Sun Fire™ T1000 Server Service Manual

Sun Microsystems, Inc.
www.sun.com

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Preface

The *Sun Fire T1000 Service Manual* provides information to aid in troubleshooting problems with and replacing components within the Sun Fire™ T1000 server.

This manual is written for technicians, service personnel, and system administrators who service and repair computer systems. The person qualified to use this manual:

- Can open a system chassis, identify, and replace internal components.
- Understands the Solaris Operating System and the command-line interface.
- Has superuser privileges for the system being serviced.
- Understands typical hardware troubleshooting tasks.

How This Book Is Organized

This guide is organized into the following chapters:

Chapter 1 describes the main features of the Sun Fire T1000 server

Chapter 2 describes the diagnostics that are available for monitoring and troubleshooting the Sun Fire T1000 server.

Chapter 3 describes how to remove and replace the FRUS.

Appendix A lists the customer-replaceable components in the Sun Fire T1000 server.

Using UNIX Commands

Use this section to alert readers that not all UNIX commands are provided. For example:

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris™ operating environment
- Other software documentation that you received with your system

Typographic Conventions

Typeface[1]	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*.

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

Shell Prompts

Shell	Prompt
C shell	*machine-name*`%`
C shell superuser	*machine-name*`#`
Bourne shell and Korn shell	`$`
Bourne shell and Korn shell superuser	`#`

Sun Fire T1000 Server Documentation

You can view and print the following documents from the Sun documentation web

site at http://www.sun.com/documentation

Title	Description	Part Number
Sun Fire T1000 Server Site Planning Data Guide	Site planning information for the Sun Fire T1000 server	819-3246
Sun Fire T1000 Server Product Notes	Late-breaking information about the server. The latest notes are posted at: http://www.sun.com/documentation	819-3244
Sun Fire T1000 Server Product Overview	Provides an overview of the features of this server	819-3247
Sun Fire T1000 Server Getting Started Guide	Information about where to find documentation to get your system installed and running quickly	819-3249
Sun Fire T1000 Server Installation Guide	Detailed rack mounting, cabling, power-on, and configuration information	819-3248
Sun Fire T1000 Server System Administration Guide	How to perform administrative tasks that are specific to the Sun Fire T1000 server	819-3250
Advanced Lights Out Management (ALOM) CMT v1.1 Guide	How to use the Advanced Lights Out Manager (ALOM) software on the Sun Fire T1000 server	819-3246

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Please include the title and part number of your document with your feedback:

Sun Fire T1000 Server Service Manual, part number 819-3248-10

CHAPTER 1

Sun Fire T1000 Server Overview

This chapter provides an overview of the features of the Sun Fire T1000 server.

The following topics are covered:

- "Sun Fire T1000 Server Features" on page 1
- "Chassis Identification" on page 6

Sun Fire T1000 Server Features

The Sun Fire T1000 server FIGURE 1-1 is a high-performance, entry-level server that is highly scalable and very reliable.

FIGURE 1-1 Sun Fire T1000 Server

Chip-Multitheaded (CMT) Multicore Processor and Memory Technology

The UltraSPARC® T1 multicore processor is the basis of the Sun Fire T1000 server. The UltraSPARC T1 processor is based on chip multithreading (CMT) technology that is optimized for highly threaded transactional processing. The UltraSPARC T1 processor improves throughput while using less power and dissipating less heat than conventional processor designs.

Depending on the model purchased, the processor has six or eight UltraSPARC cores. Each core equates to a 64-bit execution pipeline capable of running four threads. The result is that the 8-core processor handles up to 32 active threads concurrently.

Additional processor components, such the DDR2 memory controllers, L1 cache, L2 cache, and the Jbus I/O interface have been carefully tuned for optimal performance.

shows the major components in the Sun Fire T1000 server.

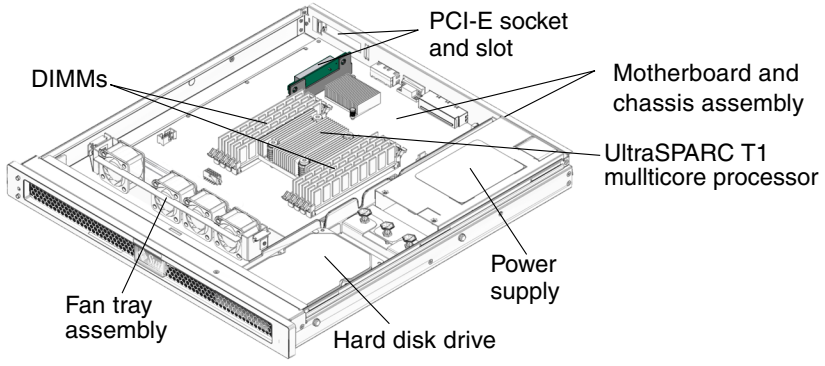

FIGURE 1-2 Sun Fire T1000 Server Components

Performance Enhancements

The Sun Fire T1000 server introduces several new technologies with its sun4v architecture and multicore, multithreaded UltraSPARC T1 multicore processor.

TABLE 1-1 lists feature specifications for the Sun Fire T1000 server.

TABLE 1-1 Sun Fire T1000 System Features

Feature	Description
Processor	1 UltraSPARC T1 multicore processor (6 or 8 cores)
Memory	8 slots that can be populated with one of the following types of DDR-2 DIMMs: • 512 MB (4 GB maximum) • 1 GB (8 GB maximum) • 2 GB (16 GB maximum)
Ethernet ports	4 ports, 10/100/1000 Mbit auto-negotiating. Each of the 4 Ethernet RJ45s includes two LEDs: • A green **Link** indicator, lit when a link is established at any speed, • A yellow **Activity** indicator, which blinks during packet transfers.
DB-9 serial port	1 DB-9 serial port
Internal hard disk drive	1 SATA disk drive, 3.5-inch form factor Support for hardware-embedded RAID 1 (mirroring)
Cooling	4 fans in a single assembly
PCI interface	1 PCI-Express (PCI-E) slot for low-profile cards (supports 1x, 4x, and 8x width cards)
Power	1 power supply (PS)
	ALOM system controller (integrated on motherboard) with a serial and 10/100 Mbit Ethernet port
Firmware	OpenBoot™ PROM for reset and POST support ALOM-CMT for remote management administration
Operating system	Solaris 10 1/06 or later Operating System preinstalled on the hard disk drive
Other software	Java™ Enterprise System with a 90-day trial license

For additional information on the Sun Fire T1000 server features refer to the *Sun Fire T1000 Server Product Overview*.

Remote Manageability With ALOM

The Sun Advanced Lights Out Manager (ALOM) feature is a system controller (SC) that enables to you remotely manage and administer the Sun Fire T1000 server.

The ALOM-CMT software is preinstalled as firmware, and therefore, ALOM initializes as soon as you apply power to the system. You can customize ALOM to work with your particular installation.

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

You can configure ALOM to send email alerts of hardware failures, hardware warnings, and other events related to the server or to ALOM. The ALOM circuitry runs independently of the server, using the server's standby power. Therefore, ALOM firmware and software continue to function when the server operating system goes offline or when the server is powered off. ALOM monitors the following Sun Fire T1000 server components:

- Hard disk drive status
- Enclosure thermal conditions
- Power supply status
- Voltage levels
- Faults detected by POST (Power-On Self-Test)
- Solaris OS Predictive Self Healing (PSH) diagnostic facilities

For information about configuring and using the ALOM system controller, refer to the *Sun Fire T1000 Server Advanced Lights Out Manager (ALOM) Guide*.

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 Fire T1000 server offers the following features:

- Environmental monitoring
- Error detection and correction for improved data integrity
- Easy access for most component replacements
- Extensive POST tests that automatically delete faulty components from the configuration.

- PSH automated run time diagnosis capability that takes faulty components off line.

For more information about using RAS features, refer to the *Sun Fire T1000 Server System Administration Guide*.

Environmental Monitoring

The Sun Fire T1000 server features an environmental monitoring subsystem designed to protect the server and its components against:

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

Temperature sensors throughout the system 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 panels. If the temperature condition persists and reaches a critical threshold, the system initiates a graceful system shutdown.

All error and warning messages are sent to the ALOM system controller system console and logged in the ALOM log file. Additionally, some FRUs such as the power supply provide LEDs that indicate a failure within the FRU.

Additionally, the power supply contains an LED that is lit to indicate a failure within the power supply.

Error Correction and Parity Checking

The SPARC T1 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 3MB L2 cache has parity protection on the tags, and ECC protection of the data.

Advanced ECC, also called Chipkill, detects up to 4-bits in error.

Predictive Self-Healing

The Sun Fire T1000 server features the latest fault management technologies. With the Solaris 10 Operating System (OS), Sun is introducing a new architecture for building and deploying systems and services capable of *predictive self-healing*. Self-healing technology enables Sun 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 Fire T2000 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.

Chassis Identification

FIGURE 1-3 and FIGURE 1-4 show the physical characteristics of the Sun Fire T1000 server.

FIGURE 1-3 Sun Fire T1000 Server Front Panel

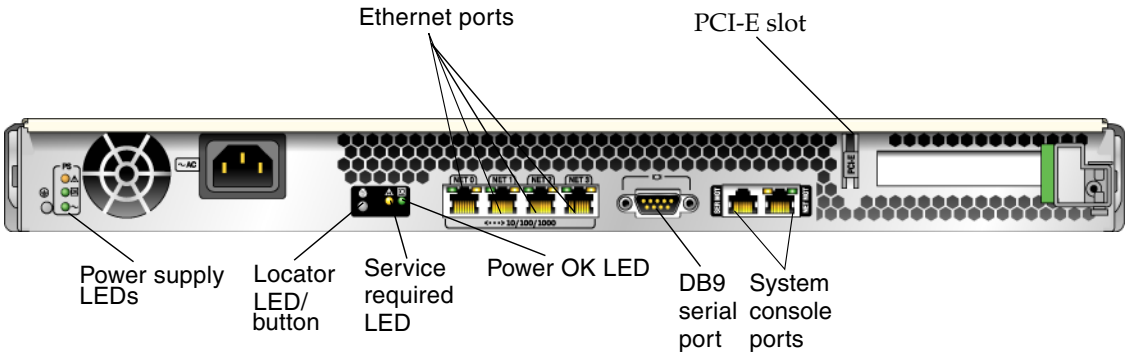

FIGURE 1-4 Sun Fire T1000 Server Rear Panel

Additional Service Related Information

In addition to this document, the following resources are available to help you keep your server running optimally:

- **Product Notes** – The *Sun Fire T1000 Server Product Notes* (819-3244) contain late breaking information about the system including required software patches, updated hardware and compatibility information, and solutions to know issues. The product notes are available online at:
  http://www.sun.com/documentation
- **Release Notes** – The Solaris OS Release Notes contain important information about the Solaris operating system. The release notes are available online at:
  http://www.sun.com/documentation
- **SunSolve™ Online** – Provides a collection of support resources. Depending on the level of your service contract, you have access to Sun patches, the Sun System Handbook, the SunSolve knowledge base, the Sun Support Forum, and additional documents, bulletins, and related links. Access this site at:
  http://sunsolve.sun.com
- **Predictive Self-Healing Knowledge Database** – You can access the knowledge article corresponding to a self-healing message by taking the Sun Message Identifier (SUNW-MSG-ID) and entering it into the field on this page:
  http://www.sun.com/msg

CHAPTER 2

Sun Fire T1000 Server Diagnostics

This chapter describes the diagnostics that are available for monitoring and troubleshooting the Sun Fire T1000 server. This chapter does not provide detailed troubleshooting procedures, but instead describes the Sun Fire T1000 server diagnostics facilities and how to use them.

This chapter is intended for technicians, service personnel, and system administrators who service and repair computer systems.

The following topics are covered:

- "Overview of Sun Fire T1000 Server Diagnostics" on page 9
- "Using LEDs to Identify the State of Devices" on page 14
- "Using ALOM For Diagnosis and Repair Verification" on page 17
- "Running POST" on page 27
- "Using the Solaris Predictive Self-Healing Feature" on page 35
- "Collecting Information From Solaris OS Files and Commands" on page 39
- "Managing System Components with Automatic System Recovery Commands" on page 40
- "Exercising the System with SunVTS" on page 43

Overview of Sun Fire T1000 Server Diagnostics

There are a variety of diagnostic tools, commands, and indicators you can use to troubleshoot a Sun Fire T1000 server.

- **LEDs** – provide a quick visual notification of the status of the server and of some of the FRUs.

- **ALOM-CMT** firmware – is the system firmware that runs on the system controller. In addition to providing the interface between the hardware and OS, ALOM also tracks and reports the health of key server components. ALOM works closely with POST and Solaris predictive self healing technology to keep the system up and running even when there is a faulty component.
- **Power-On self-test (POST)** – Performs diagnostics on system components upon system reset to ensure the integrity of those components. POST is configureable and works with ALOM to take faulty components offline if needed and blacklist them in the *asr-db*.
- **Solaris OS predictive self healing (PSH)** – Continuously monitors the health of the CPU and memory, and works with ALOM to take a faulty component offline if needed.
- **Log files and console messages** – Provide the standard Solaris OS log files and investigative commands that can be accessed and displayed on the device of your choice.
- **SunVTS™** – is an application you can run that exercises the system, provides hardware validation, and discloses possible faulty components with recommendations for repair.

The LEDs, ALOM, Solaris OS PSH, and many of the log files and console messages are integrated. For example, a fault detected by the Solaris PSH software will display the fault, log it, pass information to ALOM where it is logged, and depending on the fault, might result in the illumination of one or more LEDs.

The diagnostic flowchart in FIGURE 2-1 and TABLE 2-1 describe an approach for using the servers diagnostics that is likely identify a faulty field-replaceable unit (FRU). The diagnostics you use, and the order in which you use them, depend on the nature of the problem you are troubleshooting, so you might not follow this flow step-by-step.

The flowchart assumes that you have already performed some rudimentary troubleshooting such as verification of proper installation, visual inspection of cables and power, and possibly reset server (For details, refer to the *Sun Fire T1000 Server Installation Guide and Sun Fire T1000 Server Administration Guide*.

Use this flow chart to understand what diagnostics are available to troubleshoot faulty hardware, and use TABLE 2-1 to find more information about each diagnostic in this chapter.

