Sun Fire™ T2000 Server Overview Guide

Sun Microsystems, Inc.
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Contents

Preface

The *Sun Fire T2000 Server Overview Guide* describes the hardware and software features for the Sun Fire™ T2000 server.

Sun Fire T2000 Server Documentation

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Title	Description	Part Number
Sun Fire T2000 Server Site Planning Guide	Site planning information for the Sun Fire T2000 server	819-2545
Sun Fire T2000 Server Product Notes	Late-breaking information about the server. The latest notes are posted at: http://www.sun.com/documentation	819-2544
Sun Fire T2000 Server Getting Started Guide	Information about where to find documentation to get your system installed and running quickly	819-2542
Sun Fire T2000 Server Installation Guide	Detailed rackmounting, cabling, power-on, and configuration information	819-2546
Sun Fire T2000 Server Administration Guide	How to perform administrative tasks that are specific to the Sun Fire T2000 server	819-2549
Sun Fire T2000 Server Service Manual	How to run diagnostics to troubleshoot your server and how to remove and replace parts in the server	819-2548
Advanced Lights Out Management (ALOM) CMT vx.x Guide	How to use the Advanced Lights Out Management (ALOM) CMT software.	Varies, based on version

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Sun Fire T2000 Server Overview Guide, part number 819-2543-12

Sun Fire T2000 Server Features

This chapter describes the features of the Sun Fire T2000 server. The following topics are covered:

Sun Fire T2000 Server Features

The Sun Fire T2000 server is a scalable and reliable high-performance, entry-level server, offering the following characteristics:

- Space efficient, rack-optimized 2U form factor for horizontally scaled environments.
- Chip multithreading technology (CMT) in the UltraSPARC® T1 processor with CoolThreads™ technology offering four, six, or eight cores, with four threads per core for improved throughput and reduced power consumption.
- Four on-board Ethernet ports providing efficient integration and connectivity.

Investment protection with SPARC® V9 binary application compatibility and the Solaris™ 10 Operating System. The Solaris 10 OS also provides features such as Solaris Predictive Self-Healing, Solaris Dynamic Tracing, and support across UltraSPARC platforms.

