



Sun Netra™ X4450 Server Product Notes

Sun Microsystems, Inc.
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Adobe PostScript

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Preface

This document contains the late-breaking news and known issues for the Sun Netra™ X4450 server.

Related Documentation

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

<http://docs.sun.com/app/docs/prod/server.nebs>

Application	Title	Part Number	Format	Location
Service	<i>Sun Netra X4450 Server Service Manual</i>	820-4017	PDF and HTML	Online
Installation	<i>Sun Netra X4450 Server Installation Guide</i>	820-4015	PDF and HTML	Online
ILOM reference	<i>Sun Integrated Lights Out Manager 2.0 Supplement for the Sun Netra X4450 Server</i>	820-5244	PDF and HTML	Online
Platform safety and compliance	<i>Sun Netra X4450 Server Safety and Compliance Guide</i>	820-4183	PDF and HTML	Online
Generic safety	<i>Important Safety Information for Sun Hardware Systems</i>	816-7190	PDF	Online
Getting started	<i>Sun Netra Server Getting Started Guide</i>	820-3016	Printed PDF	Shipping kit Online

Sun Netra X4450 Server Product Notes

This document contains the late-breaking news for the Sun Netra™ X4450 server.

Topics include:

- [“New Features” on page 1](#)
- [“Supported Operating Systems” on page 3](#)
- [“System Firmware” on page 4](#)
- [“Preinstalled and Preloaded Software” on page 4](#)
- [“General Issues” on page 5](#)
- [“Hardware and BIOS Issues” on page 7](#)
- [“System Management Issues” on page 9](#)
- [“System Management Browser Issues” on page 12](#)
- [“Documentation Errata” on page 13](#)

New Features

For this release, there are two new features that are described in this section.

Telco Dry-Contact Alarm Port

The Alarm port is located on the rear panel and uses a standard DB-15 connector. In a telecommunications environment, the Alarm port connects to the central office alarming system. Refer to the Sun Netra X4450 Server Service Manual for alarm connector pinouts and signals.

Watchdog Timers

There are two ILOM controlled watchdog timers supported on the service processor:

- SP BIOS watchdog timer
- SP operating system (OS) watchdog timer

These watchdog timers enable the service processor to reset or power off the system if the BIOS or operating system (OS) crashes or hangs. Both watchdog timers are set using the BIOS Setup Utility.

Refer to the Sun Netra X4450 Server Service Manual for information on configuring the watchdog timers.

Pre-Installation Power Calculations

To determine the power consumption requirements at your site, use the following power calculator:

http://www.sun.com/solutions/eco_innovation/powercalculators.jsp

Optional PCI Cards

The Sun Netra X4450 server supports several optional PCI cards. Additional cards are being qualified, so the following table might not be complete.

TABLE 1-1 Sun Netra X4450 Server Optional PCI Cards

X-Option Name	Part Number	Qty.	Description
1027A-Z	501-7283	1	Dual 10-GbE (fiber)
4447A-Z	501-7606	4	Quad-port 1-GbE Cu
7281A-2	371-0904-01	3	Dual-port 1-GbE (fiber)
SG-XPCIE8SAS-I-Z	371-3255-01	1	8-port LSI 1068e SAS
SG-XPCIE2SCSIU320Z	375-3357-04	1	Dual-port U320 SCSI
(X)6000A	594-2923-01 375-3424	1	Sun™ Crypto Accelerator 6000
SG-XPCI2FC-EM4-Z	375-3399	2	Dual 4-Gb FC host adaptor (Emulex)
SG-XPCI2FC-QF4	375-3294-01	2	Dual 4-Gb FC host adaptor

Features Not Supported in This Release

The Tools and Driver CD is not available in the ship kit. However, the CD image is available on Sun Download Center (SDLC) at:

<http://www.sun.com/download>

You can use the CD image to install supported operating systems and to update firmware. For more information, go to:

<http://www.sun.com/servers/netra/x4450/support.xml>

Supported Operating Systems

The Solaris 10 10/08 OS is preinstalled on the Sun Netra X4450 server.

Before contacting support, ensure that all mandatory patches are installed on your server. Check the SunSolveSM web site on a regular basis for the availability of new patches.

Note – If you add option cards to the server, refer to the documentation and README files for each card to determine if additional patches are required.