For many faults, service can be deferred, either because the faulty component has been asr'd out, the fault is being corrected, or the fault is predictive

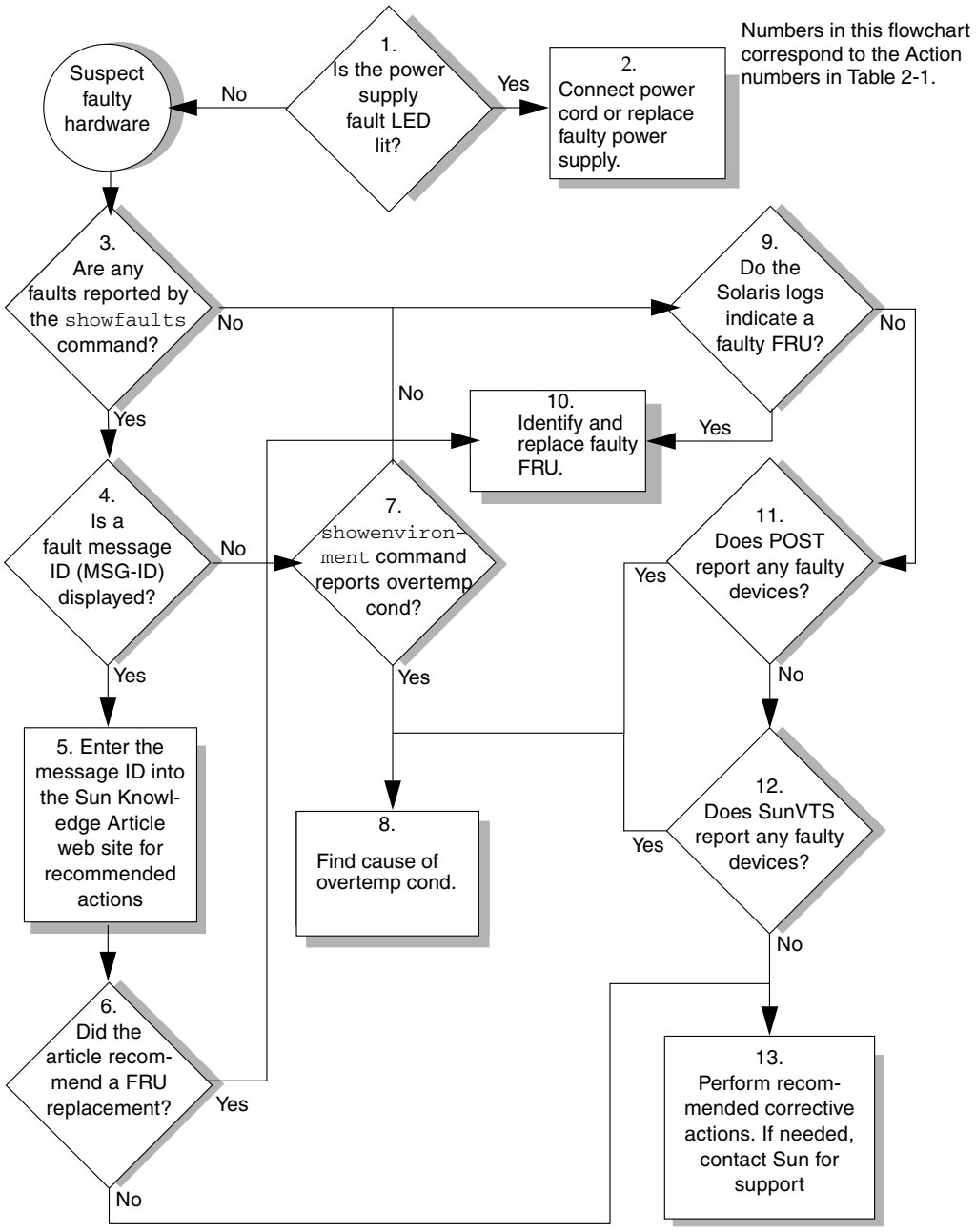

FIGURE 2-1 Diagnostic Flow Chart

TABLE 2-1 Diagnostic Flow Chart Actions

Action No.	Diagnostic Action	Resulting Action	For more information, see these sections
1.	Check the power supply fault LED.	The amber Fault LED indicates the power cord in unplugged or the power supply is faulty. • If the Fault LED is lit, go to Action 2.	
2.	Check the power cord.	Connect the power cord. • If the Fault LED is still lit, replace faulty power supply. • If the green LEDs are lit, go to Action 3.	"To Remove the Power Supply" on page 61 and "To Replace the Power Supply" on page 62
3.	Run the ALOM `showfaults` command.	The `showfaults` command displays faults detected by the system firmware. • If faults are displayed, go to Action 2. • If no faults are displayed, go to Action 6.	"To Run the `showfaults` Command" on page 21
4.	Check fault message for a Sun Message ID.	Sun Message IDs (SUNW-MSG-ID) indicate that information is available from Sun's knowledge article database. • If you have a message ID number, go to Action 5. • If you do not have a message ID number, go to Action 10.	
5.	Enter the Sun Message ID into the Sun Knowledge Article web site.	Enter the Sun Message ID number into the knowledge article web site at: `http:www.sun.com/msg` and go to Action 4.	"Using the Solaris Predictive Self-Healing Feature" on page 35
6.	Analyze the suggested actions.	In some cases, fault related messages are identified with suggested actions. • If the suggested action recommends replacing a FRU, go to Action 9. • If the suggested action does not recommend replacing a FRU, perform the suggested action. Contact Sun for additional support, if needed	Sun Support information: `http://www.sun.com/service/contacting`
7.	Run the ALOM `showenvironment` command.	The `showenvironment` command reports over temperature conditions when the ambient room temperature exceeds the upper limit.	"To Run the `showenvironment` Command" on page 22

TABLE 2-1 Diagnostic Flow Chart Actions *(Continued)*

Action No.	Diagnostic Action	Resulting Action	For more information, see these sections
8.	Identify the cause of the over temperature condition	The over temperature condition may be caused excessive ambient room temperature, an overheating power supply or a faulty fan tray assembly. • If ambient room temperature is too high, reduce room temperature. • If over temperature condition still exists, go to Action 9. • If over temperature condition does not exist, go to Action 10.	
9.	Identify the faulty FRU.	The FRUs require that you shut down the server to perform a cold-swap. After replacing the faulty FRU, go to Action 14.	"To Remove the Fan Tray Assembly" on page 60 and "To Replace the Fan Tray Assembly" on page 61. "To Remove the Power Supply" on page 61 and "To Replace the Power Supply" on page 62
10.	Check the Solaris log files for fault information.	The Solaris message buffer and log files record system events and can provide information about faults. • If system messages indicate a faulty device, replace the FRU (Action 11). • To obtain more diagnostic information, got to Action 7.	"Collecting Information From Solaris OS Files and Commands" on page 39
11.	Run POST.	POST perforsm basic tests of the server components and reports faulty FRUs. • If POST indicates a faulty FRU, replace the FRU (Action 9). • If POST does not indicate a faulty FRU, go to Action 12.	"Running POST" on page 27
12.	Run SunVTS.	SunVTS provides tests used to exercise and diagnose FRUs. To run SunVTS, the server must be running the Solaris OS. • If SunVTS reports a faulty device replace the FRU (Action 9). • If SunVTS does not report a faulty device, go to Action 11.	"Exercising the System with SunVTS" on page 43

TABLE 2-1 Diagnostic Flow Chart Actions *(Continued)*

Action No.	Diagnostic Action	Resulting Action	For more information, see these sections
13.	Replace faulty FRU.	The FRUs require that you shut down the server to perform a cold-swap. After replacing the faulty FRU, go to Action 14.	"Removing and Replacing FRUs" on page 51
14.	Verify the repair.	Various commands and utilities can be used to verify the functionality of the system components. Two useful commands are: • The ALOM `showfaults` command • The ASR `showcomponents` command If the FRU is blacklisted, you can manually remove it from the black list with the `enablecomponent` command. If the fault is cleared, and the component is not blacklisted, the repair is verified well enough to boot the server. For added assurance, you can run the SunVTS diagnostic software.	"To Run the `showfaults` Command" on page 21 "Managing System Components with Automatic System Recovery Commands" on page 40 "Exercising the System with SunVTS" on page 43
15.	Contact Sun for Support.	The majority of hardware faults are detected by the server's diagnostics. In rare cases it is possible that a problem requires additional troubleshooting. If you are unable to determine the cause of the problem, contact Sun for support.	Sun Support information: `http://www.sun.com/service/contacting`

Using LEDs to Identify the State of Devices

The Sun Fire T1000 server provides the following groups of LEDs:

- Front and rear panel LEDS (FIGURE 2-2, FIGURE 2-3, and TABLE 2-2)
- Power supply LEDs (FIGURE 2-3 and TABLE 2-3)

AC OK LED

These LEDs provide a quick visual check of the state of the system.

FIGURE 2-2 Sun Fire T1000 Server Front Panel

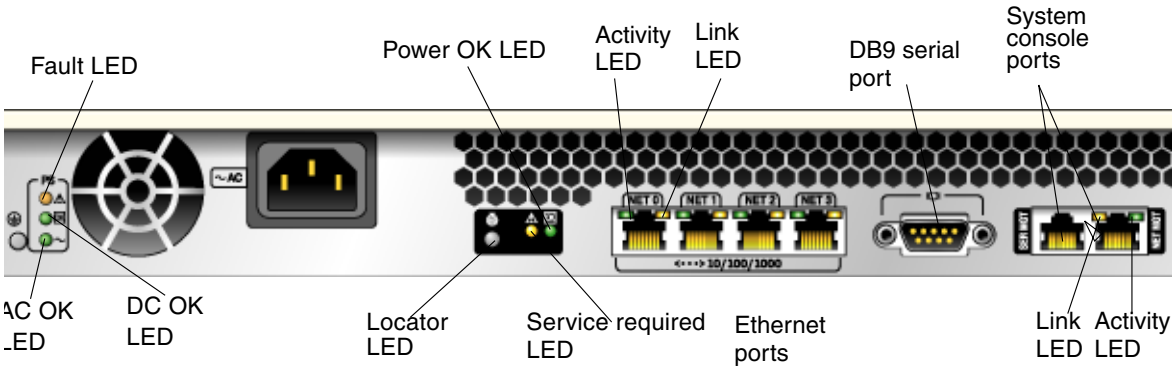

FIGURE 2-3 Sun Fire T1000 Server Rear Panel LEDs

Front and Rear Panel LEDs

Two LEDs and one LED/button are located in the upper left corner of the front panel (TABLE 2-2). The LEDs are also provided on the rear panel.

TABLE 2-2 Front and Rear Panel LEDs

LED	Color	Description
Locator LED* and button	White	Enables you to identify a particular server. The LED is controlled using one of the following methods: • Issuing the `setlocator on` or `off` command. • Pressing the button to toggle the indicator on or off. This LED provides the following indications: • Off– Normal operating state. • Fast blink – The server received a signal as a result of one of the preceding methods and is indicating *here I am*—that it is operational.
Service required LED*	Yellow	If on, indicates that service is required. The ALOM `showfaults command` will indicate any faults causing this indicator to light.
Power OK LED* and Power On/Off button	Green	The LED provides the following indications: • Off – The system is unavailable. Either it has no power or ALOM is not running. Steady on – Indicates that the system is powered on and is running in its normal operating state. No service actions are required. • Standby 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. This could indicate that the system diagnostics are running, or that the system is booting. The Power On/Off button turns the server on and off. There is no Power On/Off button on the rear panel.
Ethernet Activity LEDs	Green	These LEDs indicate that there is activity on the associated net(s).

TABLE 2-2 Front and Rear Panel LEDs

LED	Color	Description
Ethernet Link LEDs	Yellow	These LEDs indicate that the system is linked to the associated net(s).
System console Activity LED	Green	This LED indicates that there is activity on the associated system console.
System console Link LED	Yellow	These LEDs indicate that the system is linked to the associated system console.

* Provided on the front and rear panel.

Power Supply LEDs

The power supply LEDs (TABLE 2-3) are located on the back of the power supply.

TABLE 2-3 Power Supply LEDs

Name	Color	Description
Fault	Amber	On – Power supply has detected a failure. Off – Normal operation.
DC OK	Green	On – Normal operation. DC output voltage is within normal limits. Off – Power is off.
AC OK	Green	On – Normal operation. Input power is within normal limits. Off – No input voltage, or input voltage is below limits.

Using ALOM For Diagnosis and Repair Verification

The Sun Advanced Lights Out Manager (ALOM) is a system controller on the Sun Fire T1000 server motherboard that enables you to remotely manage and administer your server.

ALOM enables you to run diagnostics remotely such as power-on self test (POST), that would otherwise require physical proximity to the server s serial port. You can also configure ALOM to send email alerts of hardware failures, hardware warnings, and other events related to the server or to ALOM.

The ALOM circuitry runs independently of the server, using the server s standby power. Therefore, ALOM firmware and software continue to function when the server operating system goes offline or when the server is powered off.

Note – For comprehensive ALOM information, refer to the *Sun Fire T1000 Server Advanced Lights Out Manager (ALOM) guide*.

Faults detected by ALOM, POST, and the Solaris Predictive Self-healing (PSH) technology are forwarded to the ALOM for fault handling (FIGURE 2-4).

In the event of a system fault, ALOM ensures that the Service required LED is lit, FRU ID PROMs are updated, the fault is logged, and alerts are displayed.

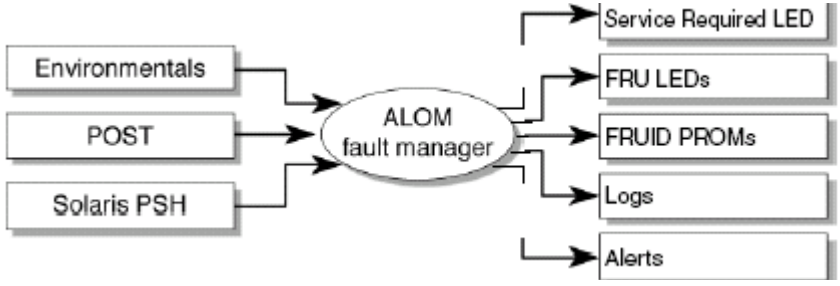

FIGURE 2-4 ALOM Fault Management

ALOM sends alerts to all ALOM users that are logged in, sending the alert through email to a configured email address, and writing the event to the ALOM event log.

