.xxx.xx.xx
Trying xxx.xxx.xx.xx...
Connected to xxx.xxx.xx.xx.
Escape character is '^]'.

Use is subject to license terms.

Sun(tm) Advanced Lights Out Manager CMT v1.x

Please login:
```

3. Login as admin, using the password you defined during the configuration of the system controller.

```
Please login: admin
Please Enter password: password
sc>
```

4. Execute the flashupdate command.

The flashupdate SC command updates the system controller flash image and the host firmware. The flashupdate command requires the following information:

- IP address of an FTP server on the network that can access the flash image.
- Full path name to the flash image that the IP address can access.
- Username and password of an account registered on the system that is specified by the IP address.

The command usage is as follows:

```
flashupdate [-s IPaddr -f pathname] [-v]
```

where:

- -s *IPaddr* is the IP address of any FTP server on the network that can access the flash image
- -f *pathname* is the full path name to the flash image

- `-v` is the flag to turn on verbose message output

```
sc> flashupdate -s xxx.xxx.xx.xx -f pathname
Username: username
Password: password
.....
Update complete. Reset device to use new image.
sc>
```

5. Reset the system controller.

After the flash has been updated, you must reset the system controller for the new image to take affect. To reset the system controller, issue the `resetsc` command, as shown below.

Note – To bypass the confirmation prompt, you can use the `-y` flag with the `resetsc` command. If `resetsc` is issued from a Telnet or SSH session, upon reset the Telnet or SSH session will be terminated. The output from the reset will be displayed on the serial console on the system controller.

```
sc> resetsc
Are you sure you want to reset the SC [y/n]? y
User Requested SC Shutdown
```

The system controller resets, runs diagnostics, and returns to the login prompt (on the serial console), similar to [CODE EXAMPLE A-1](#).

CODE EXAMPLE A-1 Typical Boot Sequence Following Firmware Update

```
ALOM BOOTMON v1.x
ALOM Build Release: 000
Reset register: f0000000 EHRS ESRS LLRS SWRS

ALOM POST 1.x

Dual Port Memory Test, PASSED.

TTY External - Internal Loopback Test
TTY External - Internal Loopback Test, PASSED.

TTYC - Internal Loopback Test
TTYC - Internal Loopback Test, PASSED.
```

CODE EXAMPLE A-1 Typical Boot Sequence Following Firmware Update

```
...  
  
ETHERNET CPU LOOPBACK TEST, PASSED  
  
Full VxDiag Tests - PASSED  
  
Status summary - Status = 7FFF  
  
VxDiag - - PASSED  
POST - - PASSED  
LOOPBACK - - PASSED  
  
I2C - - PASSED  
EPROM - - PASSED  
FRU PROM - - PASSED  
  
ETHERNET - - PASSED  
MAIN CRC - - PASSED  
BOOT CRC - - PASSED  
  
TTYD - - PASSED  
TTYC - - PASSED  
MEMORY - - PASSED  
MPC885 - - PASSED  
  
sc>
```


Selecting a Boot Device

The boot device is specified by the setting of an OpenBoot configuration variable called `boot-device`. The default setting of this variable is `disk net`. Because of this setting, the firmware first attempts to boot from the system hard drive, and if that fails, from the on-board NET0 Gigabit Ethernet interface.

This procedure assumes that you are familiar with the OpenBoot firmware and that you know how to enter the OpenBoot environment. For more information, see the *Sun SPARC Enterprise T2000 Server Administration Guide*.

Note – The serial management port on the ALOM CMT card is preconfigured as the default system console port. For more information, see the *Sun SPARC Enterprise T2000 Server Overview*.

If you want to boot from a network, you must connect the network interface to the network.

▼ To Select a Boot Device

- **At the `ok` prompt, type:**

```
ok setenv boot-device device-specifier
```

Where the *device-specifier* is one of the following:

- `cdrom` – Specifies the DVD drive
- `disk` – Specifies the system boot disk (internal disk 0 by default)
- `disk0` – Specifies internal drive 0
- `disk1` – Specifies internal drive 1
- `disk2` – Specifies internal drive 2
- `disk3` – Specifies internal drive 3

- `net`, `net0`, `net1`, `net2`, `net3` – Specifies the network interfaces
- *full path name* – Specifies the device or network interface by its full path name

Note – The Solaris OS modifies the `boot-device` variable to its full path name, not the alias name. If you choose a nondefault `boot-device` variable, the Solaris OS specifies the full device path of the boot device.

Note – You can specify the name of the program to be booted as well as the way the boot program operates. For more information, refer to the *OpenBoot 4.x Command Reference Manual* in the *OpenBoot Collection AnswerBook* for your specific Solaris OS release.

If you want to specify a network interface other than an onboard Ethernet interface as the default boot device, you can determine the full path name of each interface by typing:

```
ok show-devs
```

The `show-devs` command lists the system devices and displays the full path name of each PCI device.

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