
*Open Windows Version 3 Installation
and Start-Up Guide*



© 1991 by Sun Microsystems, Inc.—Printed in USA.
2550 Garcia Avenue, Mountain View, California 94043-1100

All rights reserved. No part of this work covered by copyright may be reproduced in any form or by any means—graphic, electronic or mechanical, including photocopying, recording, taping, or storage in an information retrieval system— without prior written permission of the copyright owner.

The OPEN LOOK and the Sun Graphical User Interfaces were developed by Sun Microsystems, Inc. for its users and licensees. Sun acknowledges the pioneering efforts of Xerox in researching and developing the concept of visual or graphical user interfaces for the computer industry. Sun holds a non-exclusive license from Xerox to the Xerox Graphical User Interface, which license also covers Sun's licensees.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 (October 1988) and FAR 52.227-19 (June 1987).

The product described in this manual may be protected by one or more U.S. patents, foreign patents, and/or pending applications.

TRADEMARKS

Sun Logo, Sun Microsystems, NeWS, and NFS are registered trademarks, and SunSoft, SunSoft logo, SunOS, SunView, Sun-2, Sun-3, Sun-4, XGL, SunPHIGS, SunGKS, and OpenWindows are trademarks of Sun Microsystems, Inc. licensed to SunSoft, Inc.

UNIX and OPEN LOOK are registered trademarks of UNIX System Laboratories, Inc.

PostScript is a registered trademark of Adobe Systems Incorporated. Adobe also owns copyrights related to the PostScript language and the PostScript interpreter. The trademark PostScript is used herein only to refer to material supplied by Adobe or to programs written in the PostScript language as defined by Adobe.

X Window System is a product of the Massachusetts Institute of Technology.

SPARC is a registered trademark of SPARC International, Inc. Products bearing the SPARC trademark are based on an architecture developed by Sun Microsystems, Inc. SPARCstation is a trademark of SPARC International, Inc., licensed exclusively to Sun Microsystems, Inc.

All other products or services mentioned in this document are identified by the trademarks, service marks, or product names as designated by the companies who market those products. Inquiries concerning such trademarks should be made directly to those companies.

Contents

Preface.....	ix
1. How to Proceed	1
1.1 Prerequisites.....	1
1.2 What Next?	3
1.3 Installation Clusters and Packages	4
Installation Clusters	4
Installation Packages	6
2. Quick-Start: Mounting the OpenWindows Software.....	7
2.1 Mounting Instructions	8
3. Quick-Start: Installing the OpenWindows Software on Your Hard Disk	13
4. Special Start-Up Cases.....	17
4.1 Configuring a Stand-alone Machine to Run the OpenWindows Software	17
4.2 Using a GrayScale Monitor	18
4.3 Running Multiple Screens	18

Examples	19
Miscellaneous Notes	21
4.4 The .xinitrc File	21
4.5 Changing Your .cshrc File	22
4.6 If You Build Your Own Kernel... ..	22
4.7 Disabling/Enabling the Compose Key.....	23
4.8 Turning off SunView Compatibility	23
5. Setting Up a Machine as an OpenWindows Server	25
5.1 Setting Up a Sun-4 or Sun-4c Server.....	26
Running the OpenWindows Software on Sun-4 Server..	28
5.2 Setting Up a Sun-3 Server	28
6. Troubleshooting	33
6.1 Installation-Related Console Messages	33
6.2 SunView-Related Console Messages	34
6.3 Server-Related Console Messages.....	36
6.4 Libraries	36
6.5 Terminal Emulator Security.....	37
A. Supported Configurations.....	39
A.1 Determining Which Device You Have	40
A.2 Default OpenWindows Support	40
A.3 DGA Support.....	40
A.4 Graphics API Support.....	41
A.5 SunView Support	41
A.6 Multiple Screen Support.....	41

B. Migrating from the OpenWindows Version 2 Environment.....	43
B.1 The .xinitrc File.....	43
Multiple Screens.....	44
DeskSet Users.....	45
B.2 The .xdefaults File.....	45
B.3 The .openwin-menu File.....	45
B.4 Key Interpretations.....	46
C. Migrating from the SunView Environment to the OpenWindows Environment.....	47
C.1 Environment Customization.....	47
.defaults and .xdefaults Files.....	47
.openwin-init File.....	48
C.2 User Interface Differences.....	48
Selection Differences.....	48
Window Movement Differences.....	48
Menu Selection Differences.....	49
C.3 Turning off SunView Compatibility.....	49
C.4 SunView Configuration Support.....	50

Tables

Table 1-1	Installation Clusters	5
Table 1-2	Installation Packages.....	6
Table A-1	Supported Device/Bus/Operating System Configurations..	39

Preface

This manual tells you how to install and start up your OpenWindows™ environment.

Basic OpenWindows Components

The OpenWindows environment is Sun's network-based application environment. It provides the user with a consistent look and feel, application programs to assist in day-to-day duties, and several toolkits for writing OpenWindows applications. It consists of the following components:

- OPEN LOOK® Graphical User Interface
- OpenWindows DeskSet™ Environment, a group of productivity tools
- XView™, an X Window System toolkit
- OPEN LOOK Intrinsic Toolkit (OLIT), a user interface toolkit based on the Xt Intrinsic from MIT
- The NeWS Toolkit (TNT), a new toolkit for NeWS programmers
- X11/NeWS™ server, a merge of the X Window System and NeWS®, Sun's network-based window system. The X11/NeWS server forms the window system platform for the OpenWindows environment

Overview of Document

The *OpenWindows Installation and Start-Up Guide* contains six chapters and three appendixes:

- Chapter 1, "How to Proceed", defines the prerequisites to run the OpenWindows software, and how to proceed to get the appropriate installation and start up information.
- Chapter 2, "Quick-Start: Mounting the OpenWindows Software", describes how to mount the software on your machine and access it using NFS.
- Chapter 3, "Quick-Start: Installing the OpenWindows Software on Your Hard Disk", describes how to install the software from CD onto the hard disk of your local machine.
- Chapter 4, "Special Start-Up Cases", describes various situations that may apply to your installation and start up needs.
- Chapter 5, "Setting Up a Machine as an OpenWindows Server", describes how to set up a Sun-3™, Sun-4™, or SPARC® machine as an OpenWindows server.
- Chapter 6, "Troubleshooting", tells you how to deal with problems that may come up while trying to install or start up the OpenWindows software.
- Appendix A, "Supported Configurations", defines specially configured workstations that are supported.
- Appendix B, "Migrating from the OpenWindows Version 2 Environment", discusses issues concerning OpenWindows Version 2 users.
- Appendix C, "Migrating from the SunView Environment to the OpenWindows Environment", discusses issues concerning SunView™ users.

Notational Conventions

This manual uses the following notational conventions:

- **bold listing font**

This font indicates text or code typed at the keyboard.

-
- *listing font*

This font indicates information displayed by the computer. It is also used in code examples and textual passages to indicate use of the C programming language.

- *italic font*

This font is used in code examples and textual passages to indicate user-specified parameters for insertion into programs or command lines. It is also used to indicate special terms or phrases used in textual descriptions.

To find out more

- For information on this release of the OpenWindows environment, see the *OpenWindows Version 3 Release Manual*.
- To learn how to use the OpenWindows environment, see the *OpenWindows Version 3 DeskSet Reference Guide* and the *OpenWindows Version 3 User's Guide*.