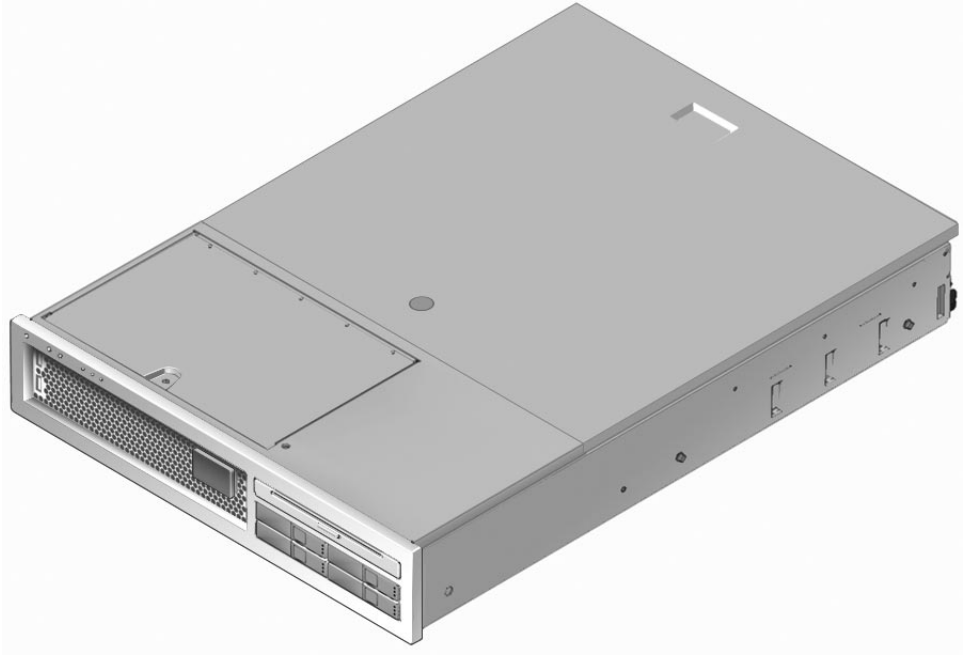

FIGURE 1 Sun Fire T2000 Server

Features at a Glance

TABLE 1 Sun Fire T2000 Server Features at a Glance

Feature	Description
Processor	1 UltraSPARC T1 multicore processor (4, 6, or 8 cores)
Architecture	SPARC V9 architecture, ECC protected Platform group: sun4v Platform name: SUNW,Sun-Fire-T200
Memory	16 slots that can be populated with one of the following types of DDR-2 DIMMS: • 512 MB (8 GB maximum) • 1 GB (16 GB maximum) • 2 GB (32 GB maximum) • 4GB (64 GB maximum)
Ethernet ports	4 ports, 10/100/1000 Mb autonegotiating
Internal hard drives	1-4 SFF SAS 73 GB, 10k rpm, 2.5-inch form factor drives (hot pluggable)
Other internal peripherals	1 slimline DVD-R/CD-RW device
USB ports	4 USB 1.1 ports (2 in front and 2 in rear)
Cooling	3 hot-swappable and redundant system fans and 1 blower unit
PCI interfaces	3 PCI Express (PCI-E) slots that support* cards with the following specifications: • low-profile • x1, x4, and x8 width • 12v and 3.3v as defined by the PCI Express specification 2 PCI-X slots that support* cards with the following specifications: • 64-bit, 133 MHz • low-profile • 3.3v (5v is also supplied, as defined by the PCI-X specification, using a 3.3V form factor connector) Note: Depending on the server model, one PCI-X slot might be occupied with a disk controller card. Refer to the *Sun Fire T2000 Server Service Manual* for details.
Power	2 hot-swappable and redundant power supply units (PSUs) Refer to the *Sun Fire T2000 Server Site Planning Guide* for power and environmental specifications.
Remote management	ALOM CMT management controller with a serial and 10/100 Mb Ethernet port

TABLE 1 Sun Fire T2000 Server Features at a Glance

Feature	Description
Firmware	System Firmware comprising: • OBP for system settings and power-on self test (POST) support • ALOM CMT for remote management administration
Cryptography	Hardware-assisted cyptographic acceleration
Operating system	Solaris™ 10 Operating System preinstalled on disk 0 Refer to the *Sun Fire T2000 Server Product Notes* for information on the minimum version of supported OS and required patches.
Other software	Java™ Enterprise System with a 90-day trial licence
Other	Some models† of this server comply with the Restriction of Hazardous Substances (RoHS) directive 2002/95/EC.H. Refer to the *Sun Fire T2000 Server Installation Guide* for certification information.

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

† To determine if a given Sun Fire T2000 server meets this directive, at the ALOM CMT `sc>` prompt, issue the `showfru -s MB` command. If the `SpecPartNo` is 885-0481, the system is not certified for the RoHS directive. If the `SpecPartNo` is 885-0689, the system meets the RoHS directive.

Refer to the *Sun Fire T2000 Server Service Manual* for hardware configuration information. Refer to the *Sun Fire T2000 Server Administration Guide* for administrative tasks that are specific to this server.

Chip-Multitheaded Multicore Processor and Memory Technology

The UltraSPARC® T1 multicore processor is the basis of the Sun Fire T2000 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 four, 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 as L1 cache, L2 cache, memory access crossbar, DDR2 memory controllers, and a JBus I/O interface have been carefully tuned for optimal performance. See FIGURE 2.

