Sun Ultra 27 Workstation Installation Guide

Sun Microsystems, Inc.
4150 Network Circle
Santa Clara, CA 95054
U.S.A.

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Contents

Preface

The *Sun Ultra 27 Workstation Installation Guide* describes how to set up and configure the workstation hardware and software.This manual is written for technicians, system administrators, authorized service providers (ASPs), and users who have advanced experience troubleshooting and replacing hardware.

Related Documentation

The document set for the Sun Ultra 27 Workstation is described in the *Where To Find Sun Ultra 27 Workstation Workstation Documentation* sheet that is packed with your system. Additionally, you can find the Sun Ultra 27 Workstation documentation at:

`http://docs.sun.com/app/docs/prod/ultra.work#hic`

Translated versions of some of these documents are available in Simplified Chinese, Traditional Chinese, French, Japanese, German, Spanish, and Korean.

English documentation is revised more frequently and might be more up-to-date than the translated documentation.

Documentation, Support, and Training

The Sun web site provides information about the following additional resources:

- Documentation (`http://www.sun.com/documentation/`)
- Support (`http://www.sun.com/support/`)
- Training (`http://www.sun.com/training/`)

Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. To share your comments, go to `http://docs.sun.com` and click Feedback.

Typographic Conventions

The following table describes the typographic conventions that are used in this book.

TABLE P–1 Typographic Conventions

Typeface	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories, and onscreen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% you have mail.`
`AaBbCc123`	What you type, contrasted with onscreen computer output	`machine_name%` **`su`** `Password:`
aabbcc123	Placeholder: replace with a real name or value	The command to remove a file is `rm` *filename*.
AaBbCc123	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the *User's Guide*. A *cache* is a copy that is stored locally. Do *not* save the file. **Note:** Some emphasized items appear bold online.

Shell Prompts in Command Examples

The following table shows the default UNIX® system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P–2 Shell Prompts

Shell	Prompt
C shell	`machine_name%`
C shell for superuser	`machine_name#`

TABLE P–2 Shell Prompts *(Continued)*

Shell	Prompt
Bourne shell and Korn shell	$
Bourne shell and Korn shell for superuser	#

Safety Information

Read the following documents for safety information:

- *Important Safety Information for Sun Hardware Systems*
- *Sun Ultra 27 Workstation Safety and Compliance Guide*

Third-Party Web Sites

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Ordering Components

You can order additional components and replacement parts for the Sun Ultra 27 Workstation. Contact your local Sun sales representative for more information. For the most up-to-date component information, see the Sun Ultra 27 Workstation components list at:

`http://sunsolve.sun.com/handbook_pub/`

Change History

The following changes have been made to the documentation set.

- April 2009, initial documentation was published.
- August 2009, OpenSolaris installation instructions were added.

◆ ◆ ◆ CHAPTER 1

Introduction to the Sun Ultra 27 Workstation

This chapter provides an overview of the Sun Ultra 27 Workstationand includes the following sections:

Checking Package Contents

Carefully unpack all workstation components from the packing cartons. The following items are contained in the package.

Hardware	■ Sun Ultra 27 Workstation ■ DMS-59 cable (if the workstation is configured with an NVS290 graphics card)
Documentation and Media Kit	■ *Sun Ultra 27 Workstation Installation Guide* (this document) ■ *Where to Find Sun Ultra 27 Workstation Documentation* (lists available online documents for this product) ■ Sun safety, warranty, and license documents ■ Sun Ultra 27 Workstation Tools and Drivers DVD (for more information, see "Additional Tools and Software" on page 18) ■ Sun VTS CD

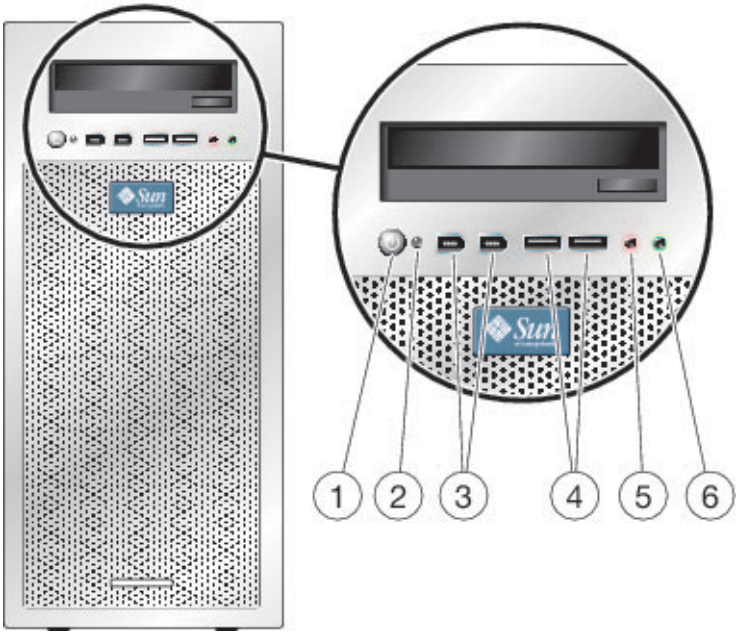
If you ordered an optional country kit, the kit ships in a separate package and includes a power cable, keyboard, and mouse.

Note – Use only a Type 7 keyboard and mouse with the Sun Ultra 27 Workstation.

External Connections and Components

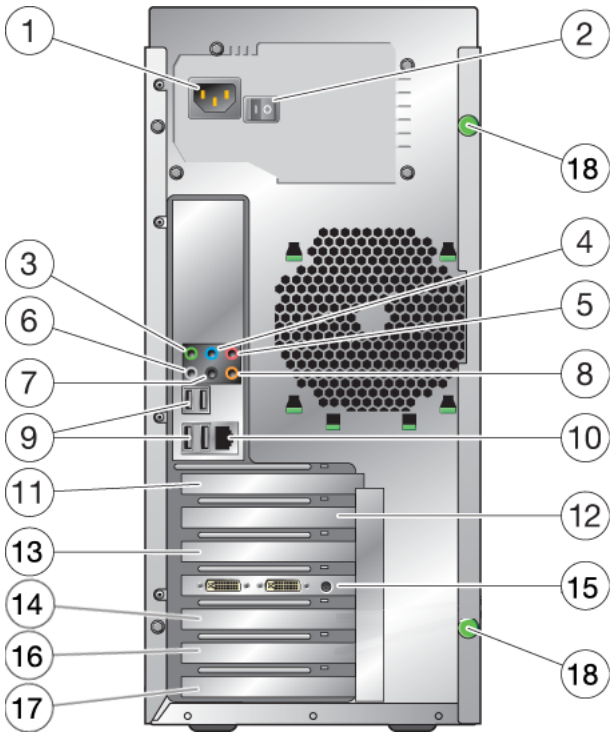
Use this section to familiarize yourself with the workstation's external connections and components.

