SPARC Enterprise M3000 Server

Overview Guide

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Contents

Preface

This guide describes system features, system specifications, hardware functions, and software functions of the SPARC Enterprise M3000 server from Oracle and Fujitsu. References herein to the M3000 server are reference to the SPARC Enterprise M3000 server.

This preface includes the following sections:

- "Audience" on page vii
- "Related Documentation" on page viii
- "Text Conventions" on page ix
- "Notes on Safety" on page ix
- "Syntax of the Command-Line Interface (CLI)" on page x
- "Documentation Feedback" on page x

Audience

This guide is written for experienced system administrators with working knowledge of computer networks and advanced knowledge of the Oracle Solaris Operating System (Oracle Solaris OS).

Related Documentation

All documents for your server are available online at the following locations.

Documentation	Link
Sun Oracle software-related manuals (Oracle Solaris OS, and so on)	http://www.oracle.com/documentation
Fujitsu documents	http://www.fujitsu.com/sparcenterprise/manual/
Oracle M-series server documents	http://www.oracle.com/technetwork/documentation/sparc-mseries-servers-252709.html

The following table lists titles of related documents.

Related SPARC Enterprise M3000 Server Documents

SPARC Enterprise M3000 Server Site Planning Guide

SPARC Enterprise Equipment Rack Mounting Guide

SPARC Enterprise M3000 Server Getting Started Guide[*]

SPARC Enterprise M3000 Server Overview Guide

SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Important Legal and Safety Information [*]

SPARC Enterprise M3000 Server Safety and Compliance Guide

SPARC Enterprise M3000 Server Installation Guide

SPARC Enterprise M3000 Server Service Manual

SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Administration Guide

SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide

SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF Reference Manual

SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Product Notes[†]

SPARC Enterprise M3000 Server Product Notes

SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Glossary

[*] This is a printed document.

[†] Beginning with the XCP 1100 release.

Text Conventions

This manual uses the following fonts and symbols to express specific types of information.

Font/Symbol	Meaning	Example
AaBbCc123	What you type, when contrasted with on-screen computer output. This font represents the example of command input in the frame.	XSCF> **adduser jsmith**
AaBbCc123	The names of commands, files, and directories; on-screen computer output. This font represents the example of command output in the frame.	XSCF> **showuser -P** User Name: jsmith Privileges: useradm auditadm
Italic	Indicates the name of a reference manual, a variable, or user-replaceable text.	See the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.
" "	Indicates names of chapters, sections, items, buttons, or menus.	See Chapter 2, "System Features."

Notes on Safety

Read the following documents thoroughly before using or handling any SPARC Enterprise M3000 server:

- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Important Legal and Safety Information*
- *SPARC Enterprise M3000 Server Safety and Compliance Guide*

Syntax of the Command-Line Interface (CLI)

The command syntax is as follows:

- A variable that requires input of a value must be put in Italics.
- An optional element must be enclosed in [].
- A group of options for an optional keyword must be enclosed in [] and delimited by |.

Documentation Feedback

If you have any comments or requests regarding this document, go to the following websites:

- For Oracle users:

http://www.oracle.com/goto/docfeedback

Include the title and part number of your document with your feedback:

  SPARC Enterprise M3000 Server Overview Guide, part number E28366-01

- For Fujitsu users:

http://www.fujitsu.com/global/contact/computing/sparce_index.html

System Overview

This chapter explains the features and specifications of the SPARC Enterprise M3000 server.

1.1 System Features

The M3000 server is a space-saving compact server equipped with a high-performance, highly-reliable SPARC64 VII+ or SPARC64 VII processors. It is also an eco-friendly server, which reduces power consumption and noise. Also equipped with the same level of high reliability and high availability as the M4000, M5000, M8000, and M9000 servers, the M3000 server provides superior service continuity.

FIGURE 1-1 shows the external view of the M3000 server.

FIGURE 1-1 External View of the Server
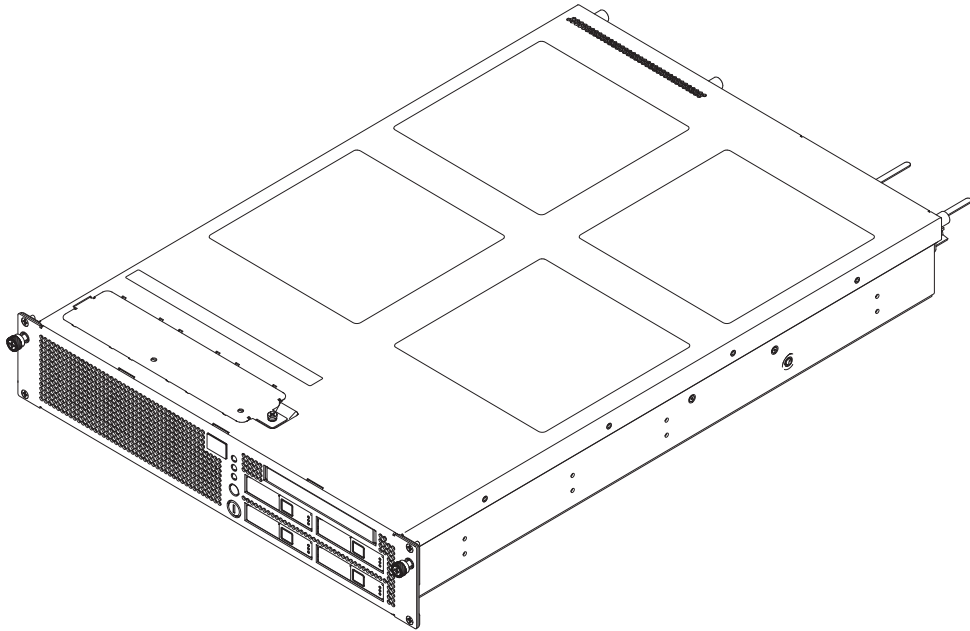
The M3000 server has the following features:

- Space-saving

  The server has a 2 rack units (2U) enclosure, which realizes the space-saving and the lightness in weight.

- Energy-saving

  Compared to our existing models, the M3000 server significantly improves the energy consumption efficiency, and reduces the system power consumption to 500W (with 200 to 240 VAC).

  - Mounted high-performance processor adopting energy-saving technology

    The SPARC64 VII+ or SPARC64 VII processors enhance the processing performance and at the same time reduces the power consumption.

  - Improved cooling and power efficiency

    The server is equipped with an air duct and a backflow prevention shutter unit which optimize the airflow within the chassis and realize high cooling efficiency. Moreover, the server uses power supply units with good power efficiency, reducing power consumption.

- Multiple-step fan speed control

  The fan speeds are finely adjusted according to the altitude and the ambient temperature at the installation site of the server. Such adjustments reduce noise and realize quiet operation well suited for the office environment as well as reducing power consumption.

- High performance server enhanced with the latest architecture
  - SPARC64 VII+ or SPARC64 VII processors

    The processors provide superior performance, with two or four cores each of which can execute 2 threads. In addition, the Error Checking and Correction (ECC) function and the instruction retry function provide high reliability and high availability.

  - Power-saving by system LSI

    By using the 65 nm process technology, system controller and memory access controller have been packed on a single LSI (Large Scale Integration), which realizes the power-saving.

  - Using PCI Express (PCIe) as an I/O bus

    The PCIe bus having a band of up to eight lanes is used for the interconnect bus with the I/O device.

- High reliability and high availability
  - Data protection with the ECC function

    ECC function protects data on all system buses and in memory, so that any errors in data are automatically corrected. In addition to ECC, advanced ECC memory protection is supported.