- For more information on writing applications in the OpenWindows environment, see the following manuals:

OpenWindows Version 3 Programmer's Guide, SunSoft, 1991

OpenWindows Version 3 Desktop Integration Guide, SunSoft, 1991

Writing Application for Sun Systems: A Guide for Macintosh Programmers, Addison-Wesley, 1991

ToolTalk 1.0 Setup and Administration Guide, SunSoft, 1991

ToolTalk 1.0 Programmer's Guide, SunSoft, 1991

- To learn more about writing X11 programs, see the following manuals:

OpenWindows Version 3 Release Manual, SunSoft, 1991

OpenWindows Version 3 Programmer's Guide, SunSoft, 1991

OpenWindows Version 3 Reference Manual, SunSoft, 1991

XView 3.0 Reference Manual: Converting SunView Applications, SunSoft, 1991

XView Programming Manual (O'Reilly & Associates, 1990)

Xlib Reference Manual (O'Reilly & Associates, 1990)

Xlib Programming Manual (O'Reilly & Associates, 1990)

X Protocol Reference Manual (O'Reilly & Associates, 1990)

OLIT 3.0 Widget Set Reference Manual, SunSoft, 1991

Xt Intrinsic Reference Manual (O'Reilly & Associates, 1990)

The X Window System Programming and Applications with Xt, OPEN LOOK Edition, Prentice Hall, 1991

- To learn more about the NeWS® and PostScript® languages, see the following manuals:

OpenWindows Version 3 Release Manual, SunSoft, 1991

OpenWindows Version 3 Programmer's Guide, SunSoft, 1991

OpenWindows Version 3 Reference Manual, SunSoft, 1991

NeWS 3.0 Programmer's Guide, SunSoft, 1991

The NeWS Toolkit 3.0 Reference Manual, SunSoft, 1991

The NeWS Book, Springer-Verlag, 1989

Adobe Systems Incorporated's *PostScript Language Reference Manual, Second Edition* (Addison-Wesley, 1990)

Adobe Systems Incorporated's *PostScript Language Tutorial and Cookbook* (Addison-Wesley, 1985)

- To learn more about the OPEN LOOK Graphical User Interface, see the following manuals:

OPEN LOOK Graphical User Interface Functional Specification (Addison-Wesley, 1989)

OPEN LOOK Graphical User Interface Application Style Guidelines (Addison-Wesley, 1990)

How to Proceed



This chapter discusses the prerequisites you must meet to run the OpenWindows environment on your workstation. If you meet the prerequisites, read the following section to determine how to proceed. If you have any additional questions about the prerequisites, ask your system administrator.

1.1 Prerequisites

To run the OpenWindows software, you must meet the following prerequisites.

- Your system's architecture must be either Sun-4™ or Sun-4c.

OpenWindows can run on most Sun-4 and Sun-4c configurations. See Appendix A, "Supported Configurations" on page 39 for more information.

To check the architecture of your workstation, use the `showrev` command. For more information, see the `showrev(1)` man page.

- Your system must be running SunOS™ Version 4.1.1, or subsequent 4.1.x release.

To check which operating system you are running, use the `showrev` command.

Note – If you have a TC, GS, GT, or GXplus display device *or* use a graphics API, *and* have not received 4.1.1 GFX Rev 2, please contact your local sales office for ordering information. This operating system feature release for



graphics acceleration is required for these devices and graphics APIs. This is *not* a feature release for the OpenWindows software. If you are running a SunOS operating system with a version more recent than 4.1.1, you do *not* need 4.1.1 GFX Rev 2. See Appendix A, “Supported Configurations” on page 39 for more information on display devices and graphics APIs supported by the OpenWindows environment.

- You must have at least 8192 kilobytes (8 Megabytes) of main memory. For improved performance, 12288k or 16384k are recommended.

Use the `dmesg` command to check how much main memory you have:

```
example% /etc/dmesg | grep mem
```

The number displayed should be at least 8192k.

Note – If your machine has not been rebooted recently, the buffer `dmesg` accesses might not contain this information.

- You must have at least 85000k of disk space to install the Full OpenWindows Cluster component on your hard disk.

Note – This is *not* required if you are mounting the OpenWindows software from a remote machine.

Use the `df(1)` command to check how much disk space you have. The “Avail” column shows the amount of free space (in thousands of bytes). For example, enter the following command if you plan to install the OpenWindows software in the default directory:

```
example% df /usr
```

- You must have swap space that is at least 2.5 times the amount of main memory in your machine to run the OpenWindows software. For example, if your machine has 16384k, you should have at least 40960k of swap space.



Use the `pstat(1)` command to check how much swap space you have:

```
example% /etc/pstat -T
```

The last number on the last line of output indicates the amount of swap space available (in thousands of bytes). To find out how to increase swap space, see your system administrator.

1.2 What Next?

- If the OpenWindows software has been installed on some other machine on your network, you can *mount* the OpenWindows directory on your machine and access it using NFS. See Chapter 2, “Quick-Start: Mounting the OpenWindows Software” on page 7.
- If you want to install the software from CD onto the hard disk of your local machine, see “Installation Clusters and Packages” on page 4 and Chapter 3, “Quick-Start: Installing the OpenWindows Software on Your Hard Disk” on page 13.
- If you are interested in any of the following special cases, see Chapter 4, “Special Start-Up Cases” on page 17.
 - Installing the software on a stand-alone workstation
 - Using a GrayScale monitor
 - Running multiple screens
 - Tailoring your `.xinitrc` and `.cshrc` files
 - Building your own kernel
 - Disabling/enabling the Compose key
 - Turning off SunView compatibility
- If you are responsible for setting up an OpenWindows server from which client machines can mount the OpenWindows software, see “Installation Clusters and Packages” on page 4 and Chapter 5, “Setting Up a Machine as an OpenWindows Server” on page 25.
- If you have a specially configured workstation (for example, special hardware, a different operating system, or unbundled graphics software), see Appendix A, “Supported Configurations” on page 39.

- If you are a previous OpenWindows Version 2 user, see Appendix B, “Migrating from the OpenWindows Version 2 Environment” on page 43.
- If you are a SunView user switching to the OpenWindows environment, see Appendix C, “Migrating from the SunView Environment to the OpenWindows Environment” on page 47.
- If problems come up while trying to install or start up the OpenWindows software, see Chapter 6, “Troubleshooting” on page 33.

1.3 Installation Clusters and Packages

The OpenWindows software was designed to meet the needs of many different types of users. Some users will want to install the full OpenWindows release. If you are setting up a server, you will probably want to install the full release (unless you have space constraints). But individual users may want to install a subset of the OpenWindows software. When you install the software from CD, you are given a choice of the subset, or cluster, you want to install.

Installation Clusters

The *clusters* in Table 1-1 on page 5 are groupings of packages that provide the functionality needed by different types of users. Clusters define the installation configurations you will have to choose from while using `cdm`. You can install only one cluster at one time. Packages are defined in “Installation Packages” on page 6.

Each cluster provides a different combination of OpenWindows packages and network support. If you discover that your configuration does not meet your needs, check to see if the correct cluster is installed. If you want a different cluster installed, you must re-install the OpenWindows software with the new cluster. The following clusters are provided:

Table 1-1 Installation Clusters

Cluster and Content	Disk Space Required
Minimal Configuration Cluster * Required Package, Online Handbooks Package, Online Manual Pages Package	28800k
End User Cluster ** Minimal Configuration Cluster, Optional Fonts Package	40900k
Advanced User Cluster End User Cluster, Optional MIT Release Package	43200k
Advanced User with Demos Cluster Advanced User Cluster, Demo Programs Package, Demo Image Package	51100k
Programmer Cluster Advanced User Cluster, Online Library Interface Manual Pages Package, Include Files Package, Lint Libraries Package, Static Libraries Package, Sample Source Package	67400k
Full OpenWindows Cluster All packages defined below	87400k
Other Cluster User chooses individual packages, one of which <i>must</i> be the Required Package	User-specified



* The Minimal Configuration Cluster provides basic functionality needed to run the default OpenWindows environment (not including Demos).

Caution – Many unbundled and third party applications may not run because they require the Optional Font Package. Install this cluster *only* if you have space constraints.

** The End User Cluster provides functionality equivalent to the OpenWindows Version 2 End User Subset. Note that the End User Cluster above requires more disk space than the Version 2 End User Subset.

You should use one of the predefined clusters. However, if these do not meet your needs, create your own cluster by choosing Custom Cluster while using `cdm`. You can choose any combination of packages, one of which *must* be the Required Package.



Note – All of the above clusters may not appear on the first `cdm` menu that allows you to choose installation clusters. If the cluster you want to install *does not* appear, choose Other Cluster. This option presents all of the clusters and packages provided for installation.

