

Tru64 UNIX

Installation Guide

Part Number: AA-QTLGC-TE

April 1999

Product Version: Tru64 UNIX Version 4.0F or higher

This guide describes how to install the Compaq Tru64 UNIX (formerly DIGITAL UNIX) operating system Version 4.0F or higher on all supported processors and single-board computers.

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About This Guide

This guide describes how to install Compaq Tru64™ UNIX® (formerly DIGITAL UNIX) Version 4.0F on all supported processors and single-board computers. Specifically, it describes how to prepare your system for installation, how to boot the system from the distribution media, and how to perform the installation procedure. It also explains how to install the operating system's worldwide language support software after installing the base operating system.

Note

In this document, the following terms are used to refer to different versions of this operating system:

- Version 4.0F of the operating system is referred to as the **current version** or the **new version**.
- Version 4.0D or 4.0E of the operating system is referred to as a **previous version** or the **last version**. You can perform an update installation directly from the previous version of the operating system to the new version of the operating system.
 - If you update a previous version of the operating system to the new version, the `/sbin/installupdate` program preserves your user and data files and any system setup you may have done.
 - If you perform an update installation and you are running Worldwide Language Support (WLS), the `winstallupdate` procedure updates the operating system from the previous version to the new version by invoking the `/sbin/installupdate` command, then updating the WLS software.
- Any version of the operating system earlier than Version 4.0D or 4.0E is referred to as an **earlier version** or an **older version**. You cannot perform an update installation directly from an earlier version of the operating system to the new version of the operating system; you must either

perform a full installation or successive update installations as described in Table 2-3.

If your system is delivered to you with Factory Installed Software (FIS), the software necessary to get your system up and running has already been installed for you by the manufacturer. Follow the instructions for entering system information in the *FIS Quick Reference Card* delivered with your system, and then refer to Chapter 7 in this guide for instructions on how to configure and set up your system.

Audience

This book is intended for anyone installing the base operating system software or worldwide language support software. Before starting an installation, you must do the following:

- Read the documentation supplied with your processor or single-board computer
- Read the current version of the operating system *Release Notes*
- Understand how to load and unload the installation media and know which disks are needed during the installation
- Know the names and unit numbers of your disk devices
- Have a basic understanding of the file system and commands

New and Changed Features

The following are new and changed installation features in this version of the operating system:

- Your system must have a minimum of 64 Mb of memory to install and run this version of the operating system.
- Table 2-3 has been updated to reflect new successive updates for this version of the operating system.
- Hardware product kits include kernel modules that let your operating system support new or upgraded hardware without reinstalling the base operating system. Chapter 6 tells you how to install a hardware product kit on either a running system or during a full installation, and Chapter 2 has been updated to integrate hardware product kit processing during an update installation.
- The list of supported disks for the root file system in Table 3-3 has been updated.

- The processor-specific boot instructions in Chapter 4 have been modified to include supported Alpha processors for this release of the operating system.
- Reference pages for several system management (SysMan) applications have moved from section 8X to section 8. These are reflected in Table 7–2.
- The online documentation set is now available in both HTML and PDF versions. Chapter 8 tells you how to access the online documentation set, use Netscape Navigator, install Acrobat Reader, and copy the online documentation set files to your system.
- The software provided with this version of the operating system includes Netscape Communicator 4.5. References to Netscape applications have been updated in Chapter 8 and Appendix E.
- The new `Inst_disklabel` CDF item and its attribute descriptions are documented in Section C.6.2.1.
- The Software Subset Sizes appendix has been deleted. This information is now in the *Release Notes*.
- The Default Disk Partitions appendix has been deleted. Instructions for finding the default disk partitions for any supported disk on your system are now found in Section 3.2.

Organization

This manual is organized as follows:

Chapter 1	Installation Overview and Preinstallation Tasks Describes the tasks you must complete before beginning an installation. This chapter also describes the different installation options.
Chapter 2	Performing an Update Installation Describes how to perform an update installation.
Chapter 3	Planning Disk Space for a Custom Installation Describes the disk space planning you may want to consider before beginning a custom installation. It also includes information to consider if you plan to use the POLYCENTER Advanced File System (AdvFS) and Logical Storage Manager (LSM) products.
Chapter 4	Processor-Specific Boot Instructions for Full Installations Describes how to boot each supported processor or single-board computer from the distribution media to start a full (default or custom) or cloned installation.