▼ Download Patches

1. Determine if the patches are installed on the server:

```
# showrev -p | grep "Patch: patch_number"
```

where *patch_number* is the number of the patch that you want to install.

2. Go to the SunSolve site to download the patches.

Using the SunSolve PatchFinder tool, specify the base Patch ID number (the first six digits) to access the current release of a patch.

3. Follow the instructions in the README file for each patch.

System Firmware

The system firmware includes Sun Integrated Lights Out Manager (ILOM) software, the Basic Input/Output System (BIOS), and POST firmware. The following are the minimum supported versions of system firmware for this release of the Sun Netra X4450 server:

- SP firmware 2.0.2.6
- SP firmware build 34017
- SP filesystem 0.1.16
- BIOS S92A2B05.ROM

Firmware updates are available from the Sun Download Center (SDLC) at:

<http://www.sun.com/download>

For details on how to update your firmware, refer to the *Sun Netra X4450 Server Installation Guide*. Updating your system firmware updates your ILOM software and the BIOS and POST firmware.

Preinstalled and Preloaded Software

This section describes the preinstalled and preloaded software on the server. The preinstalled software is ready to use. The preloaded software must first be installed from the preloaded location.

TABLE 1-2 Preinstalled Software

Software	Function
Solaris OS 10 10/08	Operating system
Java™ Runtime Environment (JRE) 5.0 B14	Java compatible environment for web browsers
Netbeans™ 6.0.1	Integrated development environment (IDE) for software developers
Sun Studio 12	C, C++, and Fortran compiler

Sun Studio – C, C++, Fortran Compilers, and Tools

Sun Studio delivers high performance by optimizing C, C++, and Fortran compilers for the Solaris OS on multicore systems. For an overview and documentation, go to:

<http://developers.sun.com/sunstudio/index.jsp>

General Issues

The following issues apply to the Sun Netra X4450 server.

Solaris OS on x86 Platforms

This section contains issues that have been found on x86 platforms when running the Solaris OS.

Unexpected SIGTRAP signal causes dbx debugger to hang (CR 6546562)

When the dbx debugger is being used on the Solaris 10 5/08 for x86/x64 platforms to debug a program that raises or delivers signals that have signal handlers, dbx might receive an unexpected SIGTRAP signal from the kernel that causes it to hang. This situation can occur when dbx is single stepping, running to a breakpoint, collecting runtime checking (RTC) data, or performing any other activity that depends on signal trapping.

In some cases, dbx displays a warning of a unexpected SIGTRAP signal when it hangs:

```
dbx: internal warning: unexpected SIGTRAP!
```

In other cases, dbx indicates receipt of a SEGV signal, as in the following example:

```
signal SEGV (no mapping at the fault address) in main at line 29  
in file "test.c"
```

If you use a `cont -sig SEGV` command to continue execution with the SEGV signal, dbx will display the SIGTRAP warning.

Workaround: Install kernel patch 137112-07.

RTC: x86: signal SIGSEGV if debuggee calls
grantpt (CR 6550564)

For the Sun Studio 12 debugger, sigsegv and sigaltstack are restricted on Solaris 10 Update 5 x86/x64.

RTC instruments memory access instructions for access checking. These instructions are handled by a sigsegv handler at runtime. Because RTC requires its own sigsegv handler and signal alternate stack, any attempts to install an sigsegv handler or signal alternate stack (sigaltstack) will result in EINVAL, or the installation will be ignored. The sigsegv handler calls cannot be nested. Otherwise, the nesting will result in a terminating signal 11 SIGSEGV error.

Workaround: If a terminating signal 11 SIGSEGV error occurs, use rtc skippatch to skip the instrumentation of the affected function. Otherwise, install patch 124873-06 to fix most of the segvs errors.

Use IPMITool Commands to Set or Clear Alarms

The system alarms are set and cleared using IPMITool commands. Refer to the Sun Integrated Lights Out Manager 2.0 Supplement for the Sun Netra X4450 Server for examples of these IPMITool commands. You can download the IPMITool utility from the following web site:

<http://ipmitool.sourceforge.net/>

IPMITool version 1.8.9.4 or later is required for the Sun Netra X4450 server's service processor (ILOM version 2.0.2.6) and IPMITool version 1.8.8 or later is required to run on the host OS.

