Sun Netra T5440 Server

Installation Guide

Part No.: E23168-01
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Contents

Preface

This guide provides instructions, background information, and reference material to help you install Sun Netra T5440 server from Oracle®. The installation instructions in this document assume that a system administrator is experienced with the Oracle Solaris Operating System.

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

How This Document Is Organized

Chapter 1 provides an overview of the server.

Chapter 2 provides background information about the server installation procedures.

Chapter 3 provides instructions for installing the server into an open 4-post rack and an open 2-post rack.

Chapter 4 provides instructions for cabling the server.

Chapter 5 provides instructions for powering on the server and for enabling the service processor network management port.

Appendix A provides instructions for updating the service processor firmware and the system firmware.

Appendix B provides instructions for selecting a boot device.

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

Shell Prompts

Shell	Prompt
C shell	*machine-name*`%`
C shell superuser	*machine-name*`#`
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 `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`%` **`su`** `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

Note – Characters display differently depending on browser settings. If characters do not display correctly, change the character encoding in your browser to Unicode UTF-8.

Related Documentation

The following table lists the documentation for this product. The online documentation is available at:

http://download.oracle.com/docs/cd/E19874-01/index.html

Application	Title	Format	Location
Planning	Sun Netra T5440 Server Site Planning Guide	PDF, HTML	Online
Installation	Sun Netra T5440 Server Installation Guide	PDF, HTML	Online
Administration	Sun Netra T5440 Server Administration Guide	PDF, HTML	Online
ILOM Reference	Oracle Integrated Lights Out Manager (ILOM) 2.0 Supplement for the Sun Netra T5440 Server	PDF, HTML	Online
ILOM Reference	Oracle Integrated Lights Out Manager (ILOM) 3.0 Supplement for the Sun Netra T5440 Server	PDF, HTML	Online
Service	Sun Netra T5440 Server Service Manual	PDF, HTML	Online
Compliance	Sun Netra T5440 Server Safety and Compliance Guide	PDF	Online
Issues & Updates	Sun Netra T5440 Server Product Notes	PDF, HTML	Online
Overview	Sun Netra T5440 Server Getting Started Guide	Printed PDF	Shipping kit & Online

CHAPTER 1

Sun Netra T5440 Features Overview

This chapter describes the features of the server. Topics include:

- Review the *Sun Netra T5440 Server Product Notes* (820-4447) and the SunSolve Web pages for the most recent system firmware release. The system firmware postings contain a README file detailing the fixes and new features.

Features at a Glance

TABLE 1-1 lists the features of Oracle's Sun Netra T5440 server.

TABLE 1-1 Feature Specifications

Feature	Description
Processor	Two 6 or 8 core UltraSPARC T2 processors with one of the following: • 6 cores (48 x2, for a total of 96 concurrent threads) • 8 cores (64 x2, for a total of 128 concurrent threads)
Memory Slots/Capacity	Up to 256 GB of memory with 32 (16 slots standard with optional addition of 16 slots) that can be populated with one of the following types of fully buffered DIMMS (FB-DIMMs): • 1 GB (32 GB maximum) • 2 GB (64 GB maximum) • 4 GB (128 GB maximum) • 8 GB (256 GB maximum)
Internal Hard Drives	12 hot-pluggable 146 GB SFF SAS drives Integrated hard drive controller supports RAID 0 and RAID 1
Optical Media Drive	One, slot-loading, slimline DVD drive, supporting CD-R/W, CD+R/W, DVD-R/W, DVD+R/W
Power Supplies	Four hot-swappable 660 W AC/DC power supply units (PSUs) providing 2N redundancy.
Alarm	One Telco alarm
Cooling	Three high-power system fans for processor, memory FB-DIMM, and PCI card cooling Three low-power fans for hard drive and removable media drive cooling
Ethernet Ports	Four 10/100/1000 Mbps Ethernet, RJ-45-based, autonegotiating ports (on two separate controllers) Note - Two 10 GbE ports are available by adding XAUI cards

TABLE 1-1 Feature Specifications *(Continued)*

Feature	Description
PCIe, PCI-X, or XAUI Interfaces*	• Eight x8 (eight-lane) PCIe slots (Slots 4 and 5 support either PCIe or XAUI 10GbE cards) • Two PCI-X (one full-length and full-height, one half-length/full-height) slots Note – There is a 25 W maximum load for PCI Slots 0-3 and a 15 W maximum load for PCI slots 4-9. However, Slot 2 and Slot 3 are x8 PCIe slots that have x16 mechanical connectors. These slots support form factor PCIe cards, and support the highest power 75 Watt PCIe card. However, only one 75 Watt PCIe card can be installed in the server. It is suggested to install the 75 Watt card in Slot 2 for better cooling.
USB Ports	Two USB 2.0 ports on the front panel and two on the rear panel
Additional Ports	The following ports are located on the rear panel of the server: • One RJ-45 serial management port (SER MGT) – the default connection to system controller • One 10/100 Mbps Ethernet network management port (NET MGT) – connection to the system controller • One alarm port – connection to the alarm card • One DB-9 serial port – connection to the host
Remote Management	On-board Integrated Lights Out Management with two command sets: • ILOM CLI • ALOM CMT compatibility CLI (legacy command set)
Firmware	Firmware comprising: • OpenBoot™ PROM for system settings and power-on self test (POST) support • ILOM for remote management

TABLE 1-1 Feature Specifications *(Continued)*

Feature	Description
Cryptography	Processor integrated, cyptographic acceleration that supports industry standard security ciphers
Operating System	Solaris 10 5/08 Operating System preinstalled on disk 0 Refer to the *Sun Netra T5440 Server Product Notes* for information on the minimum version of supported OS and required patches
Other Software (refer to the *Sun Netra T5440 Server Product Notes* [820-4447] for details)	• Solaris Live Upgrade • Java™ Enterprise System with a 90-day trial licence • Logical Domains Manager • Sun Studio 12 • Sun N1™ System Manager • Cool Tools GCC • Corestat • CMT Tools • SunVTS™ 6.4 Patch Set (PS) 2 • Sun Update Connection

* PCIe and PCI-X specifications described in this table list the physical requirements for PCI cards. Additional support capabilities must also be provided (such as device drivers) for a PCI card to function in the server. Refer to the specifications and documentation for a given PCI card to determine if the required drivers are provided that enable the card to function in this server.

PCIe, PCI-X, and XAUI Card Features

This section describes suggested PCI/XAUI card features and configurations. See FIGURE 1-3 for back panel locations of the PCI slots.

PCI Cards on the PCI Auxilliary Board

Slot 0 and Slot 1 are 133MHZ PCI-X slots and support form factor PCI-X cards. The maximum power for each slot is 25 Watts.

Slot 2 and Slot 3 are x8 PCIe slots that have x16 mechanical connectors. These slots support form factor PCIe cards, and support the highest power 75 Watt PCIe card. However, only one 75 Watt PCIe card can be installed in the server. It is suggested to install the 75 Watt card in Slot 2 for better cooling.

PCI Cards on the PCI Mezzanine Assembly

PCIe Slots 4-9 are x8 PCIe slots and support low profile PCIe cards and Max power for each slot is 25 Watts. PCIe Slot 4 and PCIe Slot 5 are combination slots with XAUI4 and XAUI5.

If a XAUI card is installed in the XAUI4 slot, the PCIe Slot 4 cannot be used, and the Ethernet Port 1 on the motherboard will be disabled. If a XAUI card is installed in the XAUI5 slot, the PCIe Slot 5 cannot be used and the Ehternet Port 0 on the motherboard will be disabled.

High Bandwidth PCIe Card Installation

To balance the PCIe bus bandwidth from the upstream of the PCIe buses, it is suggested to limit the numbers of high bandwidth PCIe cards installed in the server. It is also suggested to install the high bandwidth PCIe cards in the assigned slots. The following are two examples:

Example 1 – If one or two XAUI cards are installed in the server, it is suggested to install two high bandwidth PCIe cards: one in Slot 2 and in Slot 8.

Example 2 – If there are no XAUI cards installed in the server, it is suggested to install four high bandwidth PCIe cards: one in Slot 2, 4, 8, and 9.

Chassis Overview

The Sun Netra T5440 server is based on a new four rack unit (4U) chassis.

Note – For chassis dimensions and other specifications, refer to the *Sun Netra T5440 Server Site Planning Guide*.

Infrastructure Boards

The Sun Netra T5440 server has the following boards installed in the chassis:

- Motherboard – The motherboard includes two CMP modules, slots for 16 FB-DIMMs, memory control subsystems, and all service processor (ILOM) logic. In addition, a removable SCC module contains all MAC addresses, host ID, and ILOM configuration data. When replacing the motherboard, the SCC module can

be transferred to a new board to retain system configuration data. However, your OpenBoot PROM configuration information is stored on the NVRAM on the motherboard, and the NVRAM cannot be transferred to the new motherboard, so you should record your OpenBoot PROM configuration information before replacing the motherboard.

The service processor (ILOM) subsystem controls the server power and monitors server power and environmental events. The ILOM controller draws power from the server's 3.3V standby supply rail, which is available whenever the system is receiving main input power, even when the system is turned off.

Note – CPUs can not be upgraded or replaced on the motherboard. If a CPUs fails, the motherboard must be replaced as a field-replaceable unit (FRU).

- Memory mezzanine assembly – This is an option that requires purchasing an upgrade. This assembly provides an additional 16 memory slots.
- Power distribution board – This board distributes main 12V power from the power supplies to the rest of the system. This board is directly connected to the motherboard through a bus bar and ribbon cable.
- Power supply backplane – This board carries 12V power from the power supplies to the power distribution board with a pair of bus bars.
- Fan power boards – This board carries power to the system fan modules, and is cabled to the power distribution board.
- SAS backplane – This board includes the connectors for the 12 SAS hard drives.

  Each drive has its own Power/Activity, Fault, and Ready-to-Remove LEDs.
- System Alarm Board – This board contains the interconnect for the front I/O board, Power and Locator buttons, and system/component status LEDs.
- PCI auxiliary board (PCI_AUX) – This board has two PCIe slots and two PCI-X slots to support full length and full height PCIe/PCI-X cards. One Intel 41210 PCIe to PCI-X chip is used to convert the PCIe bus to two PCI-X buses. One PLX8525 PCIe switch is used to expand two PCIe slots. All the PCIe signal/buses are from the PCI mezzanine board, through the cables.
- PCI mezzanine board (PCI_MEZZ) – This board is designed with six x8 PCIe slots and two XAUI slots (combo) to support six low profile PCIe cards or four low profile PCIe cards and two XAUI cards. One PLX8533 PCIe switch is used to expand the PCIe slots.
- DVD interface board – This board connects the optical media drive to the motherboard.
- PCIe/XAUI risers – There are three risers per system, each attached to the rear of the motherboard.

Note – 10-Gbit Ethernet XAUI cards are only supported in Slots 4 and 5.

System Cables

The Sun Netra T5440 server has the following cables:

- Ribbon cable, connected between the power distribution board (PDB) and the motherboard
- One SAS cable connects from MB to SAS expander board
- Two power and signals cables are used between PDB and PCI_AUX board
- One x4 PCIe cable, one x8 PCIe cable, and power cable are connected between the PCI Mezz board and the PCI-AUX board
- A power cable connects the fan board and the PDB
- An alarm cable connects the PDB to the DB15 connector in the rear of the server
- A cable is used to connect the PDB to the SYS/Alarm LED board in the front of the server

Front Panel

The server front panel contains a recessed system power button, system status and fault LEDs, Locator button and LED, and Telco Alarm Status LEDs. The front panel also provides access to internal hard drives, the removable media drive, and the two front USB ports.

Issue With Opening the Front Bezel

Caution – Do not open the fron bezel while the server is on a flat surface. If opened on a flat surface, the bezel hinges will break.

The server must either be rackmounted, OR the front of the server (including bezel hinges) *must* extend over the edge of a table or desktop surface before opening the bezel.

Front Panel Component Access

FIGURE 1-1 and FIGURE 1-2 depicts front panel features on the server. For a detailed description of front panel controls and LEDs, see "Front Panel LEDs" on page 10.

FIGURE 1-1 Bezel of the Sun Netra T5440 Server

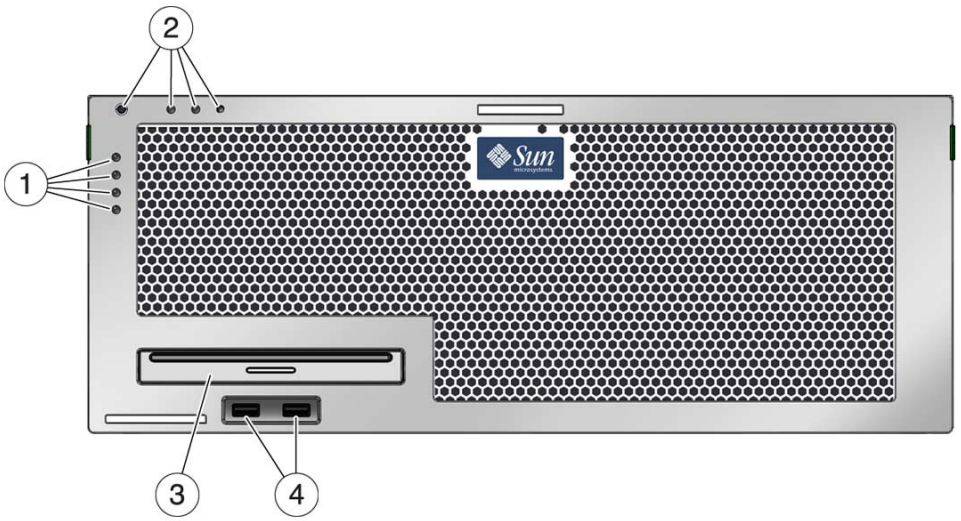

Figure Legend

1	Alarm status indicators: Top to bottom: Critical LED, Major LED, Minor LED, User LED	**3**	Removable media
2	System Status Indicators: Left to right: Locator LED Button, Service Required LED, System Activity LED, Power Button	**4**	Front left and right USB ports

FIGURE 1-2 Front Panel of the Sun Netra T5440 Server With the Bezel Removed

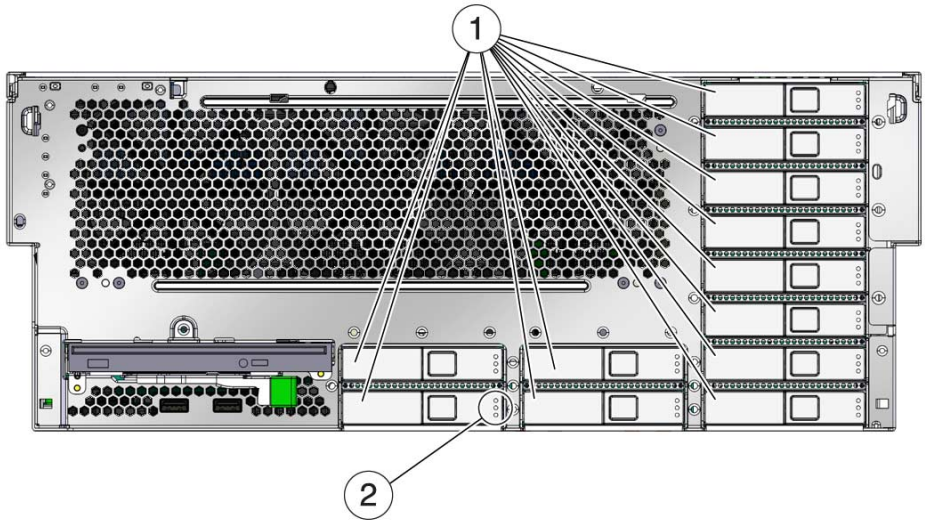

Figure Legend

1	Hard Disk Drives (HDD): Starting from bottom left; Left to right, bottom to top: HDD0, HDD1, HDD2, HDD3, HDD4, HDD5, HDD6, HDD7, HDD8, HDD9, HDD10, HDD11
2	Hard drive LEDs (each HDD) top to bottom: OK to Remove LED, Service Required LED, Power OK LED

Front Panel LEDs

TABLE 1-2 describes the front panel system LEDs and controls.

TABLE 1-2 Front Panel LEDs and Controls

LED or Button	Icon	Description
Locator LED and button (White)		The Locator LED enables you to find a particular system. The LED is activated using one of the following methods: • The ALOM CMT command setlocator on. • The ILOM command set /SYS/LOCATE value= Fast_Blink • Manually press the Locator button to toggle the Locator LED on or off. This LED provides the following indications: • Off – Normal operating state. • Fast blink – System received a signal as a result of one of the methods previously mentioned, indicating that it is active.

TABLE 1-2 Front Panel LEDs and Controls *(Continued)*

LED or Button	Icon	Description
Service Required LED (Amber)		If on, indicates that service is required. POST and ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication. The ILOM show faulty command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (Green)		Provides the following indications: • Off – Indicates that the system is not running in its normal state. System power might be on or in standby mode. The service processor might be running. • Steady on – Indicates that the system is powered on and is running in its normal operating state. No service actions are required. • Fast blink – Indicates the system is running at a minimum level in standby and is ready to be quickly returned to full function. The service processor is running. • Slow blink – Indicates that a normal transitory activity is taking place. Slow blinking could indicate that the system diagnostics are running, or that the system is booting.
Power button		The recessed Power button toggles the system on or off. • If the system is powered off, press once to power on. • If the system is powered on, press once to initiate a graceful system shutdown. • If the system is powered on, press and hold for 4 seconds to initiate an emergency shutdown. For more information about powering on and powering off the system, refer to the *Sun Netra Server Adminstration Guide*.

Rear Panel

The rear panel provides access to system I/O ports, PCIe ports, 10 Gigabit Ethernet (XAUI) ports, power supplies, Locator button and LED, and system status LEDs.

Rear Panel Component Access

FIGURE 1-3 shows rear panel features on the server. For a detailed description of PCIe slots, refer to the *Sun Netra T5440 Server Service Manual*.