Chapter 5	Performing Full Installations
	Describes how to perform a default, custom, or cloned installation.
Chapter 6	Installing Supplemental Hardware Support
	Describes how to install hardware product kits onto a running system or during a full installation.
Chapter 7	Setting Up Your System After Installation
	Describes how to set up the system for general use after installing the operating system software.
Chapter 8	Viewing Online Documentation
	Describes how to access, use, and copy the online documentation.
Chapter 9	UNIX Shell Option
	Describes how to restore file systems, modify disk labels, and perform system maintenance in the shell environment.
Chapter 10	Using <code>setld</code> to Install and Remove Software Subsets After an Installation
	Provides information on using the <code>setld</code> command to install and remove optional software at any time after the initial installation.
Chapter 11	Performing a Worldwide Installation
	Describes how to install the Worldwide Language Support (WLS) software.
Chapter 12	Performing a Worldwide Update Installation
	Describes how to perform an update installation of the Worldwide Language Support (WLS) software.
Appendix A	Preinstallation Tasks for Systems Running LSM, LVM, Prestoserve™, and AdvFS
	Describes how to prepare for a full installation if the system is currently using LSM, LVM, Prestoserve, or AdvFS.
Appendix B	Compact Disk Overview
	Describes how to load an operating system CD-ROM into a caddy and a drive, how to mount and unmount a CD-ROM, and how to remove a CD-ROM from a drive and a caddy.
Appendix C	User-Supplied Files and Installation Cloning
	Describes installation cloning and the user-supplied files that you can use in the installation cloning process.
Appendix D	Base Operating System Subset Descriptions

	Provides descriptions of base operating system software subsets.
Appendix E	Associated Product Descriptions Provides descriptions of associated product software subsets.
Appendix F	Worldwide Software Subset Descriptions Provides descriptions of Worldwide Language Support software subsets.
Appendix G	Provides default disk partitions for supported disks. Installation Error Messages Describes installation error messages.
Appendix H	Sample Text-Based Installations Provides samples of text-based default and custom installations.

Related Documentation

The printed version of the Tru64 UNIX documentation set is color coded to help specific audiences quickly find the books that meet their needs. (You can order the printed documentation from Compaq.) This color coding is reinforced with the use of an icon on the spines of books. The following list describes this convention:

Audience	Icon	Color Code
General users	G	Blue
System and network administrators	S	Red
Programmers	P	Purple
Device driver writers	D	Orange
Reference page users	R	Green

Some books in the documentation set help meet the needs of several audiences. For example, the information in some system books is also used by programmers. Keep this in mind when searching for information on specific topics.

The *Documentation Overview* provides information on all of the books in the Tru64 UNIX documentation set.

Read the related documentation in the following order:

1. The documentation for your hardware shows how to set up the processor and its additional devices, and supplies valuable troubleshooting guidelines.
2. Before beginning the installation, read the current version of the operating system *Release Notes*.
3. Refer to *Sharing Software on a Local Area Network* for information about Remote Installation Services (RIS) and Dataless Management Services (DMS). RIS lets you install software products over a network. DMS lets you set up an environment where the `root` and `/usr` file systems are exported from a server onto a client.
4. Refer to the *System Administration* document for information about administering and maintaining your system. This guide also contains information about the POLYCENTER Advanced File System (AdvFS).
5. Refer to *Network Administration* for information about network setup and network administration.
6. Refer to *Software License Management* for information about registering and loading Product Authorization Keys (PAKs), the software licenses from Compaq Computer Corporation.

Reader's Comments

Compaq welcomes any comments and suggestions you have on this and other Tru64 UNIX manuals.

You can send your comments in the following ways:

- Fax: 603-884-0120 Attn: UBPG Publications, ZKO3-3/Y32
- Internet electronic mail: `readers_comment@zk3.dec.com`

A Reader's Comment form is located on your system in the following location:

```
/usr/doc/readers_comment.txt
```

- Mail:

Compaq Computer Corporation
UBPG Publications Manager
ZKO3-3/Y32
110 Spit Brook Road
Nashua, NH 03062-9987

A Reader's Comment form is located in the back of each printed manual. The form is postage paid if you mail it in the United States.

