Sun Ultra™ 24 Workstation Installation Guide

Sun Microsystems, Inc.
www.sun.com

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Preface

The *Sun Ultra 24 Workstation Installation Guide* provides the information that you need to set up and configure the workstation hardware and software.

How This Book Is Organized

This guide is organized into the following chapters:

Chapter 1 contains instructions on unpacking, cabling, and powering the workstation.

Chapter 2 explains how to set up the preinstalled Solaris™ 10 OS and additional development software.

Appendix A describes how to configure the Solaris, Linux, and Windows operating systems for dual monitors.

Appendix B discusses troubleshooting system issues and obtaining support.

Appendix C provides information about the Sun Ultra 24 workstation Tools and Drivers DVD, supported operating systems, and system specifications.

Shell Prompts

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

Typographic Conventions

Typeface*	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; onscreen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with onscreen computer output	`%` **`su`** `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

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

Related Documentation

The document set for the Sun Ultra 24 workstation is described in the *Where To Find Sun Ultra 24 Workstation Documentation* sheet that is packed with your system. Additionally, you can find the Sun Ultra 24 workstation documentation at http://docs.sun.com/app/docs/prod/ultra24.

Translated versions of some of these documents are available at http://docs.sun.com. Select a language from the drop-down list and navigate to the Sun Ultra 24 document collection using the workstation category link. Available translations for the Sun Ultra 24 workstation include Simplified Chinese, Traditional Chinese, French, Japanese, and Korean.

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

Documentation, Warranty, Support, and Training URLs

Sun Function	URL	Description
Hardware Documentation	http://www.sun.com/documentation	Read Sun hardware documents.
Software Documentation	http://docs.sun.com	Read Solaris OS and other software documents.
Warranty	http://www.sun.com/service/support/warranty/index.html	View specific details regarding your warranty.
Support	http://www.sun.com/support/	Obtain technical support, including patches.
Training	http://www.sun.com/training/	Learn about Sun courses and educational offerings.

Ordering Components

You can order additional components and replacement parts for the Sun Ultra 24 workstation. Contact your local Sun sales representative for more information. For the most up-to-date component information, see the Sun Ultra 24 workstation components list at http://sunsolve.sun.com/handbook_pub/.

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Safety Information

Read the following documents for safety information:

- *Important Safety Information for Sun Hardware Systems*
- *Sun Ultra 24 Workstation Safety and Compliance Guide*

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Please include the title and part number of your document with your feedback: *Sun Ultra 24 Workstation Installation Guide*, 820-2475-10.

CHAPTER 1

Introduction to the Sun Ultra 24 Workstation Hardware

This chapter provides an overview of the Sun Ultra 24 workstation hardware.

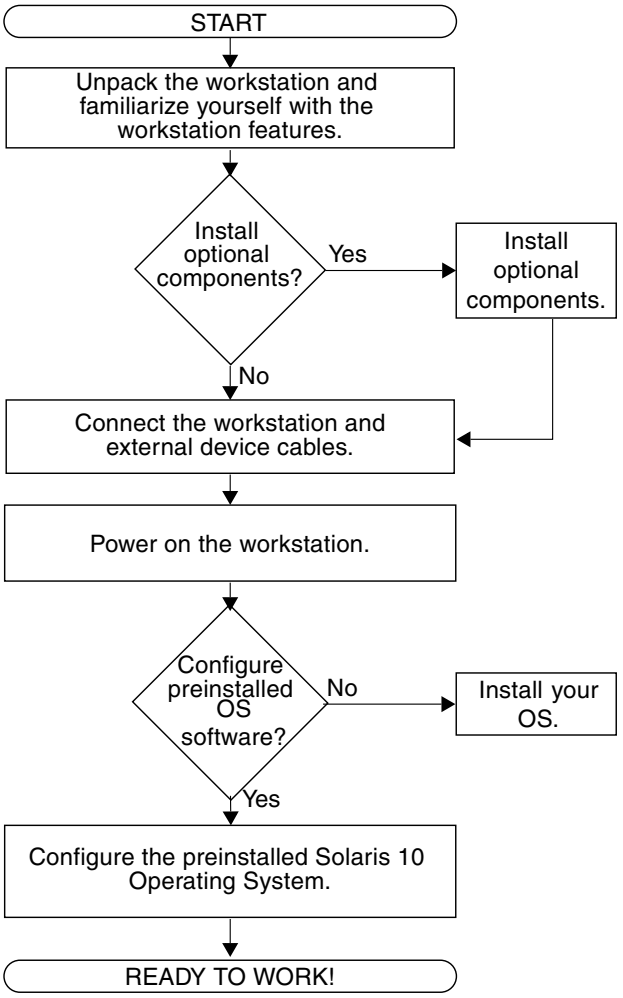
This chapter includes the following sections:

- Section 1.1, “Planning the Installation Process” on page 1-2
- Section 1.2, “Inventorying Package Contents” on page 1-3
- Section 1.3, “Front Panel” on page 1-3
- Section 1.4, “Back Panel” on page 1-5
- Section 1.5, “Interior Components” on page 1-6
- Section 1.6, “Connecting External Devices to the Workstation” on page 1-7
- Section 1.7, “Powering the Workstation On and Off” on page 1-9
- Section 1.8, “Adding and Removing Devices To and From the Boot Menu” on page 1-10

1.1 Planning the Installation Process

Use the following flowchart as a process tool to assist you with installation of the Sun Ultra 24 workstation.