FIGURE 1-3 Rear Panel Cable Connectors and LEDs on the Sun Netra T5440 Server

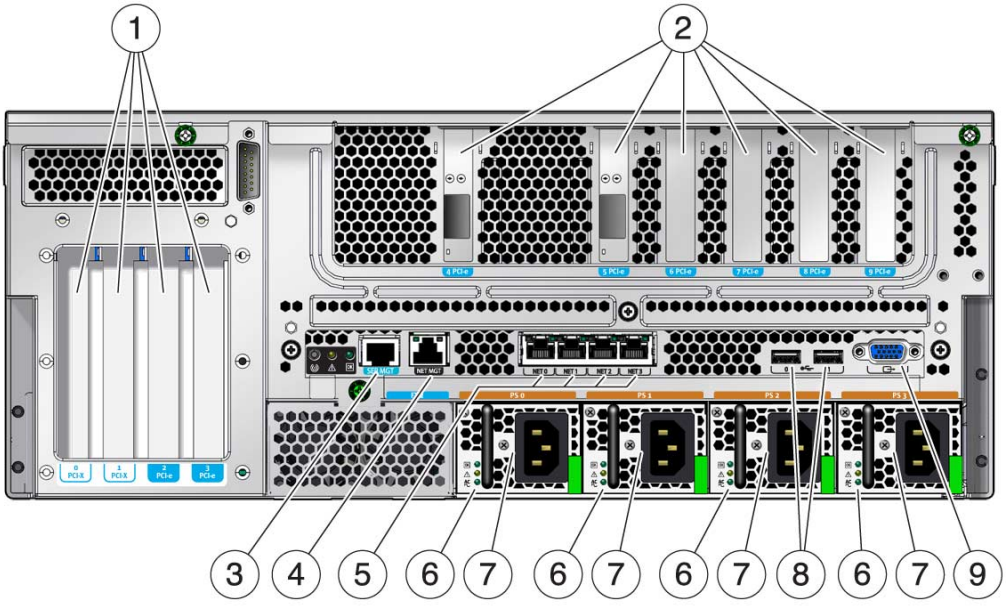

Figure Legend

1	PCI Slots 0-3: left to right: PCI-X Slot 0 (25 W maximum load), PCI-X Slot 1 (25 W maximum load), PCIe Slot 2 (75 W maximum load), PCIe Slot 3 (75 W maximum load) Note - Only one 75 W PCIe card can be installed in the server at one time. It is suggested to install the 75 W card in Slot 2 for better cooling.
2	PCI (or XAUI) Slots 4-9: left to right: PCIe or XAUI Slot 4 (15 W maximum load), PCIe or XAUI Slot 5 (15 W maximum load), PCIe Slot 6 (15 W maximum load), PCIe Slot 7 (15 W maximum load), PCIe Slot 8 (15 W maximum load), PCIe Slot 9 (15 W maximum load)
3	Service Processor Serial Management Port
4	ServIce Processor Network Management Port
5	Gigabit Ethernet ports left to right: NET0, NET1, NET2, NET3
6	Power Supply LEDs (each PSU) top to bottom: Output On LED (Green), Service Required LED (Amber), Input Power OK LED (Green)
7	Power supplies (PSs): left to right: PS 0, PS 1, PS 2, PS 3
8	Rear left and right USB ports
9	TTYA serial port

Rear Panel LEDs

TABLE 1-2 describes the front panel system LEDs and controls.

TABLE 1-3 Rear Panel LEDs and Controls

LED or Button	Icon	Description
Locator LED and button (White)		The Locator LED enables you to find a particular system. The LED is activated using one of the following methods: • The ALOM CMT command setlocator on. • The ILOM command `set /SYS/LOCATE value=Fast_Blink` • Manually press the Locator button to toggle the Locator LED on or off. This LED provides the following indications: • Off – Normal operating state. • Fast blink – System received a signal as a result of one of the methods previously mentioned, indicating that it is active.
Service Required LED (Amber)		If on, indicates that service is required. POST and ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication. The ILOM show faulty command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (Green)		Provides the following indications: • Off – Indicates that the system is not running in its normal state. System power might be on or in standby mode. The service processor might be running. • Steady on – Indicates that the system is powered on and is running in its normal operating state. No service actions are required. • Fast blink – Indicates the system is running at a minimum level in standby and is ready to be quickly returned to full function. The service processor is running. • Slow blink – Indicates that a normal transitory activity is taking place. Slow blinking could indicate that the system diagnostics are running, or that the system is booting.

FIGURE 1-4 Rear Panel Power Supply LEDs on the Sun Netra T5440 Server

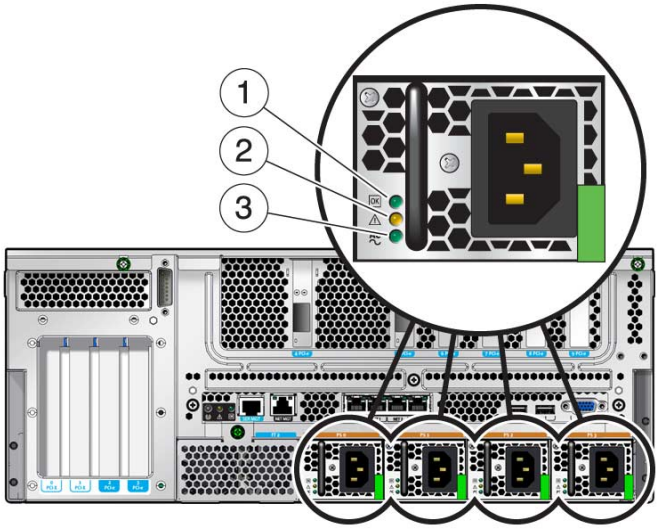

Figure Legend

1	Power Supply Output On LED (Green)
2	Power Supply Service Required LED (Amber)
3	Power Supply Input Power OK LED (Green)

Additional Feature Information

Chip-Multithreaded Processor and Memory Technology

The UltraSPARC T2 Plus multicore processor is the basis of the Sun Netra T5440 server. The UltraSPARC T2 processor is based on chip multithreading (CMT) technology that is optimized for highly threaded transactional processing. The UltraSPARC T2 processor improves throughput while using less power and dissipating less heat than conventional processor designs.

Depending on the model purchased, each processor chip has four, six, or eight UltraSPARC cores. Each core has two integer pipelines. Each pipeline runs four threads, for a total of eight threads per core.

Additional processor components, such as L1 cache, L2 cache, memory access crossbar, memory controllers, and the I/O interface have been carefully tuned for optimal performance.

Performance Enhancements

The Sun Netra T5440 server expands the CoolThreads family to include dual socket systems. The server delivers extremely high compute density with up to 128 threads in 4 rack units.

The server provides advanced power management through the UltraSPARC T2 power management features that work at both the core and the memory levels of the processor. These features include the ability to reduce instruction issue rates, parking of idle threads and cores, and the ability to turn off clocks in both cores and memory to reduce power consumption.

In addition, the server offers the following features:

- High memory density with up to 256 (with full 32 slots) Gbytes in 4 rack units.
- High internal storage capacity with 1742 Gbytes available
- Robust I/O bandwidth with 8 lanes available in all of the PCIe slots.
- Eco-responsibility through the use of power supplies that are compliant with 80 Plus and Climate Savers computing initiatives.

Preinstalled Solaris Operating System

The Sun Netra T5440 server is preinstalled with the Solaris 10 OS, and offers the following Solaris OS features:

- Stability, high performance, scalability, and precision of a mature 64-bit operating system
- Support for over 5,000 leading technical and business applications, and thousands of Java based services
- Solaris Containers – Isolate software applications and services using flexible, software-defined boundaries
- DTrace – A comprehensive dynamic tracing framework for tuning applications and troubleshooting systemic problems in real time
- Predictive Self-Healing – Capability that automatically diagnoses, isolates, and recovers from many hardware and application faults
- Security – Advanced security features designed to protect the enterprise at multiple levels

- Network Performance – Completely rewritten TCP/IP stack dramatically improves the performance and scalability of your networked services

You can use the preinstalled Solaris 10 OS, or reinstall a supported version of the Solaris 10 OS from your network, CD, or downloaded copy. In some cases, if you reinstall the Solaris OS, you must also install patches. Refer to the *Sun Netra T5440 Server Product Notes* for information on the supported OS releases for your server.

Hardware-Assisted Cryptography

The UltraSPARC T2 Plus multicore, multithreaded, processors provide hardware-assisted acceleration of symmetric, asymmetric, hashing, and random number generation cryptographic operations as follows:

- Asymmetric algorithms – RSA, DSA, Diffie Hellman, and Elliptic Curve cryptography
- Symmetric algorithms – AES, 3DES, and RC$
- Hashing algorithms – SHA1, SHA256, and MD5

The Solaris 10 OS provides the multithreaded device driver that supports the hardware-assisted cryptography.

Support for Virtualization Through Logical Domains

The Sun Netra T5440 server supports the use of Logical Domains (LDoms) technology. Through the use of the Solaris OS and the built-in server firmware, and by installing the Logical Domains Manager software, you can virtualize the compute services that run on your server. LDoms technology is open source technology, and is included at no additional cost.

A *logical domain* is a discrete, logical grouping with its own operating system, resources, and identity within a single computer system. Each logical domain can be created, destroyed, reconfigured, and rebooted independently, without requiring a power cycle of the server.

You can run a variety of applications software in different logical domains and keep them independent for performance and security purposes.

Each logical domain can be managed as an entirely independent machine with its own resources, such as:

- Kernel, patches, and tuning parameters
- User accounts and administrators

- Network interfaces, MAC addresses, and IP addresses

Each logical domain can interact only with those server resources made available to it, and the configuration is controlled using the Logical Domains Manager.

For more information on Logical Domains, refer to the *Logical Domains (LDoms) Administration Guide*.

Remote Manageability With ILOM

The Integrated Lights Out Manager (ILOM) feature is a service processor, built into the server, that enables you to remotely manage and administer the server. The ILOM software is preinstalled as firmware, and initializes as soon as you apply power to the system.

ILOM enables you to monitor and control your server over an Ethernet connection (supports SSH), or by using a dedicated serial port for connection to a terminal or terminal server. ILOM provides a command-line interface and a browser-based interface to remotely administer geographically distributed or physically inaccessible machines. In addition, ILOM enables you to run diagnostics (such as POST) remotely that would otherwise require physical proximity to the server's serial port.

You can configure ILOM to send email alerts of hardware failures and warnings, and other events related to the server. The ILOM circuitry runs independently of the server, using the server's standby power. Therefore, ILOM firmware and software continue to function when the server operating system goes offline or when the server is powered off. ILOM monitors the following Sun Netra T5440 server conditions:

- CPU temperature conditions
- Hard drive status
- Enclosure thermal conditions
- Fan speed and status
- Power supply status
- Voltage conditions
- Faults detected by POST (power-on self-test)
- Solaris Predictive Self-Healing (PSH) diagnostic facilities

In addition to the ILOM CLI and browser interface (BI), you can set up the server to use an ALOM CMT compatibility CLI. The ALOM CMT compatibility CLI provides commands that approximate the ALOM CMT CLI that is a system controller interfaced provided on some previous servers.

For information about configuring and using the ILOM service processor, refer to the latest *Integrated Lights Out Management (ILOM) User's Guide* and the *Sun Integrated Lights Out Manager 2.0 (ILOM 2.0) Supplement for the Sun Netra T5440 Server*.

High Levels of System Reliability, Availability, and Serviceability

Reliability, availability, and serviceability (RAS) are aspects of a system's design that affect its ability to operate continuously and to minimize the time necessary to service the system. Reliability refers to a system's ability to operate continuously without failures and to maintain data integrity. System availability refers to the ability of a system to recover to an operational state after a failure, with minimal impact. Serviceability relates to the time it takes to restore a system to service following a system failure. Together, reliability, availability, and serviceability features provide for near continuous system operation.

To deliver high levels of reliability, availability, and serviceability, the Sun Netra T5440 server offers the following features:

- Ability to disable individual threads and cores without rebooting
- Lower heat generation reduces hardware failures
- Hot-pluggable hard drives
- Redundant, hot-swappable power supplies (four)
- Redundant fan units (not hot-pluggable)
- Environmental monitoring
- Internal hardware drive mirroring (RAID 1)
- Error detection and correction for improved data integrity
- Easy access for most component replacements

Hot-Pluggable and Hot-Swappable Components

Sun Netra T5440 server hardware is designed to support hot-plugging of the chassis-mounted hard drives and power supplies. By using the proper software commands, you can install or remove these components while the system is running. Hot-swap and hot-plug technology significantly increases the system's serviceability and availability by providing the ability to replace hard drives, fan units, and power supplies without service disruption.

Environmental Monitoring

The Sun Netra T5440 server features an environmental monitoring subsystem that protects the server and its components against:

- Extreme temperatures
- Lack of adequate airflow through the system
- Power supply failures
- Hardware faults

Temperature sensors are located throughout the system to monitor the ambient temperature of the system and internal components. The software and hardware ensure that the temperatures within the enclosure do not exceed predetermined safe operating ranges. If the temperature observed by a sensor falls below a low-temperature threshold or rises above a high-temperature threshold, the monitoring subsystem software lights the amber Service Required LEDs on the front and back panel. If the temperature condition persists and reaches a critical threshold, the system initiates a graceful system shutdown. In the event of a failure of the system controller, backup sensors protect the system from serious damage, by initiating a forced hardware shutdown. Required LEDs remain lit after an automatic system shutdown to aid in problem diagnosis.

The power subsystem is monitored in a similar fashion by monitoring power supplies and reporting any fault in the front and rear panel LEDs.

Support for RAID Storage Configurations

You can set up hardware RAID 1 (mirroring) and hardware RAID 0 (striping) configurations for any pair of internal hard drives, providing a high-performance solution for hard drive mirroring.

By attaching one or more external storage devices to the Sun Netra T5440 server, you can use a redundant array of independent drives (RAID) software application such as Solstice DiskSuite™ or VERITAS Volume Manager to configure system drive storage in a variety of different RAID levels. Software RAID applications such as VERITAS Volume Manager are not included with this server. You must obtain and license them separately.

Error Correction and Parity Checking

The UltraSPARC T2 Plus multicore processor provides parity protection on its internal cache memories, including tag parity and data parity on the D-cache and I-cache. The internal L2 cache has parity protection on the tags, and ECC protection on the data.

Advanced ECC corrects up to 4 bits in error on nibble boundaries, as long as the bits are all in the same DRAM. If a DRAM fails, the DIMM continues to function.

Fault Management and Predictive Self Healing

The Sun Netra T5440 server provides the latest fault management technologies. The Solaris 10 OS architecture provides a means for building and deploying systems and services capable of *Predictive Self-healing*. Self-healing technology enables systems to accurately predict component failures and mitigate many serious problems before they actually occur. This technology is incorporated into both the hardware and software of the Sun Netra T5440 server.

At the heart of the predictive self-healing capabilities is the Solaris Fault Manager, a new service that receives data relating to hardware and software errors, and automatically and silently diagnoses the underlying problem. Once a problem is diagnosed, a set of agents automatically responds by logging the event, and if necessary, takes the faulty component offline. By automatically diagnosing problems, business-critical applications and essential system services can continue uninterrupted in the event of software failures, or major hardware component failures.

Rackmountable Enclosure

The Sun Netra T5440 server uses a space-saving, 4U-high, rackmountable enclosure that can be installed into a variety of industry standard racks.

CHAPTER 2

Preparing for Installation

This chapter provides background information about the server installation procedures.

This chapter contains these topics:

Power Redundancy and Requirements

The Sun Netra T5440 server provides four hot-swappable power supplies in a 2+2 redundant configuration. The system will continue operating under the following fault conditions:

1. A power source failure which removes input power from one or two power supplies.
2. Failure of one or two power supplies.
3. Service actions which require removal of one or two power supplies.

The Sun Netra T5440 server may be operated on two, three, or four power supplies depending on the ambient temperature conditions.

Failure to adhere to the following guidelines could result in a temporary system shut down due to activation of over temperature protection in the power supplies.

- At room ambient temperatures of 30° C or less, the system may be operated continuously with two or more power supplies functioning.
- At room ambient temperatures between 30° C and 45° C, the system may be operated continuously with three or four power supplies functioning.
- At room ambient temperatures between 30° C and 45° C, the system may be operated for up to five minutes with two power supplies functioning.
- At room ambient temperatures above 45° C, all four power supplies must be functioning.

Changing Sun Netra Rack Servers from AC to DC Input or From DC to AC Input

Safety agency requirements prohibit Sun Microsystems from changing a product from AC input to DC input or from DC input to AC input after the product has been removed from the agency approved manufacturing site.

Additional Power System Information

- The total input power for the system is divided equally among the power supplies in operation.
- Reversing the positive and negative inputs to the power supplies of a DC input system will not cause damage. However, the power supplies with reversed input will not operate.
- The inputs to a power supply are isolated from the system chassis and the other power supply inputs.
- The AC or DC power inputs may be at different voltages within the acceptable range and may have different offset voltages relative to the system chassis.

Tools and Equipment Needed

To install the system, you must have the following tools:

- No. 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
- Workstation
- Terminal server
- Patch panel connected to a terminal server

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 cartons 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.

- Server chassis
- 19-inch, 4-post hardmount rack kit
- Package of mounting screws and nuts in assorted sizes to fit various types of racks and cabinets
- Wago Type 831-3203 connectors kit for use with DC PSUs
- M5 nuts for use with chassis grounding studs
- Any optional components that were ordered with the 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 PCI cards, these will be shipped separately. If possible, install these components prior to installing the server in a rack.

Note – There is a 25 Watt maximum load for PCI Slots 0-3, and a 15 Watt maximum load for PCI (or XAUI) Slots 4-9.

If you ordered any options that are not factory-installed, see the *Sun Netra T5440 Server Service Manual* for installation instructions.

Note – The list of optional components can be updated without notice. See the product web pages for the most current list of components supported in the server. (http://www.sun.com/products-n-solutions/hw/networking/)

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 servers.

Caution – To protect electronic components from electrostatic damage, which can permanently disable the system or require repair by 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 that 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 23.
2. Gather configuration information for your system. See your system administrator for specific details, including these parameters:
   - Netmask
   - IP address for the service processor
   - Gateway IP address
3. Install any optional 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 24.
4. Mount the server into a rack or cabinet. See Chapter 3 for 4-post and 2-post racks.

Note – In the rest of this guide, 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 77.

Caution – The serial terminal or a terminal emulator should be connected before you connect the power cables. As soon as power is connected to the system, the service processor immediately powers on and runs diagnostics. Diagnostic test failures will be printed on the serial terminal. For more information, refer to the *Integrated Lights Out Manager 2.0 (ILOM 2.0) Supplement for the Sun Netra T5440 Server*.

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6. Connect the data cables to the server, but do not connect the power cable yet. See "Connecting the Server Cables" on page 66.
7. Connect the power cable to the server and examine the display for any error messages. See "Powering On the System for the First Time" on page 77.

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

Note – The service processor runs on the 3.3V standby voltage. As soon as AC/DC power is connected to the system, the service processor immediately powers on, runs diagnostics, and initializes the ILOM firmware.

---

8. After the service processor boots, access the ILOM command-line interface (CLI) through the serial management port. See "Logging In To the Service Processor" on page 82.

9. Configure the service processor network addresses. See "Configuring the Service Processor Network Management Port" on page 84.

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

---

10. Commit the changes to the service processor network parameters. See Step 7 in "Powering On the System for the First Time" on page 77.

11. Power on the server from a keyboard using the ILOM software. See "Powering On the System for the First Time" on page 77.

12. Configure the Solaris OS. See "Booting the Solaris Operating System" on page 93.

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

13. Install any required patches to the server.

    Refer to the *Sun Netra T5440 Server Product Notes* for a list of 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.