Installation Packages

The *packages* in Table 1-2 are files that either have inter-dependencies or a logical grouping. The files within a package *cannot* be installed separately; they must be installed as a group. The following packages are provided:

Table 1-2 Installation Packages

Package and Content	Disk Space Required
The Required Package X11/NeWS server, XView, OLIT, TNT, dynamically linked libraries, DeskSet, core set of fonts, basic clients, support programs, and data files	25500k
The Online Manual Pages Package man pages sections 1, 5, 6, 7, and 8	1300k
The Online Library Interface Manual Pages Package man pages section 3	2100k
The Online Handbooks Package Online handbook and Desktop Intro	2000k
The Optional MIT Release Package Unrequired X11R4 release applications	2300k
The Demo Programs Package OpenWindows demonstration applications	2800k
The Demo Images Package Graphic images used by certain demo programs	5100k
The Include Files Package	2900k
The Lint Libraries Package	600k
The Static Libraries Package	10700k
The Sample Source Package	7900k
The Optional Fonts Package Fonts required for non-default OpenWindows applications	12100k

Quick-Start: Mounting the OpenWindows Software



If the OpenWindows software has been installed on some other machine on your network, you can mount the OpenWindows directory on your machine and access it using NFS. Though the instructions in this section should be adequate, please contact your system administrator if you have any problems.

Before you mount the OpenWindows software, take note of these additional considerations:

- If it is your responsibility to set up an OpenWindows server on your network, refer to Chapter 5, “Setting Up a Machine as an OpenWindows Server” on page 25.
- If you ran the OpenWindows Version 2 software, see Appendix B, “Migrating from the OpenWindows Version 2 Environment” on page 43.

Note – If you already have an `.xinitrc` file in your home directory, you must either rename it or delete it. See Chapter 4, “Special Start-Up Cases,” for more information.

- If you are migrating from a SunView environment, see “Migrating from the SunView Environment to the OpenWindows Environment” on page 47 for information that will make your transition easier.
- If you want to customize your OpenWindows environment, see the *OpenWindows Version 3 User’s Guide* for information.

Most users need only follow instructions in this chapter. However, some advanced users may need to take additional steps and should see Chapter 4, "Special Start-Up Cases," for more information.

2.1 Mounting Instructions

You can mount an OpenWindows directory via the `mount` command each time you log on, or you can set up your `/etc/fstab` file to mount the directory automatically. Most users set up their `/etc/fstab` file to mount the OpenWindows directory automatically when their machine boots up. For information on how to mount the OpenWindows directory manually, or each time you log on, see the `mount(1)` man page or the *SunOS User's Guide: Customizing Your Environment*.

Note – Starting the OpenWindows environment on top of an existing OpenWindows or SunView environment is not supported. You should exit the current environment before you start up the OpenWindows environment.

To mount the OpenWindows software using your `/etc/fstab` file, follow these steps:



1. Become root.

You must be root to perform the following steps. Use the `su` command, and remain root until instructed to exit from root.

```
example% su
Password:      <enter root password>
example#
```

2. Create a directory in which to mount the OpenWindows software.

If the directory in which you are going to mount the OpenWindows software does not exist, create it using `mkdir`. (In the example below, replace `/usr/openwin` with the directory where you want the OpenWindows software to be mounted on your machine.)

```
example# mkdir /usr/openwin
```

3. Add a line of the following form to your `/etc/fstab` file:

You do not need to be able to write to the OpenWindows directory; thus, mount it *read-only*. The options `bg`, `ro`, `hard`, and `intr` are suggested options; read the `mount(8)` and `mntent(5)` man pages if you would like a further explanation of the various options available. (In the example below, replace *server-machine* with the name of the server where the OpenWindows software resides, and replace `/usr/openwin-server` with the directory where the OpenWindows software resides on the server from which you are mounting.)

```
server-machine:/usr/openwin-server /usr/openwin nfs suid,bg,ro,hard,intr 0 0
```



Caution – The OpenWindows software includes both `setuid` and `setgid` programs. Therefore, make sure you mount the OpenWindows software with the `suid` option (i.e., do *not* use the `nosuid` option). The `suid` option is the default, so normally you will not have to do anything special.

4. Mount the directories in `/etc/fstab`:

Use the `mount` command with the `-a` option:

```
example# mount -a
```

5. Set the `OPENWINHOME` environment variable to the directory where you have mounted or installed the OpenWindows software.



Note – Make sure that the OpenWindows directory has been mounted with `suid` permissions as discussed in Step 3.

Replace `/usr/openwin` below with the directory where you want the OpenWindows software to be mounted on your machine. (This is the directory created with the `mkdir` command in step 2.)

```
example# setenv OPENWINHOME /usr/openwin
```

6. Run the `install_openwin` script.

You only need to run this script once—before you start up the OpenWindows software for the first time. You must be `root` to run `install_openwin`.

```
example# $OPENWINHOME/bin/install_openwin
          <various status messages>
***** Done with OpenWindows Installation
example#
```

Various status messages will be displayed after you start the installation process with the `install_openwin` command. If the last line is the same as in the example above, the installation process is complete. If this line is not displayed, check with your system administrator.

Note – The `install_openwin` script must first be run on the NFS server of diskless clients or any machines NFS mounting the `/usr` file system. (The `install_modules` script must be run on Sun-3 servers.) If you have mounted `/usr` from an NFS server and `install_openwin` fails on your machine, check with your system administrator to make sure the appropriate script has been run on the server. (See Chapter 5, “Setting Up a Machine as an OpenWindows Server,” for more information.)

7. Exit from `root`.

```
example# exit
example%
```

8. Set the `OPENWINHOME` environment variable to the directory where you have mounted or installed the OpenWindows software.

In the example below, replace `/usr/openwin` with the directory where the OpenWindows software is mounted on your machine. (This is the directory created with the `mkdir` command in Step 2.)

```
example% setenv OPENWINHOME /usr/openwin
```

9. Start up the OpenWindows software using the openwin script.

For the average user, a shell script called `openwin` takes care of all the default server configuration issues. You should run

`$OPENWINHOME/bin/openwin` to start the server. (Note that you should change directory to your home directory before you start the OpenWindows software.)

```
example% cd
example% $OPENWINHOME/bin/openwin
```


Quick-Start: Installing the OpenWindows Software on Your Hard Disk



This chapter contains instructions for loading the OpenWindows software from CD onto a hard disk, and starting up the OpenWindows software. If you have already chosen to mount the OpenWindows software over the network, see “Quick-Start: Mounting the OpenWindows Software” on page 7.

The `cdm` (Compact Disc Manager) program guides you through the process of installing software from CD. Before you can do this, you must mount the CD drive to your Sun-4 or Sun-4c workstation as described in the *CDmanager and CDM User's Guide*. The *CDmanager and CDM User's Guide* also contains more information about using the `cdm` program.

Note – Starting the OpenWindows environment on top of an existing OpenWindows or SunView environment is not supported. You should exit the current environment before you start up the OpenWindows environment.

Note – If you already have an `.xinitrc` file in your home directory, you must either rename it or delete it. See Chapter 4, “Special Start-Up Cases,” for more information.

See “Installation Clusters and Packages” on page 4 for more information about the content of packages and clusters before proceeding with the installation.

To begin the OpenWindows installation from CD, follow these steps:



1. Become root.

You must be root to perform the following steps. Use the `su` command, and remain root until instructed to exit from root.

```
example% su
Password:      <enter root password>
example#
```

2. Change directory to the directory where your CD drive is mounted.

Replace `/cdrom` below with the directory where your CD drive is mounted.

```
example# cd /cdrom
```

3. Run the `cdm` program.

`cdm` will initialize and display its main menu.

```
example# cdm
```

a. Choose Select Application—enter the digit 1.

Tell `cdm` which application you wish to install by choosing the first item on the `cdm` main menu, Select Application:

b. Choose OpenWindows—enter the digit 1.

Tell `cdm` that you want the OpenWindows software installed by choosing the only item on the menu.

c. Choose Install Application—enter the digit 3.

Tell `cdm` that you want to install the selected application by choosing the third item on the main menu, Install Application. `cdm` displays a menu listing the available installation configurations.

d. Choose the installation configuration.

Here you must decide which configuration you wish to install. If you're not sure of which configuration to install, see "Installation Clusters and Packages" on page 4 for more information about the content of clusters and packages.

e. Choose the installation location.

Here you must decide where you want the OpenWindows software to be installed. The default is `/usr/openwin`. The script checks to make sure the installation directory exists, is empty, contains enough space, and is properly mounted.

f. Enter “q” twice to exit through the two menus from which you have just made selections.