FIGURE 1-1 Process for Setting Up the Sun Ultra 24 Workstation



More information is available in "Front Panel" on page 3 and "Back Panel" on page 5.

For information about how to install DIMMs, graphic accelerator cards, PCI cards, hard drives, or CD or DVD drives, refer to the *Sun Ultra 24 Workstation Service Manual*.

For instructions, go to "Connecting External Devices to the Workstation" on page 7.

For instructions, go to "Powering the Workstation On and Off" on page 9.

For information about how to install an optional, supported OS, refer to the *Sun Ultra 24 Workstation Operating System Guide*.

For instructions about how to perform this task, go to "Configuring the Solaris 10 OS" on page 1.

See Appendix C and the *Sun Ultra 24 Workstation Operating System Guide*.

1.2 Inventorying Package Contents

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

TABLE 1-1 Items Included in the Sun Ultra 24 Workstation Box

Hardware	• Sun Ultra 24 workstation • DMS-59 cable (if the workstation is configured with an NVS290 graphics card)
Documentation	• *Sun Ultra 24 Workstation Installation Guide* (this document) • *Where to Find Sun Ultra 24 Workstation Documentation* (lists available online documents for this product) • Sun safety, warranty, and license documents
CD-ROM	• Sun Ultra 24 Workstation Tools and Drivers DVD (includes drivers and diagnostics software)

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 24 workstation.

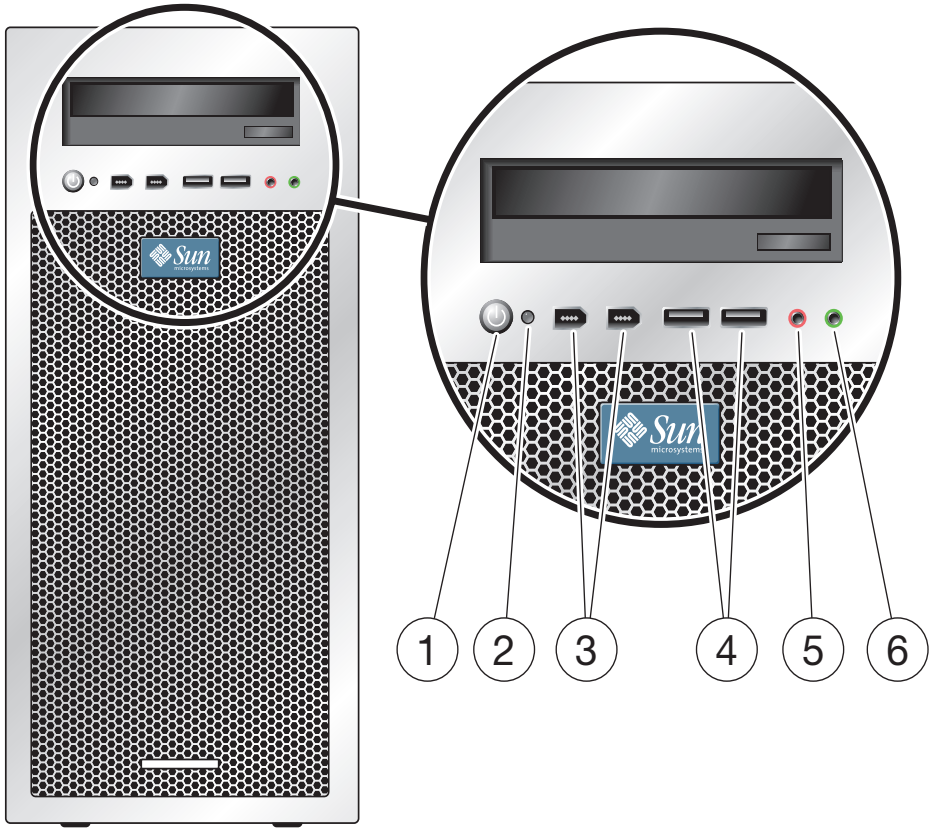
1.3 Front Panel

TABLE 1-2 lists the front panel components of the Sun Ultra 24 workstation. See FIGURE 1-2 for the location of these components.