Safety Precautions

Caution – Deploy the antitilt bar on the equipment rack before beginning an installation.

Caution – The Sun Neta T5440 server weighs approximately 80 lb (36.14 kg). Two people are required to lift and mount this 2U server into a rack enclosure when using the procedures in this document.

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

CHAPTER 3

Installing a Sun Netra T5440 Server Into a Rack

This chapter provides instructions for installing the Sun Netra T5440 server into a 4-post or 2-post rack. Topics include:

Note – The 19-inch 4-post hardmount rack kit is included in the standard configuration of the Sun Netra T5440 server.

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

Caution – The server is heavy. Two people are required to lift and mount the server into a rack enclosure when following the procedures in this chapter.

Rackmounting Options

The Sun Netra T5440 server ships with a 19-inch, 4-post hardmount rack kit (see "Hardmounting the Server in a 19-Inch 4-Post Rack" on page 30 for installation instructions). The following lists the four additional rackmount kit options that can be ordered from Sun. This chapter provides installation instructions for all of these rackmount kit options.

Hardmounting the Server in a 19-Inch 4-Post Rack

The hardmount rack kit for a 19-inch 4-post rack consists of:

- Two hardmount brackets
- Two rear mount support brackets
- Two rear mount flanges
- Two bags of screws

FIGURE 3-1 Contents of the Hardmount 19-Inch 4-Post Kit

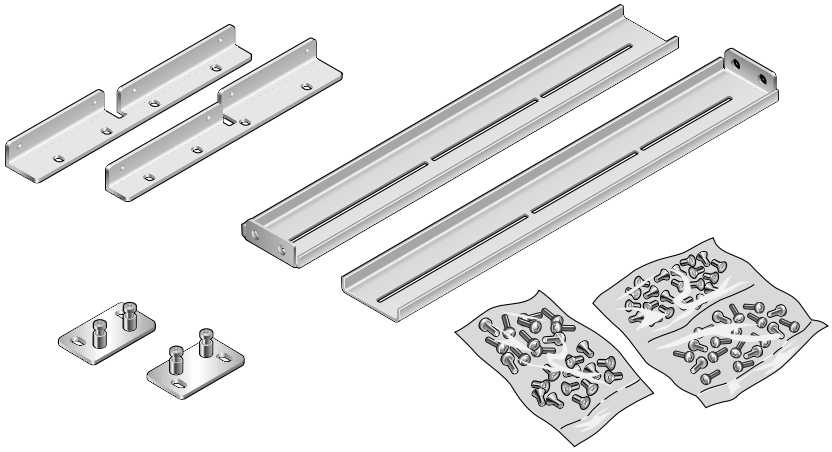


Figure Legend

1	Side brackets	**3**	Rear plates
2	Screws	**4**	Rail guides

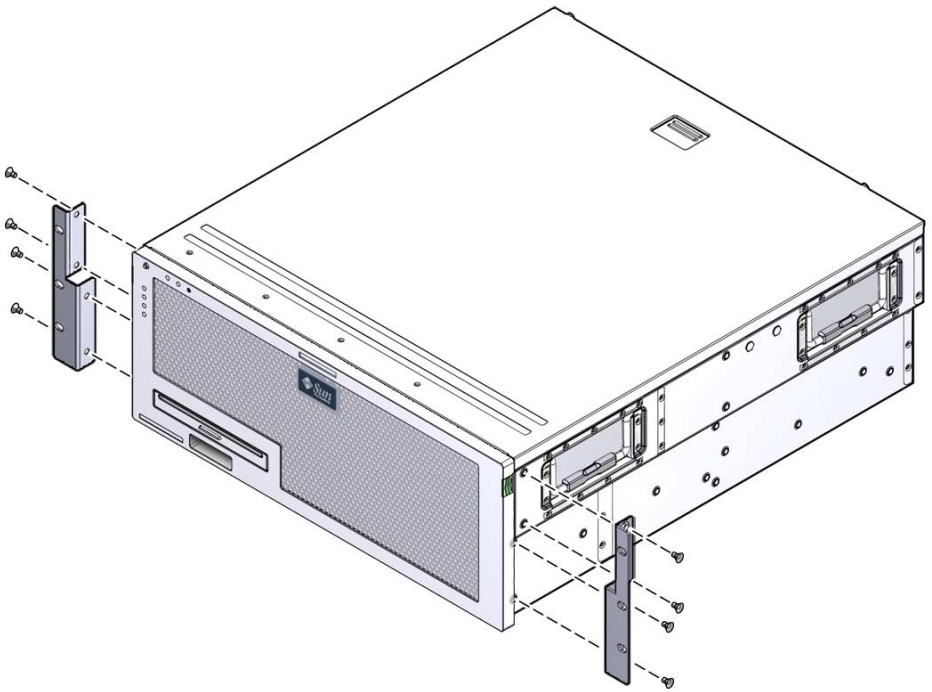
TABLE 3-1 19-inch 4-Post Rackmount Screw Kit Contents

Number	Description	Where Used
8	M5 x 8 mm Phillips flathead screws	8 for hardmount brackets
6	M5 x 8 mm Phillips panhead screws	4-6 for rear mount brackets (depending on rack depth)
12	M5 x 12 mm screws	12 for rack, if appropriate
12	M6 x 12 mm screws	12 for rack, if appropriate
12	M6 square clip nuts	12 for rack, if appropriate
12	10-32 x 0.5 in. combo head screws	12 for rack, if appropriate
12	12-24 x 0.5 in. combo head screws	12 for rack, if appropriate

▼ To Hardmount in a 19-Inch 4-Post Rack

1. **Get the front hardmount brackets from the rack kit (**FIGURE 3-1**).**
2. **Using eight of the supplied M5 x 8 mm flathead Phillips screws (four screws for each bracket), secure the front hardmount brackets to the sides of the server (**FIGURE 3-2**).**

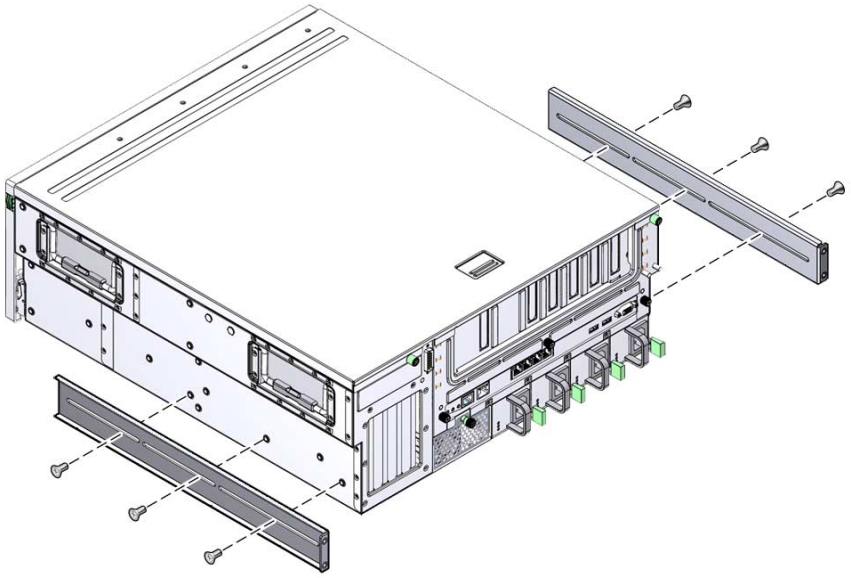
FIGURE 3-2 Securing the Hardmount Brackets to the Server



3. **Measure the depth of the rack.**
4. **Get the two rear mount support brackets from the rack kit.**
5. **Install the rear mount support brackets at the rear of the server, extending the rear mount support brackets to the measured depth of the rack.**

   Use two to three of the supplied M5 x 8 mm panhead Phillips screws for each bracket, depending on the rack depth. If your rack is especially deep, you might only be able to secure the rear mount support brackets using two screws per side.

FIGURE 3-3 Attaching the Rear Mount Support Brackets



6. **Lift the server to the desired location in the rack.**

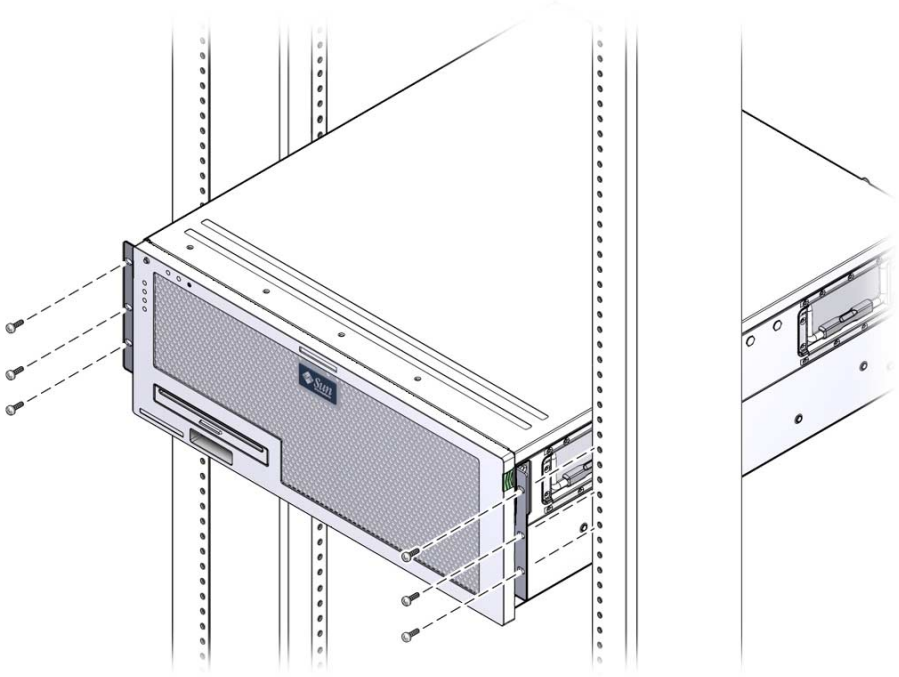
Tip – It is strongly suggested to use a mechanical lift for your safety and safe-handling of the server.

---

7. **Using three screws per side, secure the front hardmount brackets attached to the sides of the server to the front of the rack.**

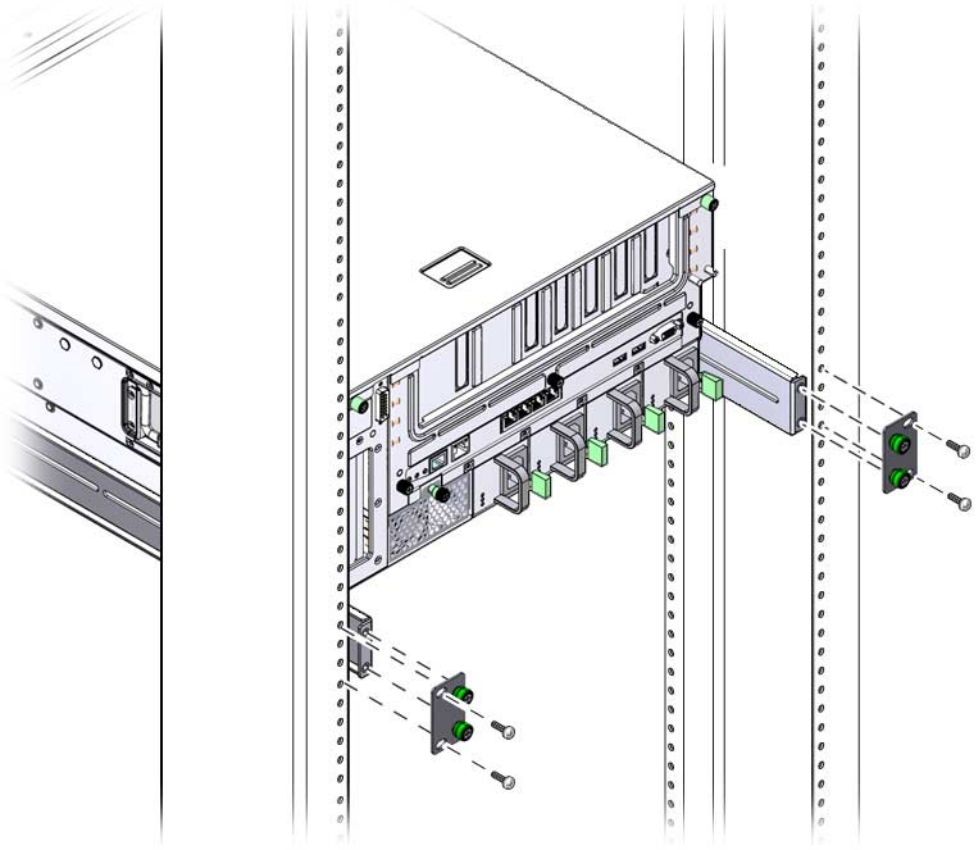
   The size of the screws varies, depending on your particular rack.

FIGURE 3-4 Securing the Front of the Server to the Rack



8. **Get the two rear mount flanges from the rack kit.**
9. **At the rear of the rack, use the two captive screws to secure the two rear mount flanges to the rear mount support brackets that are attached to the server.**

FIGURE 3-5 Securing the Rear of the Server to the Rack



10. **Using two screws for each rear mount support bracket, secure the rear mount support brackets to the rear of the rack.**

    The size of the screws vary, depending on your particular rack.

Mounting the Server in a Sliding Rail 19-Inch 4-Post Rack

The sliding rail mount kit for a 19-inch 4-post rack consists of:

- Two 19-inch 4-post Telco slide assemblies

- Two short brackets
- Two long brackets
- Two long bracket extenders
- Two hardmount front brackets
- Bag of screws

FIGURE 3-6 Contents of the Sliding Rail 19-Inch 4-Post Kit

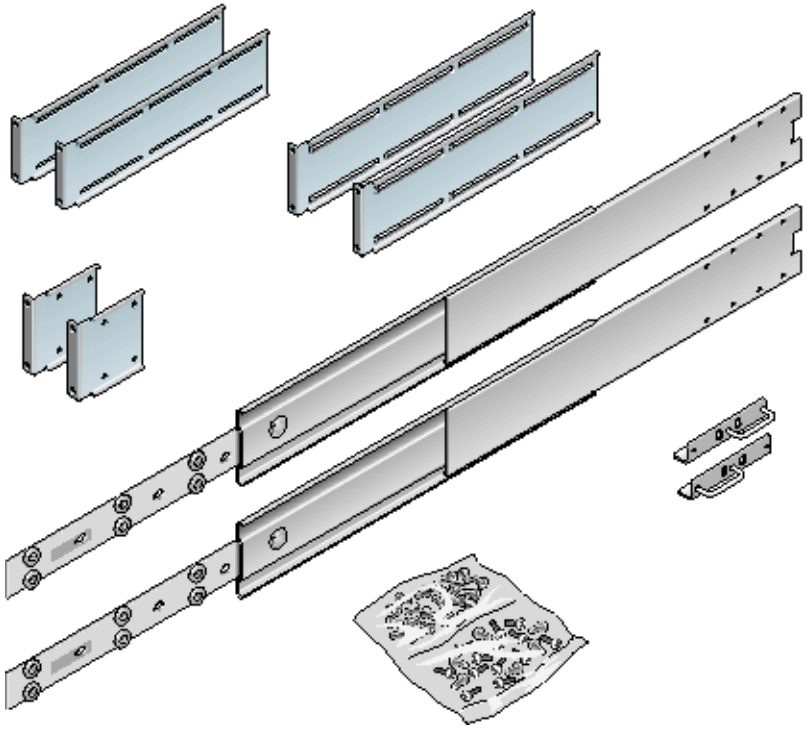


TABLE 3-2 Sliding Rail 19-inch 4-Post Rackmount Screw Kit Contents

Number	Description	Where Used
4	M5 x 8 mm Phillips flathead screws	4 for hardmount front brackets
8	Shoulder screws	8 for glides
10	M6 brass collar screws	4 for short brackets, 4 for long brackets, 2 extra
8	M5 panhead screws	8 for slides
12	M5 x 12 mm screws	20 for rack, if appropriate
12	M6 x 12 mm screws	12 for rack, if appropriate

TABLE 3-2 Sliding Rail 19-inch 4-Post Rackmount Screw Kit Contents *(Continued)*

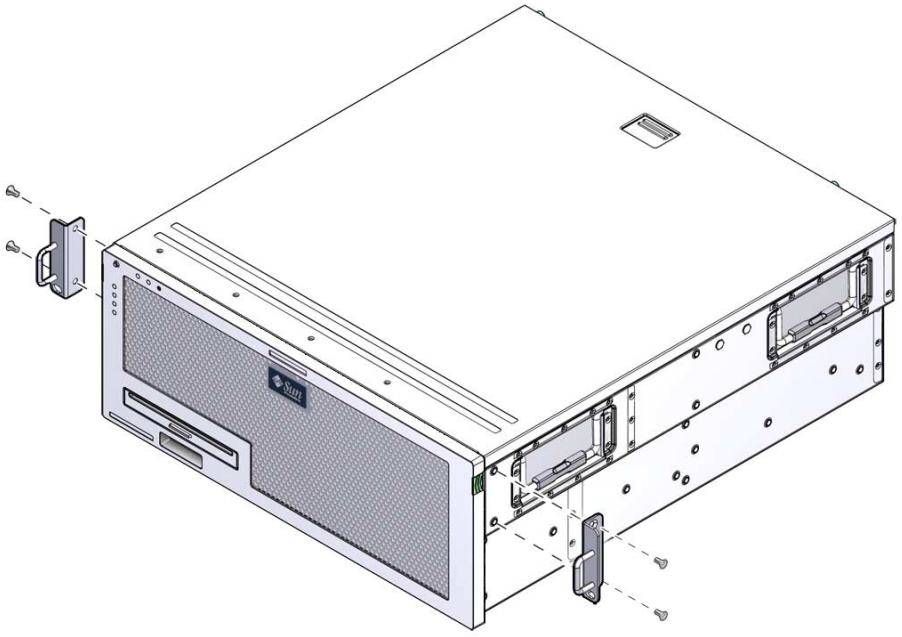
Number	Description	Where Used
12	M6 square clip nuts	12 for rack, if appropriate
12	10-32 x 0.5 in. combo head screws	12 for rack, if appropriate
12	12-24 x 0.5 in. combo head screws	12 for rack, if appropriate

Note – The front-to-back rail spacing must be at least 755.7 mm (29.75 inches) and not more than 755.7 mm (29.75 inches) from the outside face of the front rail to the outside face of the back rail. If the spacing exceeds the maximum measurement, install the rail extenders as described in "To Install the Long Bracket Extenders" on page 45 .