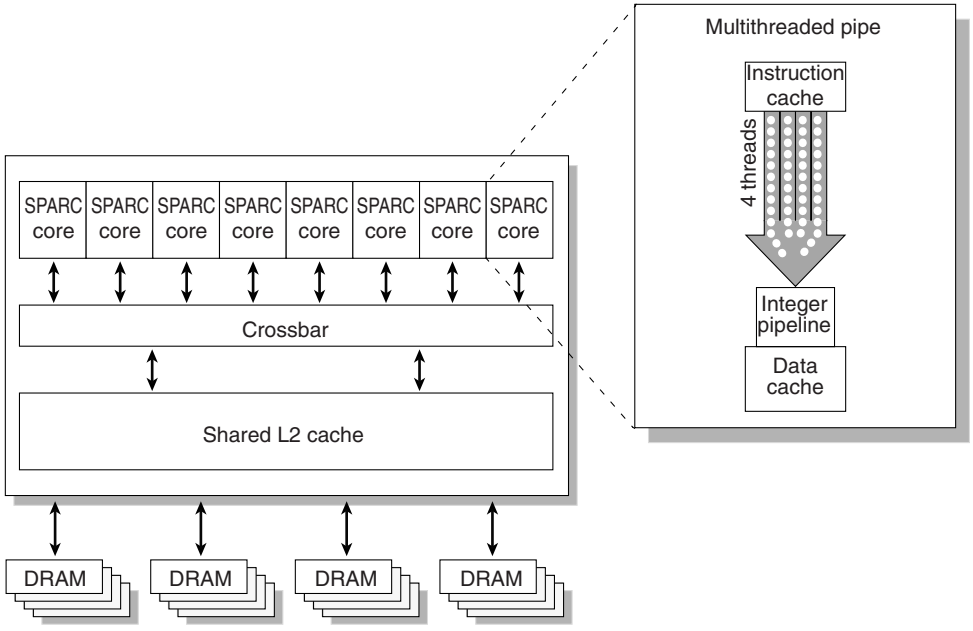

FIGURE 2 UltraSPARC T1 Multicore Processor Block Diagram

Performance Enhancements

The Sun Fire T2000 server running the Solaris 10 OS provides several new performance enhancing technologies with its sun4v architecture and multicore multithreaded UltraSPARC T1 multicore processor.

Some of these enhancements are:

- Large page optimization
- Reduction on TLB misses
- Optimized block copy
- Improved web services performance through the kernel-level SSL proxy Solaris 10 OS feature

PreInstalled Solaris Operating System

The Sun Fire T2000 server is preinstalled with the Solaris 10 Operating System (Solaris OS), and offers the following Solaris OS features:

- Stability, high performance, scalability, and precision of a mature 64-bit operating system
- Support for over 12,000 leading technical and business applications
- Solaris Containers – Isolate software applications and services using flexible, software-defined boundaries.
- DTrace – A comprehensive dynamic tracing framework for tuning applications and troubleshooting systemic problems in real time.
- Predictive Self-Healing – Capability that automatically diagnoses, isolates, and recovers from many hardware and application faults.
- Security – Advanced security features designed to protect the enterprise at multiple levels.
- Network Performance – Completely rewritten TCP/IP stack dramatically improves the performance and scalability of your networked services.

If you prefer to install the Solaris OS rather then use the preinstalled Solaris OS, you can do so. The Sun Fire T2000 server supports Solaris 10 OS. For possible updates to supported Solaris releases, refer to the *Sun Fire T2000 Server Product Notes*.

Preloaded Java Enterprise System Software

The Sun Fire T2000 server is preinstalled with Java™ Enterprise System software and includes a free 90-day evaluation license for the following Java Enterprise System software applications:

- Access Manager – A security foundation that helps manage secure access to an enterprises' web applications by offering single sign-on (SSO) as well as enabling federation across trusted networks.
- Application Server – Provides a Java 2 Platform, Enterprise Edition (J2EE platform) 1.4 compatible platform for developing and delivering server-side Java applications and web services.
- Calendar Server – A Web-based tool that facilitates team collaboration by enabling users to manage and coordinate appointments, events, tasks, and resources.
- Cluster software – Delivers high availability to enterprise system applications.
- Directory Server – User-management infrastructure for enterprises that manage high volumes of user information by providing a centralized repository for storing and managing user profiles and access privileges, as well as application and network resource information.
- Directory Proxy Server – Provides secure firewall-like services for the Directory Server.
- Instant Messaging – A standards-based, real-time communication and collaboration application.
- Message Queue – An enterprise-level message server using a standards-based (JMS) messaging solution.
- Messaging Server – A high-performance, highly secure messaging platform that provides security features that help ensure the integrity of communications.
- Portal Server – Provides portal services that identify users through centralized identity services using roles, and policies.
- Web Server – A secure, reliable, easy-to-use web server designed for medium and large business applications.