- **Fault recovery** – The system automatically detects that the fault condition is no longer present. ALOM extinguishes the Service required LED and updates the FRUs PROM, indicating that the fault is no longer present.
- **Fault repair** – The fault has been repaired by human intervention. In most cases, ALOM detects the repair and extinguishes the Service required LED. In the event that ALOM does not perform these actions, you must perform these tasks manually with `clearfault` or `enablecomponent` commands.

ALOM can detect the removal of a FRU, in many cases even if the FRU is removed while ALOM is powered off. This enables ALOM to know that a fault, diagnosed to a specific FRU, has been repaired. The ALOM clearfault command enables you to

manually clear certain types of faults without a FRU replacement or if ALOM was unable to automatically detect the FRU replacement. ALOM does not automatically detect hard drive replacement.

Persistent environmental faults can automatically recover. A temperature that is exceeding a threshold may return to normal limits. An unplugged a power supply can be plugged in and so on. Recovery of environmental faults is automatically detected. Recovery events are reported using one of two forms:

fru at *location* is `OK`.

sensor at *location* is within normal range.

Environmental faults can be repaired through removal and replacement of the faulty FRU. FRU removal is automatically detected by the environmental monitoring and all faults associated with the removed FRU are cleared. The message for that case, and the alert sent for all FRU removals is:

fru at *location* has been removed.

There is no ALOM command to manually repair an environmental fault.

ALOM does not handle hard drive faults. Use the Solaris message files to view hard drive faults. See "Collecting Information From Solaris OS Files and Commands" on page 39.

Running ALOM Service-Related Commands

This section describes the ALOM commands that are commonly used for service-related activities.

Connecting to ALOM

Before you can run ALOM commands, you must connect to the ALOM. There are several ways to connect to the system controller:

- Connect an ASCII terminal directly to the serial management port.
- Use the `telnet` command to connect to ALOM through an Ethernet connection on the network management port.
- Connect an external modem to the network management port and dial-in to the modem.

Note – Refer to the *Sun Fire T1000 Server Advanced Lights Out Manager (ALOM) Guide* for instructions on configuring and connecting to ALOM.

Switching Between the System Console and ALOM

- To switch from the console output to the ALOM `sc>` prompt, type **`#.`** (Pound Period).
- To switch from the `sc>` prompt to the console, type **`console`**.

Service-Related ALOM Commands

TABLE 2-4 describes the typical ALOM commands for servicing a Sun Fire T1000 server. For descriptions of all ALOM commands, issue the `help` command or refer to the *Sun Fire T1000 Server Advanced Lights Out Management (ALOM) Guide*.

TABLE 2-4 Service-Related ALOM Commands

ALOM Command	Description
`help` [*command*]	Displays a list of all ALOM commands with syntax and descriptions. Specifying a command name as an option displays help for that command.
`clearfault` *UUID*	Manually clears system faults. *UUID* is the unique fault ID of the fault to be cleared.
`powercycle` [`-f`]	Performs a `poweroff` followed by `poweron`. The `-f` option forces an immediate `poweroff`, otherwise the command attempts a graceful shutdown.
`poweroff` [`-y`] [`-f`]	Removes the main power from the host server. The `-y` option enables you to skip the confirmation question. The `-f` option forces an immediate shutdown. CAUTION: Using the -y option to skip the confirmation question could enable you to inadvertently shut down the system.
`poweron` [`-y`] [`-c`] [*FRU*]	Applies the main power to the host server. or FRU. The `-y` option enables you to skip the confirmation question. The [-c] option instructs ALOM to connect to the system console after performing the operation.
`removefru`[`-y`] [*FRU*]	Prepares a FRU for removal, and illuminates the host system's OK to Remove LED. >
`reset` [`-y`]-`[-c]`	Generates a hardware reset on the host server. The `-y` option enables you to skip the confirmation question. The[-c option instructs ALOM to connect to the system console after performing the operation.
`resetsc` [`-y`]	Reboots the ALOM system controller. The `-y` option enables you to skip the confirmation question.
`setkeyswitch` [`normal | stby | diag | locked`]	Sets the virtual keyswitch.
`setlocator` [`on | off`]	Turns the Locator LED on the server on or off.

TABLE 2-4 Service-Related ALOM Commands *(Continued)*

ALOM Command	Description
`showenvironment`	Displays the environmental status of the host server. This information includes system temperatures, power supply, front panel LED, hard drive, fan, voltage, and current sensor status. See "To Run the `showenvironment` Command" on page 22.
`showfaults` [`-v`]	Displays current system faults. See "To Run the `showfaults` Command" on page 21.
`showfru` [`-g` *lines*] [`-s` | `-d`] [*FRU*]	Displays information about the FRUs in the server. • The `-g` *lines* option specifies the number of lines to display before pausing the output to the screen. • The `-s` option displays static information about system FRUs (defaults to all FRUs, unless one is specified) • The `-d` displays dynamic information about system FRUs (defaults to all FRUs, unless one is specified). See "To Run the `showfru` Command" on page 24
`showkeyswitch`	Displays the status of the virtual keyswitch.
`showlocator`	Displays the current state of the Locator LED as either on or off.
`showlogs` [`-b` *lines* | `-e` *lines*] [`-g` *lines*] [`-v`]	Displays the history of all events logged in the ALOM event buffer.
`showplatform` [`-v`]	Displays information about the host system's hardware configuration, and whether the hardware is providing service.

Note – For the ALOM ASR commands, see TABLE 2-7.

▼ To Run the `showfaults` Command

The `showfaults` command displays faults handled by ALOM. Use the `showfaults` command for the following reasons:

- To see if any faults have been passed to, or detected by ALOM.
- To obtain the fault message ID (SUNW-MSG-ID).
- To verify that the replacement of a FRU has cleared the fault and not generated any additional faults.

- **At the** `sc>` **prompt, type the** `showfaults` **command.**

```
sc> showfaults -v
Last POST run: WED OCT 20 19:32:24 2004
POST status: Passed all devices

  ID Time              FRU               Fault
   1 OCT 21 14:32:48   MB/CMP0/CH0/R1/D0 Host detected fault,
MSGID:
SUN4U-8000-2S  UUID: a26d5379-24b8-4a46-bcbf-d9e1ff75a1bc
```

In this example, `showfaults` is reporting a memory error at DIMM location MB/CMP0/CH0/R1/D0. (J0701).

▼ To Run the `showenvironment` Command

The `showenvironment` command displays a snapshot of the server's environmental status. The information this command can display includes system temperatures, hard drive status, power supply and fan status, and voltage and current sensors.

Note – You do not need user permissions to use this command.

- **At the** `sc>` **prompt, type the** `showenvironment` **command.**

```
sc> showenvironment


=============== Environmental Status ===============


-------------------------------------------------------------------------------
System Temperatures (Temperatures in Celsius):
-------------------------------------------------------------------------------
Sensor           Status  Temp LowHard LowSoft LowWarn HighWarn HighSoft HighHard
-------------------------------------------------------------------------------
MB/T_AMB         OK        28    -10      -5       0      45       50       55
MB/CMP0/T_TCORE  OK        50    -10      -5       0      85       90       95
MB/CMP0/T_BCORE  OK        51    -10      -5       0      85       90       95
MB/IOB/T_CORE    OK        49    -10      -5       0      95      100      105

-----------------------------------------------------
System Indicator Status:
-----------------------------------------------------
SYS/LOCATE           SYS/SERVICE          SYS/ACT
OFF                  OFF                  ON
```

```
-------------------------------------------------------

-------------------------------------------------------
Fans (Speeds Revolution Per Minute):
-------------------------------------------------------
Sensor           Status           Speed   Warn    Low
-------------------------------------------------------
FT0/F0           OK                6762   2240   1920
FT0/F1           OK                6762   2240   1920
FT0/F2           OK                6762   2240   1920
FT0/F3           OK                6653   2240   1920

-------------------------------------------------------------------------------
Voltage sensors (in Volts):
-------------------------------------------------------------------------------
Sensor          Status      Voltage LowSoft LowWarn HighWarn HighSoft
-------------------------------------------------------------------------------
MB/V_VCORE      OK            1.30    1.20    1.24    1.36     1.39
MB/V_VMEM       OK            1.79    1.69    1.72    1.87     1.90
MB/V_VTT        OK            0.89    0.84    0.86    0.93     0.95
MB/V_+1V2       OK            1.18    1.09    1.11    1.28     1.30
MB/V_+1V5       OK            1.49    1.36    1.39    1.60     1.63
MB/V_+2V5       OK            2.51    2.27    2.32    2.67     2.72
MB/V_+3V3       OK            3.29    3.06    3.10    3.49     3.53
MB/V_+5V        OK            5.02    4.55    4.65    5.35     5.45
MB/V_+12V       OK           12.25   10.92   11.16   12.84    13.08
MB/V_+3V3STBY   OK            3.33    3.13    3.16    3.53     3.59

-------------------------------------------------------
System Load (in amps):
-------------------------------------------------------
Sensor           Status              Load     Warn Shutdown
-------------------------------------------------------
MB/I_VCORE       OK                20.560   80.000   88.000
MB/I_VMEM        OK                 8.160   60.000   66.000
-------------------------------------------------------


----------------------
Current sensors:
----------------------
Sensor          Status
----------------------
MB/BAT/V_BAT     OK


-------------------------------------------------------------------------------
Power Supplies:
-------------------------------------------------------------------------------
Supply  Status          Underspeed  Overtemp  Overvolt  Undervolt  Overcurrent
-------------------------------------------------------------------------------
PS0     OK              OFF         OFF       OFF       OFF        OFF

sc>
```

Note – Some information might not be available when the server is in standby mode.

▼ To Run the `showfru` Command

Note – By default, the output of the `showfru` command for all FRUs is very long.

The `showfru` command displays information about the FRUs in the server. Use this command to see information about an individual FRU, or for all the FRUs.

Note – You do not need user permissions to use this command.

- **At the** `sc>` **prompt, enter the** `showfru` **command.**

```
sc> showfru -s
FRU_PROM at MB/SEEPROM
SEGMENT: SD
/ManR
/ManR/UNIX_Timestamp32:      TUE OCT 18 21:17:55 2005
/ManR/Description:           ASSY,Sun-Fire-T1000,Motherboard
/ManR/Manufacture Location:  Sriracha,Chonburi,Thailand
/ManR/Sun Part No:           5017302
/ManR/Sun Serial No:         002989
/ManR/Vendor:                Celestica
/ManR/Initial HW Dash Level: 03
/ManR/Initial HW Rev Level:  01
/ManR/Shortname:             T1000_MB
/SpecPartNo:                 885-0505-04


FRU_PROM at PS0/SEEPROM
SEGMENT: SD
/ManR
/ManR/UNIX_Timestamp32:      SUN JUL 31 19:45:13 2005
/ManR/Description:           PSU,300W,AC_INPUT,A207
/ManR/Manufacture Location:  Matamoros, Tamps, Mexico
/ManR/Sun Part No:           3001799
/ManR/Sun Serial No:         G00001
/ManR/Vendor:                Tyco Electronics
/ManR/Initial HW Dash Level: 02
/ManR/Initial HW Rev Level:  01
/ManR/Shortname:             PS
/SpecPartNo:                 885-0407-02


FRU_PROM at MB/CMP0/CH0/R0/D0/SEEPROM
/SPD/Timestamp: MON OCT 03 12:00:00 2005
/SPD/Description: DDR2 SDRAM, 2048 MB
/SPD/Manufacture Location:
/SPD/Vendor: Infineon (formerly Siemens)
/SPD/Vendor Part No:   72T256220HR3.7A
/SPD/Vendor Serial No: d03fe27


FRU_PROM at MB/CMP0/CH0/R0/D1/SEEPROM
/SPD/Timestamp: MON OCT 03 12:00:00 2005
/SPD/Description: DDR2 SDRAM, 2048 MB
/SPD/Manufacture Location:
/SPD/Vendor: Infineon (formerly Siemens)
/SPD/Vendor Part No:   72T256220HR3.7A
```

```
/SPD/Vendor Serial No: d03f623


FRU_PROM at MB/CMP0/CH0/R1/D0/SEEPROM
/SPD/Timestamp: MON OCT 03 12:00:00 2005
/SPD/Description: DDR2 SDRAM, 2048 MB
/SPD/Manufacture Location:
/SPD/Vendor: Infineon (formerly Siemens)
/SPD/Vendor Part No:   72T256220HR3.7A
/SPD/Vendor Serial No: d03fc26


FRU_PROM at MB/CMP0/CH0/R1/D1/SEEPROM
/SPD/Timestamp: MON OCT 03 12:00:00 2005
/SPD/Description: DDR2 SDRAM, 2048 MB
/SPD/Manufacture Location:
/SPD/Vendor: Infineon (formerly Siemens)
/SPD/Vendor Part No:   72T256220HR3.7A
/SPD/Vendor Serial No: d03eb26


FRU_PROM at MB/CMP0/CH3/R0/D0/SEEPROM
/SPD/Timestamp: MON OCT 03 12:00:00 2005
/SPD/Description: DDR2 SDRAM, 2048 MB
/SPD/Manufacture Location:
/SPD/Vendor: Infineon (formerly Siemens)
/SPD/Vendor Part No:   72T256220HR3.7A
/SPD/Vendor Serial No: d03e620


FRU_PROM at MB/CMP0/CH3/R0/D1/SEEPROM
/SPD/Timestamp: MON OCT 03 12:00:00 2005
/SPD/Description: DDR2 SDRAM, 2048 MB
/SPD/Manufacture Location:
/SPD/Vendor: Infineon (formerly Siemens)
/SPD/Vendor Part No:   72T256220HR3.7A
/SPD/Vendor Serial No: d040920


FRU_PROM at MB/CMP0/CH3/R1/D0/SEEPROM
/SPD/Timestamp: MON OCT 03 12:00:00 2005
/SPD/Description: DDR2 SDRAM, 2048 MB
/SPD/Manufacture Location:
/SPD/Vendor: Infineon (formerly Siemens)
/SPD/Vendor Part No:   72T256220HR3.7A
/SPD/Vendor Serial No: d03ec27


FRU_PROM at MB/CMP0/CH3/R1/D1/SEEPROM
```

```
/SPD/Timestamp: MON OCT 03 12:00:00 2005
/SPD/Description: DDR2 SDRAM, 2048 MB
/SPD/Manufacture Location:
/SPD/Vendor: Infineon (formerly Siemens)
/SPD/Vendor Part No:   72T256220HR3.7A
/SPD/Vendor Serial No: d040924


sc>
```

If you do not provide a command-line argument, all FRUs are listed.