▼ Mounting the Server in a 19-Inch 4-Post Rack With Sliding Rails

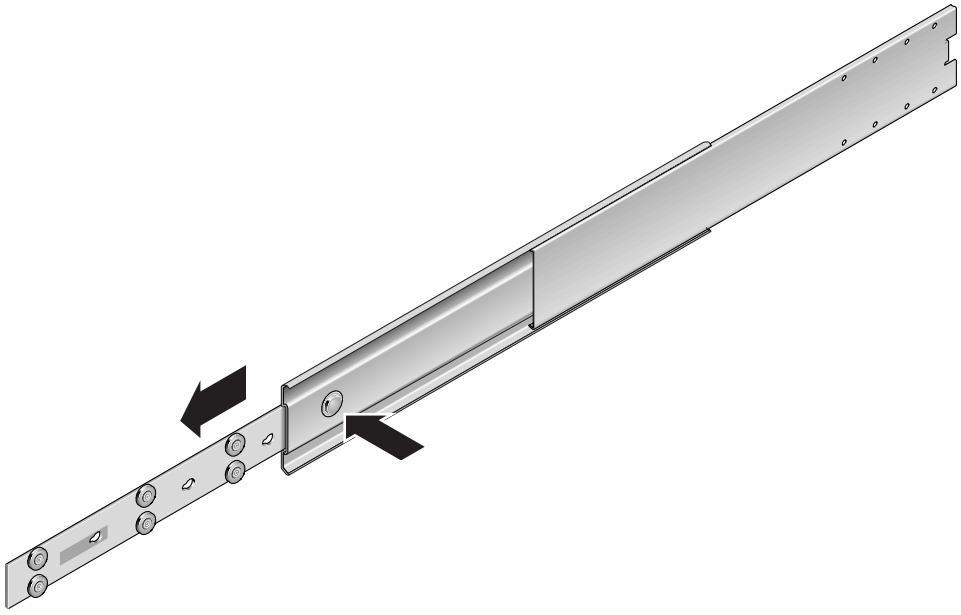
1. **Get the hardmount brackets and M5 x 8 mm flathead Phillips screws from the rack kit (**FIGURE 3-6**).**
2. **Using four of the supplied M5 x 8 mm flathead Phillips screws (two screws for each bracket), secure the hardmount brackets to the sides of the server (**FIGURE 3-7**).**

FIGURE 3-7 Securing the Hardmount Bracket to the Server



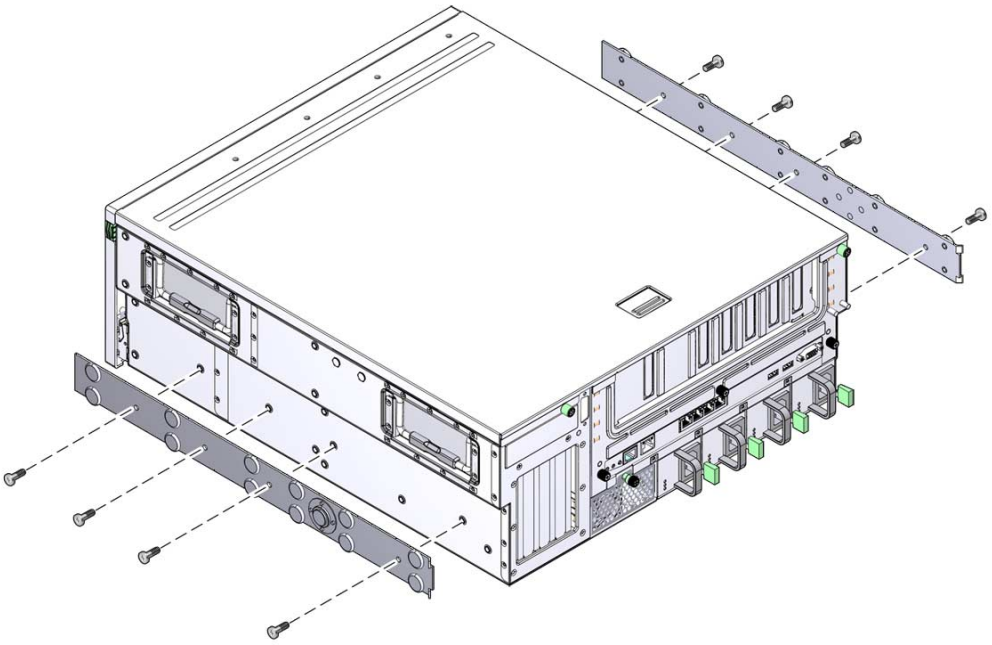
3. **Get the Telco slide assemblies from the rack kit (**FIGURE 3-6**).**
4. **Press in the button on each slide and pull the glide completely out of the slide (**FIGURE 3-8**).**

FIGURE 3-8 Dismantling the Slide



5. **Align the holes in the glides with the appropriate holes on the sides of the server and, using the eight screws from the ship kit (four screws for each side), secure the glides to the sides of the server (**FIGURE 3-9**).**

FIGURE 3-9 Securing the Guides to the System Chassis

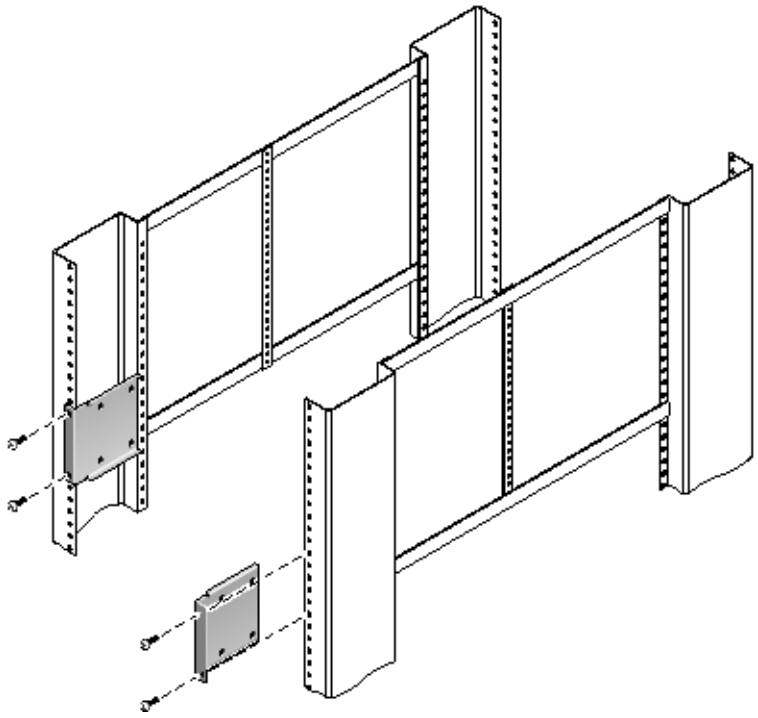


6. **Get the short brackets and long brackets from the rackmount kit (**FIGURE 3-6**).**

7. **Lift each short bracket to the desired position at the front of the rack and attach a short bracket to each of the front rack uprights (**FIGURE 3-10**).**

   Use two of the brass M6 collar screws and M6 cage nuts (if required) to secure each bracket.

FIGURE 3-10 Securing the Short Brackets to the Front of the Rack

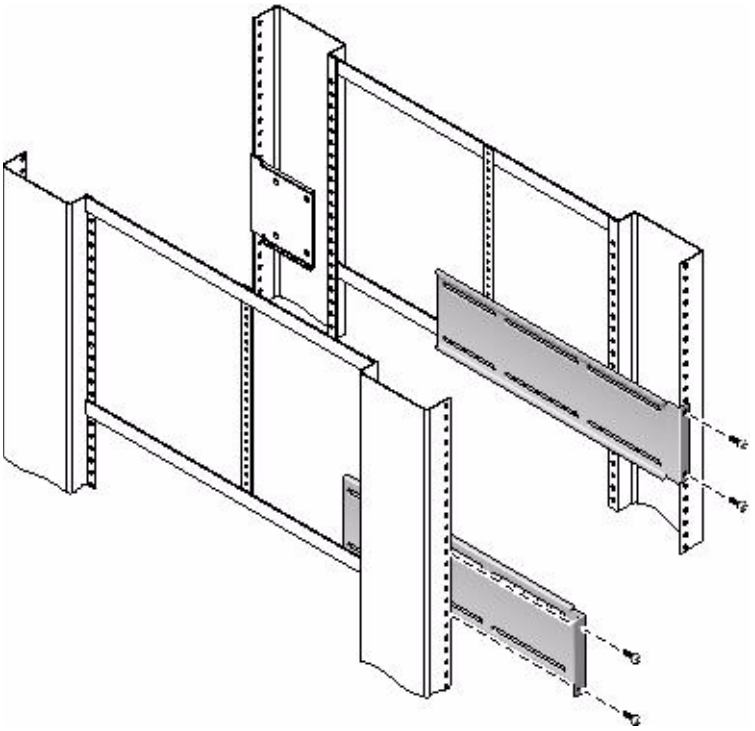


8. **Lift each long bracket to the desired position at the rear of the rack and attach a long bracket to each of the rear rack uprights (**FIGURE 3-11**).**

   To secure each bracket, use two of the brass M6 collar screws and M6 cage nuts (if required), exactly as you did for the front rack uprights in the previous step.

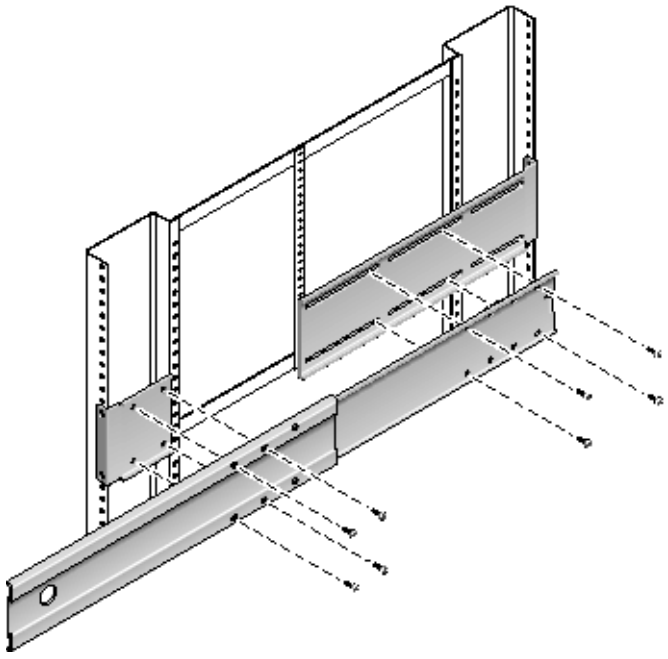
Note – If the dimension is greater than 755.7 mm, attach the rail extenders to the long brackets as described in "To Install the Long Bracket Extenders" on page 45.

FIGURE 3-11 Securing the Long Brackets to the Rear of the Rack



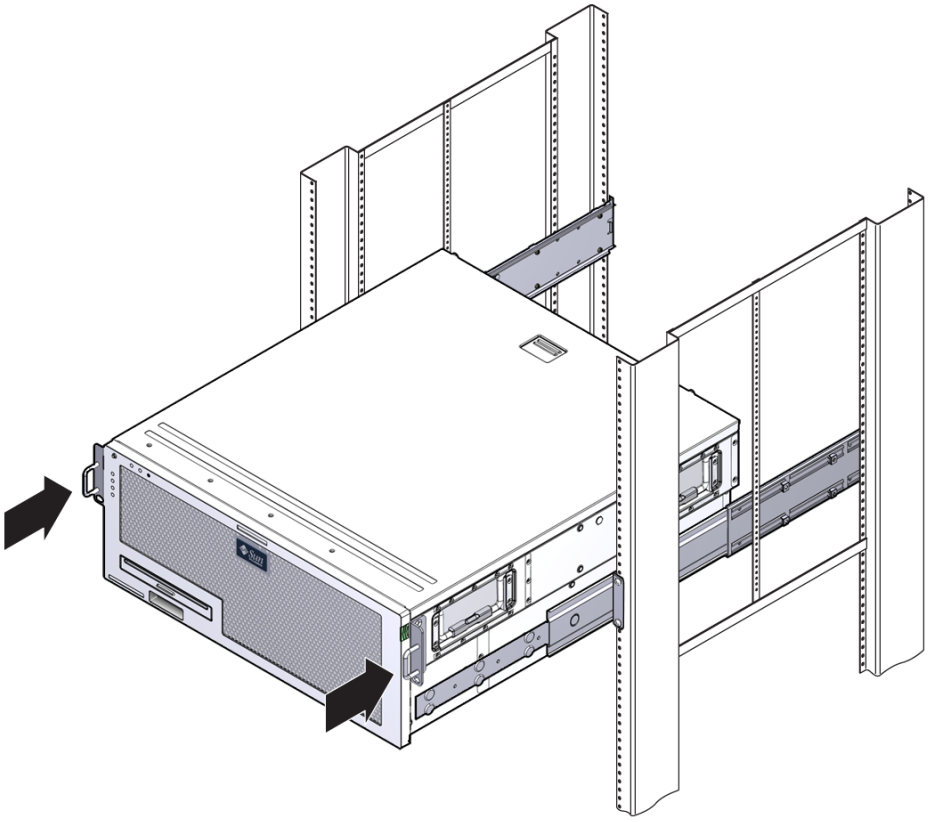
9. **Extend a slide to line up the access holes with the front screw holes.**
10. **Using the M5 panhead screws (four for the short bracket and four for the long bracket), secure the slide onto the short and long brackets at the front and rear of the rack (**FIGURE 3-12**).**

FIGURE 3-12 Securing the Slide to the Brackets



11. **Repeat Step 9 and Step 10 for the slide on the other side of the rack.**
12. **Push the slides completely into the assembly on each side of the rack and release the stop catches.**
13. **Align the glides attached to the system with the slide assemblies in the rack.**
14. **You might find that there is too much or too little room between the two slides mounted in the rack. The glides attached to the system also might not align correctly with the slides in the rack. If either situation occurs, loosen the M6 collar screws and cage nuts on the long and short brackets (Step 7 and Step 8), move them inward or outward to the appropriate points, then tighten the servers again.**
15. **Push in the slide buttons and slide the system all the way into the rack enclosure (**FIGURE 3-13**).**

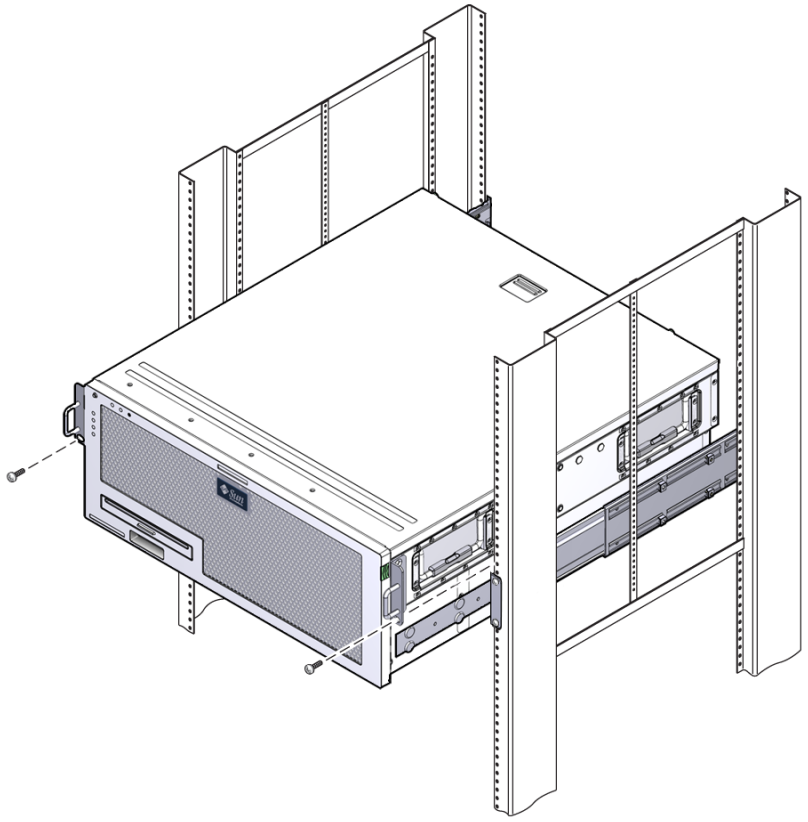
FIGURE 3-13 Sliding the System Into the Rack



16. **Using one screw per side, secure the front of the hardmount brackets that are attached to the sides of the server to the front of the rack (**FIGURE 3-14**).**

    The size of the screws varies, depending on your particular rack.

FIGURE 3-14 Securing the Front of the Server to the Rack



▼ To Install the Long Bracket Extenders

Use this procedure to attach the long bracket extenders to the long brackets and slide assemblies. See for mounting details when using this procedure.

Note – If the long brackets are already attached to the slide assembly, you might have to remove the long brackets and reinstall them using this procedure.

---

1. **Locate the long bracket extenders.**

   The extenders are shorter than the long brackets and do not have clip nuts attached.

2. **Place an extender and slide assembly inside a long bracket.**

3. **Install two M5 panhead screws through the rear set of holes in the slide assembly and into the front clip nuts in the center slots of the long bracket.**

   Tighten the screws.

4. **Install two M5 panhead screws through one of the front set of holes in the slide assembly and into the matching clip nuts in the long bracket.**

   Tighten the screws.

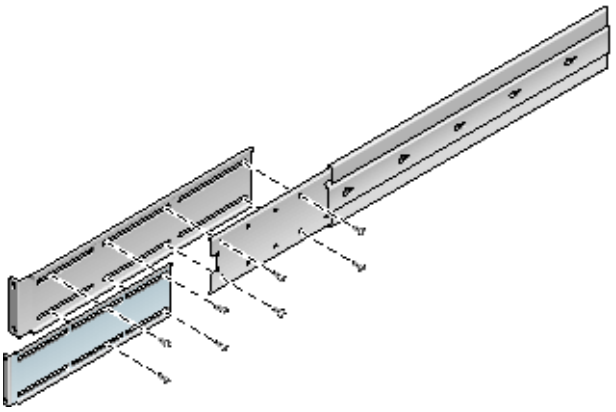
5. **Install two M5 panhead screw through the front slots of the bracket extender and into the rear clip nuts in the center slots of the long bracket.**

   Hand tighten the screws.

6. **Install the two M5 panhead screws through the center slot of the bracket extender and into the matching clip nuts on the long bracket.**

   Hand tighten the screws.