  - Redundant configuration and active/hot replacement of components

    Hard disk drives, fan units, and power supply units support redundant configuration and active/hot replacement. In a redundant configuration, the system can be operated continuously even if one of the components fails. Faulty components can be maintained/replaced without stopping the system.

  - Automatic reboot at component failure

    If a failure occurs, the faulty component is automatically isolated from the system, and the system is rebooted. If 1-bit errors occur frequently in the cache memory configuring a CPU, the faulty memory can be dynamically isolated without rebooting the Oracle Solaris Operating System (Oracle Solaris OS).

    These degradation functions enable the business operation to be continued based on non-faulty resources. The functions thus implement high fault-tolerance even if a component fails.

- Uninterruptible Power Supply (UPS) controller

  For measures against commercial power failure, the server is equipped with UPS controller(UPC) ports. Using a UPS enables stable power supply to the system when a power failure or an extensive power interruption occurs.

- Hardware RAID function

  Several hard disks which are connected to the on-board Serial Attached SCSI (SAS) controller of the M3000 server can be constructed as a single logical volume. The mirrored configuration of the constructed logical volume can secure the data redundancy, as well as achieve the improvement in system fault tolerance.

Note – Hardware RAID is available only on the M3000 server with the SPARC64 VII+ processors.

- eXtended System Control Facility (XSCF)

  The server is equipped with a service processor called eXtended System Control Facility (XSCF), which monitors the system status including system temperature, hardware status of the power supply units and fan units, and operating status of the domain. There are two types of interfaces: browser interface called XSCF Web and command-line interface called XSCF Shell.

  When a power failure is detected, it is also possible to configure whether to partially degrade the faulty component to continue system operation.

  In addition, the schedule management function can be used to automatically power the server on/off according to the specified operation schedule.

  The console of the domain can be controlled by XSCF firmware via a network. For the console control, prepare a terminal to display the console. The following devices can be used as terminals:

    - Personal computer (PC)
    - Workstation
    - ASCII terminal
    - Terminal server (or patch panel connected to the terminal server)

  For information on how to connect the console, see the *SPARC Enterprise M3000 Server Installation Guide*.

- Use of Oracle Solaris OS

  The Oracle Solaris OS is widely used in the world. The Oracle Solaris 10 OS used by the M3000 server has an enhanced process privilege management function and network function, and is further equipped with superior functions including Oracle Solaris Predictive Self-Healing that enables error prediction and self-recovery.

1.2 System Specifications

TABLE 1-1 shows the specifications of the fully configured M3000 server. For details on specifications of each component, see Section 1.4, "Components" on page 1-9. For the specifications of the equipment rack, see the *SPARC Enterprise Equipment Rack Mounting Guide*.

TABLE 1-1 Server Specifications

Item	Specifications
Motherboard unit	1 unit
CPU	Type: SPARC64 VII+ or SPARC64 VII processors 1 CPU (2 cores/4 cores)
Memory modules	8 modules
PCI Express (PCIe) slot	4 slots
eXtended System Control Facility unit (XSCF unit)	1 unit
Power supply unit	2 units (1+1 redundant configuration)
Fan unit	2 units (1+1 redundant configuration)
On-board drive	1 CD-RW/DVD-RW drive unit 4 hard disk drives
Domain	1 domain
Architecture	Platform group: sun4u Platform name: SUNW, SPARC-Enterprise
Mountable rack	Equipment rack
Server dimensions (width x depth x height)	440 x 657 x 87 mm (2 rack units) 17.4 x 25.9 x 3.4 in.
Weight	22 kg (48.5 lb)[*]

* The weight of cables are not included.

The environmental requirements listed in TABLE 1-2 reflect the test results of the server. The optimum conditions indicate the recommended operating environment. Operating the server for extended periods at or near the operating range limits or installing the server in an environment where it remains at or near the non-operating range limits could possibly increase the failure rate of hardware components significantly. In order to minimize the occurrence of system failure due to component failure, set temperature and humidity in the optimal ranges.

TABLE 1-2   Environmental Requirements

	Operating Range	Non-Operating Range	Optimum
Ambient temperature	5 °C to 35 °C (41 °F to 95 °F)	Unpacked: 0 °C to 50 °C (32 °F to 122 °F) Packed: -20 °C to 60 °C (-4 °F to 140 °F)	21 °C to 23 °C (70 °F to 74 °F)
Relative humidity [*]	20 % RH to 80 % RH	to 93 % RH	45 % RH to 50 % RH
Altitude restriction [†]	3,000 m (10,000 ft)	12,000 m (40,000 ft)	
Temperature conditions	5 °C to 35 °C (41 °F to 95 °F): 0 m to 500 m (0 ft to 1,640 ft) 5 °C to 33 °C (41 °F to 91.4 °F): 501 m to 1,000 m (1,644 ft to 3,281 ft) 5 °C to 31 °C (41 °F to 87.8 °F): 1,001 m to 1,500 m (3,284 ft to 4,921 ft) 5 °C to 29 °C (41 °F to 84.2 °F): 1,501 m to 3,000 m (4,925 ft to 9,843 ft)		

[*] There is no condensation regardless of the temperature and humidity.

[†] All altitudes are above sea level.

1.3 Component Names

FIGURE 1-2 and FIGURE 1-3 show the M3000 server components and list their names.

FIGURE 1-2 Front View of the Server
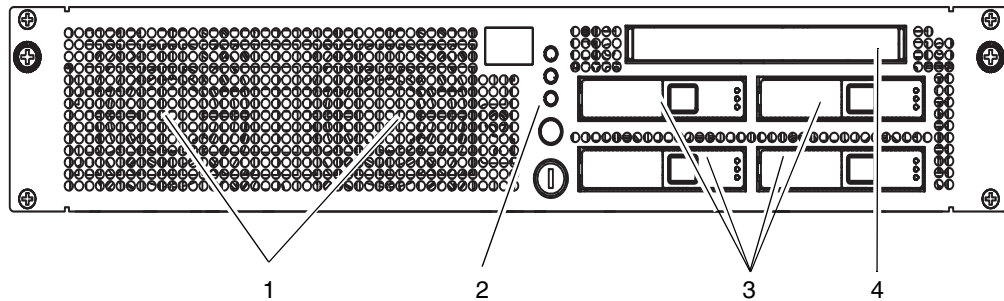
Location No.	Component	Maximum Number per Server
1	Fan unit (FAN_A)	2
2	Operator panel (OPNL)	1
3	Hard disk drive (HDD) (2.5-inch SAS disk)	4
4	CD-RW/DVD-RW drive unit (DVDU)	1

FIGURE 1-3 Rear View of the Server (AC Power Supply Model)

Location No.	Component	Maximum Number per Server
1	Power supply unit (PSU)	2
2	PCIe slot	4
3	RCI port [*]	1
4	USB port (for XSCF)	1
5	Serial port (for XSCF)	1
6	LAN port (for XSCF)	2
7	UPC port	2
8	Serial Attached SCSI (SAS) port	1
9	Gigabit Ethernet (GbE) port (for OS)	4

[*] For information on whether the RCI function is supported for your server, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Product Notes*.

1.4 Components

This section explains the components of the M3000 server.

- Motherboard Unit
- Fan Unit
- Power Supply Unit
- Operator Panel
- On-board Drive Units
- I/O Port

TABLE 1-3 lists Field Replaceable Units (FRUs). For details of the replacement and expansion procedures, see the *SPARC Enterprise M3000 Server Service Manual*.