Front Panel



1	Power button	4	Two USB ports
2	Power LED	5	Microphone-in jack
3	Two 1394 ports	6	Headphone-out jack

Back Panel



1	AC power connector	10	Ethernet connector
2	Power switch	11	Cover plate (no slot)
3	Audio jack (green)	12	Slot 0, PCIe2 x16
4	Line-in jack (blue)	13	Slot 1, PCIe2 (x8 mechanical, x4 electrical)
5	Microphone jack (blue)	14	Slot 2, PCIe2 x16
6	Audio jack (gray)	15	Slot 3, PCIe x1
7	Audio jack (black)	16	Slot 4, PCI 33MHz, 32–bit slot
8	Audio jack (orange)	17	Slot 5, PCIe (x8 mechanical, x4 electrical)
9	Four USB 2.0 ports	18	Thumbscrew (for side cover)

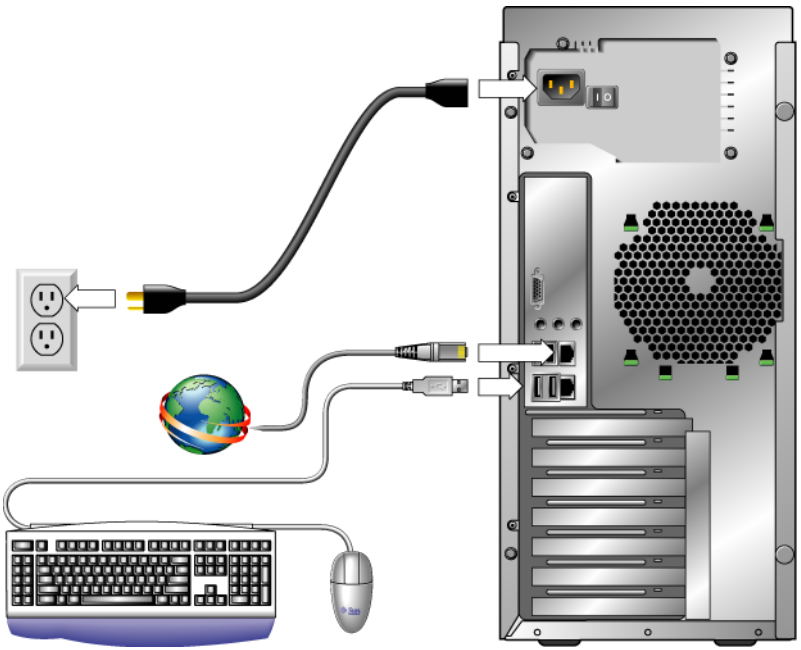
Setting Up the Workstation

This section describes how to connect the power, peripheral devices, and the network.

Note – For maximum reliability and performance, install your workstation into an environment that conforms to the environmental specifications listed in the section, "Environmental Specifications" on page 49, and ensure correct configuration of the workstation as discussed in this document.

▼ To Set Up the Workstation

1 **Connect the workstation power cord to a grounded electrical outlet.**



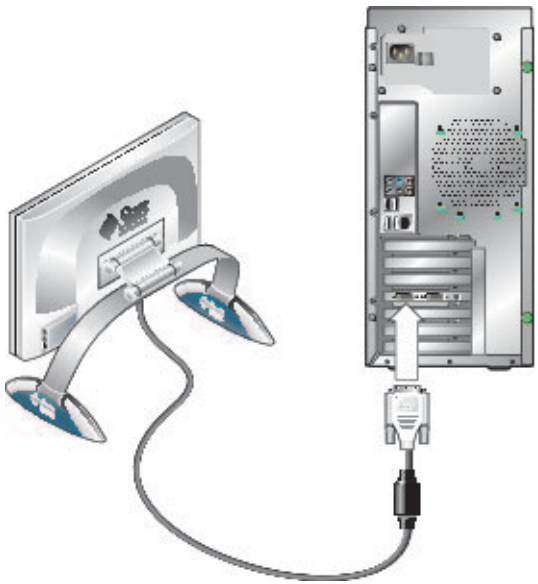
2 **Connect the keyboard to a USB connector on the back or front panel.**

3 **Connect the mouse to the USB connector on the underside of the keyboard or to a USB connector on the front or back panel.**

4 **Connect the Ethernet cable to the Sun Ultra 27 Workstation, and connect the other end of the cable to an Ethernet RJ-45 jack.**

5 **Connect the monitor to the graphics card connector.**

For information about connecting multiple monitors, see Appendix A, "Configuring the System for Multiple Monitors."



Note – Your graphics card might require a DVI cable to connect to your monitor.

6 **Connect any additional external devices to the workstation using the front or back connectors.**

If you are adding an external boot device, see the section, "Adding and Removing Boot Devices " on page 16.

Powering the Workstation On and Off

This section describes how to properly power on and off your workstation.

▼ To Power On the Workstation

1 **Turn on the power to the monitor and to all external devices.**

2 **Turn the power switch on the back of the workstation to the On (|) position.**

3. **Press and release the power switch on the front panel.**
4. **After several seconds, verify that the Power LED next to the power switch is lit.**
   The Power LED lights up after the workstation begins the internal booting process.
5. **To change the system parameters in the BIOS, press the F2 key during the POST process to access the BIOS Setup Utility.**

Caution – Be careful when making changes to the system BIOS, as some changes can cause your system to malfunction. See the *Sun Ultra 27 Workstation Service Manual* for information about the BIOS Setup Utility.

▼ To Power Off the Workstation

1. **Save your data and close any open applications.**
2. **Use one of the following power-off options:**
   a. **Use the operating system shutdown command or menu option.**

Caution – To avoid data loss, use the first option whenever possible.

   b. **If the first step does not shut off the workstation power, press and hold the Power button for approximately four seconds.**
   c. **If the preceding options do not power off the workstation, turn the power switch on the back panel to the Off (0) position.**

Note – After powering off the workstation, wait at least 10 seconds before powering on the workstation again.

Adding and Removing Boot Devices

The BIOS Setup Utility's Boot screen lists the known devices from which the workstation can boot. To boot from a newly installed or attached device, you must first access the BIOS Setup Utility and add the device to the boot list. You can also remove devices from the list or arrange the order of the devices to specify a boot priority.

Caution – Incorrect BIOS settings can cause your workstation to malfunction. Be careful when making changes to the BIOS Setup Utility.