TABLE 1-2 Front Panel Components

Label	Button/LED/Port	Label	Button/LED/port
1	Power button	4	Two USB 2.0 ports
2	Power LED	5	Microphone-in jack
3	Two 1394 ports	6	Headphone-out jack

FIGURE 1-2 Front Panel Components



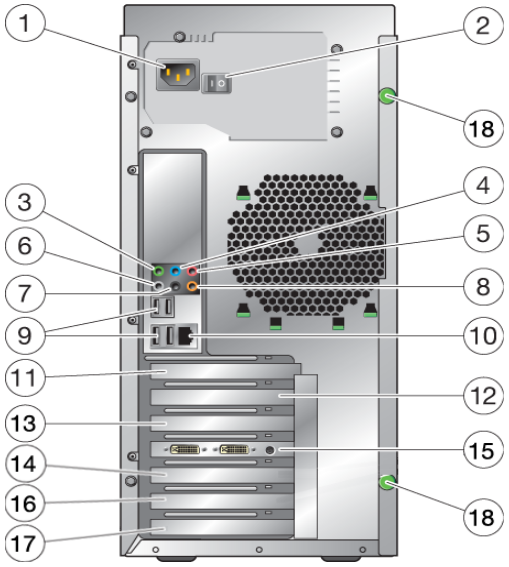
1.4 Back Panel

TABLE 1-3 lists the Sun Ultra 24 workstation back panel components. These components are called out in FIGURE 1-3.

TABLE 1-3 Back Panel Components

Label	Connector/Slot	Label	Connector/Slot
1	Power connector	10	One Ethernet connector
2	Power switch	11	Cover plate, no slot
3	Front audio connector (green)	12	PCI Express x16 slot
4	Line-in jack (blue)	13	PCI Express x1 slot
5	Microphone jack (pink)	14	PCI 33 MHz 32-bit slot
6	Side audio connector (gray)	15	PCI Express x16 slot
7	Back audio connector (black)	16	PCI 33 MHz 32-bit slot
8	Center audio connector (orange)	17	PCI E x8 mechanical slot (x4 electrical)
9	Four USB 2.0 connectors	18	Thumbscrews (for side cover)

FIGURE 1-3 Back Panel Components



1.5 Interior Components

TABLE 1-4 lists the interior components of the Sun Ultra 24 workstation. See FIGURE 1-4 for the location of these components.

For further information about PCI slots, see Section C.3.3, "PCI-E and PCI Expansion Slots" on page C-5. For component installation, removal, and replacement procedures, see the *Sun Ultra 24 Workstation Service Manual*.

TABLE 1-4 Internal System Components

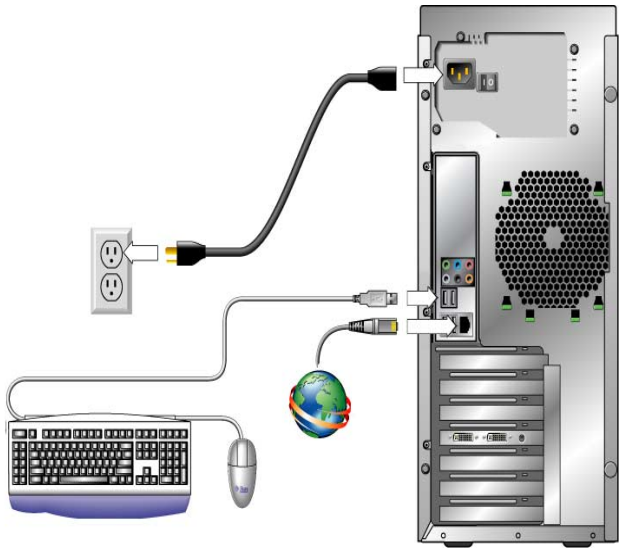
Label	Component	Label	Component
1	Power supply	8	PCI slots 0,1
2	Memory (DIMMs)	9	PCI-E slot 3 (x8 mechanical, x4 electrical)
3	System fan	10	DVD release lever
4	Empty slot	11	I/O board release thumbscrew
5	PCI-E slot 0 (x16)	12	System serial number
6	PCI-E slot 1 (x1)	13	Hard drive bays (1 to 4)
7	PCI-E slot 2 (x16)	14	Heatsink

FIGURE 1-4 Internal System Components Internal System Components

1.6 Connecting External Devices to the Workstation

FIGURE 1-5 illustrates the external device cable connections to the workstation.