Running POST

Power on self test (POST) is a group of PROM-based tests that run when the server is powered on or reset. POST checks the basic integrity of the critical hardware components in the server (motherboard, memory, and I/O buses).

If POST detects a faulty component, it is disabled automatically. If the system is capable of running without the disabled component, the system will boot when POST is complete. For example, if one of the processor cores is deemed faulty by POST, the core will be disabled, and the system will boot and run using the remaining cores.

Devices can be manually enabled or disabled using ASR commands (see "Managing System Components with Automatic System Recovery Commands" on page 40).

Controlling How POST Runs

The server can be configured for normal, extensive, or no POST execution. You can also control the level of tests that run, the amount of POST output that is displayed, and which reset events trigger POST by using ALOM variables.

TABLE 2-5 lists the ALOM variables used to configure POST and FIGURE 2-5 shows how the variables work together.

TABLE 2-5 ALOM Parameters Used For POST Configuration

Parameter	Values	Description
`setkeyswitch`*	`normal`	The system can power on and run POST (based on the other parameter settings). For details see FIGURE 2-5. This parameter overrides all other commands.
	`diag`	The system runs POST based on predetermined settings.
	`stby`	The system cannot power on.
	`locked`	The system can power on and run POST, but no flash updates can be made.
`diag_mode`	`off`	POST does not run.
	`normal`	Runs POST according to `diag_level` value.
	`service`	Runs POST with preset values for `diag_level` and `diag_verbosity`.
`diag_level`	`min`	If `diag_mode` = `normal`, run minimum set of tests.
	`max`	If `diag_mode` = `normal`, runs all the minimum tests plus extensive CPU and memory tests.
`diag_trigger`	`none`	Do not run POST on reset.
	`user-reset`	Runs POST upon user initiated resets.
	`power-on_reset`	Only run POST for the first power on. This is the default.
	`error-reset`	Runs POST if fatal errors are detected.
	`all-reset`	Runs POST after any reset.
`diag_verbosity`	`none`	No POST output is displayed.
	`min`	POST output displays functional tests with a banner and pinwheel.
	`normal`	POST output displays all test and informational messages.
	`max`	POST displays all test, informational, and some debugging messages.

* All of these parameters are set using the ALOM `setsc` command except for the `setkeyswitch` command.

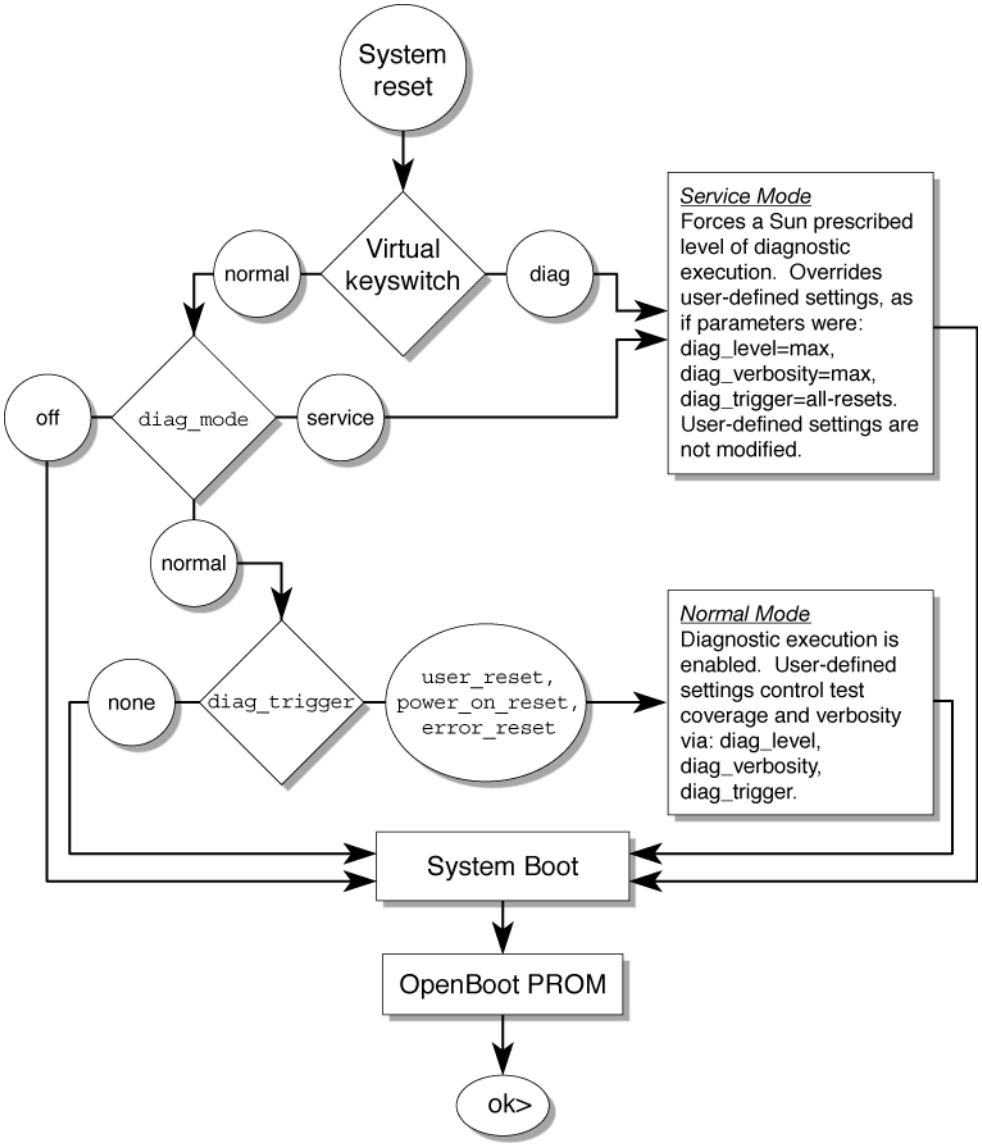

FIGURE 2-5 Flowchart of ALOM Variable for POST Configuration

TABLE 2-6 shows typical combinations of ALOM variables and associated POST mode.

TABLE 2-6 ALOM Parameters and POST Modes

Parameter	Normal Diagnostic Mode (default settings)	No POST Execution	Diagnostic Service Mode	Keyswitch Diagnostic preset values
`diag_mode`	`normal`	off	`service`	`normal`
`setkeyswitch`*	`normal`	normal	`normal`	`diag`
`diag_level`	`max`	n/a	`max`	`max`
`diag_trigger`	`power-on-reset error-reset`	none	`all-resets`	`all-resets`
`diag_verbosity`	`normal`	n/a	`max`	`max`
Description of POST execution	This is the default POST configuration and provides a reasonable compromise between testing thoroughness and quick server initialization.	POST does not run, resulting in quick system initialization, but this is not a suggested configuration.	POST runs the full spectrum of tests with the maximum output displayed.	POST runs the full spectrum of tests with the maximum output displayed.

* The `setkeyswitch` parameter, when set to `diag`, overrides all the other ALOM POST variables.

▼ To Change POST Parameters

1. **Access the ALOM sc> prompt:**

   At the console, issue the `#.` key sequence:

   ```
   #.
   ```

2. **At the ALOM sc> prompt, use the `setsc` command to set the POST parameter:**

   Example:

   ```
   sc> setsc diag_mode service
   ```

   The `setkeyswitch` parameter is a command that sets the virtual keyswitch, so it does not use the `setsc` command. Example:

   ```
   sc> setkeyswitch diag
   ```

Reasons to Run POST

You can use POST for basic sanity checking of the server hardware and for troubleshooting as described in the following sections.

Routine Sanity Check of the Hardware

POST tests critical hardware components to verify functionality before the system boots and accesses software. If POST detects an error, the faulty component is disabled automatically, preventing faulty hardware from impacting system operation.

Under normal operating conditions, the server is usually configured to run POST maximum mode for all power-on or error-generated resets. This enables the system to initialize quickly, and still have hardware checkups to ensure a healthy system.

Diagnosing the System Hardware

You can use POST as an initial diagnostic tool for the system hardware. In this case, configure POST to run in diagnostic service mode for maximum test coverage and verbose output.

▼ To Run POST

This procedure describes how to run POST when you want maximum testing, as in the case when you are troubleshooting a system.

1. **Switch from the system console prompt to the SC console prompt by issuing the #. escape sequence and type the command** `setsc diag_mode normal`**.**

```
ok #.
sc> setsc diag_mode normal
```

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

```
sc> setkeyswitch diag
```

3. **Reset the system so that POST runs.**

   The following example uses the `powercycle` command. For other methods, refer to the *Sun Fire T1000 Server Administration Guide*.

```
sc> powercycle
Are you sure you want to powercycle the system [y/n]? y
Powering host off at MON JAN 10 02:52:02 2000

Waiting for host to Power Off; hit any key to abort.

SC Alert: SC Request to Power Off Host.

SC Alert: Host system has shut down.
Powering host on at MON JAN 10 02:52:13 2000

SC Alert: SC Request to Power On Host.
```

4. **Switch to the system console to view the post output:**

```
sc> console
```

   Example of POST output:

SC: Alert: Host system has reset1 *Note: Some output omitted.*

0:0>

0:0>@(#) ERIE Integrated POST 4.x.0.build_17 2005/08/30 11:25

/export/common-source/firmware_re/ontario-fireball_fio/build_17/post/Niagara/erie/integrated (firmware_re)

0:0>Copyright © 2005 Sun Microsystems, Inc. All rights reserved

SUN PROPRIETARY/CONFIDENTIAL.

Use is subject to license terms.

0:0>VBSC selecting POST IO Testing.

0:0>VBSC enabling threads: 1

0:0>VBSC setting verbosity level 3

0:0>Start Selftest.....

0:0>Init CPU

0:0>Master CPU Tests Basic.....

0:0>CPU =: 0

```
SC: Alert: Host system has reset1                    Note: Some output omitted.
0:0>
0:0>Test 6291456 bytes at 00000001.00000000 Memory Channel [ 0 3 ] Rank 0 Stack 1
0:0>IO-Bridge unit 1 ilu init test
0:0>IO-Bridge unit 1 tlu init test
0:0>IO-Bridge unit 1 lpu init test
0:0>IO-Bridge unit 1 link train port B
0:0>IO-Bridge unit 1 interrupt test
0:0>IO-Bridge unit 1 Config MB bridges
0:0>Config port B, bus 2 dev 0 func 0, tag 5714 BRIDGE
0:0>Config port B, bus 3 dev 8 func 0, tag PCIX BRIDGE
0:0>IO-Bridge unit 1 PCI id test
0:0>INFO:10 count read passed for MB/IOB_PCIEb/BRIDGE! Last read VID:1166|DID:103
0:0>INFO:10 count read passed for MB/IOB_PCIEb/BRIDGE/GBE! Last read VID:14e4|DID:1648
0:0>INFO:10 count read passed for MB/IOB_PCIEb/BRIDGE/HBA! Last read VID:1000|DID:50
0:0>Quick JBI Loopback Block Mem Test
0:0>Quick jbus loopback Test 262144 bytes at 00000000.00600000
0:0>INFO:
0:0>POST Passed all devices.
0:0>POST:Return to VBSC.
0:0>Master set ACK for vbsc runpost command and spin...
```

5. **Perform further investigation if needed.**

   When POST is finished running, the system will continue to boot even if post detects a faulty FRU, provided it does not leave the system without memory or a CPU core.

   Note that certain DIMM failures may not be diagnosable to a single DIMM. These failures are fatal, and will result in both logical banks being unconfigured.If POST detects a faulty device, the fault is displayed and the fault information is passed to ALOM for fault handling..

   a. Interpret the POST messages:

   POST error messages use the following syntax:

   c:*s* > `ERROR: TEST` = *failing-tes*t
   c:*s* > `H/W under test` = *FRU*
   c:*s* > `Repair Instructions: Replace items in order listed by H/W`

under test above
c:*s* > MSG = *test-error-message*
c:*s* > END_ERROR

where *c* = the core number, *s* = the strand number.

Warning and informational messages use the following syntax:

INFO or WARNING: *message*

The following is an example of a POST error message.

```
.
.
.

0:0>Data Bitwalk
0:0>L2 Scrub Data
0:0>L2 Enable
0:0>Testing Memory Channel 0 Rank 0 Stack 0
0:0>Testing Memory Channel 3 Rank 0 Stack 0
0:0>Testing Memory Channel 0 Rank 1 Stack 0
.
.
.
0:0>ERROR: TEST = Data Bitwalk
0:0>H/W under test = MB/CMP0/CH0/R1/D0/S0 (J0701)
0:0>Repair Instructions: Replace items in order listed by 'H/W
under test' above.
0:0>MSG = Pin 3 failed on MB/CMP0/CH0/R1/D0/S0 (J0701)
0:0>END_ERROR

0:0>Testing Memory Channel 3 Rank 1 Stack 0
```

In this example, POST is reporting a memory error at DIMM location MB/CMP0/CH0/R1/D0. (J0701).

b. Run the `showfaults` **command to obtain additional fault information.**

The fault is captured by ALOM, where the fault is logged, the Service required LED is lit, and the faulty component is disabled.

Example:

```
ok .#
sc> showfaults -v
ID Time            FRU                Fault
1 APR 24 12:47:27 MB/CMP0/CH2/R0/D0 MB/CMP0/CH2/R0/D0 deemed
faulty and disabled
```

In this example, MB/CMP0/CH2/R0/D0 (DIMM 0 at J0701) is disabled. Until the faulty component is replaced, the system can boot using memory that was not disabled.

Note – You can use ASR commands to display and control disabled components. See "Managing System Components with Automatic System Recovery Commands" on page 40.

Using the Solaris Predictive Self-Healing Feature

The Solaris OS predictive self-healing technology enables Sun Fire T1000 server to diagnose problems while the Solaris OS is running, and mitigate many serious problems before they occur.

The Solaris OS uses the fault manager daemon, `fmd(1M)`, which starts at boot time and runs in the background to monitor the system. If a component generates an error, the daemon handles the error by correlating the error with data from previous errors and other related information to diagnose the problem. Once diagnosed, the fault manager daemon assigns the problem a unique identifier (UUID) that distinguishes the problem across any set of systems. When possible, the fault manager daemon initiates steps to self-heal the failed component and take the component offline. The daemon also logs the fault to the `syslogd` daemon and provides a fault notification with a message ID (MSGID). You can use message ID to get additional information about the problem from Sun's knowledge article database.