▼ To Add and Remove Boot Devices

1. **Power on the workstation (see "Powering the Workstation On and Off" on page 15).**
   The system boots.
2. **Press the F2 key during system boot.**
   The BIOS Setup screen appears.
3. **Use the arrow keys to navigate to the Boot menu.**
4. **In the Boot Settings menu, add or remove the device to or from the list of boot devices .**
5. **If necessary, change the boot device priority by moving higher priority devices towards the top of the list.**
6. **Press the F10 key to save your settings and exit.**

Adding Optional Components

If the current configuration of your workstation allows, you can add optional components, such as expansion and graphics cards, memory, and hard drives. To add optional components to the workstation, see the relevant section and procedures in the *Sun Ultra 27 Workstation Service Manual*.

Operating System Support

The following operating systems are supported for use with your Sun Ultra 27 Workstation:

- OpenSolaris OS (available as a preinstalled option, see Chapter 2, "Configuring the Optional Preinstalled OpenSolaris Operating System")
- Solaris 10 OS (available as a preinstalled option, see Chapter 3, "Configuring the Optional Preinstalled Solaris Operating System")
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Desktop
- Windows XP, Windows Server 2008, or Windows Vista Ultimate

For an updated list of supported versions of the operating systems listed above, navigate to the Sun Ultra 27 Workstation product page at:

http://www.sun.com/desktop/index.jsp

For information about installing supported versions of Linux, Windows, or a non–preinstalled version of the OpenSolaris or Solaris OS, see the *Sun Ultra 27 Workstation Linux, OpenSolaris and Solaris Operating System Installation Guide* or the *Sun Ultra 27 Workstation Windows Operating System Installation Guide*.

Additional Tools and Software

The Sun Ultra 27 Workstation Workstation Tools and Drivers DVD that is included with the workstation contains the following software:

- Supplemental drivers, which provide support for preinstalled and supported user-installed operating systems. See the appropriate workstation *Operating System Installation Guide* for information on installing these drivers.
- Eurosoft Pc-Check diagnostics software, which provides various diagnostics testing options for the Sun Ultra 27 Workstation. See the *Sun Ultra 27 Workstation Service Manual* for more information.
- Erase Primary Boot Hard Disk utility, which is used to erase the preinstalled operating system.
- XpReburn utility, which is used to add drivers to an existing Windows installation CD.
- 2003Reburn utility, which is used to add drivers to an existing Windows 2003 installation CD.
- Open DOS, which allows you to navigate the CD and run command-line utilities.

Note – The Tools and Drivers DVD that is shipped with your workstation might not be the latest version. For more information, refer to the *Sun Ultra 27 Workstation Product Notes* or the product web site for more information.

◆ ◆ ◆ CHAPTER 2

Configuring the Optional Preinstalled OpenSolaris Operating System

This chapter describes the procedure for configuring the optional preinstalled OpenSolaris operating system (OpenSolaris 2009.06 or later) on the workstation.

This chapter contains the following topics:

Before You Begin

Before you begin configuring the preinstalled OpenSolaris OS, do the following:

- Ensure that main power has been applied to the workstation.
- Gather the information that you will need for the configuration, as listed in the "Installation Worksheet" on page 19. Note that default values are indicated by an asterisk (*).

Note – To identify the MAC address for the workstation or other components, see the Customer Information Sheet (shipped with the component), or inspect the printed MAC address label attached to the workstation or component.

Installation Worksheet

Use the following worksheet to gather the information that you need to configure the preinstalled OpenSolaris OS. You only need to collect the information that applies to your application of the system.

TABLE 2–1 Worksheet for OpenSolaris Configuration

Information for Installation		Description or Example	Your Answers: Defaults (*)
Language		Select from the list of available languages for the OpenSolaris software.	
Locale		Select your geographic region from the list of available locales.	
Terminal		Select the type of terminal that you are using from the list of available terminal types.	
Network Connection		Is the system connected to a network?	Networked Non-networked (*)
DHCP		Can the system use Dynamic Host Configuration Protocol (DHCP) to configure its network interfaces?	Yes No (*)
If you are not using DHCP, note the network address:	IP address	If you are not using DHCP, supply the IP address for the system. Example: 129.200.9.1	
	Subnet	If you are not using DHCP, is the system part of a subnet? If yes, what is the netmask of the subnet? Example: 255.255.0.0	255.255.0.0*
	IPv6	Do you want to enable IPv6 on this machine?	Yes No*
Host Name		Choose a host name for the system.	
Kerberos		Do you want to configure Kerberos security on this machine? If yes, gather this information: ■ Default Realm: ■ Administration server: ■ First KDC: ■ (Optional) Additional KDCs:	Yes No*

TABLE 2–1 Worksheet for OpenSolaris Configuration *(Continued)*

Information for Installation		Description or Example	Your Answers: Defaults (*)
Name service	Name service	If applicable, which name service should this system use?	NIS+ NIS DNS LDAP None*
	Domain name	Provide the name of the domain in which the system resides.	
	NIS+ and NIS	Do you want to specify a name server, or let the installation program find one?	
	DNS	Provide IP addresses for the DNS server. You must enter at least one IP address, but you can enter up to three addresses. You can also enter a list of domains to search when a DNS query is made. ■ Search domain: ■ Search domain: ■ Search domain:	
	LDAP	LDAP Provide the following information about your LDAP profile: ■ Profile name: ■ Profile server: If you specify a proxy credential level in your LDAP profile, gather the following information: ■ Proxy-bind distinguished name: ■ Proxy-bind password:	

TABLE 2–1 Worksheet for OpenSolaris Configuration *(Continued)*

Information for Installation	Description or Example	Your Answers: Defaults (*)
Default Route	Do you want to specify a default route IP address, or let the OpenSolaris installation program find one? The default route provides a bridge that forwards traffic between two physical networks. An IP address is a unique number that identifies each host on a network. You have the following choices: ■ You can specify the IP address. An `/etc/defaultrouter` file is created with the specified IP address. When the system is rebooted, the specified IP address becomes the default route. ■ You can let the OpenSolaris installation program detect an IP address. However, the system must be on a subnet that has a router that advertises itself by using the Internet Control Message Protocol (ICMP) for router discovery. If you are using the command-line interface, the software detects an IP address when the system is booted. ■ You can select None if you do not have a router or do not want the software to detect an IP address at this time. The software automatically tries to detect an IP address on reboot.	■ Specify One ■ Detect One ■ None*
Time zone	How do you want to specify your default time zone?	■ Geographic region* ■ Offset from GM ■ Time zone file
Root password	Choose a root password for the system.	