You can use the ipmitool -V command to get IPMITool version information.

Critical Alarm Must Be Reset When Power Is Applied

A critical alarm is asserted by default when system power is not applied. The critical alarm must be reset by the user application in order to be deasserted. A critical alarm is reasserted by a subsequent power failures or by the user application. IPMITool commands can be used to set and reset the system alarms.

Hardware and BIOS Issues

The following issues apply to the hardware or BIOS.

BMC Not Responding During BIOS POST

Under rare circumstances, you might see a BMC not responding message during BIOS POST. If the BIOS halts and reports this message, reboot the server by pressing Ctrl+Alt+Delete. Refer to CR 6714006 for more information.

Scripting the SP/BIOS Flash Process

The SP/BIOS flash process includes an Update Successful message when the service processor (SP) flash completes. This message signals the end of the SP flash activity only. At this point in the process, the BIOS has not been flashed and premature termination of the process (for example, a manual reboot) will result in BIOS corruption. To avoid corrupting the BIOS review the flash sequence below:

1. SP begins the flash process.
2. SP completes the flash process.
3. CLI returns an Update Successful message.
4. The system reboots, and the BIOS begins the flash process.
5. The BIOS flash process completes.

Before writing a script to flash the BIOS/SP remotely, observe the sequence in real-time and test the script on a single system before updating all systems.

Enable USB Flash Device During Boot

In order to enable a USB flash device during boot, you must press F2 to enter into BIOS menu, select Boot->Hard Disk Drives, and select USB flash device as the first drive.

Important Note on Inserting a Hard Disk Drive

When inserting a hard disk drive, do not extend the lever past 70 degrees. If the lever is extended past 70 degrees on insertion there is a risk that the right most tab might break off. The end result of accidentally breaking off the tab is purely cosmetic – the drive still functions properly if fully inserted.

Important Note on Opening the Bezel

If you need to open the bezel, you *must* ensure that the front of the server is hanging over the edge of a flat surface. The hinges on the bezel are designed to drop the bezel below the bottom edge of the server.



Caution – The hinges will break if you open the bezel while the front of the server is on a flat surface.

Power Sources

The Sun Netra X4450 server should never be connected to outside plant power sources.

Surge Protection

The Sun Netra X4450 server does not require an additional surge protector for the AC or DC power configurations if the facility has a surge protector that limits voltage surges to less than 2000 volts. You can, however, install a surge protector if your site requires an additional protector.

Front USB Ports

Due to a possible EMI fault, power cycling the system might inactivate the two USB ports that connect to the PDB board. If an EMI fault occurs that inactivates the front USB ports, contact your Sun service representative for assistance.

System Management Issues

The following issues are related to the Sun Integrated Lights Out Manager (ILOM) remote console system. For more information on the ILOM, see the online Sun Integrated Lights Out Manager 2.0 User's Guide (820-1188).

Some Virtual USB Flash Devices Do Not Mount in Solaris OS

For some USB flash devices, the virtual device will appear mounted in the ILOM, but will not actually be mounted. This issue is under investigation.

Solaris Remote Console Session Requires Java Plug-In

When you start a Remote Console session on a Solaris system, the system prompts you for a decision regarding the `javaRKVM.jnlp` file. You have the following two options:

- If you are logged in as root, choose the option to open this file with its default application.
- If you are logged in as a user other than root, perform the following procedure.

▼ Open the `javaRKVM.jnlp` File as a Non-Root User

1. **When the server prompts you, choose the option to save the file.**

The `javaRKVM.jnlp` file is downloaded and must be run manually. The download manager displays the location of this file.

2. **Move the `javaRKVM.jnlp` file to the `/tmp` directory.**
3. **Find the location of the `javaws` application.**

4. Type the following command:

```
% /location_of_javaws/javaws /tmp/javaRKVM.jnlp
```

This opens a Remote Console session. After the remote console window is closed, the /tmp/javaRKVM.jnlp file is removed.

Selecting the Web Interface Time-Out Duration

When you perform remote installations, you should change the web interface time-out duration.