The predictive self-healing technology covers the following Sun Fire T1000 server components:

- UltraSPARC T1 multicore processor
- Memory
- I/O bus

The PSH console message provides the following information:

- Type
- Severity
- Description
- Automated Response
- Impact
- Suggested Action for System Administrator
- Details

If the Solaris OS PSH facility has detected a faulty component, use the `fmdump` command to identify the fault.

Note – Additional predictive self-healing information is available at: `http://www.sun.com/msg.`

▼ To Use the `fmdump` Command to Identify Faults

The `fmdump` command displays the list of faults detected by the Solaris PSH facility. Use this command for the following reasons:

- To see if any faults have been detected by the Solaris PSH facility.
- If you need to obtain the fault message ID (SUNW-MSG-ID) for detected faults.
- To verify that the replacement of a FRU has cleared the fault and not generated any additional faults.

If you already have a fault message ID, go to Step 2 to obtain more information about the fault from Suns Predictive Self-Healing Knowledge Article web site.

1. **Check the event log using the `fmdump` command with `-v` for verbose output:**

```
# fmdump -v
TIME                 UUID                                 SUNW-MSG-ID
Oct 21 10:32:47.2211 a26d5379-24b8-4a46-bcbf-d9e1ff75a1bc SUN4U-
8000-2S
   95%  fault.memory.dimm
          FRU: mem:///component=MB/CMP0/CH0:R1/D0/J0701
         rsrc: mem:///component=MB/CMP0/CH0:R1/D0/J0701
```

In this example, a fault is displayed, indicating the following details:

- Date and time of the fault (`Oct 21 10:32 EDT 2004`)
- Universal Unique Identifier (UUID) that is unique for every fault (`a26d5379-24b8-4a46-bcbf-d9e1ff75a1bc`)
- Sun message identifier (`SUNW4U-8000-2S`) that can be used to obtain additional fault information
- Faulted FRU (`FRU: mem:///component=MB/CMP0/CH0:R1/D0/J0701`), that in this example is identified as the DIMM at `R1/D0(J0701)`.

2. **Use the Sun message ID to obtain more information about this type of fault.**

   a. **In a browser, go to the Predictive Self-Healing Knowledge Article web site:** `http://www.sun.com/msg`

   b. **Enter the message ID in the SUNW-MSG-ID field, and press Lookup.**

   In this example, the message ID SUN4U-8000-2S returns the following information for corrective action:

Memory module errors exceeded acceptable levels

Type
Fault
Severity
Major
Description
The Solaris(TM) Fault Manager has determined that the number of correctable (single bit) memory errors reported against a memory DIMM module indicates a fault requiring repair action is present.
Automated Response
The system will attempt to remove the affected page of memory from service.
Impact
The system is at increased risk of incurring an uncorrectable error, which will cause a service interruption, until the memory DIMM module is replaced.
Suggested Action for System Administrator
For Sun Fire(TM) T1000, T2000 1280, 3800-6800, 2900-6900, E12K, E15K, F20K, and F25K systems, it is imperative that the System Controller be checked for evidence of a faulty system board to ensure that the appropriate service action is performed.

Use the fmdump(1M) command:

fmdump -vu <event-id>

to view the results of diagnosis and the specific Field Replaceable Unit (FRU) identified for repair.

The event-id can be found in the EVENT-ID field of the message. For example:

EVENT-ID:
39b30371-f009-c76c-90ee-b245784d2277

Details
The Message ID: SUN4U-8000-2S indicates the Solaris Fault Manager has received reports that multiple correctable (single bit) errors associated with a memory DIMM module have been detected. Diagnosis applied to the error reports has determined that a fault requiring repair action is present.

A service case should be opened and time scheduled to replace the FRU, identified in the fmdump(1M) output, on which the suspect DIMM is located.

```
If Customer Enabled Services apply to the product then
refer to the FRU replacement procedures in the
appropriate service manual.
```

c. Follow the suggested actions to repair the fault.

Collecting Information From Solaris OS Files and Commands

With the Solaris OS running on the Sun Fire T1000 server, you have the full compliment of Solaris OS files and commands available for collecting information and for troubleshooting.

If POST, ALOM, or the Solaris PSH features did not indicate the source of a fault, check the message buffer and log files for notifications for faults. Hard drive faults are usually captured by the Solaris message files.

Use the `dmesg` command to view the most recent system message. To view the system messages log file, view the contents of the `/var/adm/messages` file.

▼ To Check the Message Buffer

1. **Log in as superuser.**
2. **Issue the `dmesg` command:**

```
# dmesg
```

The `dmesg` command displays the most recent messages generated by the system.

▼ To View System Message Log Files

The error logging daemon, `syslogd` automatically records various system warnings, errors, and faults in message files. These messages can alert you to system problems such as a device that is about to fail.

The `/var/adm` directory contains several message files. The most recent messages are in the `/var/adm/messages` file. After a period of time (usually every ten days), a new `messages` file is automatically created. The original contents of the `messages` file are rotated to a file named `messages.1`. Over a period of time, the messages are further rotated to `messages.2` and `messages.3`, and then deleted.

1. **Log in as superuser.**
2. **Issue the following command:**

```
# more /var/adm/messages
```

3. **If you want to view all logged messages, issue the following command:**

```
# more /var/adm/messages*
```

Managing System Components with Automatic System Recovery Commands

The Automatic System Recovery (ASR) feature enables the server to automatically configure failed components out of operation until they can be replaced. In the Sun Fire T2000 server, the following components managed by the ASR feature:

- UltraSPARC T1 processor strands
- Memory DIMMs
- I/O bus

The database that contains the list of disabled components is called the ASR blacklist (`asr-db`).

In most cases, POST and ALOM automatically manage the disabling of faulty components. When the faulty FRU is replaced, it must be manually enabled.

Example: A component appears faulty and is automatically disabled. The problem is due to a loose connector, and no FRU replacement is required to fix the problem. ALOM, which would normally detect a FRU replacement and enable the FRU, does not do so. In this case, after the loose cable is reseated, the disabled component must be manually enabled.

The ASR commands (TABLE 2-7) enable you to view, and manually add or remove components from the ASR blacklist. These commands are run from the ALOM `sc>` prompt.

TABLE 2-7 ASR Commands

Command	Description
`showcomponent`*	Displays system components and their current state.
`enablecomponent` *asrkey*	Removes a component from the asr-db blacklist, where *asrkey* is the component to enable.
`disablecomponent` *asrkey*	Adds a component to the `asr-db` blacklist, where *asrkey* is the component to disable.
`clearasrdb`	Removes all entries from the `asr-db` blacklist.

* The `showcomponent` command may not report all blacklisted DIMMs.

Note – The components (*asrkeys)* vary from system to system, depending on how many cores and memory are present. Use the `showcomponent` command to see the `asrkeys` on a specific system.

Note – A `reset` or `powercycle` is required after disabling or enabling a component. If component status is changed with power on there is no effect to the system until the next reset or powercycle.The following examples show the output of these commands.

▼ To Run the `showcomponent` Command

The `showcomponent` command displays the system components (`asrkeys`) and reports their status.

1. **At the sc> prompt, enter the `showcomponent` command.**

Example with no disabled components:

```
sc> showcomponent

Keys:

.
.
.

ASR state: clean
```

Example showing a disabled component:.

```
sc> showcomponent

Keys:

.
.
.

ASR state:  Disabled Devices
   MB/CMP0/CH3/R1/D1 : dimm8 deemed faulty
```

To Run the `disablecomponent` Command

The `disablecomponent` command disables a component by adding it to the ASR blacklist.

1. **At the sc> prompt, enter the `disablecomponent` command.**

```
sc> disablecomponent MB/CMP0/CH3/R1/D1

sc>SC Alert:MB/CMP0/CH3/R1/D1 disabled
```

2. **After receiving confirmation that the `disablecomponent` command is complete, reset the server for so that the ASR command takes effect.**

```
sc> reset
```

▼ To Run the `enablecomponent` Command

The `enablecomponent` command enables a disabled component by removing it from the ASR blacklist.

1. **At the sc> prompt, enter the `enablecomponent` command.**

```
sc> enablecomponent MB/CMP0/CH3/R1/D1

sc>SC Alert:MB/CMP0/CH3/R1/D1 reenabled
```

2. **After receiving confirmation that the `enablecomponent` command is complete, reset the server for so that the ASR command takes effect.**

```
sc> reset
```

Exercising the System with SunVTS

Sometimes a server exhibits a problem that cannot be isolated definitively to a particular hardware or software component. In such cases, it may be useful to run a diagnostic tool that stresses the system by continuously running a comprehensive battery of tests. Sun provides the SunVTS software for this purpose.

This chapter describes the tasks necessary to use SunVTS software to exercise your Sun Fire T1000 server.:

- "Checking Whether SunVTS Software Is Installed" on page 43
- "Exercising the System Using SunVTS Software" on page 44

Checking Whether SunVTS Software Is Installed

This procedure assumes that the Solaris OS is running on the Sun Fire T1000 server, and that you have access to the Solaris OS command line.

▼ To Check Whether SunVTS Software Is Installed

1. **Check for the presence of SunVTS packages. Type:**

```
% pkginfo -l SUNWvts SUNWvtsr SUNWvtsts SUNWvtsmn
```

- If SunVTS software is loaded, information about the packages is displayed.
- If SunVTS software is not loaded, you see an error message for each missing package.

```
ERROR: information for "SUNWvts" was not found
ERROR: information for "SUNWvtsr" was not found
...
```

The pertinent packages are as follows.

Package	Description
SUNWvts	SunVTS framework
SUNWvtsr	SunVTS Framework (root)
SUNWvtsts	SunVTS for tests
SUNWvtsmn	SunVTS man pages

If SunVTS is not installed, you can obtain the installations packages from the following:

- Solaris Operating System DVDs
- From the Sun Download Center: `http://www.sun.com/oem/products/vts`

The SunVTS 6.0 PS3 software, and future compatible versions, are supported on the Sun Fire T1000 server.

SunVTS installation instructions are described in the *SunVTS User's Guide*.

Exercising the System Using SunVTS Software

Before you begin, the Solaris OS must be running. You also need to ensure that SunVTS validation test software is installed on your system. See "Checking Whether SunVTS Software Is Installed" on page 43.

SunVTS software requires that you use one of two security schemes. The security scheme you choose must be properly configured in order for you to perform this procedure. For details, refer to the *SunVTS User's Guide*.

SunVTS software features both character-based and graphics-based interfaces. This procedure assumes that you are using the graphical user interface (GUI) on a system running the Common Desktop Environment (CDE). For more information about the character-based SunVTS TTY interface, and specifically for instructions on accessing it by TIP or `telnet` commands, refer to the *SunVTS User's Guide.*

SunVTS software can be run in several modes. This procedure assumes that you are using the default mode.

This procedure also assumes that the Sun Fire T1000 server is *headless*—that is, it is not equipped with a monitor capable of displaying bit mapped graphics. In this case, you access the SunVTS GUI by logging in remotely from a machine that has a graphics display.

Finally, this procedure describes how to run SunVTS tests in general. Individual tests may presume the presence of specific hardware, or may require specific drivers, cables, or loopback connectors. For information about test options and prerequisites, refer to the following documentation:

- *SunVTS Test Reference Manual*
- *SunVTS 6.0 PS3 Doc Supplement (SPARC)*

▼ To Exercise the System Using SunVTS Software

1. **Log in as superuser to a system with a graphics display.**

   The display system should be one with a frame buffer and monitor capable of displaying bit-mapped graphics such as those produced by the SunVTS GUI.

2. **Enable remote display. On the display system, type:**

```
# /usr/openwin/bin/xhost + test-system
```

   where *test-system* is the name of the Sun Fire T1000 server you plan to test.

3. **Remotely log in to the Sun Fire T1000 server as superuser.**

   Use a command such as `rlogin` or `telnet`.

4. **Start SunVTS software. Type:**

```
# /opt/SUNWvts/bin/sunvts -display display-system:0
```

where *display-system* is the name of the machine through which you are remotely logged in to the Sun Fire T1000 server.

If you have installed SunVTS software in a location other than the default `/opt` directory, alter the path in this command accordingly.

The SunVTS GUI appears on the display system's screen.

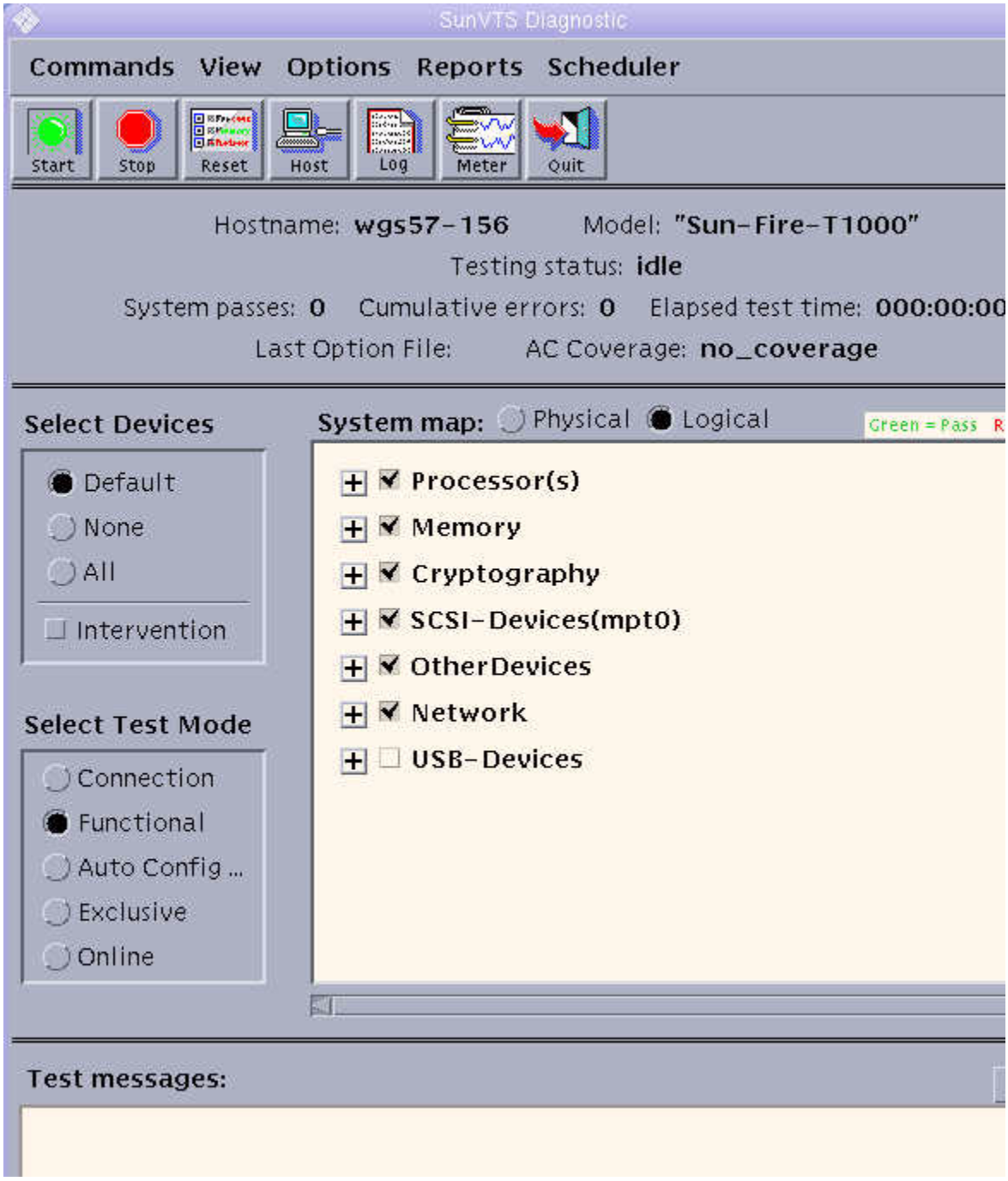

FIGURE 2-6 The SunVTS GUI Screen

5. **Expand the test lists to see the individual tests.**

   The test selection area lists tests in categories, such as *Network*, as shown in FIGURE 2-7. To expand a category, left-click the ⊞ icon to the left of the category name FIGURE 2-7 shows the expand category icon, which looks like a plus sign and appears to the left of the category name.