TABLE 1-3 Field Replaceable Units

Components	Redundant	Cold replacement	Hot replacement	Active replacement	Cold expansion	Hot expansion	Active expansion
Motherboard unit (MBU_A, MBU_A_2, MBU_A_3, MBU_A_4, MBU_A_5, MBU_A_6)	No	Yes					
Memory (DIMM)	No	Yes			Yes		
PCIe card (PCIe)	No	Yes			Yes		
Hard disk drive (HDD)	Yes [*]	Yes	Yes	Yes [†]	Yes	Yes	Yes [†]
Hard disk drive backplane (HDDBP)	No	Yes					
CD-RW/DVD-RW drive unit (DVDU)	No	Yes					
Power supply unit (PSU)	Yes	Yes	Yes	Yes			
Fan unit (FAN_A)	Yes	Yes	Yes	Yes			
Fan backplane (FANBP_B)	No	Yes					
Operator panel (OPNL)	No	Yes					

[*] The hard disk drive will have a redundant configuration by setting the mirroring.

[†] ■ If a hard disk drive is a nonmirrored boot device, it must be replaced according to the cold replacement procedure.
■ If a hard disk drive is in a mirrored configuration, active replacement can be performed on the failed drive because the mirrored hard disk drive continues to be online and functioning. The hard disk replacement procedure varies by the mirroring configuration method.

1.4.1 Motherboard Unit

The motherboard unit contains the main circuits of the M3000 server. The following components are mounted on the unit.

- CPU
- Memory Slot
- PCIe Slot
- eXtended System Control Facility Unit (XSCF Unit)
- DC-DC Converter

FIGURE 1-4 shows the motherboard unit and the components mounted on it.

FIGURE 1-4   Motherboard Unit
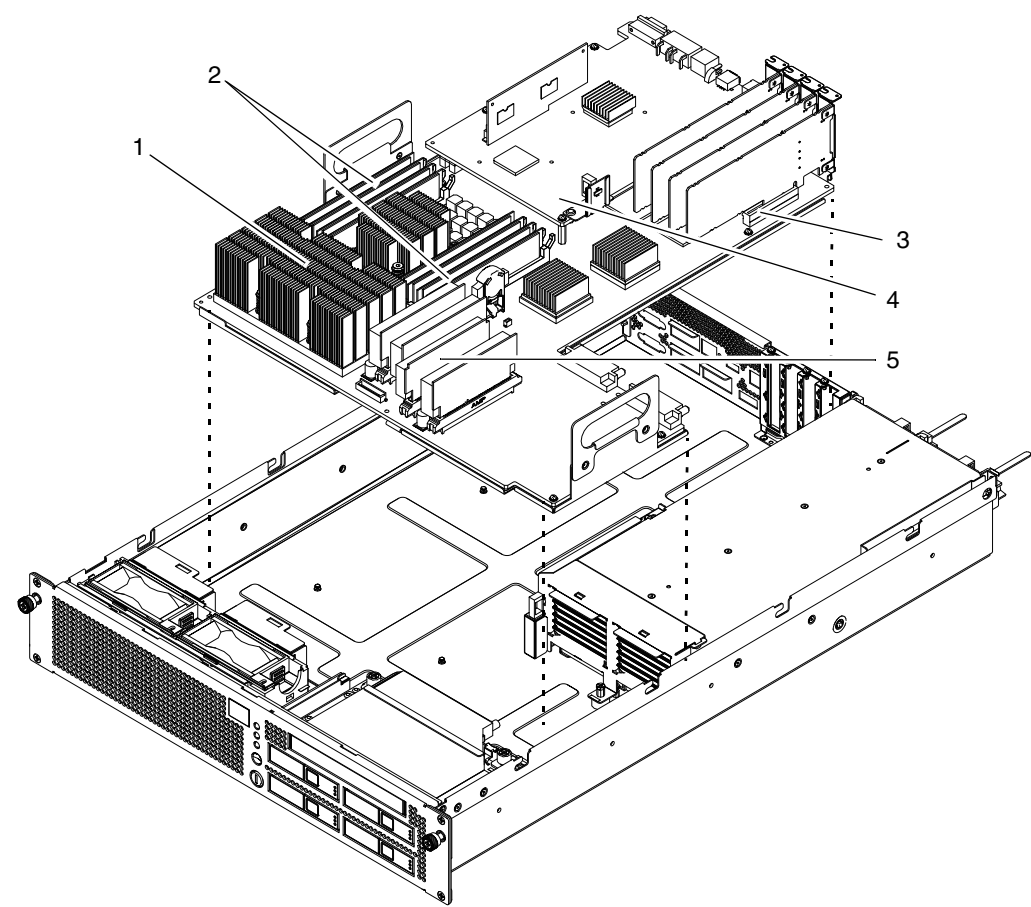
Location No.	Component	Maximum Number per Server
1	CPU	1
2	Memory slot	8
3	PCIe slot	4
4	eXtended System Control Facility unit (XSCF unit)	1
5	DC-DC converter	4

Note – The form of the DC-DC converter may be different depending on the motherboard unit which is mounted.

To replace the CPU, the XSCF unit, and the DC-DC converters, you must replace the motherboard unit.

To replace the motherboard unit, you must power the server off. For details, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.1.1 CPU

The CPU is fixed to the motherboard unit. To replace the CPU, therefore, you must replace the motherboard unit. For information on how to replace the motherboard unit, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.1.2 Memory Slot

The M3000 server has eight memory slots. The server uses DDR2 SDRAM, as mountable memory, that has the following functions:

- Data protection by ECC
- Recovery from memory chip failure

FIGURE 1-5 shows the memory slot locations.

FIGURE 1-5 Memory Slot Locations
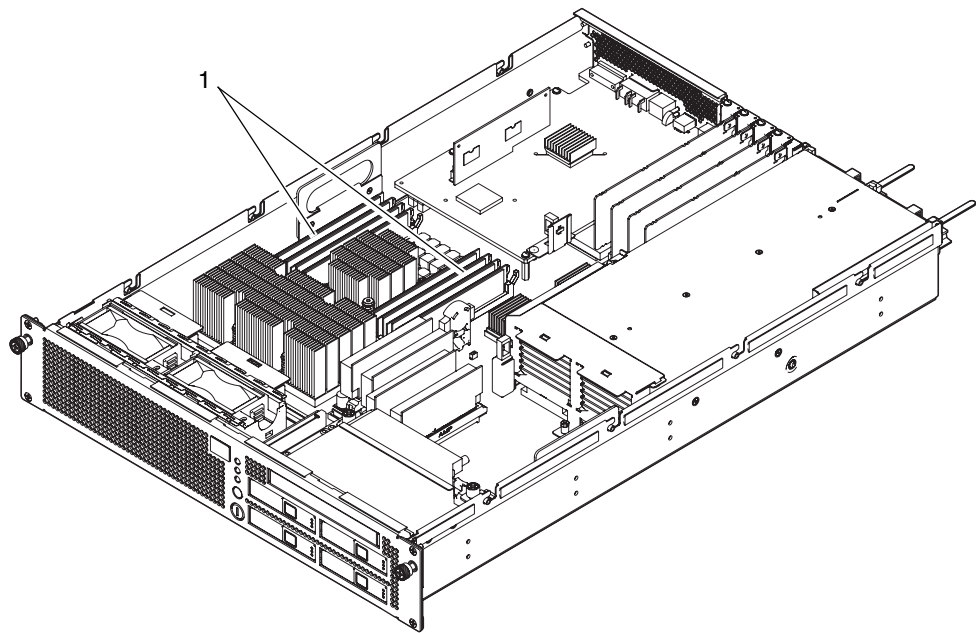
Location No.	Component	Maximum Number per Server
1	Memory slot	8

For information on how to replace the memory module, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.1.3 PCIe Slot

The M3000 server has four PCIe (x8 lanes) slots and supports low profile PCIe cards.

The PCIe features include a high-speed serial point-to-point interconnect. Compared with PCI-X, the PCIe data transfer rates are doubled.

FIGURE 1-6 shows the PCIe slot locations.