▼ Choose the Web Interface Time-Out Duration

1. **Log in to the ILOM web interface.**
2. **Click the System Information tab, then click the Session Time-Out tab.**
3. **Set the timeout to 15 minutes, 30 minutes, 1 hour, or 3 hours.**
4. **Click Apply.**

Select Mouse Mode Settings According to Host OS

You must select the correct mouse mode corresponding to the host OS in order for your local mouse to manage the host remotely via the ILOM web interface.

▼ Select Mouse Mode Settings

1. **Select the appropriate mouse mode:**
 - Select Absolute mouse mode if your host is running the Windows or Solaris OS.
 - Select the Relative mouse mode for the Linux OS.
2. **Reset the SP to apply this change.**

Switch Control Between Local Mouse and Host Mouse

Press Alt-M to switch control between local mouse and host mouse.

Pop-Ups Must Be Enabled to Run Remote Console on Firefox

If you have a pop-up blocker enabled in the browser that is running the remote console through the ILOM web interface, the remote console will be blocked from starting on Firefox. If you do not see the remote console, check to see if the built-in pop-up blocker has blocked it.

Remote Console and Virtual Devices on Solaris OS

If you are running Solaris OS on your remote console system, you must log into the operating system as `root` (superuser) to mount any virtual devices.

Virtual Media Considered a USB Device

Virtual Media is considered a USB device by the server, and is listed as a CD-ROM device. This setting overrules any CD-ROM currently set as a USB device.

Enabling Virtual CD-ROM During Boot

Perform the following procedure if you need to enable the virtual CD-ROM during the boot process.

▼ Enable Virtual CD-ROM During Boot

1. Press F2 to enter into the BIOS Setup Utility menu.
2. Select Boot -> CD/DVD Drives.
3. Select Virtual CD-ROM as the first drive.

Remote OS Installation Over a Remote Console Requires Unmount and Remount of the Virtual CD-ROM

When installing an OS remotely using a Remote Console session, each CD request from an installation requires the user to unmount and remount the virtual CD-ROM. When a virtual CD is ejected, the OS treats it as a USB device removal. You must remount the virtual CD to continue the installation.

OS Installation Stops During a Remount of the CD-ROM

The remounting of the CD during an operating system installation causes an error and the OS cannot access the CD.

System Management Browser Issues

The ILOM browser issues are contained in this section.

Minimum Supported Browsers

TABLE 1-3 shows the minimum versions that are supported for running the ILOM web interface for the Sun Netra X4450 server on the Solaris, Linux, and Windows operating systems.

TABLE 1-3 Versions Numbers for Browsers

Browser	Solaris x86	RHEL 32-bit	RHEL 64-bit	SLES 32-bit	SLES 64-bit	Windows
Mozilla	1.7	1.7.12	1.7.13	1.7.8	1.7.13	N/A
Firefox	1.5.0.4	1.0.7	1.5.0.4	1.5.0.4	1.5.04	1.5.0.4
Internet Explorer	N/A	N/A	N/A	N/A	N/A	6

Configuring Java Runtime Environment for Each Browser

Java™ Runtime Environment (JRE) 5 Update 7 is the minimum supported version for the browsers to run the ILOM web interface.

▼ Download JRE 5 Update 7 for Mozilla and Firefox

1. Go to the following URL:

<http://www.java.sun.com/>

2. Click the Get Java Software button.

3. Click Download Now in the new window that opens.

The web site will display the appropriate plug-in options for the operating system that you are running.

4. Click Download to download the appropriate plug-in.

Installation instructions and plug-in verification are also available on this site.

Streaming Video and Remote Console

The Remote Console feature of the ILOM SP is designed for administering your system. Applications requiring heavy video bandwidth (for example, watching videos) will not perform well with the Remote Console.



Documentation Errata

This section contains issues in the Sun Netra X4450 server documentation that were found after the release of the documentation.

Sun Netra X4450 Server Service Manual

This section contains issues that were found in the *Sun Netra X4450 Server Service Manual*.

NIC Naming and Booting Priority

Appendix A in the service manual contains NIC naming values and booting priority that are incorrect.

The following table contains the correct name values.