Please include the following information along with your comments:

- The full title of the book and the order number. (The order number is printed on the title page of this book and on its back cover.)
- The section numbers and page numbers of the information on which you are commenting.
- The version of Tru64 UNIX that you are using.
- If known, the type of processor that is running the Tru64 UNIX software.

The Tru64 UNIX Publications group cannot respond to system problems or technical support inquiries. Please address technical questions to your local system vendor or to the appropriate Compaq technical support office. Information provided with the software media explains how to send problem reports to Compaq.

Conventions

% \$	A percent sign represents the C shell system prompt. A dollar sign represents the system prompt for the Bourne, Korn, and POSIX shells.
#	A number sign represents the superuser prompt.
>>>	Three right angle brackets represent the console subsystem prompt.
% cat	Boldface type in interactive examples indicates typed user input.
<i>file</i>	Italic (slanted) type indicates variable values, placeholders, and function argument names.
[] { }	In syntax definitions, brackets indicate items that are optional and braces indicate items that are required. Vertical bars separating items inside brackets or braces indicate that you choose one item from among those listed.
cat(1)	A cross-reference to a reference page includes the appropriate section number in parentheses. For example, <code>cat(1)</code> indicates that you can find

information on the `cat` command in Section 1 of the reference pages.

`Return`

In an example, a key name enclosed in a box indicates that you press that key.

`Ctrl/x`

This symbol indicates that you hold down the first named key while pressing the key or mouse button that follows the slash. In examples, this key combination is enclosed in a box (for example, `Ctrl/C`).

1

Installation Overview and Preinstallation Tasks

This chapter includes the following information:

- Quick start information for experienced users
- A description of the two types of software distribution media
- A description of the two user interfaces
- Preinstallation tasks, including updating minimum firmware revisions for all supported processors and single-board computers and running hardware configuration utilities
- A description of the types of installation procedures: update, full, and cloned
- A description of the UNIX shell option
- A summary of the full installation process
- What to do if your system was delivered with preinstalled software
- How to install Worldwide Language Support (WLS) software

The goal of this chapter is to provide the information necessary for you to perform the user actions shown in Table 1-1.

Table 1-1: Summary of User Actions

After reading this chapter, you will ...

Perform preinstallation tasks.

Decide whether to use CD-ROM or the network for the distribution media.

Decide what type of installation you want to do.

1.1 Quick Start for Experienced Users of the Full Installation

If you are an experienced user of the operating system, you should read the overview information in this chapter. The installation procedure has two

user interfaces that you may want to read about before beginning. After reading the overview information in this chapter, refer to Table 1–2 for quick start instructions.

The following statements qualify you as an experienced user:

- You previously have performed a full installation and are familiar with the decisions required to perform a full installation.
- You know whether you are using CD-ROM or RIS as the distribution media.
- You know the type of installation you want to do.
- You know the disks and partitions you want to use for the `root`, `/usr`, and `/var` file systems and for swap space.
- You know whether or not you want to install optional software subsets.

If most of the previous statements are true, refer to Table 1–2, which provides the steps to get you started quickly.

Caution

If you are not an experienced user, read this entire chapter before you start any preinstallation or installation tasks.

Table 1–2: Full Installation Steps for Experienced Users

If you have experience performing full installations...	Follow Instructions In:
Performing preinstallation tasks for the full installation.	Section 1.4
Shut down and halt your processor, then use the processor-specific boot commands to boot off the CD-ROM or network.	Table 4–2
Enter all information requested by the installation procedure.	Chapter 5
Log in to the newly-installed system.	Section 5.21
Set up your system for general use.	Chapter 7

If you want to perform an update installation and you are an experienced user, go directly to Chapter 2.

1.2 Software Distribution Media

There are two types of distribution media you can use to install the base operating system:

- From the *Operating System Volume 1* CD-ROM that contains this version of the operating system. The software subsets contained on this CD-ROM are described in Appendix D.
- Over a network connection to a remote installation services (RIS) server that is serving this version of the operating system.

