



Sun Fire™ E2900 Systems Site Planning Guide

Sun Microsystems, Inc.
www.sun.com

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Preface

This guide describes the physical and environmental requirements for Sun Fire™ E2900 systems.

How This Book Is Organized

Chapter 1 contains packing information and a site planning checklist.

Chapter 1 describes the physical requirements.

Chapter 3 describes the environmental requirements.

Related Documentation

TABLE P-1 Related Documentation

Application	Title
Use	<i>Sun Fire Entry-level Midrange System Administration Guide</i>
Use	<i>Sun Fire Entry-level Midrange System Controller Command Reference Manual</i>
Install	<i>Sun Fire E2900 Systems Installation Guide</i>
Service	<i>Sun Fire E2900 Systems Service Manual</i>

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Tools Required For Installation and Service

The following tools are required for installation and service. They should be safely stored and made readily available for service providers when required:

- Installation tools:
 - Computer lifting device
 - Screwdriver, Phillips No. 2
 - 13 mm wrench (spanner, supplied)
 - 8 mm wrench (spanner, supplied)
- Service tools:
 - Screwdriver, Phillips No. 2
 - Needle nose pliers
 - ESD mat
 - ESD grounding wrist strap or foot strap
 - Safety platform

Site Planning Checklist

This chapter describes system requirements and the contents of the Sun Fire E2900 systems shipping package. The chapter contains the following sections:

- [Section 1.1, “System Packaging” on page 1-1](#)
- [Section 1.2, “Site Planning Checklist” on page 1-2](#)

1.1 System Packaging

Sun Fire E2900 systems are shipped secured to a wooden pallet by brackets. The system is covered by shock-resistant packaging secured by a corrugated cardboard cover, which itself is secured by unbreakable straps.

Graphics on the outside of the cover illustrate how to remove the cover and associated packaging. No special tools are required.

The modules shipped within the system depend on the configuration ordered.

1.1.1 After Unpacking

The system weighs approximately 236 pounds (107 kg) when fully equipped. A lifting device will be required to lift the system.

Ensure that doorways, corridors, and aisles are wide enough and high enough to accommodate the system while it is being moved by the lifting device.

1.2 Site Planning Checklist

1.2.1 Training

- Have system administrators and operators taken the necessary Sun Microsystems training courses?

1.2.2 System Components

- Has the system configuration been determined?
- What is the total number of systems?

1.2.3 Physical Specifications

- Has the system location been established?
- Does the equipment floor layout meet the equipment maintenance access requirements ([Section 2.3, “Service Access” on page 2-6](#))?
- Will the equipment be positioned so that the exhaust air of one device does not enter the air inlet of another?

1.2.4 Environmental Requirements

- Does the computer room environment meet the temperature and humidity specifications ([Section 3.2, “Airflow and Heat Dissipation” on page 3-3](#))?
- Can the computer room environment specifications be maintained satisfactorily?
- Is additional fire suppression equipment required?

1.2.5 Facility Power Requirements

- Have you determined system cabinet and peripheral cabinet(s) voltage?
- Have sufficient power receptacles been ordered for each system, monitor, and peripheral?
- Are circuit breakers properly installed and labeled?
- Are the power receptacles within 11.5 feet (3.5 meters) of the server cabinet system, or within 6.0 feet (1.8 meters) of the standalone server system?

Physical Specifications

This chapter describes the physical specifications and accessibility considerations for Sun Fire E2900 systems. It contains the following sections:

- [Section 2.1, “Dimensions” on page 2-1](#)
- [Section 2.2, “Mounting Requirements” on page 2-3](#)
- [Section 2.3, “Service Access” on page 2-6](#)
- [Section 2.4, “Seismic Applications” on page 2-6](#)

2.1 Dimensions

The depth given on [TABLE 2-1](#) does not include I/O connectors, power connectors, or cable management features.

Cables are likely to protrude a minimum of 1.2 in. (3 cm) from the rear of the system, and the telescopic slides protrude 1.1 in. (2.8 cm). The cable management arm could add between 2.4 in. to 7.9 in. (6 cm to 20 cm) to the system depth.

Power connectors could add 2 in. (5 cm) to the depth.

TABLE 2-1 shows the shipping dimensions of a Sun Fire E2900 system.