FIGURE 1-6 PCIe Slot Locations
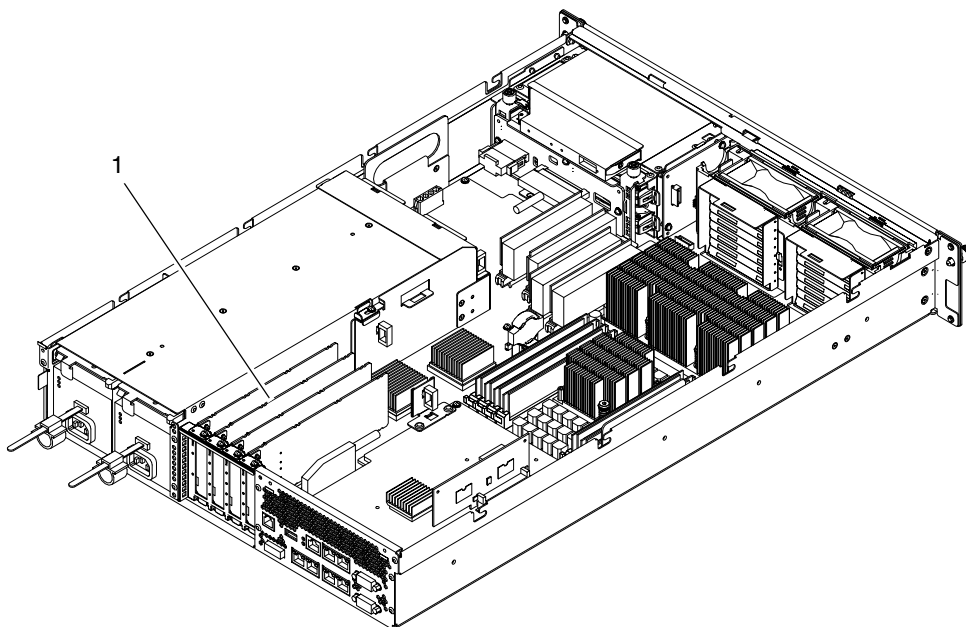
Location No.	Component	Maximum Number per Server
1	PCIe slot	4

For information on how to replace the PCIe card, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.1.4 eXtended System Control Facility Unit (XSCF Unit)

The eXtended System Control Facility unit (XSCF unit) contains the eXtended System Control Facility (XSCF) that operates and controls the server. The XSCF diagnoses and starts the server, controls the domain, and detects and notifies various failures.

The XSCF unit provides the following interfaces to enable terminals such as personal computers or workstations to connect to the XSCF. For the location and the number of each port, see .

- Serial port

  The system administrator can operate the server through the serial port. The XSCF Shell can be used to set up and control the server.

- LAN ports

  The system administrator can operate the server remotely through the LAN ports. The XSCF Shell or XSCF Web can be used to set up and control the server.

The following additional interfaces are also provided to control the system:

- UPS controller (UPC) ports

  An uninterruptible power supply (UPS) can be connected to the UPC port. Using a UPS enables stable power supply to the system when a power failure or an extensive power interruption occurs. This allows emergency shutdown processing to be performed when a power failure is detected.

- Remote Cabinet Interface (RCI) port

  A peripheral device having an RCI connector is connected to the RCI port on the server to enable power supply synchronization and error monitoring.

Note – For information on whether the RCI function is supported for your server, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Product Notes*.

- USB port

  This USB port is dedicated for use by field engineers and cannot be connected to general-purpose USB devices.

The XSCF unit is fixed to the motherboard unit. To replace the XSCF unit, therefore, you must replace the motherboard unit. For information on how to replace the motherboard unit, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.1.5   DC-DC Converter

The DC-DC converter is a component that converts DC input to another voltage level.

To replace the DC-DC converter, you must replace the motherboard unit. For information on how to replace the motherboard unit, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.2 Fan Unit

The fan unit generates airflow in the server to suppress temperature increases in the server. The M3000 server uses 80 mm fan units for the cooling system.

The fan units are redundant, so system operation continues even if one fan unit fails. If a fan unit fails during system operation, you can replace the faulty fan unit using active/hot replacement procedures. The failure of the fan units can be detected by the XSCF.

FIGURE 1-7 shows the fan unit locations.

FIGURE 1-7   Fan Unit Locations
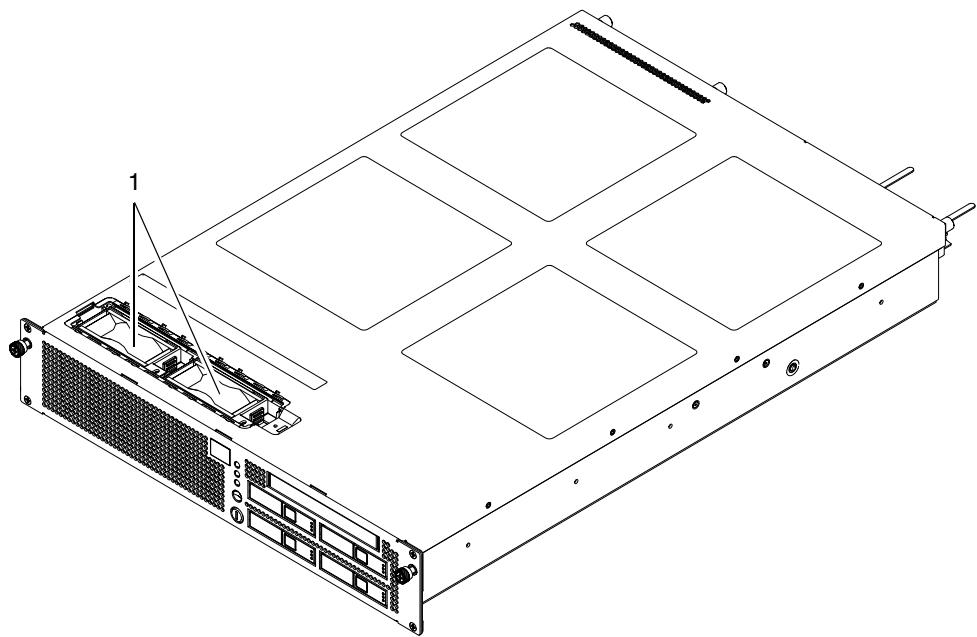
Location No.	Component	Maximum Number per Server
1	Fan unit (FAN_A#0, FAN_A#1)	2

For information on how to replace the fan unit, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.3 Power Supply Unit

The power to the server is supplied through the power supply units.

The power supply units are redundant, so system operation continues even if one power supply unit fails. If a power supply unit fails during system operation, you can replace the faulty power supply unit using active/hot replacement procedures. The failure of the power supply units can be detected by the XSCF.

FIGURE 1-8 shows the power supply unit locations.