.

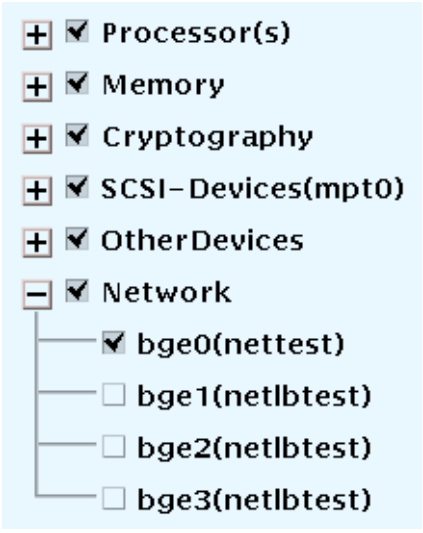

FIGURE 2-7 SunVTS Test Selection Panel

6. **(*Optional*) Select the tests you want to run.**

   Certain tests are enabled by default, and you can choose to accept these.

   Alternatively, you can enable and disable individual tests or blocks of tests by clicking the checkbox next to the test name or test category name. Tests are enabled when checked, and disabled when not checked.

   TABLE 2-8 lists tests that are especially useful to run on a Sun Fire T1000 server.

TABLE 2-8 Useful SunVTS Tests to Run on a Sun Fire T1000 Server

SunVTS Tests	FRUs Exercised by Tests
`cmttest`, `cputest`, `fputest`, `iutest`, `l1dcachetest`, `dtlbtest`, and `l2sramtest`—*indirectly*: `mptest`, and `systest`	DIMMs, motherboard
`disktest`	Disks, cables, disk backplane
`nettest`, `netlbtest`	Network interface, network cable, motherboard

TABLE 2-8 Useful SunVTS Tests to Run on a Sun Fire T1000 Server *(Continued)*

SunVTS Tests	FRUs Exercised by Tests
`pmemtest`, `vmemtest`, `ramtest`	DIMMs, motherboard
`serialtest`	I/O (serial port interface)
`hsclbtest`	Motherboard, ALOM system Controller (Host to System Controller interface)

7. **(*Optional*) Customize individual tests.**

   You can customize individual tests by right-clicking on the name of the test. For example, in the illustration under FIGURE 2-7, right-clicking on the text string `bg0(nettest)` brings up a menu that enables you to configure this Ethernet test.

8. **Start testing.**

   Click the Start button that is located at the top left of the SunVTS window. Status and error messages appear in the test messages area located across the bottom of the window. You can stop testing at any time by clicking the Stop button.

   During testing, SunVTS software logs all status and error messages. To view these, click the Log button or select Log Files from the Reports menu. This opens a log window from which you can choose to view the following logs:

   - *Information* —Detailed versions of all the status and error messages that appear in the test messages area.
   - *Test Error* —Detailed error messages from individual tests.
   - *VTS Kernel Error*—Error messages pertaining to SunVTS software itself. You should look here if SunVTS software appears to be acting strangely, especially when it starts up.
   - *UNIX Messages* (`/var/adm/messages`)—A file containing messages generated by the operating system and various applications.
   - *Log Files* (/var`/opt/SUNWvts/logs`)—A directory containing the log files.

   For further information, refer to the documents that accompany the SunVTS software

CHAPTER 3

Removing and Replacing FRUs

This chapter describes how to remove and replace field-replaceable units (FRUs) in the Sun Fire T1000 server.

The following topics are covered:

- "Safety Information" on page 51
- "Common Procedures for Parts Replacement" on page 53
- "Removing and Replacing CRUs" on page 57
- "Common Procedures for Finishing Up" on page 72

For a list of CRUs, see Appendix A, "Field-Replaceable Units (FRUs)" on page 75.

Note – Never attempt to run the system with the cover removed. The cover must be in place for proper air flow. The cover interlock switch immediately shuts the system down when the cover is removed.

Safety Information

This section describes important safety information you need to know prior to removing or installing parts in the Sun Fire T1000 server.

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all Sun standard cautions, warnings, and instructions marked on the equipment and described in *Important Safety Information for Sun Hardware Systems.*
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment s electrical rating label.
- Follow the electrostatic discharge safety practices as described in this section.

The document, *Important Safety Information for Sun Hardware Systems*, 816-7190, contains a listing of safety precautions for Sun systems. This document is located in the packing carton of your server.

The Sun Fire T1000 server complies with regulatory requirements for safety and EMI. Document about compliance is available online at:
http://www.sun.com/documentation

Safety Symbols

The following symbols might appear in this document, note their meanings:

Caution – There is a risk of personal injury and equipment damage. To avoid personal injury and equipment damage, follow the instructions.

Caution – Hot surface. Avoid contact. Surfaces are hot and might cause personal injury if touched.

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Electrostatic Discharge Safety

Electrostatic discharge (ESD) sensitive devices, such as the motherboard, PCI cards, hard drives, and memory cards require special handling.

Caution – The boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy components. Do not touch the components along their connector edges.

Use an Antistatic Wrist Strap

Wear an antistatic wrist strap and use an antistatic mat when handling components such as drive assemblies, boards, or cards. When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Do this after you disconnect the power cords from the server. Following this practice equalizes the electrical potentials between you and the server.

Use an Antistatic Mat

Place ESD-sensitive components such as the motherboard, memory, and other PCB cards on an antistatic mat.

Common Procedures for Parts Replacement

Before you can remove and replace parts that are inside the Sun Fire T1000 server, you must perform the following procedures:

- "To Shut the System Down" on page 53
- "To Remove the Server From a Rack" on page 55
- "To Perform Electrostatic Discharge (ESD) Prevention Measures" on page 56
- "To Remove the Top Cover" on page 57

The corresponding procedures that you perform when maintenance is complete are described in "Common Procedures for Finishing Up" on page 72.

Required Tools

The Sun Fire T1000 server can be serviced with the following tools:

- Antistatic wrist strap
- Antistatic mat
- No. 2 Phillips screwdriver

▼ To Shut the System Down

Performing a graceful shutdown makes sure all of your data is saved and the system is ready for restart.

1. **Log in as superuser or equivalent.**

   Depending on the nature of the problem, you might want to view the system status or the log files, or run diagnostics before you shut down the system. Refer to the *Sun Fire T1000 Server Administration Guide* for log file information.

2. **Notify affected users.**

   Refer to your Solaris system administration documentation for additional information.

3. **Save any open files and quit all running programs.**

   Refer to your application documentation for specific information on these processes.

4. **Shut down the OS:**

   a. **At the Solaris OS prompt, issue the** `uadmin` **command to halt the Solaris OS and to return to the** `ok` **prompt.**

```
# uadmin 2 0
WARNING: proc_exit: init exited
syncing file systems... done
Program terminated
ok
```

   This command is described in Solaris system administration documentation.

5. **Switch from the system console prompt to the SC console prompt by issuing the #. (Pound Period) escape sequence.**

```
ok #.
sc>
```

   b. Using the SC console, issue the `poweroff` **command.**

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

Note – You can also use the Power On/Off button on the front of the server to initiate a graceful system shutdown.

Refer to the *Sun Fire T1000 Server Administration Guide* for more information about the ALOM poweroff command.

▼ To Remove the Server From a Rack

If the server is installed in a rack with the extendable slide rails that were supplied with the server, use this procedure to remove the server chassis from the rack.

1. **(Optional) Issue the following command from the ALOM SC prompt to locate the system that requires maintenance:**

```
sc> setlocator on
Locator LED is on.
```

Once you have located the server, press the Locator button to turn it off.

2. **Check to see that no cables will be damaged or interfere when the server chassis is removed from the rack.**
3. **Disconnect the power cord from the power supply.**
4. **Disconnect all cables from the server and label them.**
5. **From the front of the server, unlock both mounting brackets (FIGURE 3-1) and pull the server chassis out until the brackets lock in the open position.**

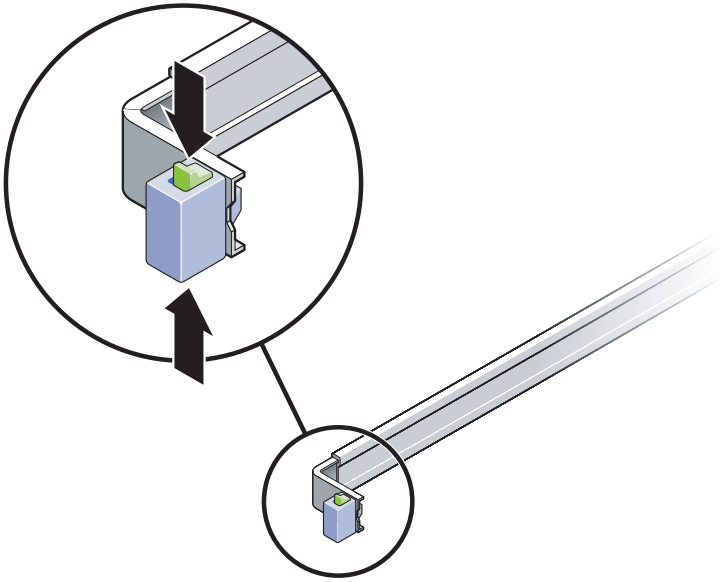

FIGURE 3-1 Unlocking a Mounting Bracket

6. **Press the release buttons on both mounting brackets (FIGURE 3-2) to release the right and left mounting brackets, then pull the server chassis out of the rails.**

   The mounting brackets slide approximately 4 in (10 cm) further before disengaging.

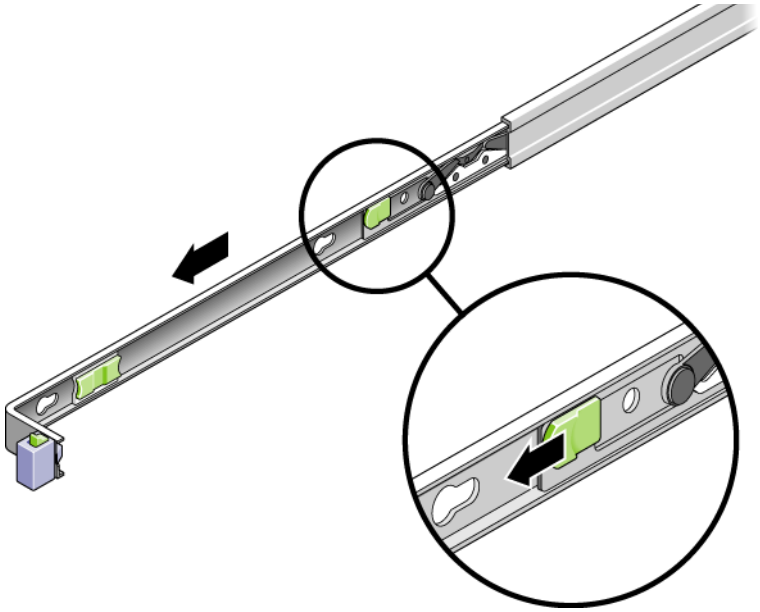

FIGURE 3-2 Location of the Mounting Bracket Release Buttons

7. **Set the chassis on a sturdy work surface.**

▼ To Perform Electrostatic Discharge (ESD) Prevention Measures

1. **Prepare an antistatic surface by which to set parts during removal and installation.**

   Place ESD-sensitive components such as the printed circuit boards on an antistatic mat. The following items can be used as an antistatic mat:

   - Antistatic bag used to wrap a Sun replacement part
   - Sun ESD mat, part number 250-1088
   - Disposable ESD mat (shipped with some replacement parts or optional system components)

2. **Use an antistatic wrist strap.**

▼ To Remove the Top Cover

Access to all customer replaceable units (CRUs) requires the removal of the top cover:

Note – Never run the system with the top cover removed. The top cover must be in place for proper air flow. The cover interlock switch immediately shuts the system down when the cover is removed.

Caution – The system supplies 3.3 Vdc standby power to the circuit boards even when the system is powered off if the AC power cord is plugged in.