TABLE 1-4 Sun Netra X4450 NIC Naming

	Net 0	Net 1	Net 2	Net3
BIOS	slot 0400	slot 0401	slot 1200	slot 1201
Solaris 10	e1000g0	e1000g1	e1000g2	e1000g3
Red Hat Linux	eth0	eth1	eth2	eth3
SUSE Linux	eth0	eth1	eth2	eth3
Windows 2003	net	net2	net3	net4

The following list contains the correct booting priority:

1. NET 0 (Intel E1000 G0)
2. NET 1 (Intel E1000 G1)
3. NET 2 (Intel E1000 G2)
4. NET 3 (Intel E1000 G3)

Jumper Settings

The PCI mezzanine board (F371-3636-xx), PCI auxillary board (F371-4413-xx), and the power distribution board (F371-4369-xx) have specific jumper settings that must be followed when these components are replaced.

TABLE 1-5 Sun Netra X4450 Server Jumper Settings

Component	Jumper Setting
PCI mezzanine board	Shunt Pin 2 and Pin 3 on J19
PCI auxiliary board	Shunt Pin 1 and Pin 2 on J12 and J15 Shunt only Pin 3 on J18
Power distribution board	Shunt Pin 2 and Pin 3 on J12

Sun Netra X4450 Server Installation Guide

This section contains issues that were found in the *Sun Netra X4450 Server Installation Guide*.

NEBS Compliance

The following cautions should have been included in the overview section.



Caution – To maintain NEBS compliance, all I/O ports, except the Ethernet ports, must use shielded cables, and both ends of the shield must be grounded.



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

Hard Drive Identification

The illustration of the front panel components in the installation guide should have included hard drive numbers. The red numbers are not physically on the hard drives.

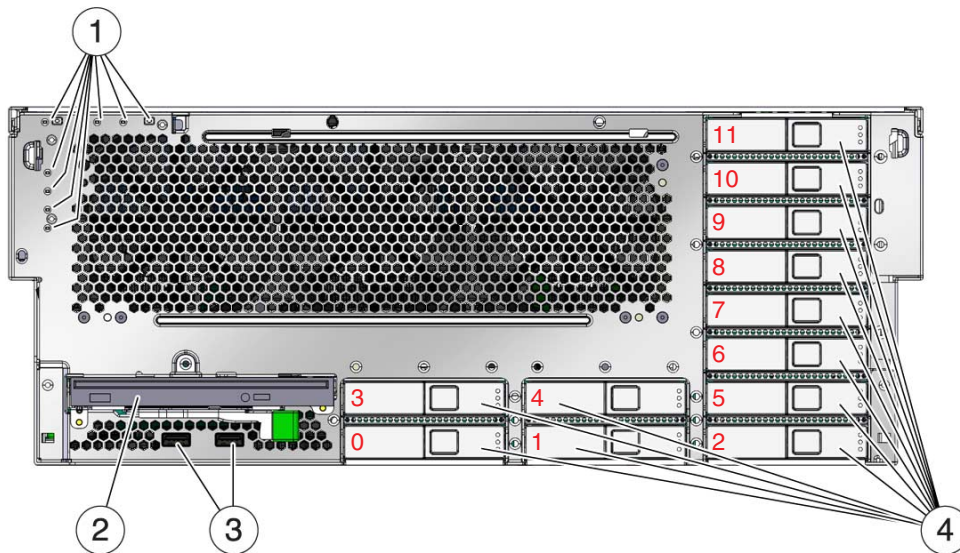


Figure Legend

-
- | | |
|---|------------------------------------|
| 1 | Alarm and system status indicators |
| 2 | DVD drive |
| 3 | USB ports |
| 4 | Hard drives 0-11 |
-

Sun Netra X4450 Server Site Planning

This chapter provides the specifications and site requirements for planning the installation of the Sun Netra™ X4450 server.

Topics include:

- “Physical Specifications” on page 18
- “Clearance for Service Access” on page 18
- “Environmental Specifications” on page 19
- “AC and DC Power Source Requirements” on page 20
- “Additional Power System Information” on page 20
- “Agency Compliance Specifications” on page 21
- “Operating Environment” on page 22

For safety and compliance information, refer to the *Sun Netra X4450 Server Safety and Compliance Guide* and the *Important Safety Information for Sun Hardware Systems* that came with your server.

Physical Specifications

The following are the physical specifications for the server.