FIGURE 1-8 Power Supply Unit Locations
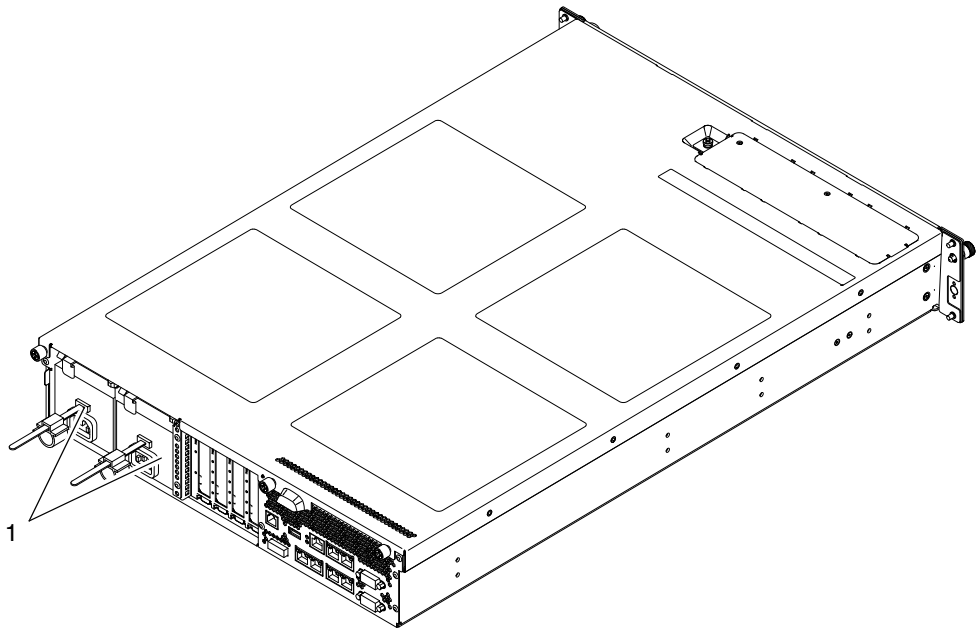
Location No.	Component	Maximum Number per Server
1	Power supply unit (PSU#0, PSU#1)	2

TABLE 1-4 lists the electrical specifications. For the other specifications, see the *SPARC Enterprise M3000 Server Site Planning Guide*.

TABLE 1-4   Electrical Specifications

Item	Specifications
Number of power cords	2 (one for each power supply unit)
Redundancy	1+1 redundant configuration
Input voltage	100 VAC to 120 VAC
	200 VAC to 240 VAC
Rated current[*]	4.80 A/5.15 A (100 VAC to 120 VAC)
	2.59 A/2.81 A (200 VAC to 240 VAC)
Frequency	50 Hz/60 Hz
Power factor[†]	0.98 (100 VAC to 120 VAC, full configuration)
	0.89 (200 VAC to 240 VAC, full configuration)

* In a redundant configuration, the rated current per cable is half the value shown in
  TABLE 1-4.

† This value applies to the full configuration.

For information on how to replace the power supply unit, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.4 Operator Panel

The operator panel displays the system status, system problem alerts, and location of system faults. It also stores system identification information and user setting information. For details of the operator panel function, see the *SPARC Enterprise M3000 Server Service Manual*.

FIGURE 1-9 shows the operator panel location.

FIGURE 1-9 Operator Panel Location
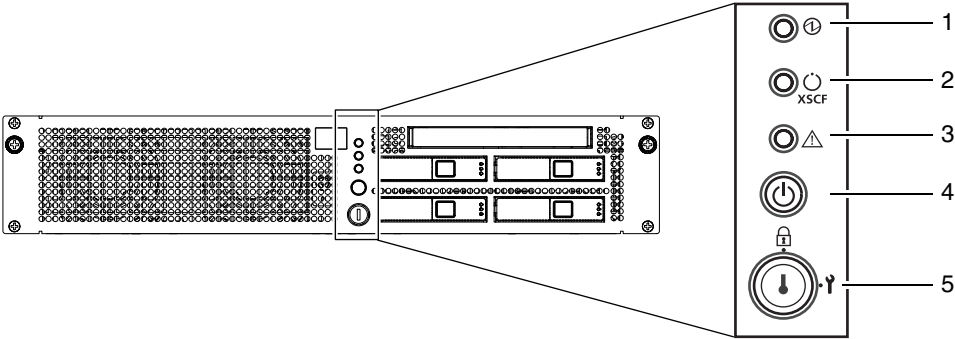
Location No.	Component
1	POWER LED
2	XSCF STANDBY LED
3	CHECK LED
4	POWER button
5	Mode switch (key switch)

TABLE 1-5 and TABLE 1-6 list the states of the server displayed with the LEDs on the operator panel and the switch functions.

TABLE 1-5   Switches (Operator Panel)

Switch	Name			Description of function
▮	Mode Switch (Key Switch)			This switch is used to set the operation mode for the server. Insert the special key that is under the customer's control, to switch between modes.
		🔒	Locked	Normal operation mode • The system can be powered on with the power button, but it cannot be powered off with the power button. • The key can be pulled out at this key position.
		🔧	Service	Mode for maintenance • The system can be powered on and off with the power button. • The key cannot be pulled out at this key position. • To stop and maintain the server, set the mode to Service.
⏻	Power button			This button is used to turn on or turn off the power to the server (all domains). Power on and power off are controlled by pressing this button in different patterns, as described below.
		Holding down the button for a short time (less than 4 seconds)		Regardless of the mode switch setting, the server is powered on. If set in the XSCF, facility (air conditioners) power-on and warm-up processing is skipped. *
		Holding down the button for a long time in Service mode (4 seconds or longer)		• If power to the server is on, OS shutdown processing is executed for all domains before the system is powered off. • If the server is being powered on, the power-on processing is cancelled, and the server is powered off. • If the server is being powered off, the operation of the power button is ignored, and the power-off processing is continued.

* In normal operation, the server is powered on only when the data center environmental conditions satisfy the specified values. Then, the server remains in the reset state until the operating system is booted.

TABLE 1-6 LEDs on the Operator Panel

Icon	Name	Color	Description
⊕	POWER LED	Green	Indicates the server power status. • On: The power to the server (a domain) is on. • Off: The power to the server is off. • Blinking: The server is powered off.
◯ XSCF	XSCF STANDBY LED	Green	Indicates the XSCF unit status. • On: XSCF unit is functioning normally. • Off: Input power source is off or is just after turned on, and XSCF unit is stopped. • Blinking: System initialization is in progress after power was turned on.
⚠	CHECK LED	Amber	Indicates that the server has detected an error. This is sometimes called a locator. • On: An error that hinders startup was detected. • Off: Normal, or power is not being supplied. • Blinking: Indicates that the unit is a maintenance target.

The operator panel displays the states of the server using combinations of three LEDs in addition to the states listed in TABLE 1-6. TABLE 1-7 lists the states that are usually displayed in the course of operation from power-on to power-off of the server.

TABLE 1-7 State Display by Combination of LEDs on the Operator Panel

Name			Description
POWER *	XSCF STANDBY	CHECK	
⊕	◯ XSCF	⚠	
Off	Off	Off	Power is not being supplied.
Off	Off	On	Power has been turned on.
Off	Blinking	Off	The XSCF unit is being initialized.
Off	Blinking	On	An error occurred in the XSCF unit.

TABLE 1-7 State Display by Combination of LEDs on the Operator Panel *(Continued)*

Name			Description
POWER *	**XSCF STANDBY**	**CHECK**	
①	◯ XSCF	⚠	
Off	On	Off	The XSCF unit is in the standby state. The server is waiting for power-on of the air conditioning facilities in the data center.
On	On	Off	Warm-up standby processing is in progress (power is turned on after the end of processing). The power-on sequence is in progress. The server is in operation.
Blinking	On	Off	The power-off sequence is in progress. (The fan units are stopped after the end of processing.)

* READY LED is referred to when the XSCF unit status is indicated.

Note – Some FRUs are equipped with status LEDs. For details of the status LEDs, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.5 On-board Drive Units

The M3000 server contains the following on-board drives:

- Hard Disk Drive
- CD-RW/DVD-RW Drive Unit

FIGURE 1-10 shows the locations of the on-board drive units.