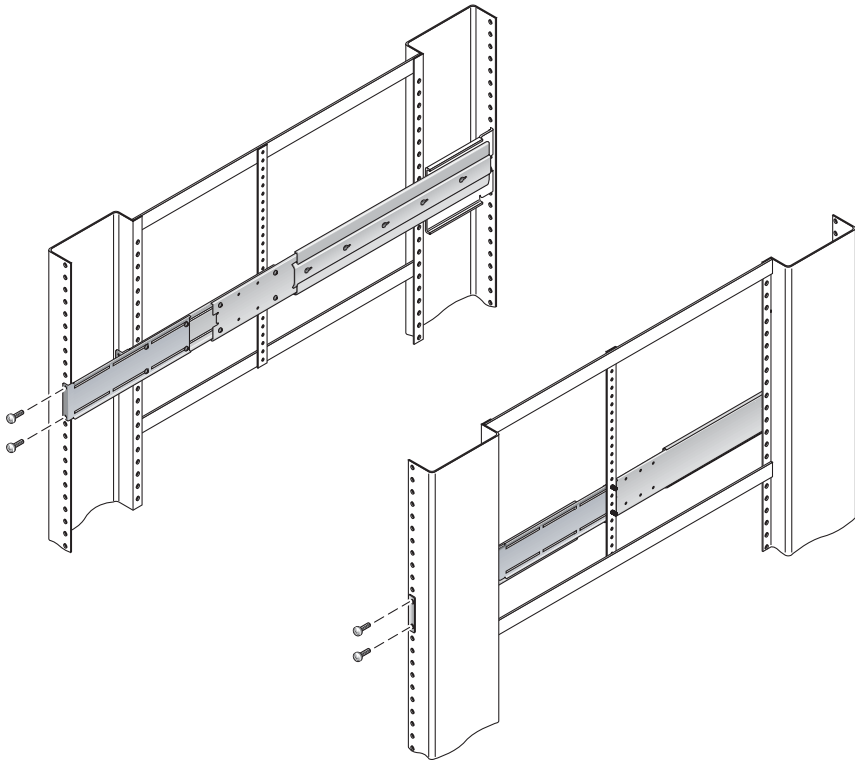
FIGURE 3-15 Installing Extender and Slide Assembly on Long Bracket



7. **Secure the extender brackets and slide assemblies in the rack as shown in (**FIGURE 3-16**).**

   Adjust the rails to the proper length, tighten the screws on the extenders, and install four M6 collar screws (two in front bracket and two in the rear bracket) for each sliding rail assembly.

FIGURE 3-16 Securing the Long Bracket Extenders and Slide Assembly to Rack



Hardmounting the Server in a 600 mm 4-Post Rack

The hardmount kit for a 600 mm 4-post rack consists of:

- Two rear mount flanges
- Two front adjuster brackets
- One bag of screws

You will also need the two hardmount brackets and two rear mount support brackets from the standard rackmount kit that came with the Sun Netra T5440 server server (FIGURE 3-17).

FIGURE 3-17 Contents of the Hardmount 600 mm 4-Post Kit

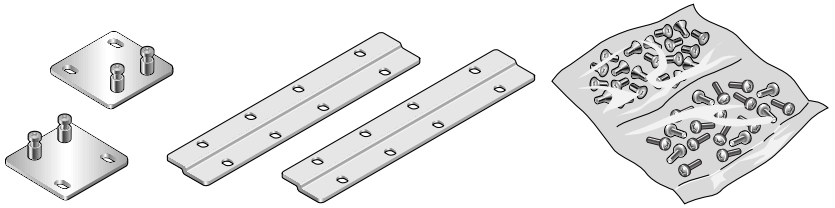


TABLE 3-3 Hardmount 600 mm 4-Post Rackmount Screw Kit Contents

Number	Description	Where Used
8	M5 x 8 mm Phillips flathead screws	8 for hardmount brackets
14	M5 x 8 mm Phillips panhead screws	8 for front adjuster brackets and 4-6 for rear mount brackets (depending on rack depth)
12	M5 x 12 mm screws	12 for rack, if appropriate
12	M6 x 12 mm screws	12 for rack, if appropriate
12	M6 square clip nuts	12 for rack, if appropriate
12	10-32 x 0.5 in. combo head screws	12 for rack, if appropriate
12	12-24 x 0.5 in. combo head screws	12 for rack, if appropriate

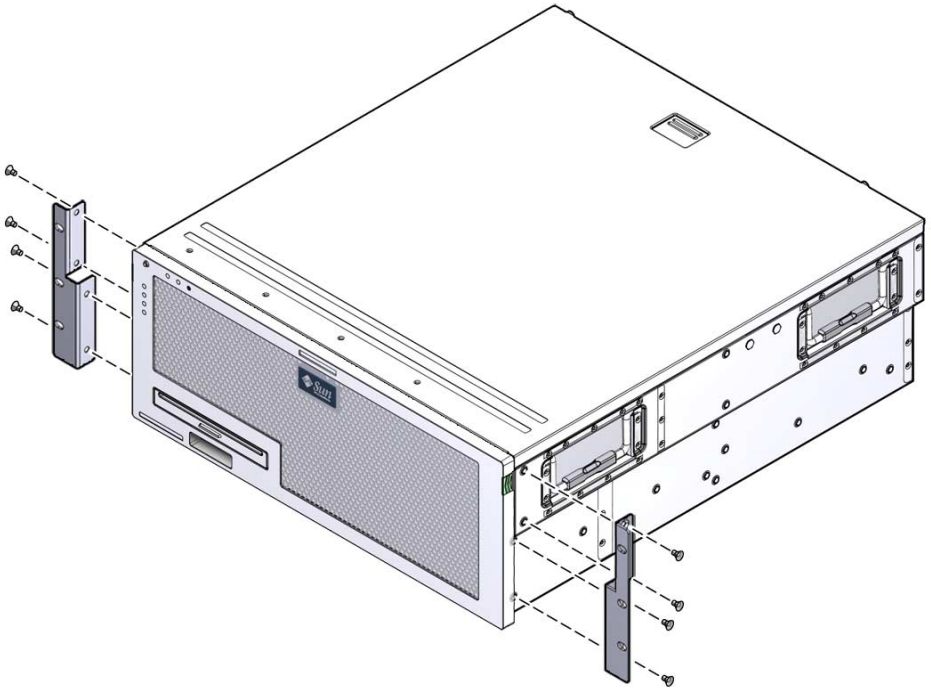
▼ To Hardmount the Server in a 600 mm 4-Post Rack

1. **Get the two front hardmount brackets from the standard rack kit (**FIGURE 3-17**).**

   These front hardmount brackets came as part of the standard Sun Netra T5440 server server ship kit, not as part of the 600 mm four-post rackmount ship kit.

2. **Using eight of the supplied M5 x 8 mm flathead Phillips screws (four screws for each bracket), secure the front hardmount brackets to the sides of the server (**FIGURE 3-18**).**

FIGURE 3-18 Securing the Hardmount Brackets to the Server



3. **Measure the depth of the rack.**

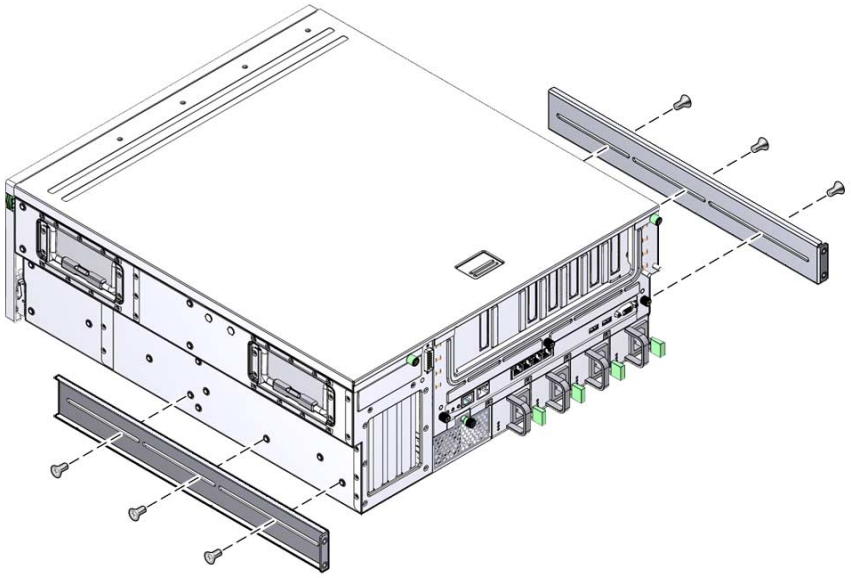
4. **Get the two rear mount support brackets from the standard rack kit (**FIGURE 3-17**).**

   These rear mount support brackets came as part of the standard Sun Netra T5440 server server ship kit, not as part of the 600 mm four-post rackmount ship kit.

5. **Install the rear mount support brackets at the rear of the server, extending the rear mount support brackets to the measured depth of the rack (**FIGURE 3-19**).**

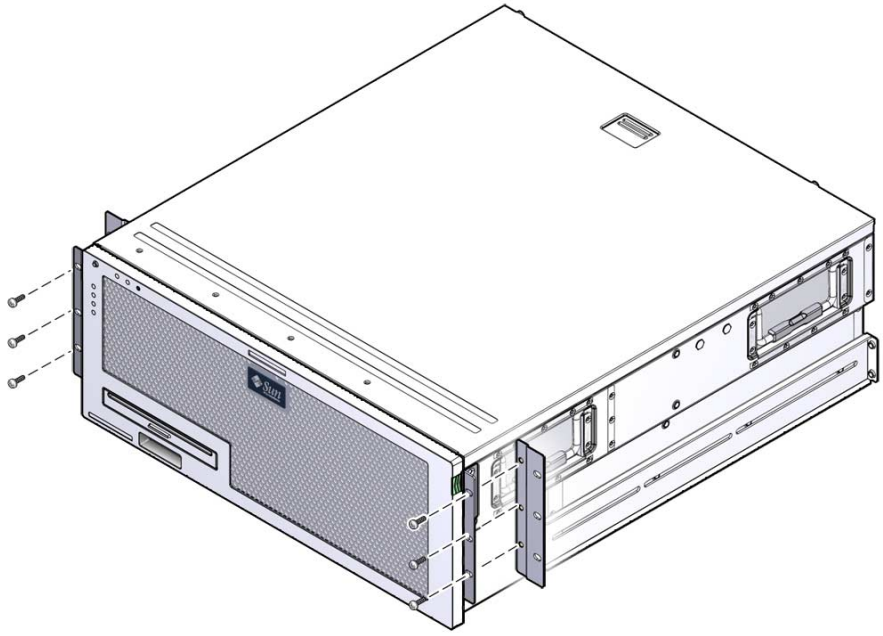
   Use two to three of the supplied M4 x 8 mm panhead Phillips screws for each bracket, depending on the rack depth. If your rack is especially deep, you may only be able to secure the rear mount support brackets using only two screws per side.

FIGURE 3-19 Attaching the Rear Mount Support Brackets



6. **Get the 600 mm front adjuster brackets from the rack kit.**
7. **Using eight of the supplied M5 x 8 mm panhead Phillips screws (four screws for each adjuster bracket), attach the front adjuster brackets to the front hardmount brackets.**

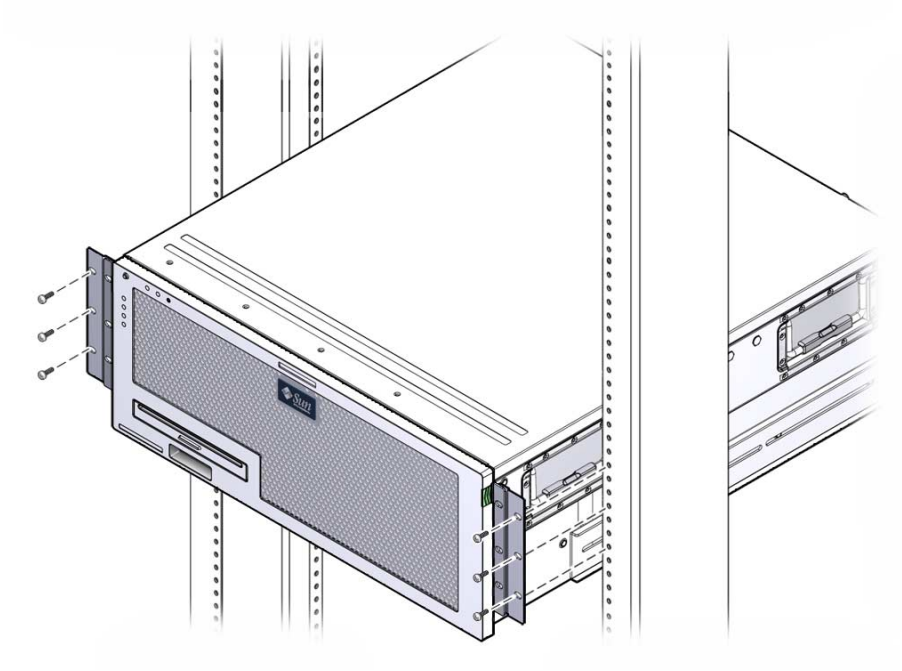
FIGURE 3-20 Attaching the Front Adjuster Brackets to the Front Hardmount Brackets



8. **Lift the server to the desired location in the rack.**
9. **Using three screws per side, secure the front adjuster brackets to the front of the rack.**

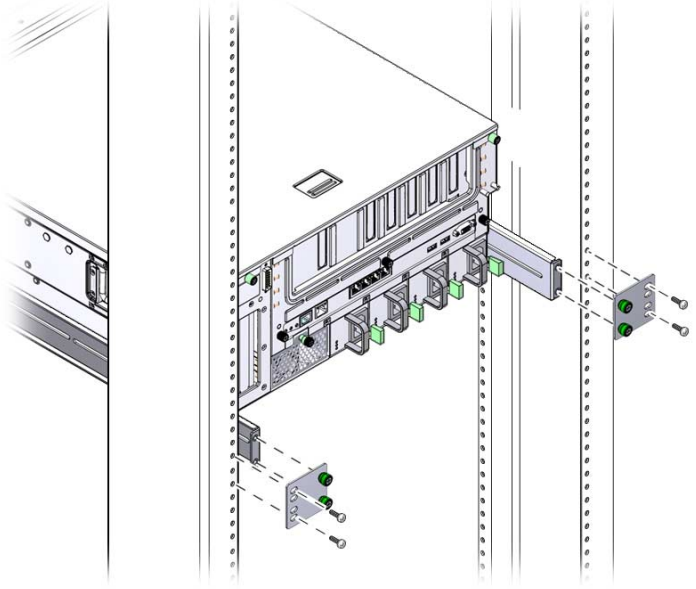
   The size of the screws varies, depending on your particular rack.

FIGURE 3-21 Attaching the Front Adjuster Brackets to the Rack



10. **Get the two rear mount flanges from the rack kit.**
11. **At the rear of the rack, use the captive screws to secure the two rear mount flanges to the rear mount support brackets that are attached to the server.**

FIGURE 3-22 Securing the Rear Mount Flange



12. **Using two screws for each rear mount support bracket, secure the rear mount support brackets to the rear of the rack.**

    The size of the screws vary, depending on your particular rack.

Hardmounting the Server in a 23-Inch 2-Post Rack

The hardmount kit for a 23-inch 2-post rack consists of:

- Two side brackets
- Bag of screws

FIGURE 3-23 Contents of the Hardmount 23-Inch 2-Post Kit

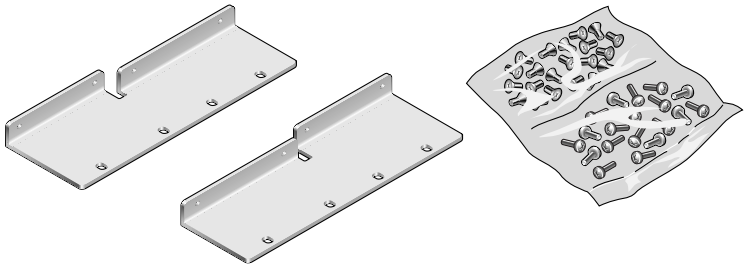


TABLE 3-4 Hardmount 23-Inch 2-Post Rackmount Screw Kit Contents

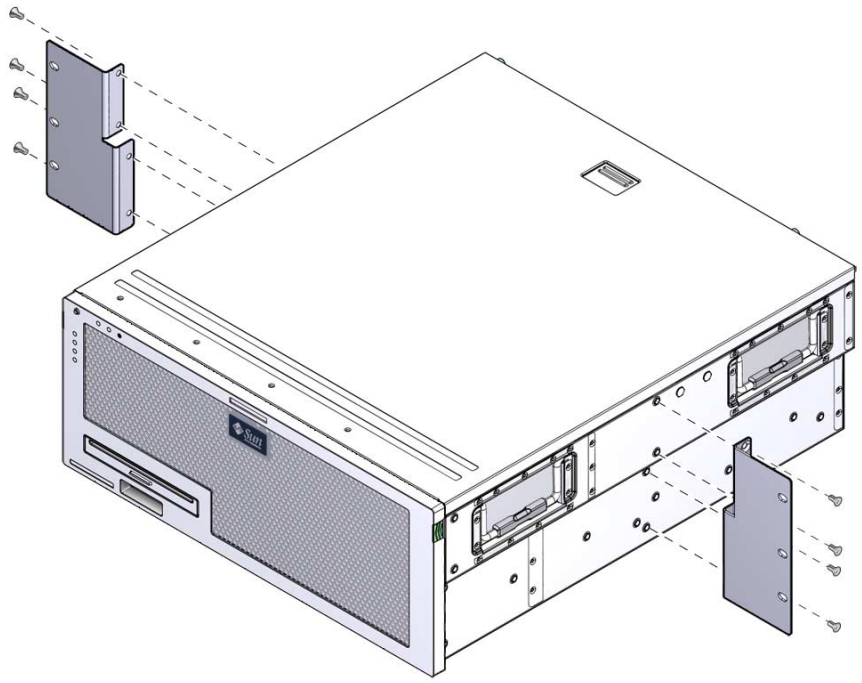
Number	Description	Where Used
8	M5 x 8 mm Phillips panhead screws	8 for side brackets
12	M5 x 12 mm screws	12 for rack, if appropriate
12	M6 x 12 mm screws	12 for rack, if appropriate
12	M6 square clip nuts	12 for rack, if appropriate
12	10-32 x 0.5 in. combo head screws	12 for rack, if appropriate
12	12-24 x 0.5 in. combo head screws	12 for rack, if appropriate

▼ To Hardmount the Server in a 23-Inch 2-Post Rack

1. **Get the side brackets from the rack kit (**FIGURE 3-23**).**
2. **Using eight of the M5 x 8 mm panhead Phillips screws (four for each side bracket), secure the side brackets to the sides of the server (**FIGURE 3-24**).**

Note – Using eight of the M5 x 8 mm panhead Phillips screws (four for each side bracket), secure the side brackets to the sides of the server.