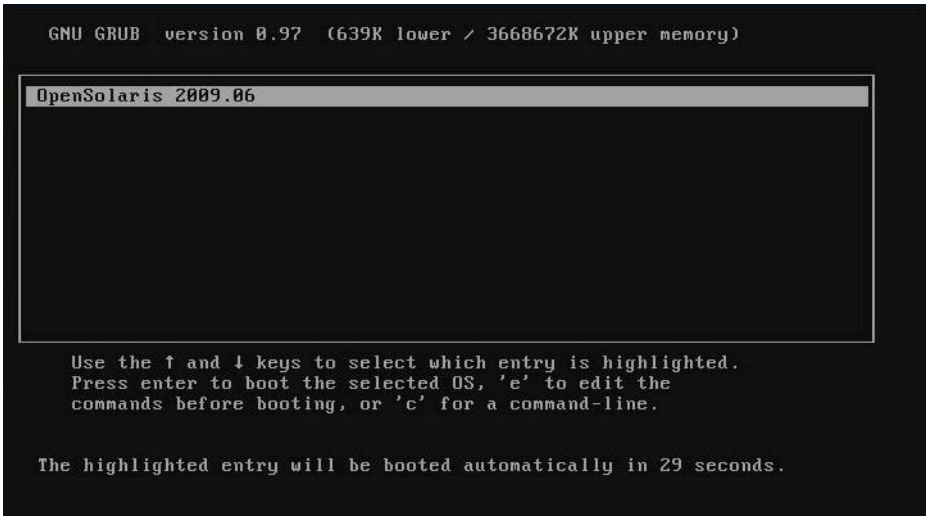
Configuring the Preinstalled OpenSolaris OS

The steps described in this section will help you configure preinstalled OpenSolaris for your workstation.

▼ To Configure the Preinstalled OpenSolaris OS

1 Power on the workstation by pressing the Power button on the front panel.

POST messages appear on your screen as the OS boots up. The GRUB boot loader menu appears.



Note – The GRUB menu on the preinstalled image has been configured to automatically select the OpenSolaris installation after power-up.

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2 Follow the OpenSolaris installation on-screen prompts using the information gathered in "Installation Worksheet" on page 19 to enter the required system and network information.

The screens that are displayed will vary, depending on the method that you chose for assigning network information to the server (DHCP or static IP address).

After you have entered the system configuration information, the server completes the boot process and displays the OpenSolaris login prompt.

3 **At the login prompt, enter your account name and password.**

The OpenSolaris desktop appears.

4 **To get started using OpenSolaris, click the Start Here icon on the desktop.**

OpenSolaris User Documentation

You can access the various collections of the OpenSolaris OS user documentation at:

`http://opensolaris.org/os/documentation/`

Restoring or Reinstalling OpenSolaris

If you need to either restore or reinstall the OpenSolaris OS, do the following:

- **Restoring the OpenSolaris OS.** You should back up the data on your workstation on a regular basis and store the backup in a safe place. Using the built-in RAID capability of your workstation will also help avoid data loss and down time. If you need to restore the operating system on the boot drive, you will need to use the last known good backup image.

- **Reinstalling the OpenSolaris OS.** If you do not have a back up and need to reinstall the OS, do the following:

Caution – The installation overwrites all the software and data on the selected target boot disk.

  - Download the OpenSolaris (x86/x64) LiveCD image from the web:

    `http://www.opensolaris.com/get/index.jsp`
  - Follow the instructions in the *Getting Started With OpenSolaris 2009.06* guide at:

    `http://dlc.sun.com/osol/docs/content/2009.06/getstart/index.html`

◆ ◆ ◆ CHAPTER 3

Configuring the Optional Preinstalled Solaris Operating System

The Solaris™ 10 OS and additional developer software might be preinstalled on the Sun Ultra 27 Workstation workstation. This chapter contains instructions for configuring the preinstalled Solaris 10 OS and describes the additional developer software.

This chapter contains the following sections:

Configuring the Preinstalled Solaris 10 OS

This section covers the following topics:

Solaris 10 OS Licensing Information

The Solaris 10 OS installed on your system does not require a licensing fee. For more information, go to:

`http://www.sun.com/software/solaris/licensing/index.xml`

Disk Layout

When the Solaris 10 OS is preinstalled, the boot hard drive (HD) in your workstation is configured as follows:

- Hard drive root partition: 14.0 Gb (Solaris 10 OS)
- Swap partition: 2.0 Gb
- `/var` partition: 6.0 Gb
- Remainder disk: For `/export`

Preparing to Configure the Preinstalled Solaris 10 OS

Use a copy of Table 3–1 to write down the information that you might need to collect before setting up the Solaris 10 OS.

To help you fill out the information in the table, your system administrator (SA) can provide you with information specific to your site before you begin. Check with your SA about whether some of the information is available on your network.

TABLE 3–1 Information for Preinstalled Solaris 10 OS Configuration

Setup Window	Explanation and Notes	Your Information
Select Language and Locale	Native language and locale to use for the workstation.	
Host Name	A name to give the workstation.	
Terminal Type	Type of terminal to use on the workstation.	
Network Connectivity (IP Address)	Network or stand-alone workstation protocols. A system administrator might be required to complete this section. **Note:** Depending on how you answer and what information is provided by your network, you might also be prompted for the workstation's IP address.	
IPv6	Option to enable IPv6 on the workstation.	
Security Settings	Security settings and protocols.	
Name Service	**Note –** Name service to use: NIS+, NIS, DNS, LDAP, or None. **Note –** This window appears only if the workstation is connected to a network.	

TABLE 3–1 Information for Preinstalled Solaris 10 OS Configuration *(Continued)*

Setup Window	Explanation and Notes	Your Information
Domain Name	NIS or NIS+ domain for this workstation. **Note –** This window appears only if you specify NIS or NIS+ as the naming Service.	
Name Server/ Subnet/ Subnet Mask	Name server (specify the server or have the workstation find one on a local subnet). **Note –** This window displays only if the workstation is connected to a network. **Note –** Depending on how you answer and what information is provided by your network, you might also be prompted for: ■ The subnet for the workstation ■ The subnet mask for the workstation	
Time Zone	Local time zone (select by geographic region, GMT offset, or a time zone file).	
Date and Time	Current date and time (accept the default, or enter the current date and time).	
Root Password	Root (superuser) password for the workstation.	
Proxy Server Configuration	Workstation connection: direct to the Internet or through a proxy server.	

▼ To Configure the Preinstalled Solaris 10 OS

1. **Power on the workstation (see "Powering the Workstation On and Off" on page 15).**
2. **Answer the prompts by following the onscreen instructions and referring to the table of information that you collected.**
3. **When you finish the configuration, the system reboots.**
4. **Type the default user name and password to log in and begin using the workstation.**

   default user name: **`root`**

   default password: **`changeme`**
5. **Review the *Sun Ultra 27 Workstation Product Notes* for any late-breaking information about your preinstalled software.**

6 **Make a system OS backup.**

The backup is used to restore the OS.