After you have selected your installation configuration and the OpenWindows software has finished installing, you need to quit the `cdm` program *twice* to get to the prompt.

4. Set the `OPENWINHOME` environment variable to the directory where you have mounted or installed the OpenWindows software.

Replace `/usr/openwin` below with the directory where you loaded the OpenWindows software on your machine.



Note – Make sure that the OpenWindows directory has been mounted with `suid` permissions.

```
example# setenv OPENWINHOME /usr/openwin
```

5. Run the `install_openwin` script.

You only need to run this script once—before you start up the OpenWindows software for the first time. You must be root to run `install_openwin`.

```
example# $OPENWINHOME/bin/install_openwin
      <various status messages>
***** Done with OpenWindows Installation
example#
```

Various status messages are displayed after you start the installation process with the `install_openwin` command. If the last line is the same as in the example above, the installation process is complete. If this line is not displayed, check with your system administrator.

Note – The `install_openwin` script must first be run on the NFS server of diskless clients or any machines NFS mounting the `/usr` file system. (The `install_modules` script must be run on Sun-3 servers.) If you have mounted `/usr` from an NFS server and `install_openwin` fails on your machine, check with your system administrator to make sure the appropriate script has been run on the server. (See Chapter 5, “Setting Up a Machine as an OpenWindows Server,” for more information.)

6. Exit from `root`.

```
example# exit
example%
```

7. Set the `OPENWINHOME` environment variable to the directory where you have mounted or installed the OpenWindows software.

If you specified an installation location, or directory, other than `/usr/openwin` while using `cdm`, replace `/usr/openwin` in the example below with the directory you specified in `cdm`.

```
example% setenv OPENWINHOME /usr/openwin
```

8. Start up the OpenWindows software using the `openwin` script.

For the average user, a shell script called `openwin` takes care of all the default server configuration issues. You should run `$OPENWINHOME/bin/openwin` to start the server. (Note that you should change directory to your home directory before you start the OpenWindows software.)

```
example% cd
example% $OPENWINHOME/bin/openwin
```

Special Start-Up Cases



Most users will be able to start up the OpenWindows software using the basic steps described in Chapter 2, “Quick-Start: Mounting the OpenWindows Software” or in Chapter 3, “Quick-Start: Installing the OpenWindows Software on Your Hard Disk”. You should look over the information discussed in this chapter to see if any of it applies to your situation.

The typical way to start up the OpenWindows software is with the `openwin` command. The command is specified as:

```
openwin [ options ]
```

where *options* are command line options that allow you to tailor the default setup of the server. There are many options allowed for this command and all are specified in the `openwin(1)` and `xnews(1)` man pages.

4.1 Configuring a Stand-alone Machine to Run the OpenWindows Software

In order to run the OpenWindows software, your system must be set up as if it is on a network, even if it is not connected to a physical network. If you have a stand-alone system (i.e., one not connected to a network), you must correctly set up the *loopback network*, which is a software network interface that does not go outside the machine. To set up the loopback network, proceed as follows:

1. Merge, into a single line, the entry for your machine's *hostname* and the entry for *localhost* in the file `/etc/hosts`:

```
127.0.0.1    hostname localhost loghost mailhost
```

Here, *hostname* represents the hostname of your machine.

2. Comment out all the `ifconfig` commands in `/etc/rc.boot` by adding a `#` symbol at the beginning of each line.

Note that if `ifconfig` is contained in an `if-then` statement, you should comment out the entire statement to prevent a shell syntax error. For example:

```
#if [ ... ]; then
#   ifconfig ...
#fi
```

3. Reboot.

4. Start up the OpenWindows software with `openwin -noauth`.

4.2 Using a GrayScale Monitor

If you have a GrayScale monitor, you should start the server using the `grayvis` device modifier:

```
example% cd
example% $OPENWINHOME/bin/openwin -dev /dev/fb grayvis
```

4.3 Running Multiple Screens

To run the OpenWindows environment on multiple screens, you must inform the system of the additional devices and display types you want to run. You can either specify the device options or use the default values available with the `openwin` script that starts up the OpenWindows software.

For more information, refer to the following man pages:

- `openwin(1)`

- `xnews(1)`
- `olwm(1)`
- `owplaces(1)`

Two command line options are required with the `openwin` command:

```
openwin [ [ -dev device ] [ deviceoptions ] ]
```

The double brackets indicate that the combination of [`-dev device`] [*deviceoptions*] can be entered more than once on the command line (i.e., once per device).

[`-dev device`]

The *device* command line option specifies the framebuffer device which the server should use for the display, or screen.

If this option is not indicated on the command line, the default `/dev/fb` is used by the server. Multiple (more than one) occurrences of the `-dev` option on the command line indicate multiple displays on the same server.

[*deviceoptions*]

The *deviceoptions* command line option is a list of device modifiers that change the behavior of the device that was specified in the `-dev` option.

The following device options are discussed below:

```
[ left ] [ right ] [ top ] [ bottom ]
```

Examples

[*left*] [*right*]

```
example% openwin -dev /dev/fb left -dev /dev/bwtwo0 right
```

This command line instructs the system to start up two displays; the left display is the default framebuffer and the right display is a monochrome. This enables you to move the cursor left and right between the two displays.

```
example% openwin -dev /dev/fb -dev /dev/bwtwo0
```

This example is equivalent to the previous example. By default, the first device is to the left of the second device listed in the command line.

```
example% openwin -dev /dev/fb right -dev /dev/bwtwo0 left
```

This command line instructs the system to start up two displays; the right display is the default framebuffer and the left display is a monochrome. This set up enables you to move the cursor left and right between the two displays.

[top][bottom]

```
example% openwin -dev /dev/cgsix top -dev /dev/bwtwo0 bottom
```

This command line instructs the system to start up two displays; the top display is a CG6 and the bottom display is a monochrome. This set up enables you to move the cursor up and down between the two displays.

```
example% openwin -dev /dev/cgsix -dev /dev/bwtwo0
```

This example is *not* equivalent to the previous example. By default, the first device is to the *left* of the second device listed in the command line.

```
example% openwin -dev /dev/cgsix bottom -dev /dev/bwtwo0 top
```

This command line instructs the server to start up two displays; the bottom display is a CG6 and the top display is a monochrome. This set up enables you to move the cursor up and down between the two displays.

Note – In all examples, the order of the devices is important. The first device corresponds to the screen physically placed to the left (or top) of the second device. The second device corresponds to the screen physically placed to the right (or bottom) of the first device.

Miscellaneous Notes

The following are important notes when running multiple screens.

- By default, `olwm` manages all screens.
- You cannot move windows between screens.

4.4 The `.xinitrc` File

The OpenWindows start-up script, `openwin`, uses the `$(OPENWINHOME)/lib/Xinitrc` file as the default start-up file. Thus, if you wish to customize start-up conditions for all users of the server, you can modify this file (along with `$(OPENWINHOME)/lib/openwin-init` and `$(OPENWINHOME)/lib/openwin-menu`). See the *OpenWindows Version 3 User's Guide* for more information. If you edited your OpenWindows Version 2 `openwin-menu` file, see Appendix B, "Migrating from the OpenWindows Version 2 Environment" for more information.

If you are a previous user of the OpenWindows environment or X11, you may have an `.xinitrc` file in your home directory. *You must either delete the `.xinitrc` file or rename it.* If your `.xinitrc` file *does not* contain special modifications, you should delete it. (The `$(OPENWINHOME)/lib/Xinitrc` file is no longer copied into your home directory as `.xinitrc`. See Appendix B, "Migrating from the OpenWindows Version 2 Environment" on page 43.)

If your `.xinitrc` file *does* contain special modifications, you should rename your `.xinitrc` file to `.xinitrc.save`. Then copy the default file, which is located in `$(OPENWINHOME)/lib/Xinitrc`, into your home directory as `.xinitrc`. You can then edit the default `.xinitrc` file to your preferences by merging it with the `.xinitrc.save` file. It is particularly important that your `.xinitrc` runs `$(OPENWINHOME)/lib/openwin-sys`; this script performs several important OpenWindows system initializations. If you run your system with multiple screens, you no longer need multiple instances of `olwm` (see Appendix B, "Migrating from the OpenWindows Version 2 Environment" on page 43 for more information).