To gain the benefits of the Java Enterprise System, you can buy a subscription license for a Java Enterprise System Suite, or a combination of Java System Suites.

Hardware-Assisted Cryptography

The UltraSPARC T1 multicore processor provides hardware-assisted acceleration of RSA and DSA cryptographic operations. The Solaris 10 Operating System provides the multithreaded device driver (`ncp` device driver) that supports the hardware-assisted cryptography.

Remote Manageability With ALOM CMT

The Advanced Lights Out Management (ALOM CMT) feature is a system controller that enables you to remotely manage and administer the Sun Fire T2000 server.

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

ALOM CMT 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 CMT provides a command-line interface that you can use to remotely administer geographically distributed or physically inaccessible machines. In addition, ALOM CMT 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 CMT to send email alerts of hardware failures, hardware warnings, and other events related to the server or to ALOM CMT. The ALOM CMT circuitry runs independently of the server, using the server's standby power. Therefore, ALOM CMT firmware and software continue to function when the server operating system goes offline or when the server is powered off. ALOM CMT monitors the following Sun Fire T2000 server components:

- CPU temperature conditions
- Disk drive status
- Enclosure thermal conditions
- Fan speed and status
- Power supply status
- Voltage conditions

For information about configuring and using the ALOM system controller, refer to the *Advanced Lights Out Management (ALOM) CMT 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 T2000 server offers the following features:

- Hot-swappable hard drives
- Redundant, hot-swappable power supplies (two)
- Redundant hot-swappable fan units (three) and one blower unit
- Environmental monitoring
- Internal hardware drive mirroring (RAID 1) and striping (RAID0)
- Error detection and correction for improved data integrity
- Easy access for most component replacements

For more information about using RAS features, refer to the *Sun Fire T2000 Server Administration Guide*.

Hot-Swappable Components

Sun Fire T2000 server hardware is designed to support hot-swapping of the chassis-mounted hard drives, fan units, and power supplies. By using the proper software commands, you can install or remove these components while the system is running. Hot-swap technology significantly increases the system's serviceability and availability by providing the ability to replace hard drives, fan units, and power supplies without service disruption.

Power Supply Redundancy

The Sun Fire T2000 server features two hot-swappable power supplies, enabling the system to continue operating should one of the power supplies fail or if one power source fails.

The Sun Fire T2000 server also has a single hot-swappable blower unit that works in conjunction with the power supply fans to provide cooling for the internal disk drives. If the blower unit fails, the three functioning fan units provide enough cooling to keep the system running.

Fan Redundancy

The Sun Fire T2000 server features three hot-swappable system fans. The fans enable the system to continue operating with adequate cooling in the event that one of the fans fails.

Environmental Monitoring

The Sun Fire T2000 server server features an environmental monitoring subsystem protects the server and its components against:

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

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

All error and warning messages are logged in the ALOM CMT event log and are optionally sent to the system controller (SC) system console. Service Required LEDs remain lit after an automatic system shutdown to aid in problem diagnosis.

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

If a power supply problem is detected, an error message is logged in the ALOM CMT event log and optionally sent to the SC system console. Additionally, LEDs located on each power supply light to indicate failures. The system Service Required LED lights to indicate a system fault.

Support for RAID Storage Configurations

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

By attaching one or more external storage devices to the Sun Fire T2000 server, you can use a redundant array of independent drives (RAID) software application such as Solstice DiskSuite™ or VERITAS Volume Manager to configure system drive storage in a variety of different RAID levels.

Error Correction and Parity Checking

The UltraSPARC 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 on the data.

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

Fault Management and Predictive Self Healing

The Sun Fire T2000 server features the latest fault management technologies. The Solaris 10 OS architecture provides a means for building and deploying systems and services capable of *predictive self-healing*. Self-healing technology enables systems to accurately predict component failures and mitigate many serious problems before they actually occur. This technology is incorporated into both the hardware and software of the Sun 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.

Rackmountable Enclosure

The Sun Fire T2000 server uses a space-saving 2U-high rackmountable enclosure that can be installed into a variety of industry standard racks.