The *Solaris 10 System Administration Collection* includes instructions for backing up your OS and is available at `http://docs.sun.com/`

Restoring or Reinstalling the Solaris OS

The hard drive for your system might contain preinstalled software, including the Solaris 10 OS and additional developer software applications. The preinstalled OS is preconfigured with drivers required to support the workstation's hardware. This section discusses restore and reinstall procedures.

▼ To Restore the Solaris OS

- **To restore the OS, use the system OS backup.**

▼ To Reinstall the Solaris OS

- **Follow the instructions in the** *Sun Ultra 27 Workstation Linux, OpenSolaris and Solaris Operating System Installation Guide* **to configure the OS and install the drivers.**

Exploring the Preinstalled Developer Software

The following minimum versions of Sun's developer software are preinstalled on your Sun Ultra 27 Workstation. The following sections provide an overview of each developer software package:

- "Sun Studio 12 Software" on page 30
- "NetBeans IDE" on page 31

Your system might have later versions of this software preinstalled.

Sun Studio 12 Software

Sun Studio software delivers a high-performance, optimizing C, C++, and Fortran developer toolchain for Solaris, OpenSolaris, and Linux operating systems, including support for multicore x86- and SPARC-based systems. The toolchain includes parallelizing compilers, code-level and memory debuggers, performance and thread analysis tools, OpenMP support as well as optimized math libraries. With a next-generation NetBeans-based IDE, development of multicore applications has never been easier.

It includes a set of basic Java language support modules that can be enabled if needed for JNI (Java™ Native Interface) development.

The Sun Studio software consists of two major components:

1. The Sun Studio component, which includes the IDE, compilers, tools, and core platform.
2. The Java 2 Platform, Standard Edition (J2SE) technology on which the core platform runs.

For more information about the Sun Studio software or to download the software, go to:

`http://developers.sun.com/sunstudio`

NetBeans IDE

The NetBeans IDE 5.0 includes Java 2 Platform, Enterprise Edition (J2EE) development capabilities. This new release not only enables developers to develop applications in the web tier, but also includes Enterprise JavaBeans (EJBs) and web service development capabilities.

The NetBeans IDE is a single platform with out-of-the-box development capabilities and support for enterprise (J2EE 1.4) applications and web services, mobile or wireless Java 2 Platform, Micro Edition (J2ME) applications and services, and desktop Java 2 Platform, Standard Edition (J2SE) applications. The robust open-source Java IDE has everything that Java software developers need to develop cross-platform desktop, web, and mobile applications straight out of the box.

For more information about the NetBeans IDE, or to download the software, go to:

`http://www.netbeans.org`

◆ ◆ ◆ APPENDIX A

Configuring the System for Multiple Monitors

This appendix describes how to configure supported versions of Windows, Linux, OpenSolaris, and the Solaris OS for multiple monitors on a Sun Ultra 27 Workstation workstation.

Configuring the Sun Ultra 27 Workstation for Multiple Monitor Support

This section provides procedures for configuring a supported operating system for multiple-monitor support.

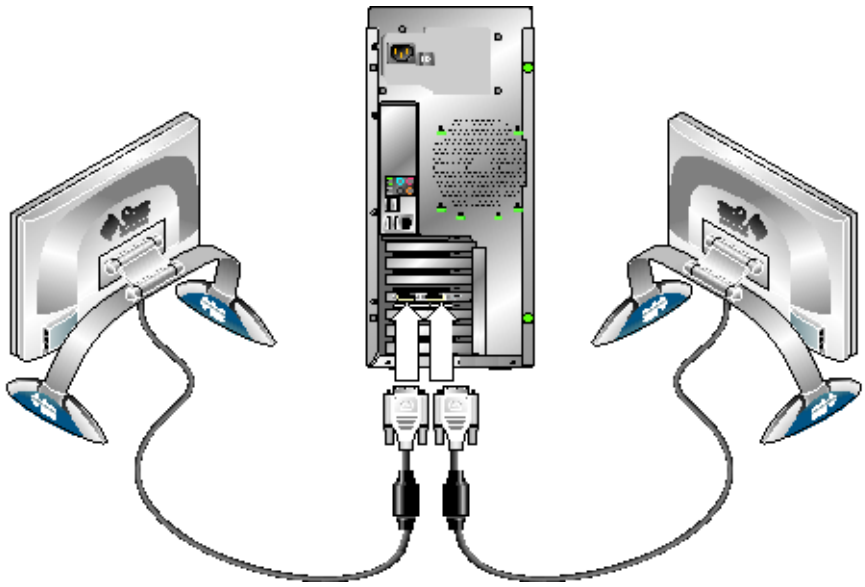
Refer to the section that applies to your configuration:

- "To Configure OpenSolaris for Multiple Monitors" on page 33
- "To Configure Solaris OS for Multiple Monitors" on page 37
- "To Configure Windows for Multiple Monitors" on page 38
- "To Configure Linux for Multiple Monitors" on page 39

▼ To Configure OpenSolaris for Multiple Monitors

1 **Connect your second monitor to the free graphics card DVI connector at the back of the workstation.**

Note – These instructions assume your workstation uses an NVIDIA graphics card with multiple output ports. If you use some other kind of graphics card, be sure to obtain the latest device driver for it. For more on device drivers, see `http://dlc.sun.com/osol/docs/content/dev/getstart/devdriver.html`.



2. **If you are not using the preinstalled OpenSolaris image and installed OpenSolaris from a distribution CD or iso image, you may need to obtain the latest graphics card device driver. Do the following:**

   a. **Power on and log in to the workstation.**

   b. **Insert the latest Tools and Drivers DVD for your workstation into the DVD drive.**

   c. **Open a terminal windows and use the `cd` command to change the directory to the following location:**

      `cd /`*mount_point*`/`*TD_name*`/drivers/sx86`

      Where *mount_point* is the mount point for the DVD, and *TD_name* is the name of the Tools and Drivers DVD.

   d. **Run the `install.sh` script.**

   e. **After the `install.sh` script has finished successfully, remove the Tools and Drivers DVD.**

   f. **Log out and reboot the workstation.**

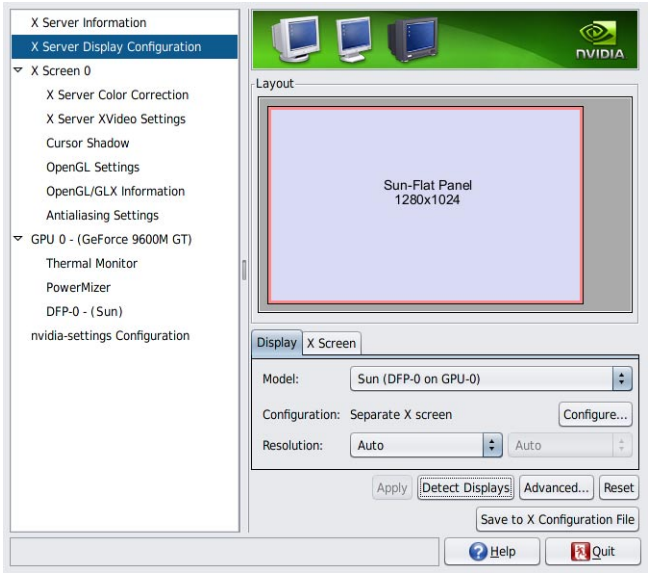
   g. **Log in to the workstation.**

3. **From the OpenSolaris desktop, select System > Preferences > NVIDIA X Server Settings.**

The NVIDIA X Screen Configuration menu appears.