Note – `olwm` is the key client in the default `.xinitrc` file; therefore, when you exit `olwm`, the server will exit.

4.5 Changing Your `.cshrc` File

Note – The `openwin` script sets your path to have the location of the OpenWindows version of the DeskSet tools before the location of the SunView tools of the same name. If you are using the C shell, make sure you run the OpenWindows tools first when you start the server. Do this by making sure that your `.cshrc` file does not reset your path to have `/usr/bin` before `$OPENWINHOME/bin`. It is best to move any “set path” lines from your `.cshrc` file to your `.login` file instead.

You may want to add the following lines to your `.cshrc` file so that your environment is set up correctly for remote logins:

```
setenv OPENWINHOME <installed location of OpenWindows>
setenv LD_LIBRARY_PATH $OPENWINHOME/lib:/usr/lib
set path=($OPENWINHOME/bin $path)
```

4.6 If You Build Your Own Kernel...

If you create your own kernel configuration file, make sure you include the following lines, so that the OpenWindows software loads the kernel drivers at run-time:

```
#
# The following option adds support for loadable kernel modules.
#
options VDDRV                # loadable modules
```

If you are not building your own kernel, you do not need to do anything, because these lines are already in the `GENERIC` and `GENERIC_SMALL` configuration files.

4.7 Disabling/Enabling the Compose Key

If you do not use the Compose key, you can disable it so that you do not have to worry about pressing it inadvertently. First, find out the keycode for `Multi_key`:

```
example$ xmodmap -pk | grep Multi_key
nn 0xff20 (Multi_key)
```

The result will be a line of the form in the example above. The important piece of information is the two-digit keycode number at the beginning of the line, represented by `nn`. Use this keycode number to construct the following line in your `.xinitrc` file:

```
xmodmap -e 'keycode nn = NoSymbol'
```

To re-enable the Compose key, modify the same line in your `.xinitrc` file:

```
xmodmap -e 'keycode nn = Multi_key'
```

4.8 Turning off SunView Compatibility

If you are not going to run SunView applications, you can improve the performance of the OpenWindows product by turning off SunView compatibility. (See the *OpenWindows Version 3 User's Guide* for information on running SunView applications.)

Also, if you have installed the 4.1.1 operating system without the SunOS SunView-Users Subset, you must either start the OpenWindows software with the `-nosunview` option or install the SunOS Sunview-Users Subset from the SunOS tape.



```
example% cd  
example% $OPENWINHOME/bin/openwin -nosunview
```

Note – If you do turn off SunView compatibility, you cannot run a second instance of the OpenWindows environment on the same server. To run a second instance of the OpenWindows environment *and* have the two screens communicate, you must use the `adjacentscreens` command. This command interfaces with the SunView driver that enables the two screens to communicate. Therefore, if you turn off SunView compatibility, your two screens will not be able to communicate.

Setting Up a Machine as an OpenWindows Server



This chapter tells you how to set up an OpenWindows server from which client machines can mount the OpenWindows software. If it is not your responsibility to set up a server on your network and you are setting up your own machine to run the OpenWindows software, see “Quick-Start: Mounting the OpenWindows Software” on page 7.

Note that the operation of installing the OpenWindows software onto a server is similar to that of installing the software onto your hard disk from CD, as described in Chapter 3, “Quick-Start: Installing the OpenWindows Software on Your Hard Disk” on page 13.

You should be aware of the following issues when setting up an OpenWindows server:

- The OpenWindows product is supported only on Sun-4 and Sun-4c architectures. You may use a Sun-3 as an OpenWindows server however, and the procedure for setting up a Sun-3 as a server is described later in this chapter.
- You must run the `install_openwin` script (as described later in this chapter) on Sun-4 servers for diskless workstations before individual users run it on their machines.
- If you plan to make both Version 2 and Version 3 of the OpenWindows software available on the server, you must install them in separate directory structures and you must run `install_openwin` for Version 3 after you

have installed Version 2. You must also make sure your users are aware of the different locations of the software and have their `OPENWINHOME` environment variable pointing to the version they want.

- If you copy the OpenWindows software from one directory structure to another, you must make the copy as `root`. Also, you should use the `tar` command with the `-p` option, rather than the `cp` command, to preserve the original `suid` and `sgid` modes.
- Although you will normally be installing the Full OpenWindows Cluster on to the server, be sure you understand the packages and clusters installation configurations as described in “Installation Clusters and Packages” on page 4.

5.1 Setting Up a Sun-4 or Sun-4c Server

This section contains instructions for loading the OpenWindows software from CD onto a hard disk of a Sun-4 or Sun-4c machine. (Note that this procedure is the same whether you are loading the software onto your machine for your own use, or you are setting up a server for other users to access.) These are the steps you need to follow.

To begin the OpenWindows installation from CD, follow these steps:



1. Become `root`.

You must be `root` to perform the following steps. Use the `su` command, and remain `root` until instructed to exit from `root`.

```
example% su
Password:      <enter root password>
example#
```

2. Change directory to the directory where your CD drive is mounted.

For the example, the directory is `/cdrom`.

```
example# cd /cdrom
```

3. Run the `cdm` program.

`cdm` will initialize and display its main menu.

```
example# cdm
```

a. Choose Select Application—enter the digit 1.

Tell `cdm` which application you wish to install by choosing the first item on the `cdm` main menu, Select Application:

b. Choose OpenWindows—enter the digit 1.

Tell `cdm` that you want the OpenWindows software installed by choosing the only item on the menu.

c. Choose Install Application—enter the digit 3.

Tell `cdm` that you want to install the selected application by choosing the third item on the main menu, Install Application. `cdm` displays a menu listing the available installation configurations.

d. Choose the installation configuration.

Here you must decide which configuration you wish to install. If you're not sure of which configuration to install, see "Installation Clusters and Packages" on page 4 for more information about the content of clusters and packages.

e. Choose the installation location.

Here you must decide where you want the OpenWindows software to be installed. The default is `/usr/openwin`. The script checks to make sure the installation directory exists, is empty, contains enough space, and is properly mounted.

f. Enter "q" twice to exit through the two menus from which you have just made selections.

After you have selected your installation configuration and the OpenWindows software has finished installing, you need to quit the `cdm` program *twice* to get to the prompt.

4. Set the `OPENWINHOME` environment variable to the directory where you have mounted or installed the OpenWindows software.

In the example below, replace `/usr/openwin` with the directory where you have loaded the OpenWindows software on your server.



Note – Make sure that the OpenWindows directory has been mounted with `suid` permissions.

```
example# setenv OPENWINHOME /usr/openwin
```

5. Run the `install_openwin` script.

You only need to run this script once—before you start up OpenWindows for the first time. You must be root to run `install_openwin`.

```
example# $OPENWINHOME/bin/install_openwin
          <various status messages>
***** Done with OpenWindows Installation
example#
```

Various status messages are displayed after you start the installation process with the `install_openwin` command. If the last line is the same as in the example above, the installation process is complete. If this line is not displayed, check with your system administrator.

6. Exit from root.

```
example# exit
example%
```

Running the OpenWindows Software on Sun-4 Server

If you want to run the OpenWindows software on the server machine as a user, see Steps 8 and 9 in Chapter 2, “Quick-Start: Mounting the OpenWindows Software”.

5.2 *Setting Up a Sun-3 Server*

This section contains instructions for loading the OpenWindows software from CD onto a hard disk of a Sun-3 machine. Note that you *cannot* run OpenWindows Version 3 on a Sun-3 machine; you can only use a Sun-3 machine as a server for Sun-4 and Sun-4c machines. The Sun-3 server may continue to run the OpenWindows Version 2 software.