FIGURE 1-5 External Cable Connections



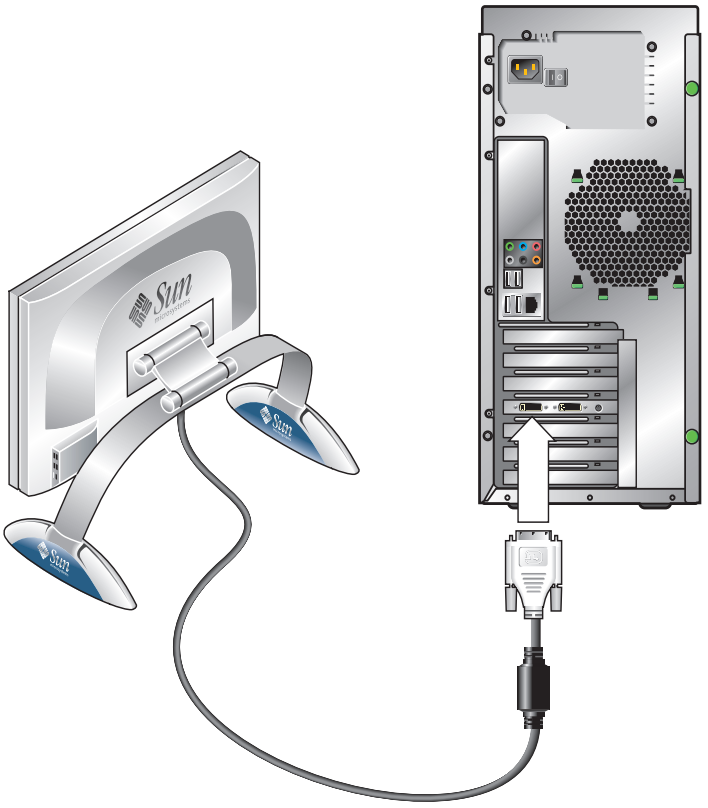
To Connect External Devices to the Workstation

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 24 workstation, and connect the other end of the cable to an Ethernet RJ-45 jack.**

5. **If a PCI Express graphics card is installed in the top PCI-E slot, connect the monitor to the graphics card connector. See the bottom of** FIGURE 1-6**.**

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

FIGURE 1-6 Connecting the Monitor to the System



6. **Connect any additional external devices to the workstation's other connectors.**

1.7 Powering the Workstation On and Off

This section contains instructions for properly powering the workstation on and off. Always use the following power procedures for 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 after the workstation begins the internal booting process.
5. **If you need to change the system parameters in the BIOS, press the F8 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.

To Power Off the Workstation

1. **Save your data and close any open applications.**
2. **Read both of the following power-off options, and then follow one of the options to turn off the workstation.**
   - Power off the workstation by using the operating system shutdown command or menu option. In most cases, this initiates an orderly shutdown of the operating system and shuts off the workstation power.

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

- If the first option does not shut off the workstation power, press and hold the Power button for approximately four seconds. This option shuts down the power to the workstation but does *not* initiate an orderly shutdown of the operating system. This option might result in data loss.

If the proceeding options do not power off the workstation, turn the power switch on the back panel to the Off (**0**) position.

After powering off the workstation, wait at least four seconds before powering on the workstation again.

1.8 Adding and Removing Devices To and From the Boot Menu

The boot menu lists the devices from which the system can boot. If you want to boot from a newly installed or attached device, you must add it to the boot menu.

To Add and Remove Devices To and From the Boot Menu

1. **Press the F2 key during system boot.**

   The BIOS Setup screen appears.

2. **In the Boot Settings menu, add the device to, or remove them from, the boot device list.**

3. **Press the F10 key to save your settings and exit.**

CHAPTER 2

Configuring the Preinstalled Solaris OS and Using Preinstalled Developer Software

The Solaris™ 10 Operating System (OS) is preinstalled on the Sun Ultra 24 workstation, along with developer software. This chapter contains instructions for configuring the preinstalled Solaris 10 OS, and information about the developer software.

For information about how to install Linux, Windows, or a different version of the Solaris OS, see the *Sun Ultra 24 workstation Operating System Installation Guide*, available on the Sun documentation web site. Also, refer to Appendix C for a list of supported operating systems.

This chapter contains the following sections:

- Section 2.1, "Configuring the Solaris 10 OS" on page 2-1
- Section 2.2, "Exploring Preinstalled Developer Software" on page 2-5
- Section 2.3, "Restoring or Reinstalling the Operating System" on page 2-8

2.1 Configuring the Solaris 10 OS

This section covers the following topics:

- Section 2.1.1, "Licensing Information" on page 2-2
- Section 2.1.2, "Disk Configuration" on page 2-2
- Section 2.1.3, "Installation Flowchart" on page 2-2
- Section 2.1.4, "Configuring the Preinstalled Solaris 10 OS" on page 2-3