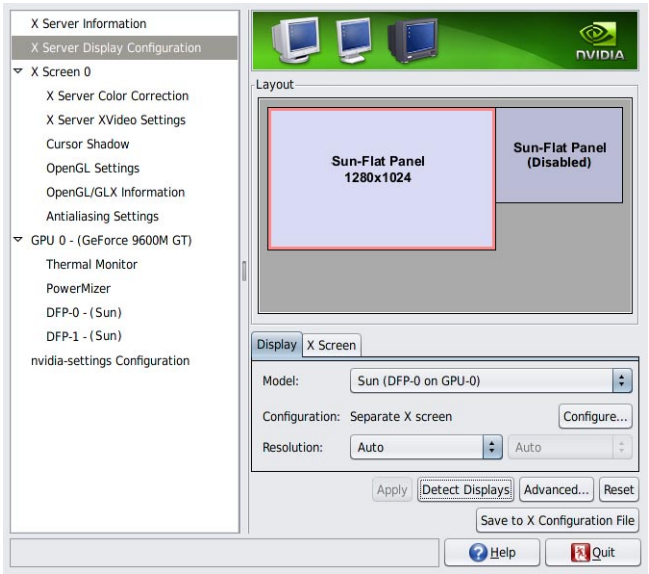
4 **Click on the X Server Display Configuration in the setting list in the left pane.**

The currently connected display should be shown.



5 **Click the Detect Displays button.**

The second display should be detected (shown as “disabled”).



6 **Click on the second display to select it (a selected display will have a red border around it).**

7 **Click the Configure... button.**

8 **Select "Separate X Screen" at the dialog, and click OK.**

9 **Click on the "Save to X Configuration File" button, select your Desktop as destination folder, and xorg.conf as the file name.**

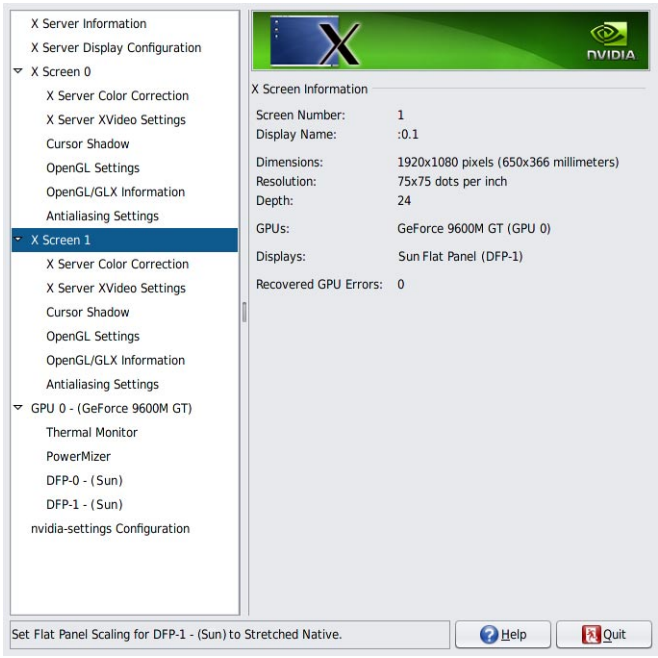
10 **Open a terminal window and enter the command:**

```
pfexec cp Desktop/xorg.conf /etc/X11
```

11 **Quit the NVIDIA X Server Settings tool and log out of the workstation.**

12 **Log back in to the workstation and relaunch the NVIDIA X Server Settings tool.**

There should be a second X screen shown in the settings list (X Screen 1).



13 Check and adjust the second display as needed using the X Screen 1 and adapter (Graphics Processor Unit) settings listed in the left pane.

▼ To Configure Solaris OS for Multiple Monitors

1 Connect your second monitor to the free graphics card DVI connector at the back of the workstation.

Note – These instructions assume your workstation uses an NVIDIA graphics card with multiple output ports. If you use some other kind of graphics card, be sure to obtain the latest Solaris-supported device driver for it.

---

2 If you are not using the preinstalled Solaris image and installed Solaris from a distribution CD or iso image, you may need to obtain the latest graphics card device driver. Do the following:

a. Power on and log in to the workstation.

b. Insert the latest Tools and Drivers DVD for your workstation into the DVD drive.

c. Open a terminal windows and use the `cd` command to change the directory to the following location:

`cd /`*`mount_point`*`/`*`TD_name`*`/drivers/sx86`

Where *mount_point* is the mount point for the DVD, and *TD_name* is the name of the Tools and Drivers DVD.

d. Run the `install.sh` script.

e. After the `install.sh` script has finished successfully, remove the Tools and Drivers DVD.

f. Log out and reboot the workstation.

3 Log in to the workstation.

4 Select Set up multi-display mode under X Server Display Configuration.

5 Click Apply to update X server with the new configuration.

6 Click Save to X Configuration File to save the display configuration to the `/etc/X11/xorg.conf` file.

▼ To Configure Windows for Multiple Monitors

1 Connect your second monitor to the free graphics card DVI connector at the back of the workstation.

Note – These instructions assume your workstation uses an NVIDIA graphics card with multiple output ports. If you use some other kind of graphics card, be sure to obtain the latest device driver for it. For more on installing Windows device drivers, see the *Sun Ultra 27 Workstation Windows Installation Guide*.

---

2 Log in to the workstation.

Note – You should have already installed a supported version of the Windows operating system including installing the Sun-supplied supplemental software, see the *Sun Ultra 27 Workstation Windows Installation Guide*.

---

3 Open the NVIDIA Control Panel from the system tray, and click Run multiple display wizard under Display to enable and customize your multi-display setup.

4. **Adjust the parameters as appropriate.**

   A second reboot might be necessary for the system to see both screens.

▼ To Configure Linux for Multiple Monitors

1. **Connect your second monitor to the free graphics card DVI connector at the back of the workstation.**

   Note – These instructions assume your workstation uses an NVIDIA graphics card with multiple output ports. If you use some other kind of graphics card, be sure to obtain the latest Linux-supported device driver for it.