These are the steps you need to follow to set up a Sun-3 server:



1. Become root on the Sun-3 server.

You must be root to perform the following steps. Use the `su` command, and remain root until instructed to exit from root.

```
sun-3% su
Password:      <enter root password>
sun-3#
```

2. Add the following line to the `/etc/exports` file on the Sun-3 machine.

This exports an OpenWindows partition with root access rights from the Sun-3 machine so that the Sun-4 machine can copy the OpenWindows software from CD onto the hard disk of the Sun-3 machine. (In the example below, replace `/foo/openwin-server` with the actual partition on your server. It is assumed that `/foo` is not already exported.)

```
/foo/openwin-server    -root=client name
```

3. Run the `exportfs` command to export the file:

```
sun-3# exportfs /foo/openwin-server
```



4. Become root on one of your Sun-4 client machines.

You must be root to perform the following steps. Use the `su` command, and remain root until instructed to exit from root.

```
sun-4% su
Password:      <enter root password>
sun-4#
```

5. Mount the OpenWindows partition onto your Sun-4 client machine.

You need to make a temporary directory on a Sun-4 machine and then mount the Sun-3 partition. (In the example below, replace `/foo/openwin-tmp` with the temporary directory where you want the Sun-3 partition mounted on your machine.)

```
sun-4# mkdir -p /foo/openwin-tmp
sun-4# mount -v -o rw sun-3:/foo/openwin-server /foo/openwin-tmp
```

6. Run the `cdm` program on the Sun-4 machine and install the OpenWindows software onto the Sun-3 partition mounted in Step 5. `cdm` will initialize and display its main menu.

```
sun-4# cdm
```

- a. **Choose Select Application—enter the digit 1.**
Tell `cdm` which application you wish to install by choosing the first item on the `cdm` main menu, Select Application:
- b. **Choose OpenWindows—enter the digit 1.**
Tell `cdm` that you want the OpenWindows software installed by choosing the only item on the menu.
- c. **Choose Install Application—enter the digit 3.**
Tell `cdm` that you want to install the selected application by choosing the third item on the main menu, Install Application. `cdm` displays a menu listing the available installation configurations.
- d. **Choose the installation configuration.**
Here you must decide which configuration you wish to install. If you're not sure of which configuration to install, see "Installation Clusters and Packages" on page 4 for more information about the content of clusters and packages.
- e. **Choose the installation location.**
Here you must decide where you want the OpenWindows software to be installed. The default is `/usr/openwin`. The script checks to make sure the installation directory exists, is empty, contains enough space, and is properly mounted.
- f. **Enter "q" twice to exit through the two menus from which you have just made selections.**
After you have selected your installation configuration and the OpenWindows software has finished installing, you need to quit the `cdm` program *twice* to get to the prompt.

7. Exit from root on the Sun-4 client machine.

```
sun-4# exit  
sun-4%
```

8. On the Sun-3 machine set `OPENWINHOME` to the location of the OpenWindows software.

In the example below, replace `//foo/openwin-server` with the actual partition on your server. This should be the same directory used in Step 2 and 3.

```
sun-3# setenv OPENWINHOME //foo/openwin-server
```

9. Run the `$OPENWINHOME/bin/install_modules` script on the Sun-3 machine.

```
sun-3# $OPENWINHOME/bin/install_modules
```

10. Exit from `root` on the Sun-3 server.

```
sun-3# exit
sun-3%
```

11. Follow up on Client Machines.

Make sure all users follow the instructions in Chapter 2, "Quick-Start: Mounting the OpenWindows Software" to get started on their client machines.



Note – Be sure that the `$OPENWINHOME/bin/install_openwin` script is run as `root` on every client Sun-4 machine.

This chapter tells you how to deal with problems that may come up while trying to install or start up the OpenWindows software.

6.1 Installation-Related Console Messages

The following console message may appear while installing OpenWindows. These messages appear due to installation problems.

```
xnews: there is already an X11 server running on :0 giving up
```

If this message appears on your screen, shut down the X11 server you have running. If you are not running another X11 server, then another process may be using socket 6000, which is the socket the OpenWindows software uses. To check the use of socket 6000, run:

```
example% netstat -an | egrep 6000
```

```
install_module: /usr/sys/sun4X/OBJ is not writable.
If this machine mounts /usr from an NFS file server, you
must also run the OpenWindows installation script on the
NFS file server. There is no need to re-run the installation
on this machine.
```

If this message appears on your screen after you install the OpenWindows software with `install_openwin` on your diskless machine or a machine that mounts `/usr` from an NFS file server, run the OpenWindows installation script on the NFS file server. This message is not fatal; the installation script should continue.

```
helpviewer: can't find document:
handbooks/desktop.intro.handbooks No such file or directory
helpviewer: error opening "handbooks/desktop.intro.handbook"
usage: helpviewer file | view-link
helpopen: Viewer could not display document:
handbooks/desktop.intro.handbooks
```

If this message appears on your screen after you have chosen Desktop Intro... from the Workspace Menu, the Handbooks Package has not been installed.

6.2 SunView-Related Console Messages

The following console message may appear while running OpenWindows with the SunView binary compatibility mode on.

```
Window display lock broken after time limit exceeded .
by pid nn
```

If this message appears on your screen after start-up, select Refresh from the root menu to redisplay the screen. The error message should disappear.

If you are on a CG4 device, and Refresh does not clear the error message, run the following command:

```
example% switcher -e 0
```

If you are on a GT device, and Refresh does not clear the error message, run the following command:

```
example% /usr/etc/gtconfig -E 0
```

Note – You should be running a console cmdtool window. If you were at the time the above error message occurred, it would have appeared in the console window and no further action would be required.

The following console message may appear while running OpenWindows with the SunView binary compatibility mode off, or starting OpenWindows with the `-nosunview` option.

```
ld.so: libsunwindow.so.0: not found  
giving up.  
/usr/openwin/bin/xinit: No such file or directory (errno 2):  
unable to connect to X server
```

If this message appears on your screen after you type `openwin`, you need to either install the SunOS Sunview-Users Subset from the SunOS tape, or start the OpenWindows software with `openwin -nosunview`.

```
SunView support is not available.  
OpenWindows was started with the -nosunview option.
```

If this message appears on your screen and you want to run SunView applications, start up the OpenWindows software again *without* the `-nosunview` option.

```
loadmodule: program must be installed setuid root
```

If this message appears on your screen after starting up the OpenWindows software with the `-nosunview` option (`openwin -nosunview`), either the `loadmodule` was not installed `setuid root`, or the `nosuid` option was used with the NFS mount.

```
loadmodule: %s file does not exist.
```

If this message appears on your screen after starting up the OpenWindows software with the `-nosunview` option (`openwin -nosunview`), the `%s` file could not be found. The `install_openwin` installation script should have moved all of the necessary files out of `$OPENWINHOME/modules` into the appropriate directories. Make sure `OPENWINHOME` was set correctly when the installation was done.

6.3 Server-Related Console Messages

```
XNeWS Network security violation  
Rejected connection from hostname
```

If this message appears on your screen, a client on the host machine, *hostname*, was denied connection because it could not authorize the connection correctly. Provide the user on *hostname* access to your server. See the *OpenWindows Version 3 Programmer's Guide* and, the `xauth(1)` and `xhost(1)` man pages. (Note that *hostname* appears as an ethernet address.)

6.4 Libraries

Some MIT programs (`xr0lo`, for example) may appear as if they do not run. The problem is that `libolgx` is statically linked and `libxview` is dynamically linked, and `libxview` depends on `libolgx`. The solution is to relink the program so that both libraries are dynamically linked.

6.5 Terminal Emulator Security

Terminal emulators, like `cmdtool`, `shelltool`, and `xterm` are installed without `setuid root`. This could be a potential security problem. Another user could log on to your machine, start an `xterm` and then display on their own machine. You would not be able to verify that the other user was logged on to your machine. The solution is to install terminal emulators with `setuid root`.

Supported Configurations



This appendix details the configurations supported by the OpenWindows product. This includes graphics devices, or display devices, buses, and SunOS operating systems. Also included are DGA (Direct Graphics Access), graphics APIs, and multiple screen support.

The following device, bus, and operating system configurations (or device configurations) are supported. See the *OpenWindows Version 3 Programmer's Guide* for more information on visuals and devices.