2.1.1 Licensing Information

The Solaris 10 OS installed on your system requires no licensing fee. The Sun Ultra 24 workstation requires Solaris 10 8/07 or a subsequent compatible version of the Solaris OS. For more information, go to:

http://wwws.sun.com/software/solaris/licensing/index.html

2.1.2 Disk Configuration

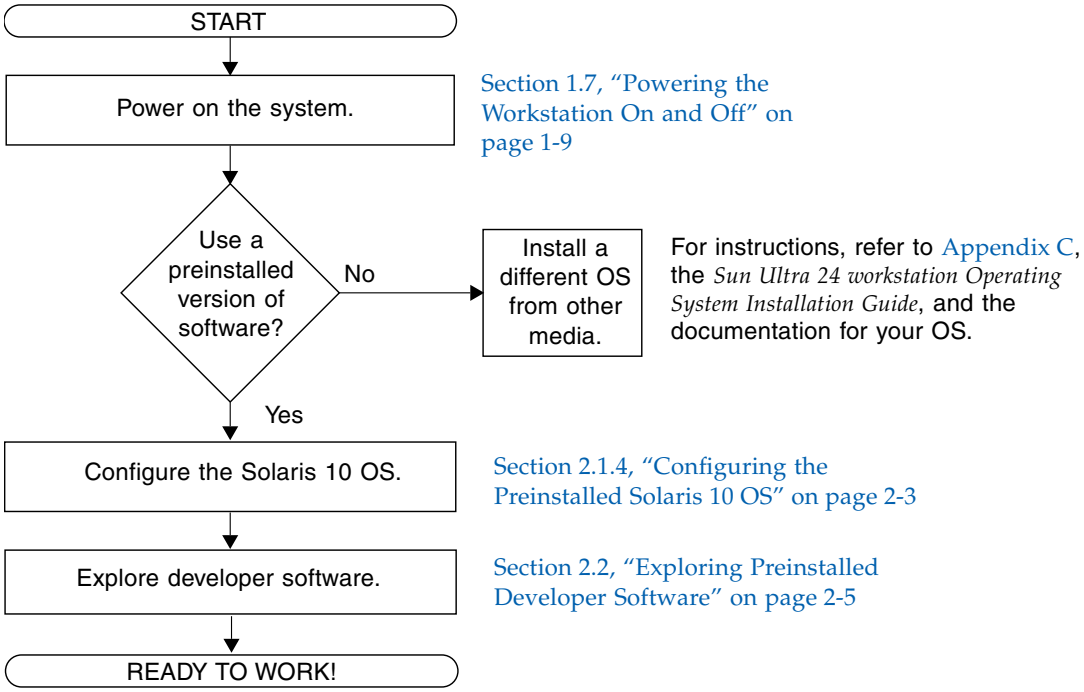
The exact disk configuration that is preinstalled is as follows:

- Hard drive root partition—14.0 Gb
- Hard drive swap partition—2.0 Gb
- Hard drive var partition—6.0 Gb
- Hard drive export partition—remainder of the disk

2.1.3 Installation Flowchart

Use the flowchart in FIGURE 2-1 to assist with setting up your OS.

FIGURE 2-1 Installation Flow Diagram



2.1.4 Configuring the Preinstalled Solaris 10 OS

Use a copy of TABLE 2-1 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) should 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 2-1 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.	

TABLE 2-1 Information for Preinstalled Solaris 10 OS Configuration *(Continued)*

Setup Window	Explanation and Notes	Your Information
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	Name service to use: NIS+, NIS, DNS, LDAP, or None. **Note:** This window appears only if the workstation is connected to a network.	
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** Section 1.7, "Powering the Workstation On and Off" on page 1-9**.**

   A configuration script starts. It prompts you to input the workstation hostname, the time zone, time and date information, and the root password.

2. **Answer the prompts by following the onscreen instructions.**

3. **When you finish the configuration, the system reboots.**

   The workstation displays the login window.

4. **Type your user name and password to log in and begin using the workstation.**

5. **Review the** *Solaris 10 Operating System Release Notes* **for any late-breaking information about your preinstalled software.**

The *Solaris 10 Operating System Release Notes* documentation is located at `http://docs.sun.com`.

2.2 Exploring Preinstalled Developer Software

The following minimum versions of Sun's developer software are preinstalled or preloaded onto your Sun Ultra 24 workstation. An overview of each developer software package is presented in the following sections.

- Sun Studio 11 (see Section 2.2.1, "Sun Studio Software" on page 2-6)
- Sun Java™ Studio Creator 2 (see Section 2.2.2, "Sun Java Studio Creator" on page 2-6)
- Sun Java Studio Enterprise 8 (see Section 2.2.3, "Sun Java Studio Enterprise" on page 2-7)
- NetBeans™ IDE 5.0 (see Section 2.2.4, "NetBeans IDE" on page 2-7)
- Sun Java Enterprise System (see Section 2.2.5, "Sun Java Enterprise System" on page 2-7)

Your system might have later versions of this software preinstalled.