   ---

2. **Log in to the workstation.**

   Note – You should have already installed a supported version of the Linux operating system, see the *Sun Ultra 27 Workstation Linux, OpenSolaris and Solaris Installation Guide*.

   ---

3. **Insert the Tools and Drivers DVD in to the workstation DVD drive.**

4. **From a terminal windows, enter the `cd` command to change to the appropriate directory:**

   `cd /cdrom/`*TD_name*`/drivers/linux/`*OS*

   where *TD_name* is the name of the Tools and Drivers DVD and *OS* either **`redhat`** or **`suse`.**

5. **Run the `install.sh` script.**

6. **After the `install.sh` script has finished successfully, log out and reboot the workstation.**

7. **Log in to the workstation.**

8. **From a terminal window, and the run `nvidia-settings` utility.**

9. **Set up multi-display mode under X Server Display Configuration.**

10. **Click Apply to update the X Server with the new configuration.**

11. **Click Save to X Configuration File to save the display configuration to the `/etc/X11/xorg.conf` file.**

◆ ◆ ◆ APPENDIX B

Troubleshooting and Technical Assistance

This appendix contains information to help you troubleshoot minor system problems and includes technical assistance contact information.

Troubleshooting the Sun Ultra 27 Workstation Setup

If you experience problems while setting up your system, refer to the troubleshooting information in Table B–1. For additional troubleshooting information, see the *Sun Ultra 27 Workstation Service Manual*.

TABLE B–1 Troubleshooting Procedures

Problem	Possible Solution
System powers on, but the monitor does not.	■ Is the Power button for the monitor turned on? ■ Is the monitor power cord connected to a wall outlet? ■ Does the wall outlet have power? Test by plugging in another device. ■ Is the monitor connected to the on-board video connector or PCI Express video connector?
CD or DVD does not eject from the media tray when you press the Eject button.	■ Move the mouse or press any key on the keyboard. The drive might be in low-power mode. ■ Use the utility software installed on your system to eject the CD.

TABLE B–1 Troubleshooting Procedures *(Continued)*

Problem	Possible Solution
No video appears on the monitor screen.	■ Is the monitor cable attached to the onboard video connector or PCI Express video connector? ■ Does the monitor work when connected to another system? ■ If you have a monitor that you know works correctly, does it work when connected to this system? ■ Verify that the BIOS settings are correct. ■ Review the *Sun Ultra 27 Workstation Product Notes* for any issues that might affect your specific software and hardware configuration.
System does not power on when the front panel Power button is pressed.	Keep notes on the following situations in case you need to call service. ■ Is the power switch on the back of the system turned on? ■ Is the Power LED illuminated on the front of the system? (Ensure that the power cord is connected to the system and to a grounded power receptacle.) ■ Does the wall outlet have power? Test by plugging in another device. ■ Do you hear a beep when the system is powered on? (Ensure that the keyboard is plugged in.) ■ Test with another keyboard that you know is functional. Do you hear a beep when you connect the keyboard and power on the system? ■ Does the monitor synchronize within five minutes after power-on? (The green LED on the monitor stops flashing and remains illuminated.)
Keyboard or mouse does not respond to actions.	■ Verify that the keyboard cable is connected to an on-board USB 2.0 connector on the system, and that the mouse is connected to a USB connector on the keyboard or on the system. ■ Verify that the system is powered on and the front Power LED is illuminated.
System appears to be in low-power mode, but the Power button LED does not blink.	The Power LED blinks only when all system components are in low-power mode. A tape drive might be connected to your system. Because tape drives do not enter low-power mode, the Power LED does not blink.
Hung or frozen system: No response from mouse, keyboard, or any application.	Are the keyboard and mouse Type 7? (Verify the model on the underside of the keyboard.) Try to access your system from another system on the network. 1. From a terminal window, enter **`ping`** *hostname.* 2. If there is no response, remotely log in from another system using `telnet` or `rlogin`, and enter the **`ping`** *hostname* command again. 3. Attempt to terminate processes until the system responds. If this procedure does not work: 1. Press the Power button to power off the system. 2. Wait 20 to 30 seconds, and power on the system.

Getting Technical Assistance

If the troubleshooting procedures in this appendix fail to solve your problem, use Table B–2 to collect information that you might need to communicate to the support personnel.

Note – Table B–3 lists Sun web sites and telephone numbers for additional technical support.

TABLE B–2 System Configuration Information Required for Support

System Configuration Information Needed	Your Information
Sun service contract number	
System model	
Operating system, including service pack number or update number	
System serial number	
Peripherals attached to the system	
Hardware configuration information, including the following: ■ Graphics card installed ■ PCI or PCI Express cards installed ■ Amount of memory ■ Processor speed ■ Optical disk type	
Email address and phone number for you and a secondary contact	
Street address where the system is located	
Superuser password	
Summary of the problem and the work being done when the problem occurred	
Output of diagnostics test, if applicable	
Other useful information	
IP address	
Workstation name (system host name)	
Network or Internet domain name	
Proxy server configuration	

TABLE B–3 Sun Web Sites and Telephone Numbers

Workstation Documents and Support Resources	URL or Telephone Number
Discussion and troubleshooting forums	http://supportforum.sun.com/
Support, diagnostic tools, and alerts for all Sun products	http://www.sun.com/bigadmin/
Software patches, lists of system specifications, troubleshooting and maintenance information, and other tools	http://www.sunsolve.sun.com/handbook_pub/
Service support phone numbers	1-800-872-4786 (1-800-USA-4Sun). Select Option 1
International telephone numbers for Sun Service Support	http://www.sun.com/service/contacting/solution.html
Warranty and contract support contacts; links to other service tools	http://www.sun.com/service/warrantiescontracts/
Warranties for Sun products	http://www.sun.com/service/warranty

◆ ◆ ◆ APPENDIX C

Sun Ultra 27 Workstation System Specifications

System Components and Features

Table C–1 shows the system's key components.