Table A-1 Supported Device/Bus/Operating System Configurations

Product Name	Device Name	Device Driver	Bus	SunOS Operating System
n/a	BW2	/dev/bwtwoX	SBus, VME/obio, P4	4.1.1
n/a	CG2/CG3/CG5	/dev/cgtwoX	VME	4.1.1
n/a	CG3	/dev/cgthreeX	SBus	4.1.1
n/a	CG4	/dev/cgfourX	P4	4.1.1
GX	CG6	/dev/cgsixX	SBus, P4	4.1.1
GXplus	CG6	/dev/cgsixX	SBus	4.1.1GFX-Rev2
TC	CG8	/dev/cgeightX	SBus, P4	4.1.1GFX-Rev2
GS	CG12	/dev/cgtwelveX	SBus	4.1.1GFX-Rev2
GT	GT	/dev/gtX	SBus	4.1.1GFX-Rev2
VX/MVX	VX/MVX	/dev/vxX	VME	4.1.1

A.1 Determining Which Device You Have

To find out which type of device (also called framebuffer) and bus you have, use the `dmesg(1)` command to examine the kernel probe message:

```
example% /etc/dmesg | egrep "(bw|cg|gp|gt|vx)"
cgsix0 at SBus slot 2 0x0 pri 7
example%
```

This example tells you that on machine `example`, a CG6 SBus is the device configuration. It also tells you that you are running one screen (see the *OpenWindows Version 3 Programmer's Guide* for more information).

Note – If your machine has not been rebooted recently, the buffer `dmesg` accesses might not contain this information.

A.2 Default OpenWindows Support

Running the default OpenWindows desktop (i.e., DeskSet XView clients, generic X11 clients only, and NeWS clients) is supported on all device configurations in Table A-1 on page 39.

Note – The TC, GS, GT, and GXplus configurations require 4.1.1GFX-Rev 2, the 4.1.1 operating system feature release for graphics acceleration and graphics APIs. This is *not* a feature release for the OpenWindows product. If you are running a SunOS operating system with a version more recent than 4.1.1, you do *not* need 4.1.1 GFX Rev 2. All other device configurations will work with 4.1.1GFX-Rev. 2, but do not require it.

A.3 DGA Support

DGA is supported all device configurations in Table A-1 on page 39, *except* the following:

- All VME bus device configurations running 4.1.1GFX-Rev2
- CG3 SBus
- CG4
- TC

A.4 Graphics API Support

Graphics APIs, like XGL™ 2.0, SunPHIGS™ 2.0, SunGKS™ 4.1, and SunPEX 1.0, require OpenWindows Version 3 in order to be used. These APIs use DGA when it is available on the device; if DGA is not available, Xlib is used.

The above graphics APIs are supported on the following device configurations in Table A-1 on page 39:

- All SBus device configurations (*except* BW2)
- CG2/CG3/CG5
- CG6 P4 bus

The following devices require 4.1.1GFX-Rev2:

- GS
- GT
- GXplus

A.5 SunView Support

Running SunView applications in binary compatibility mode is supported on all device configurations in Table A-1 on page 39, *except* the following:

- TC

A.6 Multiple Screen Support

In general, the OpenWindows product supports the use of multiple screen systems for all SBus devices, with one exception—the multiple screen configuration of CG8-CG8 is not supported. When using some configurations, the user may see cursor color changes when moving the mouse from one screen to the other.



Running a multiple screen system is subject to availability of physical connections on the particular system.

See "Running Multiple Screens" on page 18 for information on how to set up your system with multiple screens.

Migrating from the OpenWindows Version 2 Environment



The following issues apply to you if you formerly ran the OpenWindows Version 2 environment.

B.1 The .xinitrc File

In the OpenWindows Version 2 environment, the `openwin` script created an `.xinitrc` file in your home directory; this is no longer done in the OpenWindows Version 3 environment. If there is an `.xinitrc` file in your home directory, `openwin` will use it; otherwise, it will use `$OPENWINHOME/lib/xinitrc`. This behavior can be overridden by setting the `XINITRC` environment variable to the name of the file you wish to use in place of `.xinitrc`.

If you are a previous user of the OpenWindows environment or X11, you may have an `.xinitrc` file in your home directory. *You must either delete the .xinitrc file or rename it.* If your `.xinitrc` file *does not* contain special modifications, you should delete it.

If you wish to customize start-up conditions for all users of the server, you can modify this file (along with `$OPENWINHOME/lib/openwin-init` and `$OPENWINHOME/lib/openwin-menu`). See the *OpenWindows Version 3 User's Guide* for more information.

If your `.xinitrc` file *does* contain special modifications, you should rename your `.xinitrc` file to `.xinitrc.save`. Then copy the default file, which is located in `$OPENWINHOME/lib/Xinitrc`, into your home directory as `.xinitrc`. You can then edit the default `.xinitrc` file to your preferences by merging it with the `.xinitrc.save` file. It is particularly important that your `.xinitrc` runs `$OPENWINHOME/lib/openwin-sys`; this script performs several important OpenWindows system initializations. If you run your system with multiple screens, you no longer need multiple instances of `olwm` (see “Multiple Screens” for more information).

Note – `olwm` is the key client in the default `$OPENWINHOME/lib/Xinitrc` file; therefore, when you exit `olwm`, the server will exit.

Multiple Screens

To run a system with multiple screens in the OpenWindows Version 2 environment you had to run multiple instances of `olwm`. In the OpenWindows Version 3 environment you only run one instance of `olwm` to run a system with multiple screens. Therefore, if you ran the OpenWindows Version 2 environment with multiple screens, you must do *one* of the following:

- Edit your OpenWindows Version 2 `.xinitrc` file to contain only one instance of `olwm`. Note that the invocation of `olwm` has also changed.

If you ran SunView applications in Version 2, your `.xinitrc` file should contain only one instance of `svenv`. Note that the invocation of `svenv` has also changed.

or

- Delete your OpenWindows Version 2 `.xinitrc` file. When you run the `openwin` script, the default `$OPENWINHOME/lib/Xinitrc` file contains the correct set up for running OpenWindows with multiple screens. By default, it will also contain the correct set up for running SunView applications.

Note – The second choice may not be acceptable to you if you made changes to your `.xinitrc` file other than just the invocations of multiple `olwm` and `svenv`.

DeskSet Users

If in the OpenWindows Version 2 environment you copied the following lines from `$OPENWINHOME/lib/openwin-sys` into your `.xinitrc` file in `$HOME`, you should delete them:

```
xmodmap -e 'add mod1 = Meta_L Meta_R' \  
-e 'add mod2 = F13 F16 F18 F19 F20' \  
-e 'add mod3 = Mode_switch' \  
-e 'add mod4 = Num_Lock'
```

B.2 The `.Xdefaults` File

The `$OPENWINHOME/lib/Xdefaults` file is no longer copied into your home directory as `.Xdefaults`. `$OPENWINHOME/lib/Xinitrc` first checks your home directory for an `.Xdefaults` file—if there is an `.Xdefaults` file in your home directory, it is used. If there is *not* an `.Xdefaults` file in your home directory, `$OPENWINHOME/lib/Xdefaults` is used.

If your `.Xdefaults` file contains special modifications, you should rename your `.Xdefaults` file to `.Xdefaults.save`. Then copy the default file, which is located in `$OPENWINHOME/lib/Xdefaults`, into your home directory. You can then edit the default `.Xdefaults` file, to your preferences by merging it with the `.Xdefaults.save` file.

See the *OpenWindows Version 3 User's Guide* for information on how to make changes to your `.Xdefaults` file.

Note – Each time you make a change with Workspace Properties, your `.Xdefaults` file in your home directory is edited. If you do not have an `.Xdefaults` file in your home directory, and you make a change with Workspace Properties, an `.Xdefaults` file is created automatically in your home directory.

B.3 The `.openwin-menu` File

The `openwin-menu` file defines the menu items on the Workspace Menu and its submenus. If you copied the `openwin-menu` file while in the OpenWindows Version 2 environment, to `.openwin-menu` in your home

directory to edit your Workspace Menu, *you must either delete it or rename it*. The OpenWindows Version 2 default `openwin-menu` file references an obsolete program, `hyperview`.

If your `.openwin-menu` file contains special modifications, you should rename your `.openwin-menu` file to `.openwin-menu.save`, then copy the default file, which is located in `$OPENWINHOME/lib/openwin-menu`, into your home directory. You can then edit the default `openwin-menu` file, you just copied, to your preferences by merging it with the `.openwin-menu.save` file. The new file name should be `.openwin-menu`.

See the *OpenWindows Version 3 User's Guide* for information on how to make changes to your `.openwin-menu` file.