2.2.1 Sun Studio Software

Sun Studio software provides a comprehensive, productive environment for developing reliable, scalable, high-performance applications using C, C++, and FORTRAN for the Solaris OS. The software package includes compilers, performance analysis tools, and a powerful debugger, as well as an integrated development environment (IDE).

The Sun Studio IDE provides modules for creating, editing, building, debugging, and analyzing the performance of C, C++, or FORTRAN applications. 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:

- The Sun Studio component, which includes the IDE, compilers, tools, and core platform
- 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.

2.2.2 Sun Java Studio Creator

The Sun Java Studio Creator development environment (formerly "Project Rave") is the next-generation tool for Java application development. This product combines the power of 100 percent Java standards with simplified visual development techniques to give developers the most effective, most productive way to build applications in Java.

The Java Studio Creator environment was designed and tested to meet the needs of skilled developers whose primary concern is rapid turnaround of business-critical applications. Java Studio Creator enables you to leverage the power of the Java platform to solve business problems, without forcing you to give up the highly productive, visual style to which you are accustomed.

For additional information about Sun Java Studio Creator, or to download the software, go to http://developers.sun.com/jscreator.

2.2.3 Sun Java Studio Enterprise

Sun Java Studio Enterprise is a complete, cost-effective, unified platform of tools, support, and services designed to fully integrate with the capabilities of the Sun Java Enterprise System. Java Studio Enterprise enables you to develop applications in an environment carefully designed to:

- Improve productivity
- Simplify the creation of sophisticated network applications that are ready to be deployed on the Java Enterprise System

For additional information about Sun Java Studio Enterprise, or to download the software, go to http://developers.sun.com/jsenterprise.

2.2.4 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.

2.2.5 Sun Java Enterprise System

The Sun Java Enterprise System 5 (ES 5) is a comprehensive set of software and lifecycle services designed to help make the most of your software investment. Depending on your membership level, the service offering includes online and telephone technical support, software releases and updates, training, and professional services. Whether you are a new customer integrating Java ES into your existing infrastructure or a current customer with a solution in production, Sun has services to meet your needs, enabling you to focus on your business priorities.

For more information about Sun Enterprise System 5, or to download the software, go to /www.sun.com/service/javaes/.

2.3 Restoring or Reinstalling the Operating System

The hard drive for your system contains preinstalled software, including the Solaris 10 OS, developer software, and other applications. The preinstalled OS is preconfigured with drivers required to support the workstation's hardware.

The Solaris 10 8/07 OS (or a later, compatible version) is available for download, as are the developer applications, drivers, and other applications. However, if you reinstall the OS, you will need to follow the instructions in the *Sun Ultra 24 Workstation Operating System Installation Guide* to configure the OS and install the drivers.

To restore the Solaris OS, make and keep a full backup of the OS. The *Solaris 10 System Administration Collection* includes instructions for backing up your OS and is available at `http:/docs.sun.com/`.

Instead of downloading software, you can purchase the Solaris 10 media at `http://store.sun.com/`.

APPENDIX **A**

Configuring the System for Dual Monitors

This chapter describes how to configure the following operating systems for dual monitors:

- Section A.1, "To Configure Solaris for Multiple Displays" on page A-1
- Section A.2, "To Configure Windows for Multiple Displays" on page A-2
- Section A.3, "To Configure Linux for Multiple Displays" on page A-3

A.1 To Configure Solaris for Multiple Displays

1. **Install a second graphics card (optional).**
2. **Attach one monitor to the video connector of each graphic card, and boot the system.**

   The system outputs to PCI-E slot 2 (default). You can modify this in the BIOS Graphic Adapter screen, located under the Advanced menu and the Initiate submenu.
3. **When the system boots, insert the Tools and Drivers DVD, and change the directory to the following location:**

   /mount_point/T&D_version_name/`drivers/sx86`

   T&D_version_name The version name of the Tools and Drivers DVD.
4. **Run the** `install.sh` **script.**
5. **Reboot system after the** `install.sh` **script has finished successfully.**

6. **Log in.**
7. **Select Set up multi-display mode under X Server Display Configuration.**
8. **Click Apply to update X server with the new configuration.**
9. **Click Save to X Configuration File to save display configuration to the** `/etc/X11/xorg.conf` **file.**

A.2 To Configure Windows for Multiple Displays

1. **Install a second graphics card (optional).**
2. **Attach one monitor to the video connector of each graphic card, and boot the system.**

   The system outputs to PCI-E slot 2 (default). You can modify this in the BIOS Graphic Adapter screen, located under the Advanced menu and the Initiate submenu.
3. **When the system boots, insert the Tools and Drivers DVD, and change directory to the following location:**