Deciding which distribution media to use for the installation depends on the following:

- If you have a copy of the *Operating System Volume 1* CD-ROM in your possession and your system has a CD-ROM drive, you can perform the installation from CD-ROM.
- If your site has a RIS server that is capable of serving this version of the operating system, ask your RIS server administrator if you should perform a RIS installation. The RIS server administrator performs the tasks necessary to register your system as a client of the RIS server.
- If you are the RIS server administrator and want to perform a RIS installation, follow the instructions in *Sharing Software on a Local Area Network* to learn how to set up a RIS server and how to register clients.

1.3 Types of User Interfaces: Graphical and Text Based

Two user interfaces are available for the full installation process:

- A graphical interface
- A text-based, menu-driven interface

The type of interface presented during the full installation is determined automatically based on your hardware configuration and the amount of memory on your system. Systems with graphics capability present a graphical interface to the installation. Systems with consoles that do not have graphics capabilities present a text-based interface.

While you are entering information during the installation setup phase, the graphical and text-based interfaces record your responses in a configuration description file (CDF). The installation procedure uses the information stored in the CDF to configure disk and file systems and to install the selected software subsets. After the installation, the CDF is located on the newly-installed system in `/var/adm/smlogs/install.cdf`.

The CDF can be used to **clone** another system with a similar hardware configuration. Refer to Section 1.5.4 for a description of cloned installations.

Both the graphical and text-based installation interfaces share the following characteristics:

- All questions are asked and answered before your system is changed in any way.

- Free disk space is calculated and displayed automatically during software selection.
- Software subset dependencies are checked and resolved automatically.
- Online help is available.
- A UNIX shell is available to access UNIX commands and utilities before and during the installation setup process. The UNIX shell also can be used for disaster recovery and maintenance purposes.

1.4 Preinstallation Tasks

Table 1–3 summarizes the preinstallation tasks to complete before beginning any software installation.

Table 1–3: Summary of Preinstallation Tasks

Installation Task	Follow Instructions In:
Check the hardware for installation readiness.	Section 1.4.1
Check the Software Distribution Kit.	Section 1.4.2
If you are performing a RIS installation, ensure your system is registered as a client of the RIS server.	Section 1.4.3
Read the current version of the <i>Release Notes</i> .	Section 1.4.4
Back up (save) the current version of your operating system.	Section 1.4.5
Update the system firmware.	Section 1.4.6
Run hardware configuration utilities.	Section 1.4.7
Decide the type of installation to perform (update, default, custom, or cloned).	Section 1.5

Note

If you plan to run your system as a dataless client of a DMS server, consult your DMS server administrator or *Sharing Software on a Local Area Network*. On a dataless client, the `root` and `/usr` file systems are located on a dataless server and are exported to your system. You do not need the instructions in this book to run your system as a dataless client.

The following sections describe the preinstallation tasks to complete before invoking the installation procedure.

1.4.1 Check the Hardware for Installation Readiness

Ensure that you have the hardware needed for an installation. You must know the location and function of the controls and indicators on your hardware. Verify that all cables and connectors are hooked up and that the system is plugged in. Refer to your hardware owner's documentation for more information.

You need some or all of the following items to install the operating system software:

- Your system must have a CD-ROM disk drive if you are installing the software from the CD-ROM distribution media

- Disk for the `root` file system (required)

You need at least one supported disk to contain the `root` and `/usr` file systems and `swap` space. You will use this disk to boot your system after the installation. If you perform a custom installation, you can allocate the `/usr` and `/var` file systems and `swap` spaces to disks other than the disk that contains the `root` file system. Refer to Section 3.5 for more information about supported disks.

- Data disks (optional)

A data disk is a disk on which data and user files are stored and on which no operating system file system resides. The installation procedure does not configure these disks.

- Console terminal (required)

The console terminal communicates with your system during the installation.

- Network capabilities if you are planning to perform the installation using the remote installation services (RIS).

1.4.1.1 Configuring ISA Devices Before the Installation

The information in this section applies only if your system has an Integrated System Architecture (ISA) bus (most AlphaStations).

If you plan to connect ISA devices to your system (for example, floppy controllers, graphics cards), use the `isacfg` console command to supply the appropriate configuration information.