Dimension	Server Dimensions	Measurements
Width	Including bezel	17.5 in. (445.0 mm)
Depth	To PSU handles	20.87 in. (530 mm)
	To rear I/O ports	19.88 in. (505 mm)
Height	4 rack unit (4U) nominal	6.86 in. (174.2 mm)
Weight	Fully configured without PCI cards	72.6 lbs (33 kg)

Clearance for Service Access

The following table contains the minimum clearances needed for servicing the server.

Description	Specification
Front of server	36 inches (91 cm)
Rear of server	36 inches (91 cm)

Environmental Specifications

The following table contains the environmental specifications for the AC and DC versions of the server.

Specification	Operating	Nonoperating
Ambient temperature*	41°F to 104°F (5°C to 40°C) up to 6000 feet (1829 meters)\	-40°F to 158°F (-40°C to 70°C)
Relative humidity	10% to 90% noncondensing, short term 25°F to 113°F (-5°C to 55°C) 5% to 90% noncondensing, but not to exceed 0.024 kg of water per kg of dry air (0.053 lbs. water/2.205 lbs. dry air)	Up to 93% noncondensing 100.4° (37.7°C) maximum wet bulb
Elevation (Sun requirement)	Maximum 9840 feet (3000 meters) at 104°F (40°C)	Maximum 39370 feet (12000 meters)
Elevation (NEBS requirement)	-200 feet to 5900 feet (-60 meters to 1800 meters) at 104°F (40°C) 5900 feet to 13100 feet (1800 meters to 4000 meters) at 86°F (30°C)	
Vibration	DC servers: 0.1G, 5-100 Hz, 0.1 Oct/min AC servers: 0.1G (x,y axes); 0.15G (z axis), 5-500 Hz, 1 Oct/min	DC servers: 0.1G, 5-100 Hz, 0.1 Oct/min AC servers: 0.25G (x,y axes); 0.5G (z axis), 5-500 Hz, 1 Oct/min
Shock	DC servers: Operating 30 m/s ² , 11msec half-sine AC servers: 3G, 11msec half-sine	DC servers: Operating 30 m/s ² , 11 msec half-sine AC servers: 1 in. roll off front to back, 0.5 in. roll off side to side, 20 mm step-up
Seismic	AC server only: Zone 4	Not applicable

* Does not apply to removable media devices.

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

AC and DC Power Source Requirements

The server has four hot-swappable power supplies. Both the AC and the DC power supplies are capable of current sharing. To ensure redundant operation of the power supplies, connect the four power cords to separate circuits.

The following table shows the electrical limits and ranges for the server.

Parameter	AC Version Requirement	DC Version Requirement
Voltage (nominal)	100-120/200-240 VAC	-48 or -60 VDC (-40 to -75 VDC range)
Input current (maximum)	14 A	27 A
Frequency	50/60 Hz	N/A
DC Input Treatment	N/A	Isolated DC Return (DC-1)

Note – The DC power source must be reliably connected to ground.

Additional Power System Information

The total input power for the system is divided equally among the power supplies in operation. Reversing the positive and negative inputs to the power supplies of a DC input system will not cause damage. However, the power supplies with reversed input will not operate.

The inputs to a power supply are isolated from the system chassis and the other power supply inputs. The AC or DC power inputs may be at different voltages within the acceptable range and may have different offset voltages relative to the system chassis.

Changing Sun Servers From AC to DC Input or From DC to AC Input

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



Agency Compliance Specifications

The server complies with the following specifications.

Category	Relevant Standards
Safety	UL/CSA-60950-1 EN60950-1 IEC60950-1 CB Scheme with all country deviations IEC825-1, 2 CFR21 part 1040 CNS14336, GB4943
Ergonomics	EK1-ITB-2000
RFI/EMC	EN55022 Class A 47 CFR 15B Class A ICES-003 Class A VCCI Class A AS/NZ 3548 Class A CNS 13438 Class A KSC 5858 Class A GB9254 Class A EN61000-3-2 GB17625.1 EN61000-3-3

Category	Relevant Standards
Immunity	EN55024 IEC 61000-4-2 IEC 61000-4-3 IEC 61000-4-4 IEC 61000-4-5 IEC 61000-4-6 IEC 61000-4-8 IEC 61000-4-11
Telecommunications	EN300-386 IEC 60068
Regulatory markings (pending)	CE, FCC, ICES-003, C-tick, VCCI, GOST-R, BSMI, MIC, UL/cUL, UL/DEMKO/GS, UL/S-mark, CCC

Operating Environment

Your environmental control system must provide intake air for the server which complies with the limits specified in [“Environmental Specifications” on page 19](#).