Chassis Identification

The following figures show the physical characteristics of the Sun Fire T2000 server.

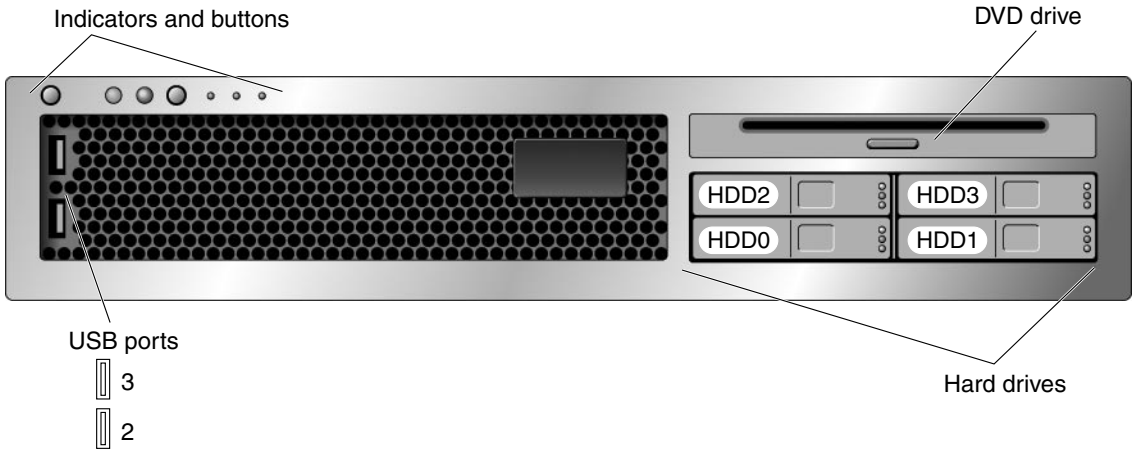

FIGURE 3 Sun Fire T2000 Server Front Panel

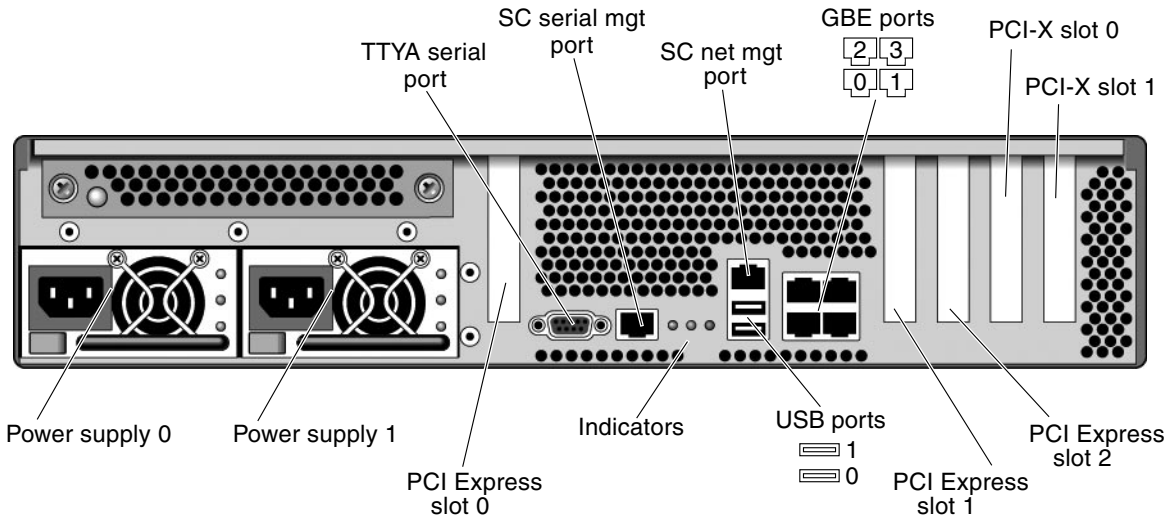

FIGURE 4 Sun Fire T2000 Server Rear Panel

For details on how to install the server refer to the *Sun Fire T2000 Server Installation Guide*.