---

1. **Press the cover release button (**FIGURE 3-3**).**
2. **While pressing the release button, grasp the rear of the cover and slide the cover toward the rear of the server about one half inch.**
3. **Lift the cover off the chassis.**

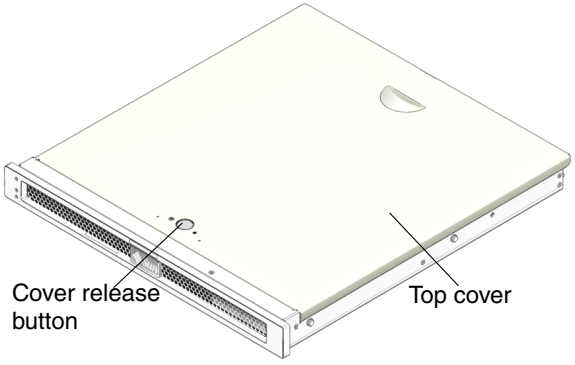

FIGURE 3-3 Location of Top Cover, Release Button

Removing and Replacing CRUs

This section provides procedures for replacing the following customer replaceable parts CRUs) inside the server chassis:

- "To Remove the Optional PCI Express Card" on page 58 and "To Add or Replace the Optional PCI Express Card" on page 60

- "To Remove the Fan Tray Assembly" on page 60 and "To Replace the Fan Tray Assembly" on page 61
- "To Remove the Power Supply" on page 61 and "To Replace the Power Supply" on page 62
- "To Remove the Hard Drive" on page 63 and "To Replace the Hard Drive" on page 64
- "To Remove DIMMs" on page 65 and "To Add or Replace DIMMs" on page 66
- "To Remove the Clock Battery on the Motherboard" on page 70 and "To Replace the Clock Battery on the Motherboard" on page 71

To locate these CRUs, refer to Appendix A, "Field-Replaceable Units (FRUs)" on page 75.

▼ To Remove the Optional PCI Express Card

Use this procedure to remove the optional low-profile PCI Express card from the server.

1. **Perform the procedures described in "Common Procedures for Parts Replacement" on page 53.**
2. **Remove any cable(s) that are attached to the card.**

3. **On the rear of the chassis, release the retention latch ()**FIGURE 3-5 **that secures the PCI Express card to the chassis.**

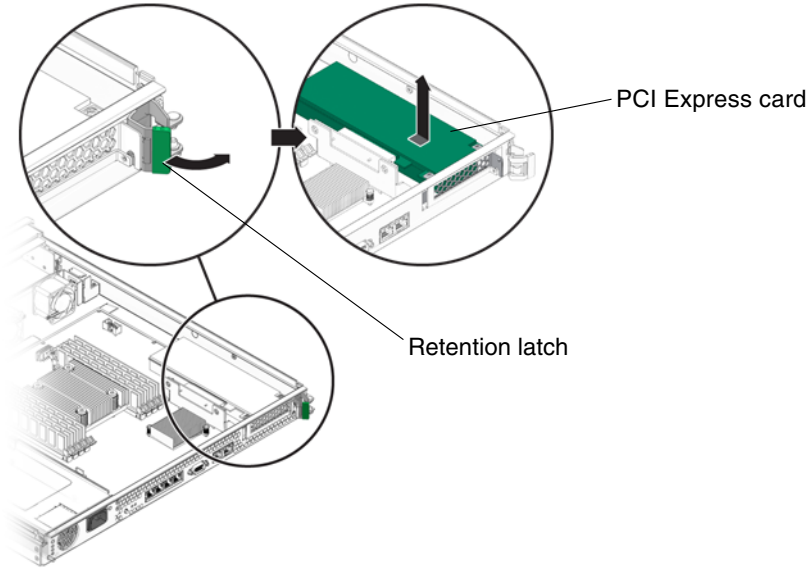

FIGURE 3-4 Releasing the PCI Express Card Retention Latch

4. **Gently work the PCI Express card out of the socket on the PCI Express riser board** FIGURE 3-5**) and the retention bracket.**

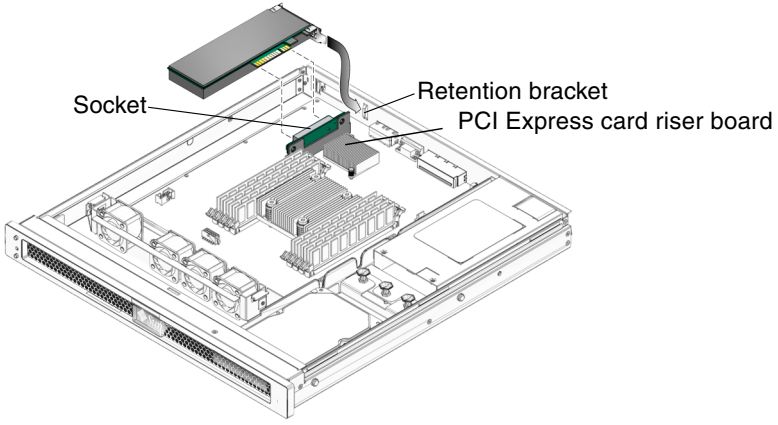

FIGURE 3-5 Removing and Replacing the PCI Express Card

5. **Place the PCI Express card on an antistatic mat.**

▼ To Add or Replace the Optional PCI Express Card

Use this procedure to replace the PCI Express card.

1. **Unpackage the replacement PCI Express card and place it on an antistatic mat.**

Note – Only low profile PCI_E cards with low brackets will fit into the chassis. There are a variety of PCI-E cards on the market. Read the product documentation for your device for additional installation requirements and instructions that are not covered here.

---

2. **Insert the PCI Express card into the connector slot and retention bracket (**FIGURE 3-5**) on the PCI Express riser board.**
3. **On the rear of the chassis, engage the retention latch (**FIGURE 3-4**) to secure the card to the chassis.**
4. **Perform the procedures described in "Common Procedures for Finishing Up" on page 72.**
5. **Run the Solaris `printdiag` command to verify that the PCI Express card is being recognized by the system.**

▼ To Remove the Fan Tray Assembly

1. **Perform the procedures described in "Common Procedures for Parts Replacement" on page 53.**
2. **Disconnect the fan power cable from the motherboard.**
3. **Release the tabs (**FIGURE 3-6**) on both sides of the fan assembly.**

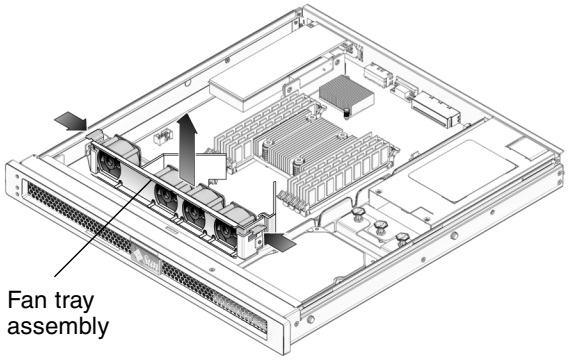

FIGURE 3-6 Removing the Fan Tray Assembly

4. **Remove the fan assembly from the sheet metal mounting brackets.**

▼ To Replace the Fan Tray Assembly

1. **Unpackage the replacement fan tray assembly and place it on an antistatic mat.**
2. **Align the fan tray assembly with the sheet metal mounting brackets and slide it into place until tabs on each side lock it into place.**
3. **Reconnect the fan power cable to the motherboard.**
4. **Perform the procedures described in "Common Procedures for Finishing Up" on page 72.**
5. **Verify that the Service required and Locator LEDs are not lit.**

▼ To Remove the Power Supply

1. **Perform the procedures described in "Common Procedures for Parts Replacement" on page 53.**
2. **Disconnect the power cable from the motherboard and pull it through the midwall.**
3. **Loosen the fastener (FIGURE 3-7) on the front of the power supply and slide the power supply forward to remove it from the chassis.**

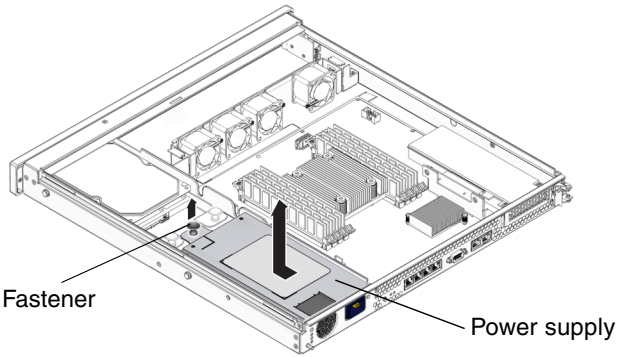

FIGURE 3-7 Removing the Power Supply

▼ To Replace the Power Supply

1. **Unpackage the replacement power supply.**
2. **Slide the power supply into the chassis and engage the two alignment pins in the rear of the chassis that mate with the power supply.**
3. **Tighten the fastener (**FIGURE 3-8**) to lock the power supply into place in the chassis.**
4. **Redress the power cable through the midwall in the chassis and connect the cable to the motherboard.**
5. **Perform the procedures described in "Common Procedures for Finishing Up" on page 72.**
6. **Verify that the amber Fault LED on the replaced power supply and the Service required LED is not lit.**
7. **At the sc> prompt, issue the `showenvironment` command to verify the status of the power supply.**

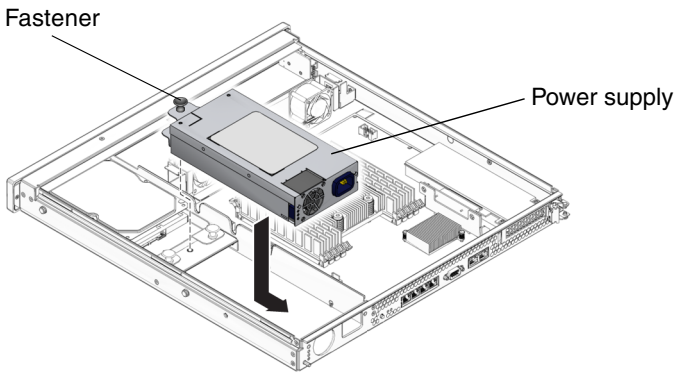

FIGURE 3-8 Replacing the Power Supply

▼ To Remove the Hard Drive

1. **Perform the procedures described in "Common Procedures for Parts Replacement" on page 53.**
2. **Disconnect the cable from the hard drive.**
3. **Unsnap the catches on the latches (FIGURE 3-9) on the front of the disk drive and remove the drive and tray assembly from the chassis.**

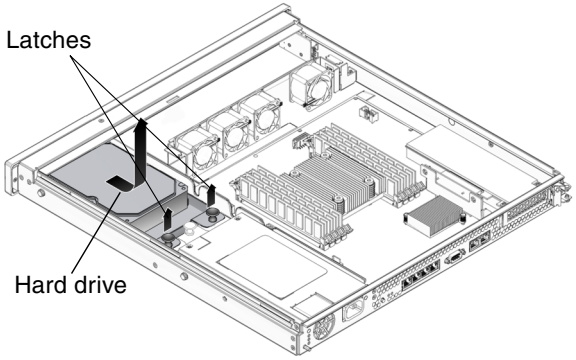

Figure showing how to remove the hard disk drive.

FIGURE 3-9 Removing the Hard Drive

▼ To Replace the Hard Drive

1. **Unpackage the replacement hard drive and tray assembly.**
2. **Slide the hard drive and tray assembly into the chassis until it mates with the front of the chassis (**FIGURE 3-10**).**

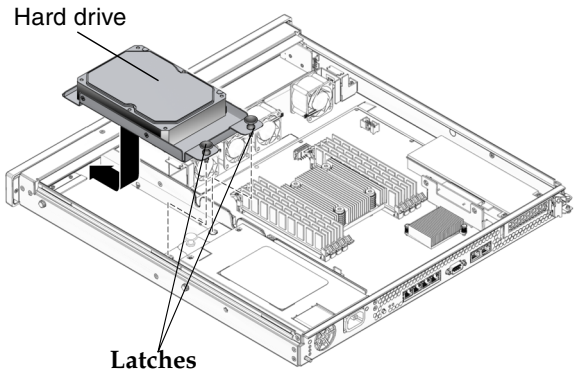

FIGURE 3-10 Replacing the Hard Drive

3. **Snap the catches on the latches to lock the drive and tray assembly into place in the chassis.**
4. **Redress the power and cable through the midwall in the chassis and reconnect the cable to the rear of the drive.**
5. **Perform the procedures described in "Common Procedures for Finishing Up" on page 72**
6. **Perform administrative tasks to reconfigure the hard disk drive.**

   The procedures that you perform at this point depend on how your data is configured. You might need to partition the drive, create file systems, load data from backups, or have it updated from a RAID configuration.

   Example:

```
cfgadm -c configure c0t0d0s0C
```

▼ To Remove DIMMs

Caution – This procedure requires that you handle components that are sensitive to static discharges that can cause the component to fail. To avoid this problem, ensure that you follow antistatic practices as described in "To Perform Electrostatic Discharge (ESD) Prevention Measures" on page 56.

1. **Perform the procedures described in "Common Procedures for Parts Replacement" on page 53.**
2. **Locate the DIMM (FIGURE 4-8) that you want to replace.**

   Use FIGURE 3-11 and TABLE 3-1 to identify the DIMM you want to remove.
3. **Make note of the DIMM location so you can install the replacement DIMM in the same socket.**
4. **Push down on the ejector levers on each side of the DIMM until the DIMM is released.**

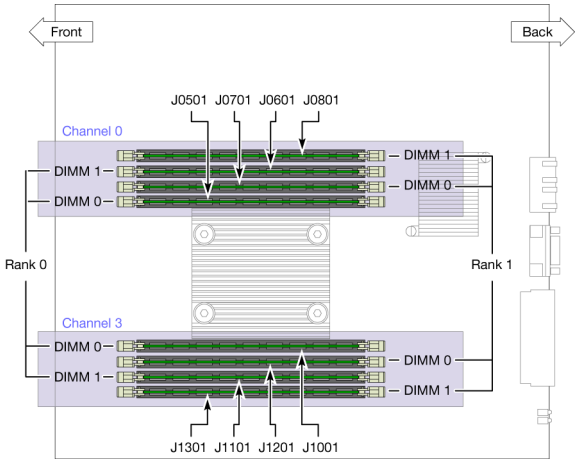

FIGURE 3-11 DIMM Locations

TABLE 3-1 maps the DIMM names that are displayed in faults to the socket numbers that identify the location of the DIMM on the motherboard.

TABLE 3-1 DIMM Names and Socket Numbers

Socket Number	DIMM Name Used in Messages*
J0501	CH0/R0/D0
J0601	CH0/R0/D1
J0701	CH0/R1/D0
J0801	CH0/R1/D1
J1001	CH3/R0/D0
J1101	CH3/R0/D1
J1201	CH3/R1/D0
J1301	CH3/R1/D1

* DIMM names in messages are displayed with the full name such as MB/CMP0/CH1/R1/D1, but this table lists the DIMM namei in an abbreviated way the preceding MB/CMP0 is omitted) for clarity.