To avoid overheating, *do not* direct warmed air:

- Toward the front air intake of the server
- Toward the server access panels

Note – When you receive your server, place it in the environment in which you will install it. Leave the server in its shipping crate at its final destination for 24 hours. This resting period prevents thermal shock and condensation.

The server has been tested to meet all functional requirements when operating in the operating environmental limits presented in [“Environmental Specifications” on page 19](#). Operating computer equipment in extremes of temperature or humidity increases the failure rate of hardware components. To minimize the chance of component failure, use the server within the optimal temperature and humidity ranges.

Electrical Power

Good practice is to connect each power supply to a separate circuit, which enables the server to remain operational if one of the circuits fails. Consult your local electrical codes for any additional requirements.

Ambient Temperature

An ambient temperature range of 21°C (69.8°F) to 23°C (73.4°F) is optimal for server reliability. At 22°C (71.6°F) it is easy to maintain safe relative humidity levels. Operating in this temperature range provides a buffer if the environmental support systems fail.

Ambient Relative Humidity

Ambient relative humidity levels between 45% and 50% are the most suitable for data processing operations in order to:

- Prevent corrosion
- Provide an operating time buffer in the event of environmental control system failure
- Help avoid failures caused by the intermittent interference from static discharges that 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%, and becomes critical when levels drop below 30%.

Airflow Considerations

- Ensure unobstructed airflow through the chassis. The server uses internal blowers that can achieve a total airflow of 120 CFM (3.4 m³/) in normal operating conditions.
- Ensure that inlet air enters at the front of the server and exits from the back.
- Ensure that ventilation openings such as cabinet doors, for both the inlet and exhaust of the server, provide a minimum open area of 35.5 in.² (231 cm²) each. This size equates to a 60% open area perforation pattern across the front and rear area of the server 17.4 in. x 3.4 in. (442 mm x 87.1 mm). The impact of other open area characteristics that are more restrictive. You must evaluate.
- Ensure that front and rear clearance of the server allow a minimum of 0.2 in. (5 mm) at the front of the server and 3.15 in. (80 mm) at the rear of the server when mounted. These clearance values are based on the inlet and exhaust impedance (available open area) stated in the third bullet assume a uniform distribution of the open area across the inlet and exhaust areas. These values also improve cooling performance.

Note – The combination of inlet and exhaust restrictions such as cabinet doors and the spacing of the server from the doors can affect the cooling performance of the server. You must evaluate these restrictions. The server placement is particularly important for high-temperature NEBS environments where the server inlet ambient temperature is 55°C (131°F). (The DC-powered server is NEBS compliant.)

- Take care to prevent recirculation of exhaust air within a rack or cabinet.
- Manage cables to minimize interference with the server exhaust vent.
- Ensure that air temperature rise through the server is no greater than 68°F (20°C).

Acoustic Noise Emissions

The acoustic noise emissions on the server are as follows:

Parameter	Operating	Idling
Acoustic power LWAd (1B=10dB)	7.1 B	7.1 B

Declared noise emissions are in accordance with ISO 9296 standards.

Calculating Heat Dissipation

To calculate the heat generated by a server so that you can estimate the heat your cooling system must dissipate, convert the figure for the server's power requirement from Watts to BTU/hr. A general formula for doing this is to multiply the power requirement figure in Watts by 3.412.

NEBS Level 3 Certification

Telcordia certified that the DC-powered version of the server meets NEBS Level 3 requirements per SR-3580, including the appropriate sections of GR-63-CORE (*Network Equipment-Building System Requirements: Physical Protection*) and GR-1089-CORE (*Electromagnetic Compatibility and Electrical Safety – Generic Criteria for Network Telecommunications Equipment*).



Caution – To maintain NEBS compliance, the network management (NET MGT) Ethernet port and the RJ-45 serial management (SER MGT) port must use shielded cables, and both ends of the shield must be grounded.