B.4 Key Interpretations

Due to mouseless features, several OpenWindows Version 2 keyboard functions have been moved to other keys. To restore the following Version 2 key functions, edit your `.xdefaults` file:

- Control-Return — go to the end of a `textsw`
- Control-Shift-Return — go to the beginning of a `textsw`

Edit your `.xdefaults` file with the following lines:

```
OpenWindows.SunViewKeys:           true
OpenWindows.Mouseless:             false
OpenWindows.KeyboardCommand.DataStart:Return+Shift+Ctrl,R7+Ctrl
OpenWindows.KeyboardCommand.DataEnd:Return+Ctrl,End+Ctrl,R13+Ctrl
```

- R2 – invoke operations specified with a `.textswrc` file

Edit your `.xdefaults` file with the following line:

```
OpenWindows.KeyboardCommand.Translate: R2 + Meta
```

Migrating from the SunView Environment to the OpenWindows Environment



If you are a SunView user who is switching to the OpenWindows environment, the following information may make your transition easier.

C.1 Environment Customization

.defaults and .Xdefaults Files

To customize your OpenWindows environment in the same way as your SunView environment, you can convert your `.defaults` file (used by the SunView software) into an `.Xdefaults` file (used by the OpenWindows software). If you have a `.defaults` file in your home directory, you should run the `convert_to_Xdefaults(1)` program in your home directory, as follows:

```
example% cd  
example% $OPENWINHOME/bin/convert_to_Xdefaults .defaults
```

This creates an `.Xdefaults` file in your home directory that will be used to customize your OpenWindows environment when you start the server.



.openwin-init File

The `.openwin-init` file in your home directory contains the tools to be run automatically when you start the OpenWindows software. To run the XView versions of the tools you run in your SunView environment, you should list them in the `.openwin-init` file. Note that the command-line arguments for the XView tools may be different than the ones for the SunView tools. Refer to the man pages for the individual tools for information on available options and to the `xview` man page for information on options generic to all XView tools. You can also type the name of the tool with `-help` flag to get a listing of the command-line arguments for that tool.

Note – The `.openwin-init` file is overwritten each time you select Save Workspace from the root menu in the OpenWindows environment. Any comments in the file will be deleted and the contents reorganized. Normally, this will not effect you and you can ignore it.

C.2 User Interface Differences

Selection Differences

In the OpenWindows environment, you open an icon by double clicking with `select`.

In the SunView environment, you open an icon by clicking once with `select`.

Window Movement Differences

To move a window in the OpenWindows environment, use `select`. The window moves in any direction—up, down, diagonally, horizontally.

To move a window in the SunView environment, use `adjust`. The window can move any direction if the pointer is near the right or left side of the window. If the pointer is near the top or bottom, the window can only move vertically.



Menu Selection Differences

You can pull right with menu or select to make a menu selection in the OpenWindows environment. If you use select, the menu will stay up until you make a selection, or stay pinned if the push-pin is activated.

Another feature in the OpenWindows environment is that you can set defaults for each menu. For example, if you bring up the root menu and highlight Program without pulling to the right, cmdtool is chosen (if cmdtool is the default). See the *OpenWindows Version 3 User's Guide* for more information.

You can only pull right to make a menu selection in the SunView environment. If you press menu, the pop-up menu disappears.

C.3 Turning off SunView Compatibility

If you are not going to run SunView applications, you can improve the performance of the OpenWindows software by turning off SunView compatibility. (See the *OpenWindows Version 3 User's Guide* for information on running SunView applications.)

Also, if you have installed the 4.1.1 operating system without the SunOS SunView-Users Subset, you must either start the OpenWindows software with the `-nosunview` option or install the SunOS Sunview-Users Subset from the SunOS tape.

```
example% cd
example% $OPENWINHOME/bin/openwin -nosunview
```

Note – If you do turn off SunView compatibility, you cannot run a second instance of the OpenWindows environment on the same server. To run a second instance of the OpenWindows environment *and* have the two screens communicate, you must use the `adjacentscreens` command. This command interfaces with the SunView driver that enables the two screens to communicate. Therefore, if you turn off SunView compatibility, your two screens will not be able to communicate.



C.4 *SunView Configuration Support*

See Appendix A, "Supported Configurations" on page 39 for information on which device configurations support SunView applications.

Index

Symbols

- `.cshrc` file 22
 - how to change 22
- `.defaults` file 47
- `.openwin-init` file 48
- `.Xdefaults` file 47
- `.xinitrc` file 21, 43
- `/etc/exports` file 29
- `/etc/fstab` file 9
- `/etc/hosts` file 17
- `/etc/rc.boot` file 18

B

- BW2, support information 39

C

- cdm, how to use 14–15, 26–27, 30
- CG2, support information 39
- CG3, support information 39
- CG4, support information 39
- CG5, support information 39

- clusters, definition of 4

- clusters, list of 5

- compose key, disable/enable 23

- convert_to_Xdefaults program 47

D

- df command 2

- display devices

- BW2, support information 39

- CG2, support information 39

- CG3, support information 39

- CG4, support information 39

- CG5, support information 39

- GS, support information 39

- GT, support information 39

- GX, support information 39

- GXplus, support information 39

- MVX, support information 39

- TC, support information 39

- VX, support information 39

- dmesg command 2

E

`exportfs` command 29

G

graphics API (Application Programmer's Interface) 2

support information 41

SunGKS 41

SunPEX 41

SunPHIGS 41

XGL 41

GrayScale monitor 18

`grayvis` device modifier 18

GS, support information 39

GT, support information 39

GX, support information 39

GXplus, support information 39

I

`ifconfig` command 18

`install_modules` script 31

`install_openwin` script 10, 15-16, 25, 28, 31

installation

`/etc/fstab` file 9

clusters, definition of 4

clusters, list of 5

disk space requirement 2

from CD 13-16

`install_modules` script 31

`install_openwin` script 10, 15-16, 28

main memory requirement 2

mounting 7-11

packages, definition of 6

packages, list of 6

prerequisites 1-3

server, setting up 25-31

Sun-3 28-31

Sun-3, `install_openwin` script
note 31

Sun-4 or Sun-4c 26-28

SunOS 4.1.1GFX-Rev 2 note 1

SunOS requirements 1

swap space requirements 2

system architecture requirements 1

troubleshooting 33-37

console messages 33-34

using `cdm` 14-15, 26-27, 30

K

kernel, build your own 22

L

`libolgx` library 36

`libxview` library 36

M

MIT programs, problems running 36

mounting the OpenWindows software,
how to 7-11

MVX, support information 39

N

NeWS

for more information xii

notational conventions X

O

`openwin` command
 `-dev` option 19
 `deviceoptions` option 19
 `-noauth` option 18
 `-nosunview` option 23
`openwin` script 11, 16
`OPENWINHOME` environment variable 10,
 15, 16, 31

P

packages, definition of 6
packages, list of 6
PostScript language
 for more information xii
`pstat` command 3

S

`setgid` program 9
`setuid` program 9
`showrev` command 1
stand-alone machine, how to configure
 17-18
 `openwin -noauth` command 18
start-up
 `.cshrc` file 22
 how to change 22
 `.xinitrc` file 21
 compose key, disable/enable 23
 configuring a stand-alone machine
 17-18
 `openwin -noauth` command
 18
 GrayScale monitor 18
 kernel, build your own 22

multiple screens, how to run 18-21
 examples 19-20
 miscellaneous notes 21
`openwin` script 11, 16
special cases 17-24
SunView compatibility 47-50
 `openwin -nosunview`
 command 23
 second instance of
 OpenWindows
 environment note 24
 turning off 23-24
 troubleshooting 33-37
`suid` option 9
`suid` permissions 9, 15, 27
SunGKS 41
SunOS 4.1.1GFX-Rev 2 note 1
SunPEX 41
SunPHIGS 41
SunView compatibility 47-50
 `.defaults` file 47
 `.openwin-init` file 48
 `.Xdefaults` file 47
 `convert_to_Xdefaults` program
 47
 migrating to the OpenWindows
 environment 47-50
 `openwin -nosunview` command
 23
 troubleshooting 34-36
 turning off 23-24
 second instance of
 OpenWindows
 environment note 24
SunView, *See* SunView compatibility
`svenv` environment variable 44

T

TC, support information 39
troubleshooting 33-37
 console messages 33-36
 libraries 36

V

VX, support information 39

X

XGL 41
xmodmap command 23