FIGURE 1-10 Locations of Hard Disk Drives and CD-RW/DVD-RW Drive Unit
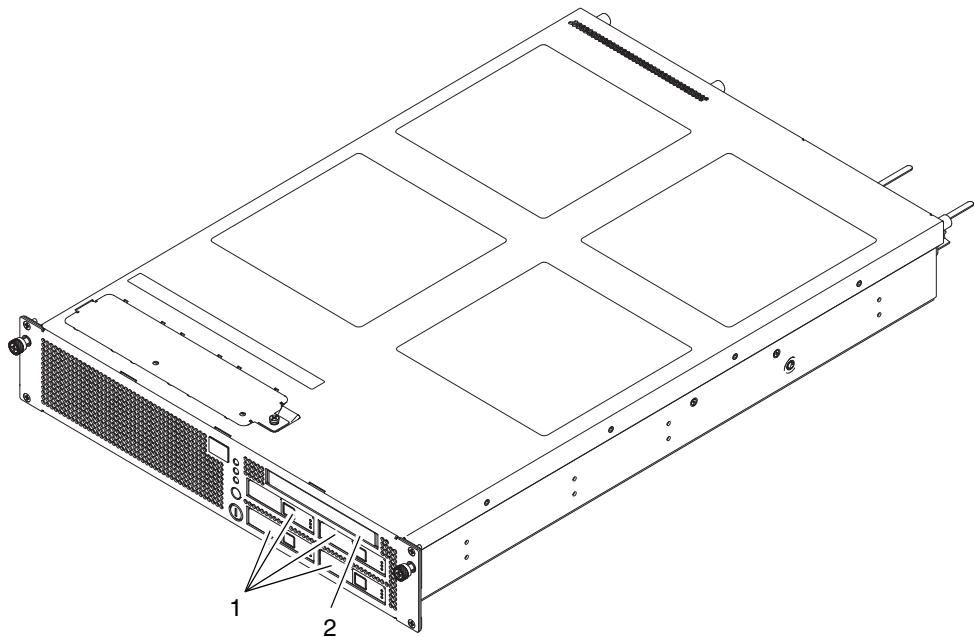
Location No.	Component	Maximum Number per Server
1	Hard disk drive (HDD#0, HDD#1, HDD#2, HDD#3)	4
2	CD-RW/DVD-RW drive unit (DVDU)	1

1.4.5.1 Hard Disk Drive

The M3000 server uses the SAS interface to implement high-speed data transfer.

When connecting multiple hard disks, you can configure these hard disks as the mirroring disks by the Hardware RAID or the software RAID.

For information on how to replace the hard disk drives, see the *SPARC Enterprise M3000 Server Service Manual*.

1.4.5.2 CD-RW/DVD-RW Drive Unit

The M3000 server supports the DVD-ROM, DVD-R/DVD-RW, CD-ROM, and CD-R/CD-RW formats and enables up to 8X read/write on DVD and up to 24X read/write on CD.

For information on how to replace the CD-RW/DVD-RW drive unit, see the *SPARC Enterprise M3000 Server Service Manual*.

There are two types of CD-RW/DVD-RW drive units: slot-loading type and tray-loading type.

FIGURE 1-11 Types of CD-RW/DVD-RW Drive Unit

Location No.	Component
1	Tray-loading CD-RW/DVD-RW drive unit
2	Slot-loading CD-RW/DVD-RW drive unit

Note – The locations of the LED and button might vary depending on the servers.

> **Note –** When you use the medium on the tray-loading type CD-RW/DVD-RW drive unit, make sure that the center of the medium is secured to the clamp of the tray, and then push the tray into the drive.

1.4.6   I/O Port

The following interfaces are provided to connect the M3000 server to networks and a external device:

■ GbE Port

■ SAS Port

FIGURE 1-12 shows the locations of the I/O ports.

FIGURE 1-12 I/O Ports Locations
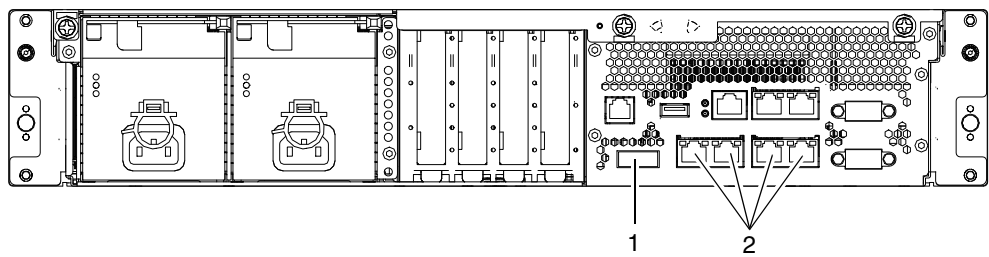
Location No.	Component	Maximum Number per Server
1	SAS port	1
2	GbE port (for Oracle Solaris OS)	4

1.4.6.1   GbE Port

The GbE ports connect the Oracle Solaris OS to networks. Because the ports support the 1000BASE-T GbE connection, high-speed and high-capacity data transmission is possible.

1.4.6.2 SAS Port

The SAS port connects the server to an external device, such as a tape drive, which has a SAS interface. For information on which devices can be connected, contact a service engineer.
Note that the transfer rate of this port is up to 600 MB/s (3Gbps x 2wide).

Note – Even though the SAS port has four lanes, only two lanes can be used with this port.

System Functions

This chapter explains the following hardware and software functions of the M3000 server.

2.1 Hardware Configuration

This section explains the hardware configuration, which includes the following topics:

- CPU
- Memory Subsystem
- I/O Subsystem
- System Bus
- System Control

2.1.1 CPU

The M3000 server contains the multi-core SPARC64 VII+ or SPARC64 VII processors that provide high performance. The SPARC64 VII+ and SPARC64 VII processors contain on-chip large-capacity caches (primary and secondary caches) to minimize memory latency. They also support an instruction retry function that enables continuous processing by retrying instructions whenever any error is detected.

2.1.2 Memory Subsystem

The memory subsystem controls memory access and cache memory. The M3000 server uses DDR2 SDRAMs and can contain up to eight memory modules. The memory subsystem supports up to two-way memory interleaving for high-speed memory access.

2.1.3 I/O Subsystem

The I/O subsystem controls data transfer with I/O devices.

The I/O subsystem of the M3000 server contains the following:

- PCIe cards

    PCIe (x8 lane) slots

- I/O controller (IOC) chip, which is the bridge chip between the system bus and the I/O bus
- PCI Express switch connected to slots
- SAS port

2.1.4 System Bus

The CPU, memory subsystem, and I/O subsystem are directly connected to implement data transfer by using a high-speed broadband switch.

If a data error is detected in the CPU, memory access controller (MAC), or I/O controller (IOC), the system bus agent corrects the data and then transfers it.

2.1.5 System Control

The M3000 server is controlled by the eXtended System Control Facility (XSCF). The XSCF operates on a dedicated service processor, which operates independently from the processor of the server. As long as the power is supplied to the server, the XSCF constantly monitors the server even if the domain power is off.

For details, see Section 2.6, "XSCF Firmware" on page 2-7 and the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

2.2 Domain

The function that divides one server into multiple independent systems is called partitioning. The partitioning function enables arbitrary assignment of resources in the server according to the job load or processing amount. Individual systems thus divided are referred to as domains. Each domain runs on an independent Oracle Solaris OS.

However, the M3000 server does not support the partitioning function and, therefore, the server cannot be divided into multiple domains. All resources in the server are allocated to a single domain that is preconfigured.

The basic hardware resource making up a domain is called the physical system board (PSB). The physical units (CPU, memory, I/O) making up the PSB are logically divided, and each divided configuration unit is called the extended system board (XSB). The types of XSB include the XSB making up a PSB not logically divided into multiple parts (Uni-XSB), and each XSB making up a PSB logically divided into four parts (Quad-XSB).

The PSB mounted in the M3000 server has one Uni-XSB. Because the system is not divided, there is only one domain.

For details on the domain, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Administration Guide*.