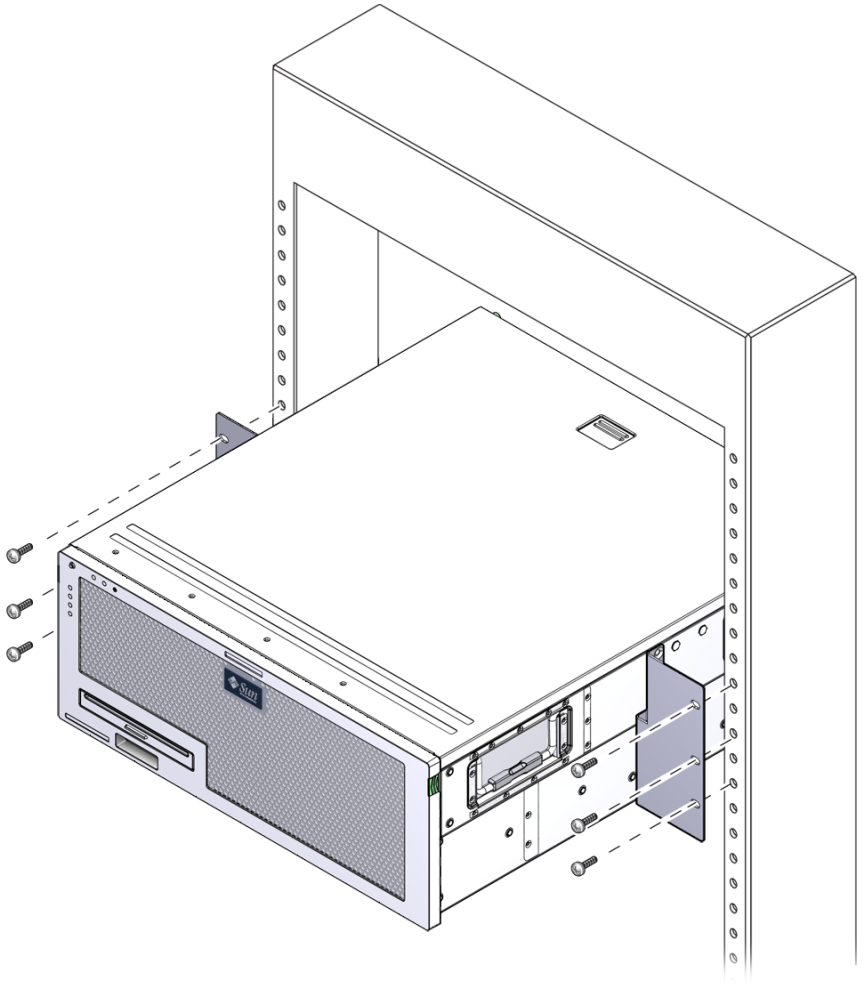
FIGURE 3-24 Securing the Slide Brackets to the Side of the Server



3. **Lift the server to the desired location in the rack.**
4. **Using three screws per side, secure the front hardmount brackets attached to the sides of the server to the front of the rack.**

   The size of the screws varies, depending on your particular rack.

FIGURE 3-25 Securing the Front of the Server to the Rack



Hardmounting the Server in a 19-Inch 2-Post Rack

The hardmount kit for a 19-inch 2-post rack consists of:

- Two hardmount brackets

- Two bags of screws
- Two rear mount support brackets (not used in this option)
- Two rear mount flanges (not used in this option)

FIGURE 3-26 Contents of the Hardmount 19-Inch 2-Post Kit

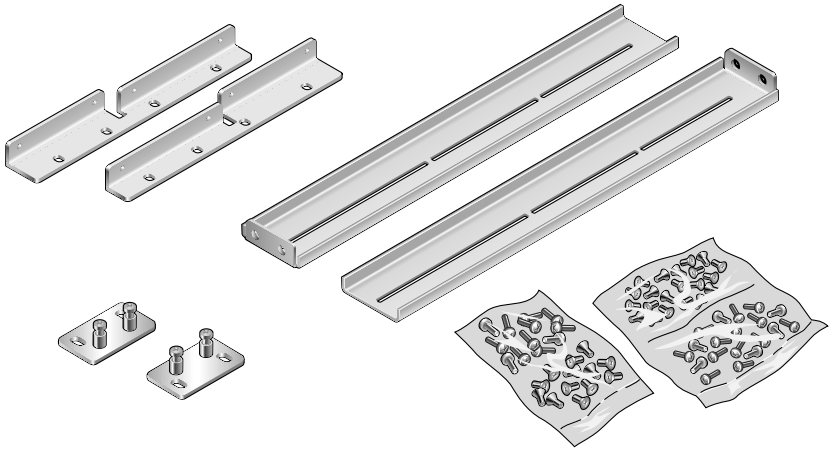


TABLE 3-5 19-inch 2-Post Rackmount Screw Kit Contents

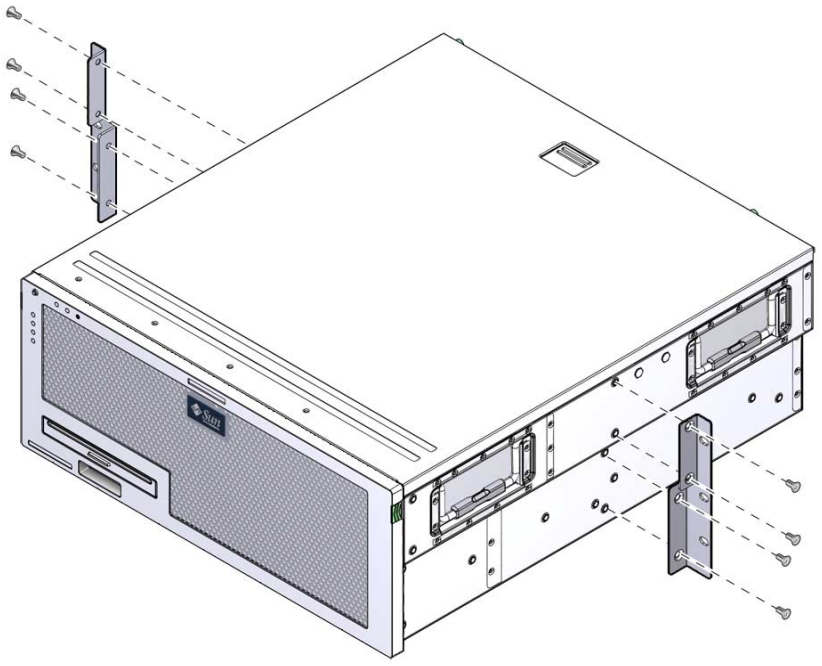
Number	Description	Where Used
8	M5 x 8 mm Phillips flathead screws	8 for hardmount brackets
6	M5 x 8 mm Phillips panhead screws	6 for rear mount brackets (not used in this option)
12	M5 x 12 mm screws	12 for rack, if appropriate
12	M6 x 12 mm screws	12 for rack, if appropriate
12	M6 square clip nuts	12 for rack, if appropriate
12	10-32 x 0.5 in. combo head screws	12 for rack, if appropriate
12	12-24 x 0.5 in. combo head screws	12 for rack, if appropriate

▼ To Hardmount the Server in a 19-Inch 2-Post Rack

1. **Get the side brackets from the rack kit (**FIGURE 3-26**).**
2. **Using eight of the M5 x 8 mm panhead Phillips screws (four for each side bracket), secure the side brackets to the sides of the server (**FIGURE 3-27**).**

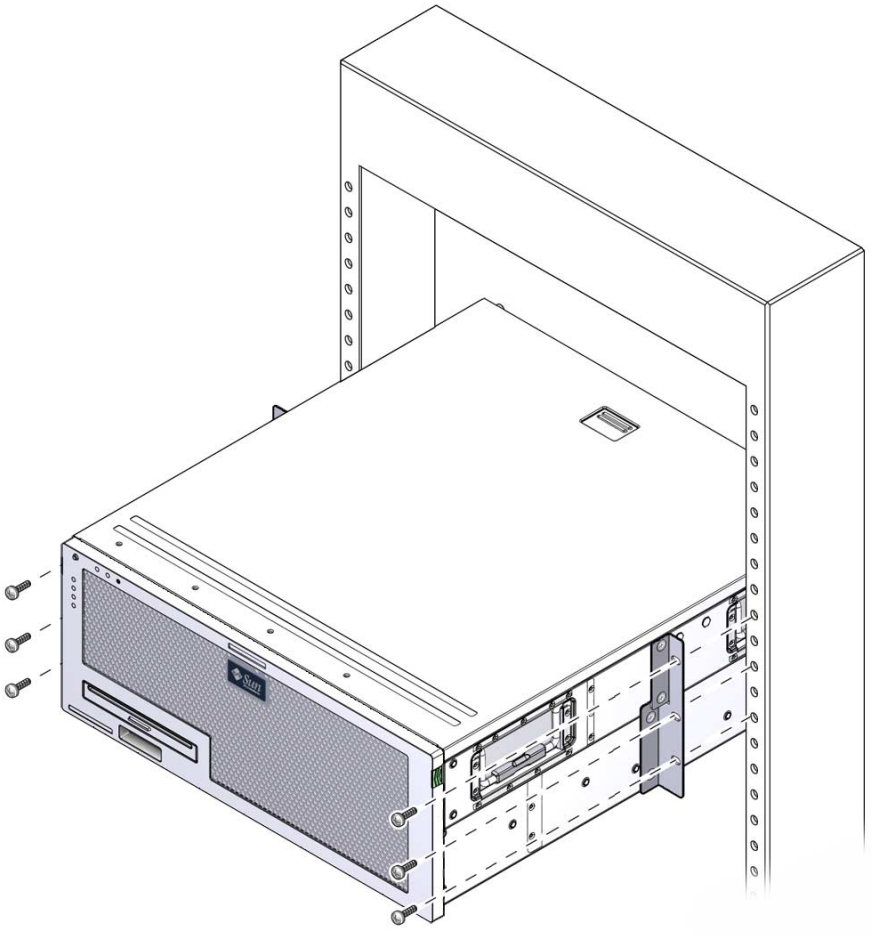
Note – The wide, flat side of the brackets are facing the rear of the server for this rackmount option, not the front.

FIGURE 3-27 Securing the Side Brackets to the Side of the Server



3. **Lift the server into the rack.**
4. **Using three screws for each bracket, secure the front of the server to the front of the rack.**

FIGURE 3-28 Installing and Securing the Server in the 2-Post Rack



CHAPTER 4

Cabling the Server

This chapter provides instructions for cabling the server. Topics include:

Note – Both AC and DC versions of the server must be installed in a restricted-access location.

Caution – The Sun Netra T5440 must not be directly connected to Outside Plant cables.

WARNING: The intra-building port(s) of the equipment or subassembly is suitable for connection to intrabuilding or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

Note – You must use an external Surge Protective Device (SPD) for the AC power input source of the server.

Cable Connections and Ports

The following list describes the server's cable connections and ports:

- Minimum cable connections for the server:
  - At least one system on-board Ethernet network connection (NET port)
  - The service processor serial management port (SER MGT port)
  - The service processor network management port (NET MGT port)
  - AC or DC power cables for the two system power supplies
- **Service processor management ports:** There are two serial management ports for use with the ILOM system controller.
  - **The service processor serial management port** (labeled SER MGT) uses an RJ-45 cable and is always available. This is the default connection to the ILOM system controller.
  - **The service processor network management port** (labeled NET MGT) is the optional connection to the ILOM system controller. This port is not available until you have configured network settings for the system controller (through the service processor serial management port). See "Enabling the Service Processor Network Management Port" on page 82. The service processor network management port uses an RJ-45 cable for a 10/100BASE-T connection. This port does not support connections to Gigabit networks.
- **Ethernet ports**: 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 4-1.

TABLE 4-1 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:** The TTYA serial port has a DB-9 connector, which is located at the lower right corner of the rear panel (FIGURE 4-1). A DB-9 to RJ-45 adapter cable is included in the shipping kit.
  - 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 service processor serial management port.
  - Use this serial port only for general purpose serial data transfers.

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

- **USB Ports:** Two Universal Serial Bus (USB) 2.0 ports labeled USB 0 and USB 1 are provided on the front panel (FIGURE 4-2), and two USB 2.0 ports (USB 3 and 4) are provided on the rear panel (FIGURE 4-1). USB ports support hot-plugging. You can connect and disconnect USB cables and peripheral devices while the server 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 OpenBoot PROM `ok` prompt is displayed or before the system has completed booting.
  - You can connect up to 126 devices to each of the four USB controllers, for a total of 504 USB devices per server.
- **Input AC/DC 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 ILOM system controller initializes as soon as the input power cables are connected to the power source. System messages might be lost if the server is not connected to a terminal, PC, or workstation at this time.

Connector Locations

FIGURE 4-1 shows the connectors on the rear panel of the Sun Netra T5440 server.

FIGURE 4-1 Rear Panel Cable Connectors, Features, and LEDs on the Rear Panel

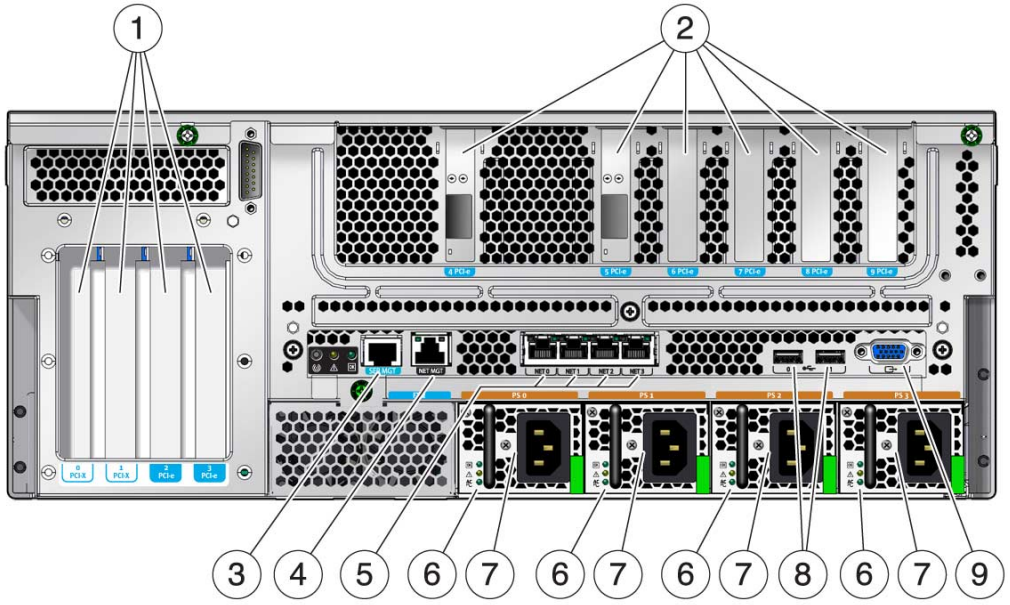


Figure Legend

1	PCI Slots 0-3: left to right: PCI-X Slot 0 (25 W maximum load), PCI-X Slot 1 (25 W maximum load), PCIe Slot 2 (25 W maximum load), PCIe Slot 3 (25 W maximum load)
2	PCI (or XAUI) Slots 4-9: left to right: PCIe or XAUI Slot 4 (15 W maximum load), PCIe or XAUI Slot 5 (15 W maximum load), PCIe Slot 6 (15 W maximum load), PCIe Slot 7 (15 W maximum load), PCIe Slot 8 (15 W maximum load), PCIe Slot 9 (15 W maximum load)
3	Service Processor Serial Management Port
4	Service Processor Network Management Port
5	Gigabit Ethernet ports left to right: NET0, NET1, NET2, NET3
6	Power supply 0 LEDs top to bottom: Output On LED (Green), Service Required LED (Yellow), Input Power OK LED (Green)
7	Power supplies (PSs): left to right: PS 0, PS 1, PS 2, PS 3
8	USB ports left to right: USB2, USB3
9	TTYA serial port

Status Indicator Locations

FIGURE 4-2 shows the status indicators on the front panel of the Sun Netra T5440 server.

FIGURE 4-2 Location of the Bezel Server Status and Alarm Status Indicators

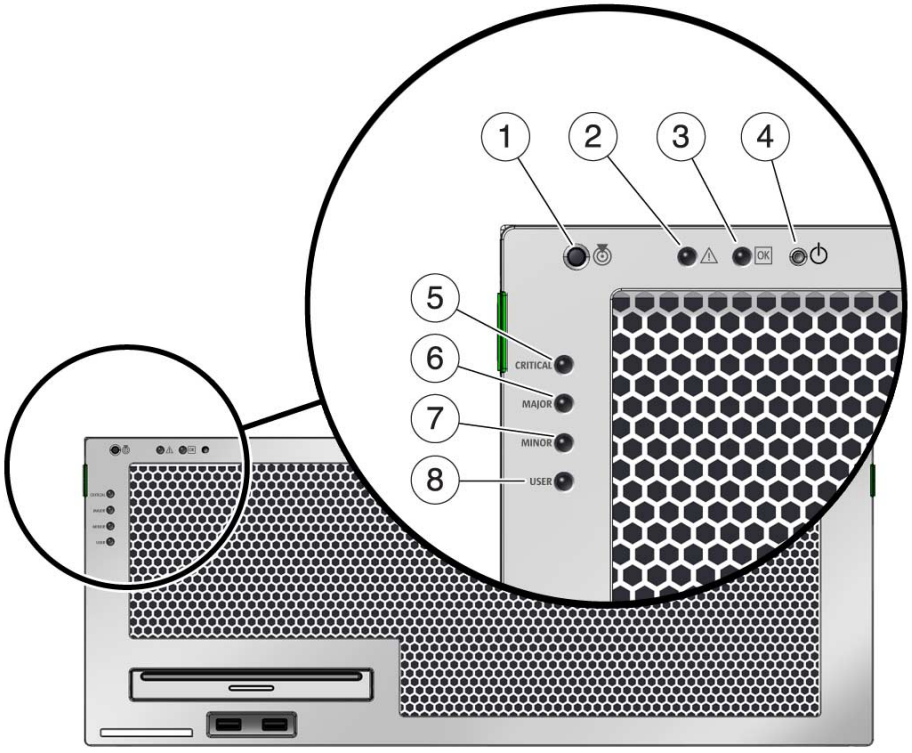


Figure Legend

1	Locator LED	**5**	Critical (Red) Alarm Status indicator
2	Fault LED	**6**	Major (Red) Alarm Status indicator
3	Activity LED	**7**	Minor (Amber) Alarm Status indicator
4	Power button	**8**	User (Amber) Alarm Status indicator

TABLE 4-2 Bezel Server Status Indicators

Indicator	LED Color	LED State	Component Status
Locator	White	On	Server is identified with the superuser `locator` or ILOM `setlocator` command.
		Off	Normal state
Fault	Amber	On	The server has detected a problem and requires the attention of service personnel.
		Off	The server has no detected faults.
Activity	Green	On	The server is powered up and running the Solaris Operating System. If the system is powered on in the OpenBoot `ok` prompt, the activity LED is blinking.
		Off	Either power is not present or the Solaris software is not running.

Electrical Specifications

TABLE 4-3 provides the electrical specifications of the Sun Netra T5440 server.