5. **Grasp the top corners of the DIMM and remove it from the motherboard.**
6. **Place the DIMM on an antistatic mat.**

▼ To Add or Replace DIMMs

Use the following guidelines and FIGURE 3-11 and TABLE 3-1 to plan the memory configuration of your server.

- Eight slots hold industry-standard DDR-2 memory DIMMs (providing a total of 16 GBytes of memory).
- The Sun Fire T1000 server accepts the following DIMM sizes:
  - 512 MB
  - 1 GB
  - 2GB
- All DIMMs installed must be the same size.
- DIMMs must be added four at a time.
- Rank 0 memory must be fully populated for the Sun Fire T1000 to function

1. **Unpackage the replacement DIMMs and place them on an antistatic mat.**
2. **Ensure that the socket ejector tabs are in the open position.**
3. **Line up the replacement DIMM with the connector.**
4. **Push the DIMM into the socket until the ejector tabs lock the DIMM in place.**
5. **Perform the procedures described in "Common Procedures for Finishing Up" on page 72.**

6. **Perform the following steps to clear the memory fault.**

   a. **Gain access to the ALOM sc> prompt.**

      Refer to the Sun Fire T2000 Server Advanced Lights Out Management (ALOM) Guide for instructions.

   b. **Run the** `showfaults -v` **command to determine how to clear the fault:**

   - If the fault is a Host-detected fault (displays a UUID), such as the following:

```
sc> showfaults -v
ID Time           FRU               Fault
0 SEP 09 11:09:26 MB/CMP0/CH0/R0/D0 Host detected fault
MSGID:
SUN4U-8000-2S UUID: 7ee0e46b-ea64-6565-e684-e996963f7b86
```

   Run the showfaults -v command to obtain the UUID to clear the fault:

```
sc> clearfault 7ee0e46b-ea64-6565-e684-e996963f7b86
Clearing fault from all indicted FRUs...
Fault cleared.
```

   - If the fault resulted in the DIMM being disabled, such as the following:

```
sc> showfaults -v
ID Time           FRU               Fault
1 OCT 13 12:47:27 MB/CMP0/CH0/R0/D0 MB/CMP0/CH0/R0/D0
deemed faulty and disabled
```

   Run the `enablecomponent` **command to enable the FRU:**

```
sc> enablecomponent
```

7. **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.**

```
sc> setkeyswitch diag
```

   b. **Issue the** `poweron` **command.**

```
sc> poweron
```

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

```
sc> console
```

Watch the POST output for possible fault messages. The following output is an indication 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...
```

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

---

d. Issue the Solaris OS `fmadm faulty` command.

```
# fmadm faulty
```

No memory or DIMM faults should be displayed.

If any faults are reported, return to the "Diagnostic Flow Chart" on page 11 for an approach to diagnosing the fault.

▼ To Remove the Motherboard and Chassis

The motherboard, power supply, and chassis are replaced as a unit. Therefore, remove all other FRUs and associated cables from your chassis and install them in the new chassis. The FRUs to remove and replace and the procedures to remove and replace them are:

1. **Remove the PCI Express card.**

   See "To Remove the Optional PCI Express Card" on page 58.

2. **Remove the fan tray assembly and cable.**

   See "To Remove the Fan Tray Assembly" on page 60.

3. **Remove the power supply and cable.**

   "To Remove the Power Supply" on page 61

4. **Remove the hard drive and cable.**

   See "To Remove the Hard Drive" on page 63.

5. **Remove the memory DIMMs.**

   See"To Remove DIMMs" on page 65.

6. **Remove the socketed system configuration SEEPROM from the motherboard and place it on an antistatic mat.**

   The system configuration SEPROM contains the persistent storage for the host ID and Ethernet MAC addresses of the system, as well as the ALOM configuration including the IP addresses and ALOM user accounts, if configured. This information will be lost unless the system configuration SEEPROM is removed and installed in the replacement motherboard. The PROM does not hold the fault data, and this data will no longer be accessible when the motherboard a nd chassis assembly is replaced.

   The location of this SEEPROM is shown in Appendix A, "Field-Replaceable Units (FRUs)" on page 75.

▼ To Replace the Motherboard and Chassis Assembly

1. **Reconnect the front panel LED cable.**

2. **Replace the PCI Express card.**

   See "To Add or Replace the Optional PCI Express Card" on page 60).

3. **Replace the fan tray assembly and cable.**

   See "To Replace the Fan Tray Assembly" on page 61).

4. **Replace the power supply and cable.**

   "To Replace the Power Supply" on page 62

5. **Replace the hard disk drive and cable.**

   See "To Replace the Hard Drive" on page 64).

6. **Replace the memory DIMMs.**

   "To Add or Replace DIMMs" on page 66.

7. **Replace the socketed system configuration SEEPROM.**

   The location of this SEEPROM is shown in Appendix A, "Field-Replaceable Units (FRUs)" on page 75.

8. **Perform the procedures described in "Common Procedures for Finishing Up" on page 72.**

9. **Boot the system and run POST to verify that the system is fully operational. See "Running POST" on page 27.**

▼ To Remove the Clock Battery on the Motherboard

1. **Perform the procedures described in "Common Procedures for Parts Replacement" on page 53.**

2. **Using a small flat head screwdriver, carefully pry the battery (FIGURE 3-12) from the motherboard.**

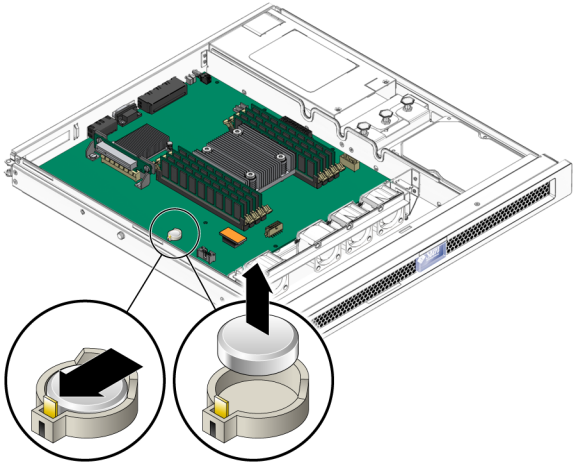

FIGURE 3-12 Removing the Clock Battery from the Motherboard

▼ To Replace the Clock Battery on the Motherboard

1. **Unpackage the replacement battery.**
2. **Press the new battery into the motherboard (FIGURE 3-13) with the + facing upward.**

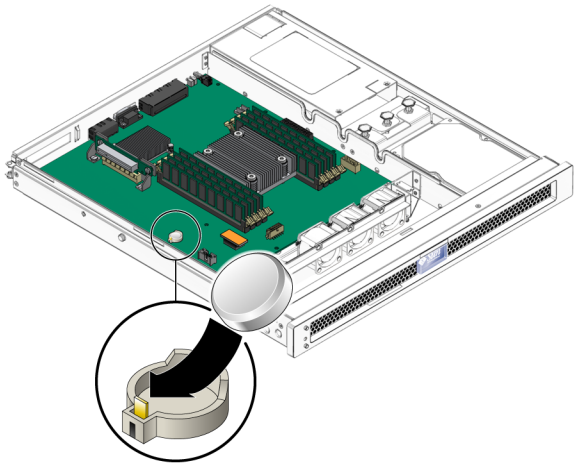

FIGURE 3-13 Replacing the Clock Battery on the Motherboard

3. **Perform the procedures described in "Common Procedures for Finishing Up" on page 72.**
4. **Use the ALOM `setdate` command to set the day and time.**

   Use the `setdate` command before you power-on the host system. For details about this command, refer to the *Sun Fire T1000 Server Advanced Lights Out Management (ALOM) Guide*.

Common Procedures for Finishing Up

▼ To Replace the Top Cover

1. **Place the top cover on the chassis.**

   Set the cover down so that the cover hangs over the rear of the server by about an inch (2.5 cm).

2. **Slide the cover forward until it latches into place.**

▼ To Reinstall the Server Chassis in the Rack

Refer to the *Sun Fire T1000 System Installation Manual* for installation instructions.

After you have reinstalled the server chassis in the rack, reconnect all cables that you disconnected when you remover the chassis from the rack.

▼ To Apply Power to the Server

1. **Reconnect the power cord to the power supply.**

Note – As soon as the power cord is connected, standby power is applied. Depending on the configuration of the firmware, the system might boot.

"Safety Information" on page 43

APPENDIX **A**

Field-Replaceable Units (FRUs)

FIGURE A-1 shows the locations of the field-replaceable units (FRUs) in the Sun Fire T1000 server. TABLE A-1 lists the FRUs. TABLE A-2 lists the locations of the DIMMs. The Channel/Rank/DIMM locations.

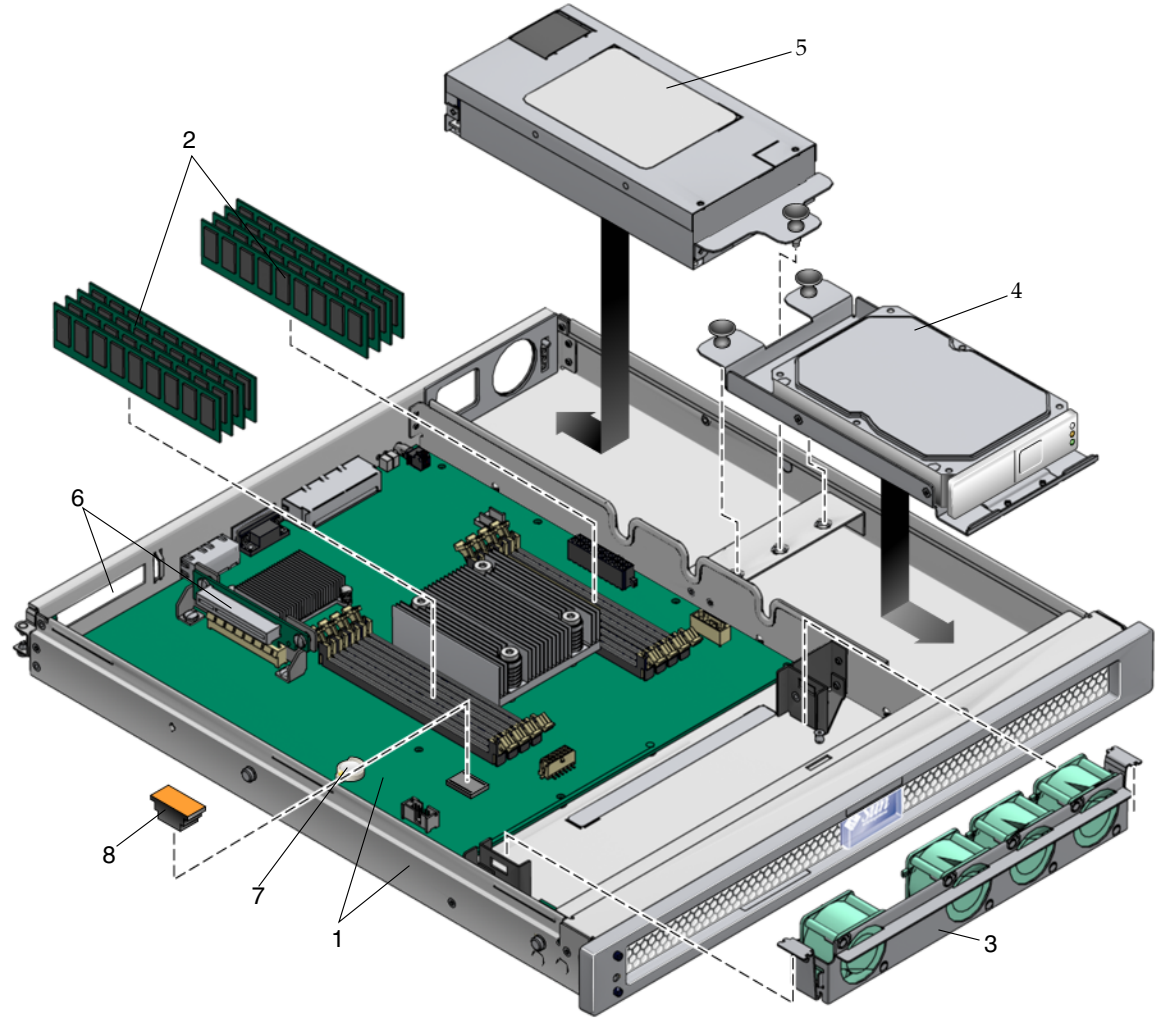

FIGURE A-1 Field-Replaceable Units

1

TABLE A-1 Sun Fire T1000 Server FRU List

Item No.	CRU	Replacement Instructions	Description	Location
1	Motherboard and chassis assembly	"To Remove the Motherboard and Chassis" on page 68	The motherboard and chassis are replaced as a single assembly. The motherboard is provided in different configurations to accommodate the different processor models (6 core and 8 core).	MB
2	DIMMs	"To Remove DIMMs" on page 65	Can be ordered in the following sizes: • 512 MB • 1 GB • 2 GB	See TABLE A-2 and FIGURE 3-11.
3	Fan assembly	"To Remove the Fan Tray Assembly" on page 60	A single assembly containing 4 fans.	FAN_TRAY
4	Power supply unit (PS)	"To Remove the Power Supply" on page 61	The power supply provides -3.3 Vdc standby power at 3 @ 3 Amps and 12 Vdc at 25 Amps.	PS0
5	Hard drive	"To Remove the Hard Drive" on page 63	SATA disk drive, 3.5-inch form factor	HD0
6	PCI Express card slot	"To Remove the Optional PCI Express Card" on page 58	Optional add-on express card	PCI0
7	Clock battery	"To Remove the Clock Battery on the Motherboard" on page 70	Battery is located on the motherboard.	SC/BAT
8	SEEPROM	Remove and replace the socketed SEEPROM.	The socketed SEEPROM contains the MAC address and system configuration information.	MB/SEEPROM

TABLE A-2 Location of DIMMs

Connector Number	Location
J0501	MB/CMP0/CH0/R0/D0
J0601	MB/CMP0/CH0/R0/D1
J0701	MB/CMP0/CH0/R1/D0
J0810	MB/CMP0/CH0/R1/D1
J1001	MB/CMP0/CH3/R0/D0
J1101	MB/CMP0/CH3/R0/D1
J1201	MB/CMP0/CH3/R1/D0
J1301	MB/CMP0/CH3/R1/D1