   `/cdrom/`*T&D_disk_version*`/drivers/windows/video`

   T&D_version_name The version name of the Tools and Drivers DVD.
4. **Change to the appropriate OS (32- or 64-bit), and load the video drivers.**
5. **Reboot the system.**
6. **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.**
7. **Adjust the parameters as appropriate.**

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

A.3 To Configure Linux for Multiple Displays

1. **Install a second graphics card (optional).**
2. **Attach one monitor to the video connector of each graphic card, and boot the system.**

   The system outputs to PCI-E slot 2 (default). You can modify this in the BIOS Graphic Adapter screen, located under the Advanced menu and the Initiate submenu.
3. **When the system boots, insert the Tools and Drivers DVD, and change directory to the following location:**

   `/cdrom/`*`T&D_disk_name`*`/drivers/linux/`*`OS`*

   T&D_disk_name The name of the Tools and Drivers disk
   OS Either **`redhat`** or **`suse.`**
4. **Run the `install.sh` script.**
5. **Reboot system after the `install.sh` script has finished successfully.**
6. **Log in to run the Nvidia settings in a terminal window.**
7. **Set up multi-display mode under X Server Display Configuration.**
8. **Click Apply to update the X Server with the new configuration.**
9. **Click Save to X Configuration File to save the display configuration to the `/etc/X11/xorg.conf` file.**

APPENDIX **B**

Troubleshooting Setup and Obtaining Technical Assistance

This appendix contains information to help you troubleshoot minor system problems, and includes information about the following topics:

- Section B.1, "Troubleshooting the Sun Ultra 24 Workstation Setup" on page B-2
- Section B.2, "Technical Assistance" on page B-3

B.1 Troubleshooting the Sun Ultra 24 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 24 Workstation Service Manual, 820-2480.*

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 onboard 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.
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 24 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 (see FIGURE 1-3)? • 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 5 minutes after power-on? (The green LED on the monitor stops flashing and remains illuminated.)

TABLE B-1 Troubleshooting Procedures *(Continued)*

Problem	Possible Solution
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.

B.2 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.

TABLE B-3 lists Sun web sites and telephone numbers for additional technical support. You can also refer to the web sites listed in "Documentation, Warranty, Support, and Training URLs" on page vii.

TABLE B-2 System 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	

TABLE B-2 System Information Required for Support *(Continued)*

System Configuration Information Needed	Your Information
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

TABLE B-3 Sun Web Sites and Telephone Numbers *(Continued)*

Workstation Documents and Support Resources	URL or Telephone Number
International telephone numbers for SunService 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**

Tools and Drivers DVD, Supported Operating Systems, and System Specifications

This appendix contains the following sections:

- Section C.1, "Tools and Drivers DVD Software" on page C-1
- Section C.2, "Supported Operating System Software" on page C-2
- Section C.3, "Sun Ultra 24 Workstation Features and Specifications" on page C-3

For maximum reliability and performance, install your system into an appropriate environment, and ensure correct configuration as discussed in this document.

C.1 Tools and Drivers DVD Software

The Sun Ultra 24 Workstation Tools and Drivers DVD, included with the workstation, contains the following software:

- Supplemental drivers to support preinstalled, or supported and user-installed, operating systems. See the *Sun Ultra 24 Workstation Operating System Guide* for information on installing these drivers.
- Eurosoft Pc-Check diagnostics software, which provides various diagnostics testing options for the Sun Ultra 24 workstation. See the *Sun Ultra 24 Workstation Service Manual* for more information.
- Erase Primary Boot Hard Disk utility to erase the preinstalled operating system.
- XpReburn utility to add drivers to an existing Windows installation CD.
- 2003Reburn utility to add drivers to an existing Windows 2003 installation CD.
- Open DOS.

C.2 Supported Operating System Software

The Solaris 10 8/07 OS is preinstalled on the Sun Ultra 24 Workstation. Previous versions of the Solaris OS are not supported.

The following operating systems (or later versions) are also supported for this workstation:

- Solaris 10 8/07
- Red Hat Enterprise Linux 4 WS Update 5, 32-bit and 64-bit
- Red Hat Enterprise Linux 5 Client Update 0, 32-bit and 64-bit
- SUSE Linux Enterprise Desktop 10 (SP 1) 64-bit only
- SUSE Linux Enterprise Server 9 (SP3) 64-bit only
- Windows XP SP2, 32-bit and 64-bit (WHQL certified)
- Windows 2003 Enterprise Server R2 SP2 32-bit and 64-bit (WHQL certified)
- Windows Vista Ultimate 32-bit and 64-bit (WHQL certified)

For an updated list of supported operating systems, go to http://www.sun.com/ultra24.

You can order Red Hat Enterprise Linux WS or SUSE Linux Enterprise Desktop for the Sun Ultra 24 workstation from Sun at http://wwws.sun.com/software/linux/index.html.