TABLE 4-3 Electrical Specifications

Parameter	AC	DC
Voltage (nominal)	100-127/200-240 VAC	-48 VDC or -60 VDC
Input current (maximum)	16 A	32 A
Frequency	50/60 Hz	N/A
DC Input Treatment	N/A	Isolated DC Return (DC-I)

Connecting the Server Cables

To power on the server, you must connect and configure the network and serial ports. The procedures are given in the following sections.

- "To Connect the Service Processor Serial Management Port" on page 67
- "To Connect the Service Processor Network Management Port" on page 68

- "To Connect the Ethernet Network Cables" on page 69
- "To Connect Power Cables to the Server" on page 70

The server also has serial and USB ports available for connections to optional devices (see "Cable Connections and Ports" on page 62).

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..

▼ To Connect the Service Processor Serial Management Port

The service processor serial management port is marked SER MGT (FIGURE 4-3). It is the leftmost RJ-45 port on the rear panel.

Note – The cable and DB-9 RJ-45 adapters are for the host serial port, and not for the server SER MGT port.

Use this port for server management. This port is needed to set up the service processor network management port, as detailed in "Enabling the Service Processor Network Management Port" on page 82.

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

Caution – Do not attach a modem to this port.

- **Connect a Category 5 cable from the SER MGT 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.

FIGURE 4-3 Service Processor Serial Management Port – Rear Panel

▼ To Connect the Service Processor Network Management Port

The service processor network management port is labeled NET MGT (FIGURE 4-4). It is located just to the right of the serial management (SER MGT) port on the rear panel.

Note – This port is not operational until you configure the network settings (through the serial managment port), as detailed in "Configuring the Service Processor Network Management Port" on page 84.

Note – If you have access to a DHCP server on the network, you can see the service processor get an IP address because the DHCP client is enabled by default.

Note – The service processor network management port is configured by default to retrieve network settings with 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 5.

- **Connect a Category 5 cable from the NET MGT network management port to your network switch or hub.**

FIGURE 4-4 Service Processor Network Management Port – Rear Panel

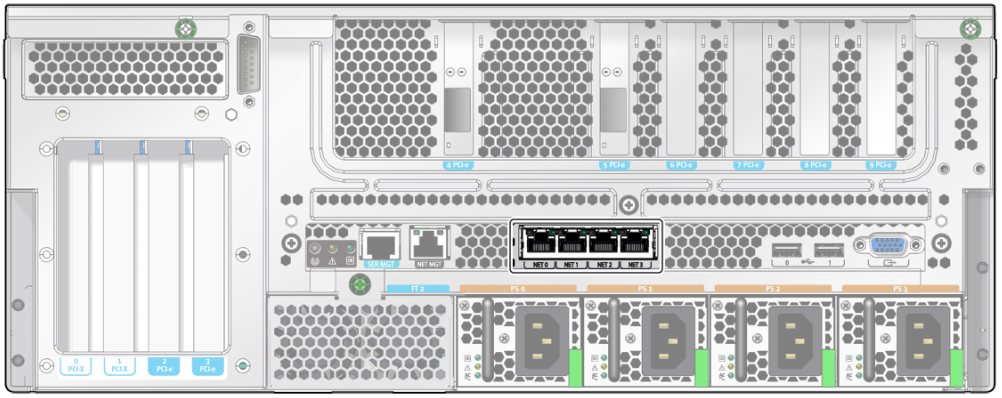
▼ To Connect the Ethernet Network Cables

The server has four network connectors, marked NET0, NET1, NET2, and NET3 (FIGURE 4-5). These connectors are RJ-45 Gigabit Ethernet.

1. **Connect a Category 5 cable from your network switch or hub to Ethernet Port 0 (NET0) on the rear of the chassis.**

   NET0 is the farthest left port in the 4-port network cluster in FIGURE 4-5.

FIGURE 4-5 Service Processor Ethernet Network Ports – Rear Panel



2. **Connect Category 5 cables from your network switch or hub to the remaining Ethernet ports, as needed.**

   The Ethernet ports are labeled left to right: NET 0, NET1, NET2, NET3.

Note – The LEDs located above each NET port are Link/Activity (left) and Speed (right) indicators for each port.

▼ To Connect Power Cables to the Server

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 cable, system messages might be lost.

Caution – Finish the hardware procedures in this chapter, but do not attach the AC power cable 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 cable, system messages could be missed.

Caution – The server goes into Standby mode and the service processor initializes as soon as the AC power cable is connected to the power source.

- **Go to** "Powering On the System for the First Time" on page 77 **for instructions on connecting the server to AC power.**

DC Operation Conditions and Procedures

This section provides DC power cabling and requirements information.

DC Power Source Requirements

TABLE 4-4 lists DC power source requirements for each power supply in the Sun Netra T5440 server, and TABLE 4-5 lists DC power source requirements for the server as a whole.

TABLE 4-4 DC Operating Power Limits and Ranges for Each Power Supply in the Server

Description	Limit or Range
Input voltage	-48 VDC to -60 VDC nominal -40 VDC to -75 VDC operating limits
Maximum operating input current	16 A
Maximum operating input power	640 W

TABLE 4-5 DC Operating Power Limits and Ranges for the Server

Description	Limit or Range
Input voltage	-48 VDC to -60 VDC nominal -40 VDC to -75 VDC operating limits
Maximum operating input current	32 A
Maximum operating input power	1280 W

DC Supply and Ground Conductor Requirements

The server must meet the following:

- Suitable conductor material: use copper conductors only
- Power supply connections through the input connector: 12 AWG (between the Sun Netra T5440 server and the source). There are three conductors:
  - -48V (negative terminal)
  - Chassis ground connection
  - -48V Return (positive terminal)
- System ground conductor: 12 AWG (to be connected to the chassis)
- Cable insulation rating: Minimum of 75˚C (167˚F), low smoke fume (LSF), flame retardant
- Cable type one of the following:
  - UL style 1028 or other UL 1581 (VW-1) compliant equivalent
  - IEEE 383 compliant
  - IEEE 1202-1991 compliant

- Branch circuit cable insulation color: Per applicable National Electrical Codes
- Grounding cable insulation color: Green/Yellow
- DC power source must meet TNV-2 requirements as defined by UL 60950-1 and IEC 60950-1

Note – Depending on the DC power source, the -48V (negative terminal) might be marked with a minus (-) symbol, and the -48V Return (positive terminal) might be marked with a positive (+) symbol.

When attaching DC cables, keep the following requirement in mind:

Caution – You must restrict the connection of the Sun Netra T5440 server to the DC power source to minimize the possibility that transient energy will appear on the main input to the equipment. The DC battery power source must be in the same premises as the server. The server cannot be in one building with the power source in another building.

Overcurrent Protection Requirements

- Overcurrent protection devices must be provided as part of each equipment rack.
- Circuit breakers must be located between the DC power source and the Sun Netra T5440 server. Use one 20 A fast trip DC-rated circuit breaker for each power supply unit.

Note – Overcurrent protection devices must meet applicable national and local electrical safety codes and be approved for the intended application.

▼ To Assemble the DC Input Power Cable

1. **Identify the parts that you will use to assemble the DC input power cable.**

   The following DC connection parts are required to assemble one or more DC power input cables. These cables connect the -48V DC input source(s) to the power supply units.

   - DC input plugs
   - Cage clamp operating lever
   - Tie wraps

2. **Turn off power from the DC power source through the circuit breakers.**

Caution – Do *not* proceed with these instructions until you have turned off the power from the DC power source through the circuit breakers.

3. **Get a DC input plug from the ship kit.**
4. **Locate the three wires coming from the DC power source that will be used in the connection to your unit:**
   - -48V (negative terminal)
   - Chassis ground
   - -48V Return (positive terminal)

Note – Depending on the DC power source, the -48V (negative terminal) might be marked with a minus (-) symbol, and the -48V Return (positive terminal) might be marked with a positive (+) symbol.

5. **Strip 5/16 inches (8 mm) of insulation from each of the wires coming from the DC power source.**

   Do not strip more than 5/16 inches (8 mm) from each wire. Doing so leaves uninsulated wire exposed from the DC connector after the assembly is complete.
6. **Open the cage clamp for this section of the DC input plug by taking one of the following actions:**
   - Insert the tip of the cage clamp operating lever into the rectangular hole directly above the hole in the DC input plug where you want to insert the first wire. Press down on the cage clamp operating lever (FIGURE 4-6).
   - Insert a small slotted screwdriver into the rectangular hole directly above the hole in the DC input plug where you want to insert the first wire, and press down on the screwdriver (FIGURE 4-7).

FIGURE 4-6 Opening the DC Input Plug Cage Clamp Using the Cage Clamp Operating Lever

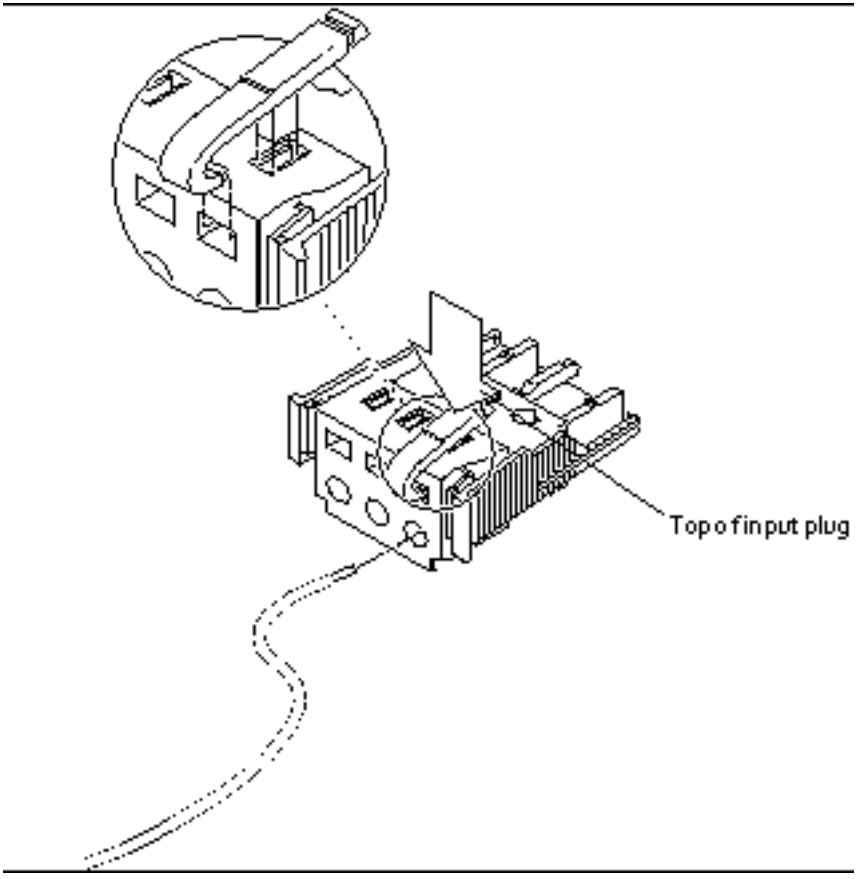
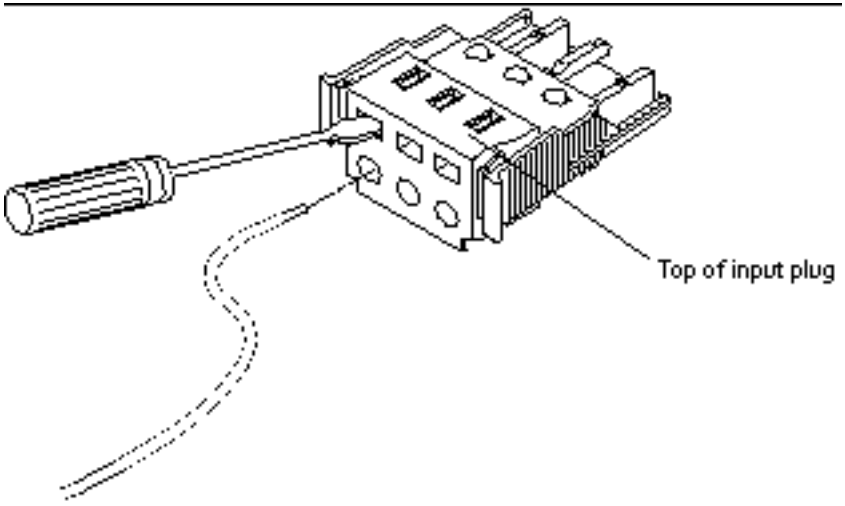


FIGURE 4-7 Opening the Cage Clamp Using a Screwdriver



7. **Feed the exposed section of the appropriate wire into the rectangular plug hole in the DC input plug.**

   FIGURE 4-8 shows which wires should be inserted into each hole in the DC input plug.

FIGURE 4-8 Assembling the DC Input Power Cable

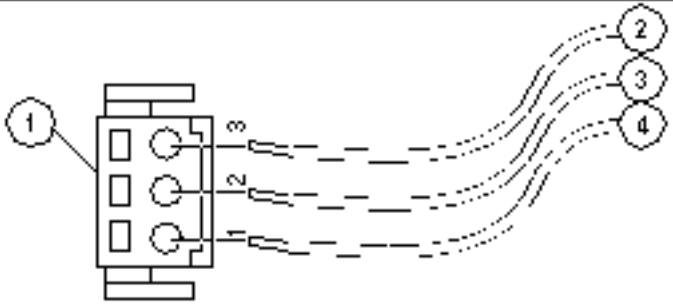


Figure Legend

1	Top of connector	**3**	From chassis ground (green/yellow)
2	From -48V return	**4**	From -48V

8. **Repeat Step 6 and Step 7 for the other two wires to complete the assembly of the DC input power cable.**

9. **Repeat Step 4 through Step 8 to create as many DC input power cables as you need for your unit.**

   You need two DC input power cables for each of the power supplies.

   If you need to remove a wire from the DC input plug, insert the cage clamp operating lever or a small screwdriver into the slot directly above the wire and press down (FIGURE 4-6 and FIGURE 4-7). Pull the wire from the DC input plug.

CHAPTER 5

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 included:

Powering On the System for the First Time

This section provides an overview and instructions for powering on your system the first time.

ILOM System Console

When you power on the system, the boot process begins under the control of the Integrated Lights Out Manager (ILOM) 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 79.

For a more detailed discussion on configuring the system console and connecting terminals, refer to the *Sun Netra T5440 Server Administration Guide*.

ILOM Service Processor

After the system console finishes its low-level system diagnostics, the ILOM service processor initializes and runs a higher level of diagnostics. When you access the ILOM service processor using a device connected to the serial management port, you see the output of the ILOM 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 ILOM service processor using the serial management port to reconfigure the network management port. See "Enabling the Service Processor Network Management Port" on page 82.

Once the network management port (NET MGT) has been assigned an IP address, you can connect to the ILOM service processor using SSH.

CLIs, User Accounts, and Passwords for Connecting to the ILOM Service Processor

When connecting to the ILOM service processor for the first time using the serial or network management ports, the default CLI is ILOM, the default user account is `root`, and the default password is *changeme*. Examples in this document use the default ILOM CLI.

ILOM also provides an Advanced Lights Out Management (ALOM) compatability CLI that uses commands that resemble the ALOM CMT CLI commands. To access the ALOM compatability CLI, you must first create an `admin` account with the role of administrator. Once you create the `admin` account, assign the ALOM

compatability CLI as the default CLI (`role=administrator`, `cli=alom`). For more information on using the ALOM compatability CLI, refer to the *Integrated Lights Out Manager 2.0 (ILOM 2.0) Supplement for Sun Netra T5440 Server.*

▼ To Power On the System for the First Time

Caution – 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 ILOM service processor initializes as soon as the AC/DC power cables are connected to the power source.

The service processor runs on the 3.3V standby voltage. As soon as AC/DC power is connected to the system, the service processor powers on, runs diagnostics, and initializes the ILOM firmware.

1. **Connect a terminal or a terminal emulator (PC or workstation) to the service processor serial management port.**

   Configure the terminal or terminal emulator with these settings:

   - 9600 baud
   - 8 bits
   - No parity
   - 1 Stop bit
   - No handshake

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 service processor serial management port, you will not see system messages. After connecting to the server with a terminal or terminal emulator, log in to the ILOM CLI or the ALOM compatability CLI to get to the service processor console.

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

FIGURE 5-1 Rear Panel Power Connectors of Oracle's Sun Netra T5440 Server

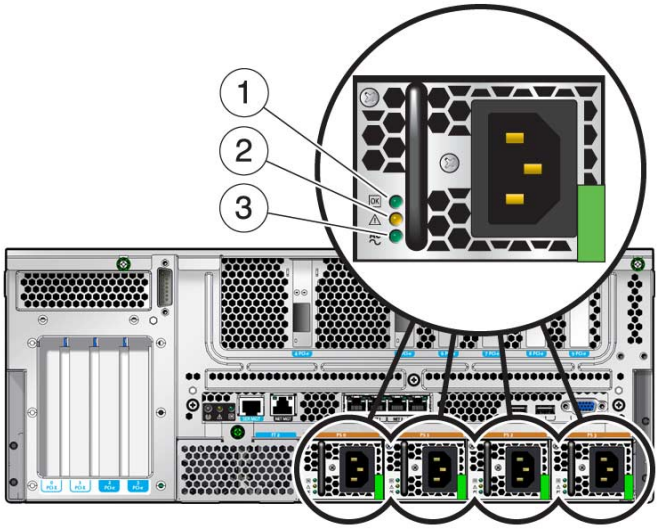


Figure Legend

1	Power Supply Output On LED (Green)	**3**	Power Supply Input Power OK LED (Green)
2	Power Supply Service Required LED (Amber)	**4**	

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

EXAMPLE 5-1 Sample Service Processor Output

```
U-Boot 1.1.1 (August 23 2007 - 21:30:12)
...
POST cpu PASSED
POST ethernet PASSED
Hit any key to stop autoboot:  0
## Booting image at fe080000 ...

IP Protocols: ICMP, UDP, TCP, IGMP

Checking all file systems...
fsck 1.37 (21-Mar-2005)
Setting kernel variables ...
... done.
Mounting local filesystems...
Cleaning /tmp /var/run /var/lock.

Identifying DOC Device Type(G3/G4/H3) ...
OK

Configuring network interfaces...Internet Systems Consortium DHCP
Client V3.0.1
Copyright 2007 Internet Systems Consortium.
All rights reserved.
For info, please visit http://www.isc.org/products/DHCP

eth0: config: auto-negotiation on, 100FDX, 100HDX, 10FDX, 10HDX.
Listening on LPF/eth0/00:14:4f:3f:8c:af
Sending on   LPF/eth0/00:14:4f:3f:8c:af
Sending on   Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 6
eth0: link up, 100 Mbps Full Duplex, auto-negotiation complete.
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 15
Hostname: hostname.
Starting portmap daemon: portmap.
Initializing random number generator...done.
INIT: Entering runlevel: 3
Starting system log daemon: syslogd and klogd.
Starting periodic command scheduler: cron.
Starting IPMI Stack..... Done.
Starting OpenBSD Secure Shell server: sshd.
Starting Servicetags listener: stlistener.
Starting FRU update program: frutool.

hostname login:
```

▼ To Avoid Booting the Solaris Operating System at Start Up

In hard drive HDD0, the Solaris OS is preinstalled.