TABLE 2-1 System Dimensions

Dimension		Measurement	
		Imperial	Metric
Width	Including slides	17.50 in.	44.50 cm
	Including mounting cradle	22.20 in.	56.48 cm
	Including wooden pallet	23.62 in.	60.00 cm
Depth	System only	22.00 in.	55.80 cm
	Including slides	22.40 in.	56.80 cm
	Including mounting cradle	22.00 in.	55.82 cm
	Including wooden pallet	27.76 in.	70.50 cm
Height	12 RU nominal	21.00 in.	53.34 cm
	Including mounting cradle	25.30 in.	64.21 cm
	Including wooden pallet	36.97 in.	93.90 cm
Weight	System only	236.0 lbs	107 kg
	Including mounting cradle	286.0 lbs	130 kg
	Including cable management and slides	310.0 lbs	141 kg
Misc.	Opening in wooden pallet to accommodate lifting device (accepts standard cargo lifting devices)	24.60 in.	62.50 cm
	Opening in orange mounting cradle to accommodate lifting device	13.30 in.	33.70 cm

2.2 Mounting Requirements

Sun Fire E2900 systems have been designed to accommodate the most common mounting configurations. The rackmount kit that ships with the system allows installation in the following racks:

- Sun™ Rack 900 Cabinet
- Sun Fire Cabinet
- Sun StorEdge™ Expansion Cabinet
- 19-inch IEC297/EIA310-D rack with a depth between mounting rails of 17.7 inches and 30.7 inches (45.00 cm and 78.00 cm)
- 19-inch two-post rack with a post depth of between 3 inches and 6 inches (7.62 cm and 15.24 cm)

An optional rackmount kit provides adapters to allow installation in a 23-inch two-post rack with a post depth of 5 inches (12.70 cm). These are intended for use with Telco unequal flange seismic frames.

Sun Fire E2900 systems must be mounted using screws suitable for the equipment rack. The screws should be M5, M6, or No. 10-32 UNF (unified bolt threads fine). All screws must be fitted. The recommended tightening torque value for either M5 or No. 10-32 UNF recess head screws is 2.8 lb-f (3.8Nm), and that for M6 screws is 4.4 lb-f (6 Nm).

The vertical mounting hole pattern of the rack should conform to the standard dimensions shown in [FIGURE 2-1](#).

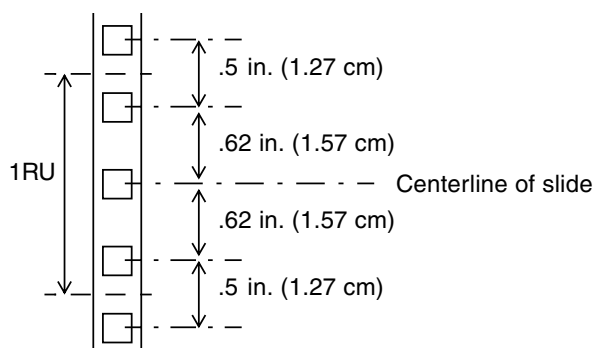


FIGURE 2-1 EIA/RETMA Universal Mounting Hole Pattern Dimensions

Ensure that the slides will fit the RETMA hole pattern so that the system, when installed, aligns with a RU (rack unit) boundary.

2.2.1 Vertical Space

Sun Fire E2900 systems occupy 12 RU (21 in./53.34 cm) of vertical height.

2.2.2 Depth

There must be a minimum of 22.44 inches (57.00 cm) usable internal depth in the rack or cabinet.

Required usable depth (rack internal space) depends upon the cooling airflow arrangement and the type of cable management used.

Examples of depth:

- Minimum = 22.44 inches (57.00 cm)

The cable management arm (CMA) must not be installed, and the front cabinet door must be removed (to provide maximum airflow) to achieve the minimum depth (cable support must be provided by the installer).

- Typical Lite = 25.3 inches (64.30 cm)

The CMA-lite cable management arm must be installed, and the front cabinet door must be ventilated with 1 inch (2.50 cm) of air plenum to achieve the typical lite depth.

- Typical = 30.8 inches (78.30 cm)

The CMA-800 cable management arm must be installed, and the front cabinet door must be ventilated with 1 inch (2.50 cm) of air plenum to achieve the typical depth.

- Maximum = 33.4 inches (84.80 cm)

The CMA-800 cable management arm must be installed, and the front cabinet door must be solid with a 3.54 inch (9.00 cm) plenum at the front of the system to act as a ventilation chimney. An inset to the front mounting rails of 4.5 inches. (11.50 cm) is required.

2.2.3 Loading

The rack must be capable of supporting a static load of 236 pounds (107kg) for each fully configured Sun Fire E2900 system installed. Dynamic load considerations are subject to site location and application specifications.

In a suitably stable four-post rack, two Sun Fire E2900 systems can be fitted. Mounting hole information is provided in the *Sun Fire E2900 Systems Installation Guide*.

No units or cables above or below a system should protrude beyond the front of the system to ensure system access when the slides are extended.



Caution – Never mount multiple systems in a two-post rack.