2.3 Resource Management

This section explains the Oracle Solaris Zone function that supports reconfiguration of domain resources during system operation.

The Oracle Solaris OS has a function called Oracle Solaris Zone, which divides processing resources and allocates them to applications. The Oracle Solaris Zone provides flexible resource allocation, which enables optimal resource management with consideration given to the processing load.

In a domain, resources can be divided into sections called containers. The processing sections are allocated to each application. The processing resources are managed independently in each container. If a problem occurs in a container, the container can be isolated so that it does not affect other containers.

2.4 RAS

RAS means the functions related to Reliability, Availability, and Serviceability.

The RAS function minimizes the system downtime by providing error checking at adequate locations, and centralized monitoring and control of error checking. It further correctly determines faulty locations and enables replacement of faulty components during operation to minimize the system downtime.

■ Reliability

■ Availability

■ Serviceability

2.4.1 Reliability

Reliability represents the length of time the server can operate normally without failure.

Reliability is equally important to both hardware and software.

To improve quality, adequate components must be selected with consideration given to the product service life and the required response in case of a failure. In evaluations such as stress tests that check the service life, components and products are inspected to determine whether they meet the target reliability levels. Furthermore, software could have problems attributable not only to programming errors by also to hardware faults. These factors need to be taken into consideration to improve the reliability of the entire system.

The M3000 server provides the following functions to implement high reliability:

■ Periodic software diagnosis (host watchdog monitoring)

Cooperates with XSCF firmware to periodically check whether the software including the Oracle Solaris OS is running in the domain.

■ Periodic memory patrol

Periodically performs memory patrol to detect memory software errors and stuck-at faults, even in memory areas not normally used. Memory patrol prevents faulty memory areas from being used by the OS or the application software and thereby prevents the occurrence of system failures.

■ Status checking of components

Keeps checking the status of each component to detect signs of an imminent fault, such as system down occurrences, and thereby prevents system failures.

2.4.2 Availability

Availability represents the ratio of time the server is accessible and usable. An operating ratio is used as an index.

Hardware and software problems in the system cannot be eliminated completely. To provide high availability, the system must be incorporated with mechanisms that enable continuous system operation even if a failure occurs in hardware such as components and devices, or in software such as the OS or business application software.

The M3000 server provides the following functions to implement high availability:

- Supports redundant configurations and active/hot replacement of power supply units and fan units
- Supports redundant configurations and active/hot replacement of hard disk drives by RAID technology
- Extends the range of automatic correction of temporary faults in memory, system buses, and LSI internal data
- Supports the enhanced retry function and degradation function for detected faults
- Shortens the system downtime by using automatic system reboot
- Shortens the time taken for system startup
- Collects fault information by the XSCF, and provides preventive maintenance using different types of warnings
- Supports the advanced ECC in the memory subsystem, which enables single-bit error correction to continue processing in response to continuous burst read errors caused by memory device failures
- Supports the memory patrol function implemented in hardware, that detects and corrects memory errors without affecting software processing

In addition, combination with clustering software or operating management software can implement higher availability.

2.4.3 Serviceability

Serviceability is characterized by how easily a server fault can be diagnosed, and how quickly the server can be recovered from the fault or how easily the fault can be corrected.

To implement high serviceability, it must be possible to easily determine the components or devices that caused faults. Furthermore, to recover from failures, the system must be able to determine the cause of the failures and isolate the faulty

components, so that the field engineer can replace them with ease. In addition, it is important to notify the system administrator or field engineer of the symptoms in an easy-to-understand manner.

The M3000 server provides the following functions to implement high serviceability:

- Status LEDs that are mounted on the operator panel, main replaceable components, and components that support active/hot replacement
- Remote monitoring of the server operating status and remote maintenance function using XSCF
- LED blinking function to indicate the maintenance target (CHECK LED, which is also called the locator LED)
- Notes and cautions marked on various label types for the system administrators and field engineer
- Automatic notification to report different types of faults to the system administrator and field engineer
- Centralized systematic monitoring, such as with SNMP, of complex systems such as in the data center

2.5 Oracle Solaris Operating System

The M3000 server uses the Oracle Solaris OS. The Oracle Solaris OS has the following features:

- Long-cultivated reliability
- Affinity that fully brings out hardware performance of the SPARC architecture
- A variety of application software and middleware
- Resource management with Oracle Solaris Zone using Oracle Solaris container technology
- Advanced system management in cooperation with XSCF

For information on the Oracle Solaris OS, refer to the documents on the following URL:

http://www.oracle.com/technetwork/documentation/index.html

2.6 XSCF Firmware

The M3000 server uses the XSCF firmware to manage the system. The XSCF firmware, which is preinstalled in the service processor on the XSCF unit before shipment from the factory, enables you to configure, manage, and maintain system components.

2.6.1 User Interfaces

The XSCF provides two types of user interfaces.

- XSCF Shell

  The XSCF Shell is a command-line interface used by connecting terminals such as a personal computer and workstation to the server through a serial connection or LAN connection.

  In a serial connection, the shell commands supported by XSCF can be used by connecting a terminal to the serial port on the server. In addition, the console redirection function provided by XSCF allows the terminal to be used as an OS console.

  In a LAN connection, the shell commands supported by XSCF can be used by connecting a terminal to XSCF through Secure Shell (SSH) or telnet.

- XSCF Web

  The XSCF Web is a browser interface used by connecting terminals to the server through a LAN connection. The terminal is connected to XSCF using the browser running on the terminal.

For details of how to connect and use the interfaces, see the following documents:

- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF Reference Manual*
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Administration Guide*

2.6.2 XSCF Functional Overview

The XSCF provides commands to manage the system platform, access control, security, faults, logs, and domain.

System management

The XSCF provides the following monitoring functions to increase system availability:

- Centralized control and monitoring of the server
- Hardware configuration management and monitoring
- Fan unit and power supply unit monitoring
- System status monitoring
- Fault monitoring
- Domain status monitoring
- Remote system monitoring through a LAN connection
- Notification of faulty information to the system administrator

Security management

The XSCF provides the following functions to ensure system security:

- User privilege management

  Manages the privileges of user accounts used to operate XSCF. The XSCF operation range of each user can be limited based on the user account types and settings.

- Access management by filtering

  Provides the filtering function for permitting IP addresses used to access XSCF and the encryption function based on SSH and SSL.

- Log management

  Stores the log data that can be used to investigate the causes of system errors including operation failures and unauthorized accesses during system operation.

System status management

The XSCF provides the following functions to manage the system status:

- Management of resources such as CPUs, memory, and I/O systems while the Oracle Solaris OS is running
- Management of errors and faults occurring in fan units and power supply units

Information on system operation and errors is stored as log data in XSCF. The log data is used to analyze system problems. The system administrator, domain administrator, and field engineer can access the log data.

Fault detection and management

The XSCF continuously monitors the status of the server for stable system operation, and does the following if a fault is detected:

- Prompt collection of fault information (hardware log)
- Analysis of fault information
- Identification of the faulty location

Hardware error and fault information are stored in XSCF. For information on the error messages displayed and their explanations, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

The XSCF degrades the faulty components to continue system operation or resets the system to prevent another problem from occurring.

Remote control and monitoring of the system

The XSCF provides the following functions to enable remote management of the server:

- Remote system monitoring through a LAN connection
- Notification of fault information to the system administrator
- Remote console input/output

2.6.3 Airflow Indicator

The airflow indicator indicates the amount of air emitted from the server while the M3000 server is up and running. To display the value, use the showenvironment air command.

CODE EXAMPLE 2-1

```
XSCF> showenvironment air
Air Flow:63CMH
```

The value does not include the peripheral devices.