TABLE C–1 Sun Ultra 27 Workstation Components

Component	Description
CPU	■ One Intel Xeon processor (W3570, W3540, or W3520) ■ Processor frequencies: 3.2, 2.93, or 2.66 GHz ■ DDR3 memory controller ■ Level 2 Cache 8 MB ■ 130 W
Memory	■ Six slots for DDR3 unbuffered DIMMs ■ Supported DIMMs: 1 GB 1066 MHz, 2 GB 1066 MHz, 2 GB 1333 MHz
Media storage	DVD-Dual
Hard drives	Up to four: 500 GB or 1 TB SATA or 300 GB or 450 GB SAS
Power supply	530 W PSU
Network I/O	■ One GigabitEthernet port (back panel) ■ Intel Pro 1000 PT Desktop Adapter NIC ■ Sun PCIe x4 Dual GigabitEthernet NIC ■ Sun PCIe x4 Dual GigabitEthernet NIC (fiber)

TABLE C–1 Sun Ultra 27 Workstation Components *(Continued)*

Component	Description
Supported Video Cards	■ NVIDIA Quadro FX5800 graphics accelerator card ■ NVIDIA Quadro FX3800 graphics accelerator card ■ NVIDIA Quadro FX1800 graphics accelerator card ■ NVIDIA Quadro FX380 graphics accelerator card ■ DVI-VGA adapter cable
Supported Storage HBA	LSI 3041E 4–port internal (only) SAS adapter
PCIe I/O and PCI I/O	■ Two PCIe2 (5.0 GT/sec) x16 slots ■ One PCIe2 (5.0 GT/sec) x4 slot ■ One PCIe (2.5 GT/sec) x1 slot ■ One PCIe (2.5 GT/sec) x4 slot ■ One PCI 33 MHz 32–bit slot
Other I/O	■ Eight USB 2.0 ports (two on front, four on back, and two internal) ■ Five audio ports (microphone and headphone on front, line-in, line-out, and microphone on back) ■ Two IEEE 1394 connectors on the front panel

PCIe and PCI Expansion Slots

Table C–2 lists the characteristics of the available PCIe and PCI expansion slots.

TABLE C–2 Sun Ultra 27 Workstation Expansion Slots

Slot#	Type	Size	Max. Width	Max. Power Load	Length	Height	Desc.	Pos.
—	Cover plate, no slot	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0	PCIe2 (5.0 GT/sec)	x16	x16	225 W (75 W + 150 W ext.)[1]	3/4	Full	For supported graphics accelerator card (secondary)	Top
1	PCIe2 (5.0 GT/sec)	x8	x4	25 W[2]	3/4	Full	Not for graphics accelerators. For PCIe expansion cards such as NIC.	Second

[1] Combined with slot PCIe2.

[2] If slot not occupied by video card in slot PCIe0.

TABLE C–2 Sun Ultra 27 Workstation Expansion Slots *(Continued)*

Slot#	Type	Size	Max. Width	Max. Power Load	Length	Height	Desc.	Pos.
2	PCIe2 (5.0 GT/sec) (default graphics output)	x16	x16	225 W (75 W + 150 W ext.)[3]	Full	Full	For supported graphics accelerator card (primary)	Third
3	PCIe (2.5 GT/sec)	x1	x1	25 W[4]	Full	Full	Not for graphics cards. For PCIe expansion cards such as NIC.	Fourth
4	PCI		32–bit	25 W	Full	Full	For 32-bit PCI cards	Fifth
5	PCIe (2.5 GT/sec)	x8	x4	25 W	Full	Full	Not for graphics cards. For PCIe expansion cards such as NIC.	Sixth

[3] Combined with slot PCIe0

[4] If slot not occupied by video card in slot PCIe2.

Additional Ports

Table C–3 lists the additional workstation ports and the maximum power load for each.

TABLE C–3 Maximum Power Load of Additional Ports

Port	Maximum Power Load
USB	2.5 W (each)
1394	18 W (each)

Memory Rules and Supported Configurations

The Sun Ultra 27 workstation contains six DIMM slots divided into three channels (two slots per channel). The slots are colored coded—three blue and three black—and are numbered from DIMM 0 (closest to the CPU) to DIMM 5 (farthest from the CPU).

Memory Population Rules

Populate the slots according to the following rules:

- The workstation requires DDR3-1066/1333, unbuffered, ECC DIMMs.
- Supported sizes and frequencies: 1 GB and 2 GB 1066 MHz and 1333 MHz DIMMs (see the *Sun Ultra 27 Workstation Workstation Product Notes* for supported hardware and other workstation-related issues.)

Note – The DDR3 interface can support up to six DDR3–1066 DIMMs running at full speed.

- DIMMs must be installed in groups of three (except the single DIMM configuration).
- The single DIMM configuration is supported for 1 GB DIMM only.
- Populate DIMMs according to the supported memory configurations listed in the section, "Supported Memory Configurations" on page 48.

Supported Memory Configurations

The following is a list of supported memory configurations for the Sun Ultra 27 Workstation. Only these configurations in combination the supported DIMMs are valid:

- One 1 GB DIMM in slot 1 (1 GB DIMM *only*)
- DIMMs in slots 1, 3, 5 only (black-colored slots only)
- All DIMM slots populated

Physical Specifications

Table C–4 lists the physical specifications for the Sun Ultra 27 Workstation.

TABLE C–4 Sun Ultra 27 Workstation Workstation Physical Specifications

Specification	British	Metric
Width	7.9 in.	200 mm
Depth	18.5 in.	470 mm
Height	17.1 in.	435 mm
Weight (max with packaging)	43.7 lb	19.8 kg

Power Specifications

The maximum continuous power for the Sun Ultra 27 Workstation is 530W.

Table C–5, Table C–6, and Table C–7 list additional power specifications for the system.

TABLE C–5 Input Voltage Range

Input Voltage	Minimum	Nominal	Maximum	Units
Range 1	90	115	132	Vrms
Range 2	180	230	264	Vrms

TABLE C–6 Input Frequency Range

Input Frequency	Minimum	Nominal	Maximum	Units
Range 1	57	60	63	Hz
Range 2	47	50	53	Hz

TABLE C–7 Input Current

Input Voltage	Maximum Input Current	Maximum Inrush Current
Range	8A	200 Apeak

Environmental Specifications

Table C–8 lists the environmental specifications for the Sun Ultra 27 Workstation.

TABLE C–8 Sun Ultra 27 Workstation Environmental Specifications

Specification	State	British	Metric
Humidity	Operating	7%–93% RH noncondensing, 100.4˚ F max wet bulb	7%–93% RH noncondensing, 38˚ C max wet bulb
	Nonoperating	93% RH, noncondensing, 109.4˚ F max wet bulb	93% RH, noncondensing, 43˚ C max wet bulb
Vibration	Operating	0.25 G in all axes, 5–500 Hz sine	
	Nonoperating	1.2 G in all axes, 5–500 Hz sine	
Shock	Operating	4.5 G, 11 msec. half-sine	
Temperature	Operating	41˚ F to 95˚ F	5˚ C to 35˚ C
	Nonoperating	–40˚ F to 149˚ F	–40˚ C to 65˚ C
Maximum operating temperature rating		–1.8˚ F for every 985 ft in altitude	–1˚ C for every 300 m in altitude
Altitude	Operating	max 9,843 ft	max 3,000 m

TABLE C–8 Sun Ultra 27 Workstation Environmental Specifications *(Continued)*

Specification	State	British	Metric
	Nonoperating	max 39,370 ft	max 12,000 m

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