2.2.4 Safety

Sun strongly suggests that all host cabinets containing a Sun Fire E2900 system be anchored to the floor, to the ceiling, or to adjacent frames, using the manufacturer's instructions.

Free standing cabinets should be supplied with an anti-tilt feature, which must sufficiently support the weight of the Sun Fire E2900 system when extended on its slides (usually a minimum of 10.6 inches (27 cm) from the front edge of the rack). Where an anti-tilt feature is not supplied and the cabinet is not bolted to the floor, a safety evaluation must be conducted by the installation or service engineer to determine rack stability when the Sun Fire E2900 system is extended on its slides.

Prior to installing the cabinet on a raised floor, a safety evaluation must be conducted by the installation or service engineer to ensure that the floor has sufficient strength to handle the Sun Fire E2900 system when extended on its slides. In this case, secure the rack through the raised floor to the concrete floor below using a proprietary rackmounting kit for the purpose.



Caution – When multiple systems are fitted in a cabinet, only one system can be extended for service at any a time.

2.3 Service Access

When determining the final location of the Sun Fire E2900 system, ensure there is enough space for service access. Allow a minimum of clearance of 35 inches (86.0 cm) at the front and rear of the system for service access.

The distance between cabinets can be zero. The last cabinet in any aisle should be a minimum of 36 inches (91.4 cm) from any data center equipment or dividing walls. Additional room on the right side of the system is desirable to improve access for I/O and IB-SSC service.

2.4 Seismic Applications

If the Sun Fire E2900 system is used in an environment where Earthquake Zone 4 compliance is required, a rack designed to tolerate a Zone 4 earthquake must be selected, and independent tests undertaken to ensure system compliance in these areas.

A seismic rack should be rigid enough to result in a fundamental resonance in the horizontal axis of greater than 5 Hz with the Sun Fire E2900 system installed.

Environmental and Electrical Specifications

This chapter describes the environmental and electrical requirements for Sun Fire E2900 systems. It contains the following sections:

- [Section 3.1, “Environmental Requirements” on page 3-1](#)
- [Section 3.2, “Airflow and Heat Dissipation” on page 3-3](#)
- [Section 3.3, “Sun Fire E2900 System Power Requirements” on page 3-4](#)

3.1 Environmental Requirements

The design of your environmental control system—such as computer room air-conditioning units—must ensure that intake air to the server system complies with the limits specified in this section.

To avoid overheating, *do not*:

- Direct warm air toward the front of the cabinet.
- Direct warm air toward the system access panels.

[TABLE 3-1](#) lists the environmental limits for Sun Fire E2900 systems. The system can be installed in an environment with the specific operating ranges shown in [TABLE 3-1](#).

TABLE 3-1 Environmental Limits for Sun Fire E2900 Systems

Environmental Factor	Operating Range	Non-Operating Range	Optimum
Ambient temperature*	41° to 95°F (5° to 35°C) up to 550 yards (500 meters) ^d	–40° to 149°F (–40° to 65°C*)	69.8° to 73.4°F (21° to 23°C*)
Relative humidity\	10 to 90% non condensing 80.6° (27°C) maximum wet bulb	10 to 90% non condensing 100.4° (38°C) maximum wet bulb	45 to 50% non condensing
Elevation	For UltraSPARC IV+ 1.8 GHz CPU/Memory boards only, maximum 7000 feet (2134 meters) All other CPU/Memory boards, maximum 10000 feet (3048 meters)	maximum 39400 feet (12000 meters)	

* Does not apply to removable media devices.

\ Subject to a maximum absolute humidity of 0.024 kg of water per kg of dry air.

d Maximum ambient operating temperature is derated by 1 degree C per 500m elevation.

The operating environmental limits in [TABLE 3-1](#) reflect systems testing. The optimum condition is the suggested operating environment. Operating computer equipment for extended periods at or near the temperature or humidity extremes is known to significantly increase the failure rate of hardware components. It is strongly suggested that customers plan and use the optimal temperature and humidity ranges in order to minimize any chance of downtime due to component failure.

3.1.1 Ambient Temperature

The ambient temperature range of 69.8° to 73.4°F (21°C to 23°C) is optimal for system reliability and operator comfort levels. Most computer equipment can operate within a wide temperature range, but a level near 71.6°F (22°C) is desirable because it is easier to maintain safe associated relative humidity levels at this temperature. Operating in this temperature range provides a safety buffer in the event the environmental support systems go down for a period of time. Though individual standards vary slightly, 69.8° to 73.4°F (21°C to 23°C) should be used as an optimal setting.