- **If you do not want to start the preinstalled OS, set the OBP parameter** `auto-boot?` **to** `false`**. For example from the ILOM CLI:**

```
-> bootmode bootscript "setenv auto-boot? false"
```

Enabling the Service Processor Network Management Port

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

1. After the service processor boots, access the ILOM CLI through the serial management port. See "To Log In To the Service Processor Using the Serial Management Port" on page 83.
2. Configure the service processor. See "Configuring the Service Processor Network Management Port" on page 84.
3. Commit the changes to the service processor parameters. See Step 7 in "To Power On the System for the First Time" on page 79.

You can now use the network management port at any time to access the service processor. See "To Log In To the Service Processor Using the Network Management Port" on page 88.

Logging In To the Service Processor

If you are powering on the system for the first time after installation, use the service processor serial port to power on the system and run POST. See "To Log In To the Service Processor Using the Serial Management Port" on page 83.

If the network management port has already been configured, you can use it instead of the serial management port. See "To Configure the Service Processor Network Management Port" on page 85.

▼ To Log In To the Service Processor Using the Serial Management Port

After the service processor boots, access the ILOM CLI to configure and manage the system. The ILOM CLI prompt (**->**) is displayed at the first time the service processor is booted. The default configuration provides an ILOM CLI `root` user account. The default `root` password is *changeme*. Change the password using the service processor ILOM CLI password command.

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

```
...
Starting OpenBSD Secure Shell server: sshd.
Starting Servicetags listener: stlistener.
Starting FRU update program: frutool.

hostname login: root
Password: changeme

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Subject to Standard License Terms and Conditions.
...

Warning: password is set to factory default.

-> set /SP/users/root password
Enter new password: ********
Enter new password again: ********

->
```

Note – After the `root` password has been set, on subsequent reboots, the ILOM CLI login prompt is displayed.

---

2. **Enter** `root` **for the login name followed by your password.**

```
...
hostname login: root
Password: password  (nothing displayed)
Waiting for daemons to initialize...
```

```
Daemons ready

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->
```

Configuring the Service Processor Network Management Port

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

Use this procedure only when:

- You are unable to use DHCP and SSH on your network.
- You need to modify the ILOM service processor network management port settings.

In this procedure, you connect to the ILOM service processor using the serial management port to manually reconfigure the network management port.

Note – For more information on configuring ILOM, refer to the *Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun Netra T5440 Server.*

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

- `/SP/network state` – Specifies whether the service processor is on the network or not
- `/SP/network pendingipaddress` – IP address of the service processor
- `/SP/network pendingipgateway` – IP address of the gateway for the subnet
- `/SP/network pendingipnetmask` – Netmask for the service processor subnet
- `/SP/network pendingipdiscovery` - Specifies whether the service processor uses DHCP or static IP address assignment
- `/SP/network commitpending` - Commits the service processor to use the pending settings

Configure these parameters with the `set` command. The usage is as follows: `set` *target property=value* where `/SP/network` is the target and `pendingipaddress=`*xx.x.xx.xxx*, for example, is the *property=value*. The following example sets the pending service processor IP address:

```
-> set /SP/network pendingipaddress=xx.x.xx.xxx
Set 'pendingipaddress' to 'xx.x.xx.xxx'
```

▼ To Configure the Service Processor Network Management Port

1. **Set the** `/SP/network state` **parameter to** `enabled`**.**

```
-> set /SP/network state=enabled
Set 'state' to 'enabled'
```

2. **Enable and disable SSH connections as needed.**

```
-> set /SP/services/ssh state=enabled
Set 'state' to 'enabled'
-> set /SP/services/ssh state=disabled
Set 'state' to 'disabled'
```

   See the *Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun Netra T5440 Server* for more information about SSH support in ILOM.

3. **Choose one of these methods to configure the service processor 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** `pendingipdiscovery` **to** `dhcp`**.**

```
-> set /SP/network pendingipdiscovery=dhcp
Set 'pendingipdiscovery' to 'dhcp'
```

   Go to Step 6.

5. **If you choose to use a static IP configuration, set the parameters** `pendingipdiscovery`**,** `pendingipaddress`**,** `pendingipgateway`**, and** `pendingipnetmask` **as follows.**

a. Set the service processor

```
-> set /SP/network pendingipdiscovery=static
Set 'pendingipdiscovery' to 'static'
```

b. to accept a static IP address.

c. Set the IP address for the service processor.

```
-> set /SP/network pendingipaddress=service-processor-IPaddr
Set 'pendingipaddress' to 'service-processor-IPaddr'
```

d. Set the IP address for the service processor gateway.

```
-> set /SP/network pendingipgateway=gateway-IPaddr
Set 'pendingipgateway' to 'gateway-IPaddr'
```

e. Set the netmask for the service processor.

```
-> set /SP/network pendingipnetmask=255.255.255.0
Set 'pendingipnetmask' to '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** `show /SP/network` **command to verify that the parameters were set correctly.**

```
-> show /SP/network
  /SP/network
     Targets:
     Properties:
         commitpending = (Cannot show property)
         dhcp_server_ip = xx.x.xx.x
         ipaddress = xx.x.xx.x
         ipdiscovery = dhcp
         ipgateway = xx.x.xx.x
         ipnetmask = 255.255.252.0
         macaddress = 00:14:4F:3F:8C:AF
         pendingipaddress = xx.x.xx.x
         pendingipdiscovery = static
         pendingipgateway = xx.x.xx.x
         pendingipnetmask = 255.255.255.0
         state = enabled
     Commands:
         cd
```

```
          set
          show
->
```

Note – After setting the configuration parameters, you must enter the `set /SP/network commitpending=true` command for the new values to take affect.

7. Commit the changes to the service processor network parameters.

```
-> set /SP/network commitpending=true
Set 'commitpending' to 'true'
```

▼ To Reset the Service Processor

It is not necessary to reset the service processor for new network values to take effect. To commit the changes to the service processor network parameters, use the `set /SP/network commitpending=true` command. See Step 7 in "Configuring the Service Processor Network Management Port" on page 84.

- **Type the `reset /SP` command.**

  You are prompted to confirm that you want to reset the service processor. Reply **`y`** when prompted.

```
-> reset /SP
Are you sure you want to reset /SP (y/n)? y
```

Note – You can specify the `-script` option to bypass the confirmation question, for example, `reset -script /SP`.

The service processor resets, runs diagnostics, and returns to the login prompt.

```
...
hostname login: root
Password: password (nothing displayed)
Waiting for daemons to initialize...

Daemons ready

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```

```
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->
```

▼ To Log In To the Service Processor Using the Network Management Port

Note – You must configure the service processor parameters shown in "Configuring the Service Processor Network Management Port" on page 84 before you can use the network management port.

- **Open an SSH session and connect to the service processor by specifying its network address.**

```
% ssh root@xx.xxx.xx.x
...
Are you sure you want to continue connecting (yes/no)? yes
...
Password: password (nothing displayed)
Waiting for daemons to initialize...

Daemons ready

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->
```

Using the Service Processor for Common Operations

Note – For more information on using the ILOM service processor, refer to the *Integrated Lights Out Manager 2.0 (ILOM 2.0) Supplement for Sun Netra T5440 Server.*

▼ To Power On the System

1. **Perform the following steps to verify that there are no faults:**

   a. **Set the virtual keyswitch to** `diag` **mode so that POST will run in Service mode.**

```
-> set /SYS keyswitch_state=diag
```

   b. **To initiate the power on sequence, type the** `start /SYS` **command.**

   You see an ILOM CLI alert message on the system console. This message indicates that the system has reset.

```
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS

->
```

   c. **Switch to the system** `console` **to view POST output.**

```
-> start /SP/console
```

   Watch the POST output for possible fault messages. The following output is a sign that POST did not detect any faults:

```
.
.
.
0:0>POST Passed all devices.
0:0>
0:0>DEMON: (Diagnostics Engineering MONitor)
0:0>Select one of the following functions
0:0>POST:Return to OBP.
0:0>INFO:
0:0>POST Passed all devices.
0:0>Master set ACK for vbsc runpost command and spin...
```

2. **Check the POST execution result with the following command:**

```
-> show /SYS/faultmgmt -level all
```

Note – Depending on the configuration of ILOM, POST variables, and whether POST detected faults or not, the server might boot, or the system might remain at the `ok` prompt. If the system is at the `ok` prompt, type `boot`.

3. **Use the** `set /SYS keyswitch_state=normal` **command to return the virtual keyswitch to Normal mode (default) so that the system can power on and start the boot process.**

```
-> set /SYS keyswitch_state=normal
```

▼ 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 service processor.

- **Type the** `start /SP/console` **command.**

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

```
-> start /SP/console
Are you sure you want to start /SP/console (y/n)? y
Serial console started.  To stop, type #.
```

Note – For more information about POST output, refer to the *Sun Netra T5440 Server Service Manual*.

▼ To Perform a Normal System Initialization

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

Note – System behavior depends on how the `auto-boot` variable is set. See the *Sun Netra T5440 Server Service Manual* for more information.

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

```
-> start /SYS
Find dropin, Copying Done, Size 0000.0000.0000.1110
Find dropin, (copied), Decompressing Done, Size
0000.0000.0006.06e0 cpu cpu cpu cpu 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

Netra T5440, No Keyboard
...


{0} ok
```

- **To understand the various devices and their path names as represented in the OpenBoot device tree, refer to the following tables.**

  This table provides disk slot numbers, logical device names, and physical device names

Disk Slot Number	Logical Device Name*	Physical Device Name
Slot 0	c1t0d0	/devices/pci@0/pci@0/pci@2/scsi@0/sd@0,0
Slot 1	c0t1d0	/devices/pci@0/pci@0/pci@2/scsi@0/sd@1,0
Slot 2	c0t2d0	/devices/pci@0/pci@0/pci@2/scsi@0/sd@2,0
Slot 3	c0t3d0	/devices/pci@0/pci@0/pci@2/scsi@0/sd@3,0

* The logical device names might appear differently on your system, depending on the number and type of add-on disk controllers installed.

This table provides device identifiers and devices, such as optional PCI cards. This information is displayed with the `showcomponents` command.

Device Identifiers	Devices
/SYS/MB/CMP*cpu-number*/P*strand-number*	CPU strand (Number: 0-63)
/SYS/MB/PCI_MEZZ//PCIE*slot-number*	PCIe card (Number: 6-9)
/SYS/MB/PCI_MEZZ/XAUI*card-number*	XAUI card (Number: 4-5)
/SYS/MB/PCI_AUX/PCIE*slot-number*	PCIe card (Number: 0-3)
/SYS/MB/GBE*controller-number*	GBE controllers (Number: 0-1) • GBE0 controls NET0 and NET1 • GBE1 controls NET2 and NET3
/SYS/MB/CMP0/L2-BANK*number*	(Number: 0-3)
/SYS/USBBD/USB*number*	USB ports (Number: 2-3, located on front of chassis)
/SYS/TTYA	DB9 serial port
/SYS/MB/CMP0/BR*branch-number*/CH*channel-number*/D*dimm-number*	DIMMS

The following is an example of `showcomponents` output:

```
/SYS/MB/PCI_MEZZ
/SYS/MB/PCI_MEZZ/XAUIcard-number
/SYS/MB/PCI_MEZZ/PCIEslot-number
/SYS/MB/PCI_AUX
/SYS/MB/PCI_AUX/PCIXslot-number
/SYS/MB/PCI_AUX/PCIEslot-number
/SYS/MB/GBE
```

```
/SYS/MB/PCI-SWITCHswitch-number
/SYS/MB/PCIE-IO/USB
/SYS/MB/SASHBA
/SYS/MB/CMP0/MCUnumber
/SYS/MB/CMP0/L2_BANKnumber
/SYS/MB/CMP0/Pstrand-number
/SYS/MB/CMP0/MR0/BRbranch-number/CHchannel-number/Ddimm-number
/SYS/MB/CMP0/BRbranch-number/CHchannel-number/Ddimm-number
/SYS/MB/CMP1/MCUnumber
/SYS/MB/CMP1/L2_BANKnumber
/SYS/MB/CMP1/Pstrand-number
/SYS/MB/CMP1/MR1/BRbranch-number/CHchannel-number/Ddimm-number
/SYS/MB/CMP1/BRbranch-number/CHchannel-number/Ddimm-number
/SYS/TTYA
```

Booting the Solaris Operating System

The Solaris OS is preinstalled on the servers 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 this step and perform Step 2.
   - 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 must append the target to the disk path.

   In the following example, the system is being booted from disk 0 (zero) on Oracle's Sun Netra T5440 server. Thus, `@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 keyserv 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** `shutdown -g0 -i6 -y` **command.**

```
# shutdown -g0 -i6 -y
```

It is not necessary to power the system off and on to simply reset the system.

▼ 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, type the `shutdown -g0 -i0 -y` command and then type `h` when prompted to halt the Solaris OS and to return to the ok prompt.

```
# shutdown -g0 -i0 -y
# svc.startd: The system is coming down.  Please wait.
svc.startd: 91 system services are now being stopped.
Jun 12 19:46:57 wgs40-58 syslogd: going down on signal 15
svc.startd: The system is down.
syncing file systems... done
Program terminated
r)eboot, o)k prompt, h)alt?
```

2. **Switch from the system console prompt to the service processor console prompt by issuing the #. escape sequence.**

```
ok #.
->
```

3. **Using the ILOM CLI, type the** `stop /SYS` **command to perform a graceful shutdown of the system.**

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS

->
```

Note – To perform an immediate and ungraceful shutdown, use the `stop -force -script /SYS` or `stop -script /SYS` commands. These commands stop everything immediately, so ensure that all data is saved before entering these commands.

4. Type the `start /SYS` command.

```
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS

->
```

Note – To force a power on sequence, use the `start -script /SYS` command.

5. Reconnect to the system console with the `start /SP/console` command.

```
-> start /SP/console
Are you sure you want to start /SP/console (y/n)? y
Serial console started.  To stop, type #.
```

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 Sun Validation Test Suite (SunVTS™) software to verify the functionality and performance of any installed components, as well as its network connections. Refer to the SunVTS documentation at `(http://www.sun.com/documentation)` for more information.

APPENDIX **A**

Updating the Firmware

The `flashupdate` command updates both the service processor firmware and the server firmware.

The flash image consists of the following components:

- Service processor firmware
- OpenBoot firmware
- POST
- Reset/Config
- Sequencer
- Partition description

Updating the Firmware

To use the features and fixes in subsequent firmware releases, perform "To Update the Firmware" on page 97.

▼ To Update the Firmware

1. **Ensure that the ILOM service processor network management (NET MGT) port is configured.**

   This action is required to access the new flash image over the network. See "Configuring the Service Processor Network Management Port" on page 84.

2. **Open an SSH session to connect to the service processor ILOM CLI.**

```
% ssh root@xx.xxx.xx.x
...
Are you sure you want to continue connecting (yes/no)? yes
...
Password: password (nothing displayed)
Waiting for daemons to initialize...

Daemons ready

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->
```

3. **Verify that the host is powered off.**

   If the host is not powered off, type the `stop /SYS` command.

```
-> stop /SYS
```

4. **Verify that the `keyswitch_state` parameter is set to `normal`.**

```
-> set /SYS keyswitch_state=normal
```

5. **Type the `load` command.**

   The `load` command updates the service processor flash image and the host firmware. The `load` command requires the following information:

   - IP address of a TFTP server on the network that can access the flash image
   - Full path name to the flash image that the IP address can access

     The command usage is as follows:

     where:

```
load [-script] -source tftp://xxx.xxx.xx.xx/pathname
```

   - `-script` – Do not prompt for confirmation and act as if yes was specified

- `-source` – Specifies the IP address and full path name (URI) to the flash image

```
-> load -source tftp://xxx.xxx.xx.xx/pathname
 NOTE: A firmware upgrade will cause the server and ILOM to
       be reset. It is recommended that a clean shutdown of
       the server be done prior to the upgrade procedure.
       An upgrade takes about 6 minutes to complete. ILOM
       will enter a special mode to load new firmware. No
       other tasks can be performed in ILOM until the
       firmware upgrade is complete and ILOM is reset.

Are you sure you want to load the specified file (y/n)? y
Do you want to preserve the configuration (y/n)? y
.............................................................

Firmware update is complete.
ILOM will now be restarted with the new firmware.
Update complete. Reset device to use new image.

->
```

After the flash image has been updated, the system will automatically reset.

The service processor resets, runs diagnostics, and returns to the login prompt (on the serial console), similar to EXAMPLE A-1.

EXAMPLE A-1 Typical Boot Sequence Following Firmware Update *(Continued)*

```
U-Boot 1.1.1 (May 23 2007 - 21:30:12)
...
POST cpu PASSED
POST ethernet PASSED
Hit any key to stop autoboot:  0
## Booting image at fe080000 ...

IP Protocols: ICMP, UDP, TCP, IGMP

Checking all file systems...
fsck 1.37 (21-Mar-2005)
Setting kernel variables ...
... done.
Mounting local filesystems...
Cleaning /tmp /var/run /var/lock.

Identifying DOC Device Type(G3/G4/H3) ...
OK

Configuring network interfaces...Internet Systems Consortium DHCP
```

```
Client V3.0.1
Copyright 2007 Internet Systems Consortium.
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For info, please visit http://www.isc.org/products/DHCP

eth0: config: auto-negotiation on, 100FDX, 100HDX, 10FDX, 10HDX.
Listening on LPF/eth0/00:14:4f:3f:8c:af
Sending on   LPF/eth0/00:14:4f:3f:8c:af
Sending on   Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 6
eth0: link up, 100 Mbps Full Duplex, auto-negotiation complete.
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 15
Hostname: hostname.
Starting portmap daemon: portmap.
Initializing random number generator...done.
INIT: Entering runlevel: 3
Starting system log daemon: syslogd and klogd.
Starting periodic command scheduler: cron.
Starting IPMI Stack..... Done.
Starting OpenBSD Secure Shell server: sshd.
Starting Servicetags listener: stlistener.
Starting FRU update program: frutool.

hostname login:
```

APPENDIX **B**

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 Netra T5440 Server Administration Guide*.

Note – The serial management port on the ILOM card is preconfigured as the default system console port. For more information, see the *Sun Netra T5440 Server Overview*.

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

Selecting a Boot Device

▼ 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 on-board Ethernet interface as the default boot device, you can determine the full path name of each interface by typing either of the following commands:

```
ok show-devs
ok show-nets
```

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

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