Note – The showenvironment air command displays the calculated airflow based on the fan speed such as Low speed (level -1) or High speed (level -7) etc. The fan speed is displayed by the showenvironment Fan command.

For details of the showenvironment(8) command, refer to the man page. For installation details of the SPARC Enterprise M3000 server, see the *SPARC Enterprise M3000 Server Site Planning Guide* and the *SPARC Enterprise M3000 Server Installation Guide*.

You can also obtain the exhaust air data using the SNMP agent function. To obtain the data of exhaust air using the SNMP agent function, install the latest XSCF extension MIB definition file to the SNMP manager. For details on the XSCF extension MIB definition file, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

2.6.4 Power Consumption Monitoring Function

The power consumption monitoring function confirms the amount of power consumed while the SPARC Enterprise M3000 server is up and running.

To display the power consumption, use the showenvironment power command.

CODE EXAMPLE 2-2

```
XSCF> showenvironment power
Permitted AC power consumption:470W
Actual AC power consumption:450W
```

Note – The values displayed by the power consumption monitoring function are for reference only. The power consumption value of the server varies by the conditions such as the power supply in use, CPU types, or system configurations, or system load.

For details of the showenvironment(8) command, see the man page. For installation details of the SPARC Enterprise M3000 server, see the *SPARC Enterprise M3000 Server Site Planning Guide*.

You can also obtain the power consumption data using the SNMP agent function. To obtain the power consumption data using the SNMP agent function, install the latest XSCF extension MIB definition file to the SNMP manager. For details on the XSCF extension MIB definition file, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

When there is a change in the power system, such as in the following occurrences, wait for one minute, then check the value again.

- During the server power-on or power-off, or after the power-on or power-off is complete

■ During the active replacement of a power supply unit, or after the active replacement is complete

APPENDIX **A**

DC Power Supply Model

This appendix describes the requirements specific to the DC power supply model.

Contact your sales representative for the DC power supply model.

To use the DC power supply model, make sure to read this information.

- Section A.1, "The Server Views" on page A-2

  This is equivalent to Section 1.3, "Component Names" on page 1-7. When using the DC power supply model, refer to the content described in this appendix.

- Section A.2, "Electrical Specifications" on page A-4

  This is equivalent to TABLE 1-4. When using the DC power supply model, refer to the content described in this appendix.

- Section A.3, "Power Consumption Monitoring Function" on page A-5

  This is equivalent to Section 2.6.4, "Power Consumption Monitoring Function" on page 2-10. When using the DC power supply model, refer to the content described in this appendix.


Note – The content not mentioned in this appendix is common to the AC power supply model and the DC power supply model. Refer to the description in each chapter.

A.1 The Server Views

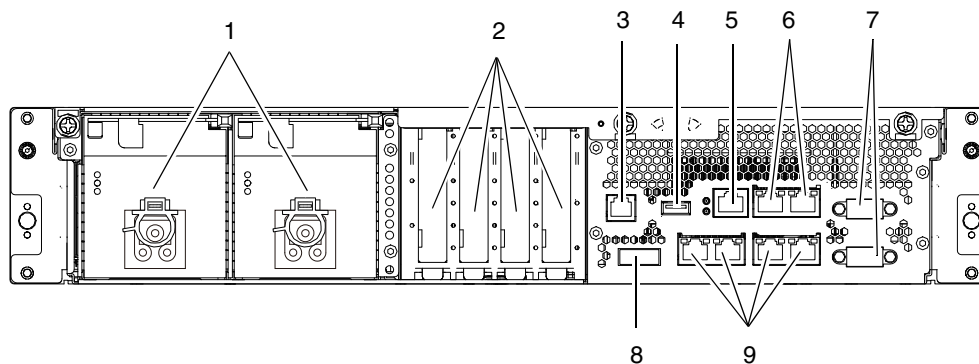This section describes the names of parts mounted on the DC power supply model.

Note – This is equivalent to Section 1.3, "Component Names" on page 1-7. When using the DC power supply model, refer to the content described in this appendix.

FIGURE A-1 Front View of the Server
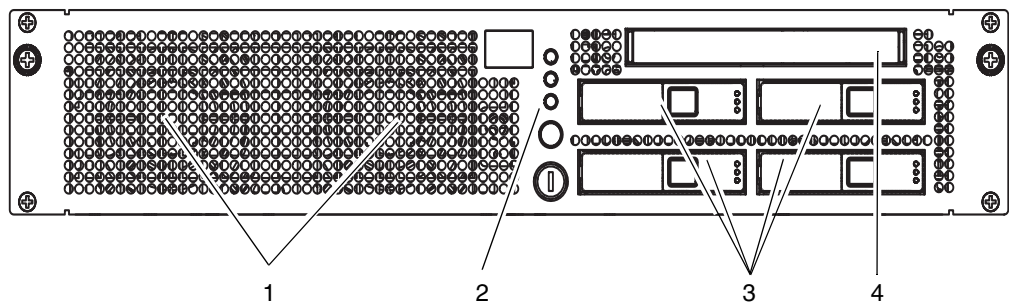
Location No.	Component	Maximum Number per Server
1	Fan unit (FAN_A)	2
2	Operator panel (OPNL)	1
3	Hard disk drive (HDD) (2.5-inch SAS disk)	4
4	CD-RW/DVD-RW drive unit (DVDU)	1

FIGURE A-2   Rear View of the Server (DC Power Supply Model)

Location No.	Component	Maximum Number per Server
1	Power supply unit (PSU)	2
2	PCIe slot	4
3	RCI port[*]	1
4	USB port (for XSCF)	1
5	Serial port (for XSCF)	1
6	LAN port (for XSCF)	2
7	UPC port	2
8	Serial Attached SCSI (SAS) port	1
9	Gigabit Ethernet (GbE) port (for OS)	4

* For information on whether the RCI function is supported for your server, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Product Notes*.

A.2 Electrical Specifications

This section describes the electrical specifications of the DC power supply model.

Note – This is equivalent to TABLE 1-4. When using the DC power supply model, refer to the content described in this appendix.

TABLE A-1   Electrical Specifications

Item	Specifications	
Number of power cords	2 (one for each power supply unit)	
Redundancy	1 + 1 redundant configuration	
Input voltage	-48 Vdc	-60 Vdc
Rated current[*]	10.52 A	8.50 A

* In a redundant configuration, the rated current per cable is half the value shown in TABLE A-1.

A.3   Power Consumption Monitoring Function

This section describes the Power Consumption Monitoring Function of the DC power supply model.

Note – This is equivalent to Section 2.6.4, "Power Consumption Monitoring Function" on page 2-10. When using the DC power supply model, refer to the content described in this appendix.

The power consumption monitoring function confirms the amount of power consumed while the SPARC Enterprise M3000 server is up and running.

To display the power consumption, use the showenvironment power command.

CODE EXAMPLE A-1

```
XSCF> showenvironment power
Permitted DC power consumption:470W
Actual DC power consumption:450W
```

Note – The values displayed by the power consumption monitoring function are for reference only. The power consumption value of the server varies by the conditions such as the power supply in use, CPU types, or system configurations, or system load.

For details of the showenvironment(8) command, see the man page. For installation details of the SPARC Enterprise M3000 server from Oracle and Fujitsu, see the *SPARC Enterprise M3000 Server Site Planning Guide*.

You can also obtain the power consumption data using the SNMP agent function. To obtain the power consumption data using the SNMP agent function, install the latest XSCF extension MIB definition file to the SNMP manager. For details on the XSCF extension MIB definition file, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

When there is a change in the power system, such as in the following occurrences, wait for one minute, then check the value again.

- During the server power-on or power-off, or after the power-on or power-off is complete
- During the active replacement of a power supply unit, or after the active replacement is complete

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