3.1.2 Ambient Relative Humidity

The ambient relative humidity levels between 45 percent and 50 percent are the most suitable for safe data processing operations. Under certain circumstances, most data processing equipment can operate within a fairly wide environmental range (20 percent to 80 percent), but the optimal goal should be between 45 percent to 50 percent for the following reasons:

- Optimal range helps protect computer systems from corrosivity problems associated with high humidity levels.
- Optimal range provides the greatest operating time buffer in the event of environmental control system failure.
- This range helps avoid failures or temporary malfunctions caused by intermittent interference from static discharges that might occur when relative humidity is too low.

Electrostatic discharge (ESD) is easily generated and less easily dissipated in areas where the relative humidity is below 35 percent. ESD becomes critical when levels drop below 30 percent. The 5 percent relative humidity range might seem unreasonably tight when compared to the guidelines used in typical office environments or other loosely controlled areas. However, it is not as difficult to maintain in a data center because of the high efficiency vapor barrier and low rate of air changes normally present.



3.2 Airflow and Heat Dissipation

The maximum rate of heat release from a Sun Fire E2900 system with all slots occupied and active is 3720W (12683.38 British Thermal Units (BTU) per hour). [TABLE 3-2](#) shows detailed figures.

TABLE 3-2 Heat Dissipation

Configuration	Heat Dissipation
	Sun Fire E2900
4 CPUs, 8 Gbytes memory	1540W (5250.64 BTU/hr)
8 CPUs, 16 Gbytes memory	2430W (8285.11 BTU/hr)
12 CPUs, 24 Gbytes memory	3320W (11319.58 BTU/hr)
12 CPUs, 96 Gbytes memory	3720W (12683.38 BTU/hr)

The Sun Fire E2900 system has been designed to function while mounted in a natural convection airflow. The following rules must be followed to meet the environmental specification.

- Ensure adequate airflow through the system. The Sun Fire E2900 system uses internal fans that can achieve a total airflow of 400 cubic feet of air per minute (cfm) in normal operating conditions.
- The system has front-to-back cooling. The air inlet is at the front of the system. The exhaust exits from the rear of the system.
- Ventilation openings for both the inlet and exhaust of the system should provide a minimum open area of 160 inches² (1030 cm²) each.
- Allow a minimum of clearance of 35 inches (86 cm) at the front and rear of the system for adequate ventilation.
- Ensure that additional equipment installed in the cabinet does not exceed environmental limits at the air inlet. The environmental limits assume the system is operating in the system cabinet with ventilated doors closed.

3.3 Sun Fire E2900 System Power Requirements

The Sun Fire E2900 system is supplied ready for installation in an equipment rack.

Note – The voltage must be in the range 200–240 VAC for the system to power on.

The Sun Fire E2900 system is supplied with four detachable power cords fitted with wall plugs to mate with the local electrical socket outlets. [TABLE 3-3](#) shows the power cord ratings.

Note – The plug at the end of each power cord is the primary means of disconnection for this product.

TABLE 3-3 Sun Fire E2900 System AC Power Cord Ratings

Rating	Value
Voltage	200 to 240 VAC
Maximum input current per cord	9A at 200 VAC
Line cord	10A nominal
Circuit breakers – North America (4)	15A to 20A
Circuit breakers – international (4)	16A

[TABLE 3-4](#) shows the on-site AC power requirements.

TABLE 3-4 Sun Fire E2900 System Power Requirements

Rating	Value
Voltage	200 to 240VAC
Frequency	50 to 60 Hz

[TABLE 3-5](#) shows the current and power consumption of the Sun Fire E2900 system at 200VAC.

TABLE 3-5 Sun Fire E2900 System Current and Power Consumption

Rating	Value
Current	9A per cord, if only two cords are powered
Inrush Current	18A after 100 μ s
Surge Current	After 5 ms brown-out short term surge is higher at 75A
Power Consumption	3300W max. total

3.3.1 Grounding Requirements

The Sun Fire E2900 system enclosure has an additional safety earth bonding point.

This bonding point must meet the central office requirements for enclosure or shelf grounding in GR1089-CORE. This is for a path between the unit system and enclosure metal or nearby point on the central office ground system.

The use of this bonding point connection is optional and is generally dependent on the equipment practice of the installer.

This bonding point is independent of the safety ground connection for the power system grounding, which is provided by the earth wire present in each of the power cords. This connection must be present.

3.3.2

Connecting AC Power for Redundancy



Caution – For optimum redundancy, the power cords should be connected to two independent power sources (two power cords for each power source).

Most commonly, two independent power sources means an outside power line as one source and an uninterruptible power supply backup system (UPS) as the second source. That way, if a single power source should fail, the system will continue to function.

Each power cable should have its own circuit breaker.

The system will not enter standby unless two system power supplies have AC inputs in range.