Follow the installation instructions provided with the operating systems. The *Sun Ultra 24 Workstation Operating System Guide* contains instructions and information relating to driver installation for supported operating systems.

C.3 Sun Ultra 24 Workstation Features and Specifications

C.3.1 System Components and Features

TABLE C-1 shows the system's key components.

TABLE C-1 Sun Ultra 24 Workstation Components

Component	Description
CPU	• One Intel Core 2 Duo/Quad processor • Processor frequencies: 2.0 GHz and faster • Level 2 Cache from 4 MB to 8 MB per processor
Memory	• Four DIMM slots • 512 MB, 1 GB, 2 GB unbuffered DDR2-667, unbuffered, ECC DIMM modules supported (see Section C.3.2, "Memory Configurations" on page C-4)
Media storage	DVD-ROM or DVD-Dual
Hard disk drives	Up to four SATA-II disk drives
Power supply	530W PSU
Network I/O	Onboard 10/100/1000BASE-T Gigabit Ethernet controller providing one RJ45 connector on the rear panel
Video	NVIDIA Quadro graphics card on PCI-E x16 slot 2
PCI-E I/O and PCI I/O (see Section C.3.3, "PCI-E and PCI Expansion Slots" on page C-5)	• Two PCI Express x16 slots • Two PCI 33MHz 32-bit under PCI-E I/O and PCI I/O • One PCI Express x8 mechanical slot (x4 electrical) • One PCI Express x1 slot
Other I/O	• Six USB 2.0 connectors (two on the front and four on the back of the workstation) • Two IEEE 1394 connectors on the front panel • Six audio connectors on the back panel (lined up in two rows of three) • Microphone-in jack on the front and back panels • Headphone-out jack on the front panel

C.3.2 Memory Configurations

TABLE C-2 lists the possible memory configurations for the Sun Ultra 24 workstation.

The system requires DDR2-667/800, unbuffered, ECC DIMMs installed in pairs (except the base 512 MB configuration). You can purchase DIMM kits at http://store.sun.com.

DIMM slots are numbered from DIMM 0 (closest to the CPU) to DIMM 3 (farthest from the CPU). You should populate DIMMs in the following order: DIMM slot 1 (black), DIMM slot 3 (black), DIMM slot 0 (blue), and DIMM slot 2 (blue).

TABLE C-2 Sun Ultra 24 workstation Memory Configurations

Total Memory	Supported DIMM Configuration 1	Supported DIMM Configuration 2
512 MB	1 x 512 MB	
1 GB	2 x 512 MB	
2 GB	2 x 1 GB	4 x 512 MB
3 GB	2 x 1 GB and 2 x 512 MB	
4 GB	2 x 2 GB	4 x 1 GB
5 GB	2 x 2 GB and 2 x 512 MB	
6 GB	2 x 2 GB and 2 x 1 GB	
8 GB	4 x 2 GB	

C.3.3 PCI-E and PCI Expansion Slots

TABLE C-3 lists the characteristics of the available PCI-E and PCI expansion slots.

TABLE C-3 Internal Expansion Slots

Slot	Connector Type	Length	Height	Description	Position
0	Cover plate, no slot	n/a	n/a	Open slot.	Top
0	PCI-E x16 slot	x16	Full	For NVS 290, FX 570, or FX 1700, or FX4600 graphics accelerator (secondary).	Top
1	PCI-E x1 slot	x1	Full	Not for graphics accelerators. Intended for PCI-E expansion cards such as NIC.	Second
2	PCI-E x16 slot (default graphics output)	x16	Full	For NVS 290, FX 570, FX 1700, FX4600, or FX5600 graphics accelerator (primary).	Third
0	PCI 33MHz 32-bit	Full	Full	Accommodates 64-bit PCI cards, but cards operate at 32-bit mode.	Top
1	PCI 33MHz 32-bit	Full	Full	Accommodates 64-bit PCI cards, but cards operate at 32-bit mode.	Bottom
3	PCI-E x8 mechanical slot (x4 electrical)	x8	Full	Not for graphics cards. Intended for PCI-E expansion cards such as NIC.	Bottom

C.3.4 Physical Specifications

TABLE C-4 lists the physical specifications for the Sun Ultra 24 workstation.

TABLE C-4 Sun Ultra 24 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

C.3.5 Power Specifications

The maximum continuous power for the Sun Ultra 24 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 A_{peak}

C.3.6 Environmental Specifications

TABLE C-8 lists the environmental specifications for the Sun Ultra 24 workstation.

TABLE C-8 Sun Ultra 24 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	0.25G in all axes, 5–500 Hz sine	
	Nonoperating	1.2G in all axes, 5–500 Hz sine	
Shock	Operating	4.5G, 11 msec. half-sine	

TABLE C-8 Sun Ultra 24 Workstation Environmental Specifications *(Continued)*

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