The `isacfg` console command is available on systems that have an ISA bus. There is information about the command in the user documentation

for each of the systems that support ISA bus devices. If you need to know more about the format of the command, enter the following:

```
>>> help isacfg
```

The System Reference Manual (SRM) console firmware provides information about the ISA bus devices that come configured with Compaq systems as well as the device handles that are set up. Use the following console firmware command to view this information:

```
>>> isacfg -all
```

When you specify a device with the `isacfg` command, you must use a handle as the name of the device. The following table lists the handles for optional ISA devices that you can configure for your system.

Table 1–4: Optional ISA Device Handles

Device	Handle
Ethernet LeMAC (DE203, DE204, DE205)	DE200-LE
Sound board	PCXBJ
ATI Mach64 SVGA graphics	MACH64
Generic VGA graphics	ISA--VGA ^a
Any other kernel device driver kit	Handle defined by vendor ^b

^aIf you configure generic VGA graphics, you must reset the graphics device handle (with `isacfg`) as defined by the vendor, when the system halts after loading the subsets. This allows the Xserver to recognize the device. Section 5.18 provides the instructions to do so where applicable in the installation procedure.

^bA kernel device driver kit is any graphics kit that is not supplied by the operating system base operating kit. If you are performing a RIS installation from a RIS area that has the required graphics kit already installed, the handle for `isacfg` should be set to the handle specified by the vendor. Section 5.18 provides the instructions to do so where applicable in the installation procedure.

Use the `-handle` handle-name flag to specify the device handle. The following example sets the parameters for configuring the DE205 Ethernet controller:

```
>>> isacfg -slot 1 -dev 0 -mk -handle DE200-LE -irq0 5 \  
-iobase0 300 -membase0 d0000 -memlen0 10000 \  
-etyp 1 -enadev 1
```

The backslashes (\) are for line continuation and need not be entered.

See your hardware documentation for more information about ISA configuration.

1.4.1.2 Setting the Network Adapter Mode

If you plan to connect your system to a network, you may need to change the value of a console variable to enable your network interface. Failure to

do so will prevent you from executing remote installations, configuring network services, or running any network-aware software, such as the Common Desktop Environment (CDE).

By default, your network adapter is configured to operate on twisted-pair (10BaseT) networks. If this is compatible with your network, you do not need to do anything. Otherwise, you need to take one or more of the following actions:

- If you are using a DE500-AA or DE500-BA network adapter and if the switch or repeater to which you are connecting supports IEEE[®] 802.3u autonegotiation, set the `ewa0_mode` console variable with the following command:

```
>>> set ewa0_mode autonegotiate
```

- If you are using an EISA DE425 adapter, run the EISA Configuration Utility (ECU) to select the media that you want. Refer to Section 1.4.7.1 for information about running the ECU.
- For all other adapters, upgrade your Alpha System Reference Manual (SRM) Console firmware to the most recent version available for your system. Then set the `EW*0_MODE` or `ETHERNET` console variable, depending on your machine type, for each interface. For example:
 - Enter the following command at the console prompt to enable thinwire support if you are connecting the system to a thinwire (10Base2) network:

```
>>> set EW*0_MODE BNC
```

- Enter the following command at the console prompt to enable thickwire support if you are connecting an older machine to a thickwire (10Base5) network:

```
>>> set ETHERNET THICK
```

See your hardware documentation for more information about these console variables.

- Optionally, for all adapters (including the EISA DE425), you can use the `lan_config` command to select the mode of operation that you want. This command overrides whatever you select through the ECU or console (`EW*0_MODE` or `ETHERNET` variables). Use the `/etc/inet.local` configuration file to preserve the `lan_config` settings for subsequent reboots.

Refer to the `tu(7)`, `inet.local(8)`, and `lan_config(8)` reference pages for more information.

1.4.1.3 Installing ATM Adapters Before the Installation

The information in this section applies only if you plan to use Asynchronous Transfer Mode (ATM) adapters.

You should install the DGLTA ATM adapter before installing this version of the operating system so that the installation procedure properly detects the presence of the ATM adapter and automatically installs the ATM software subsets. If you install the ATM adapter after installing the operating system, you must boot the system using the generic kernel `/genvmunix`, install the ATM software subsets from the CD-ROM or RIS server, and then run the `doconfig` program to rebuild your system kernel to enable the added ATM support.

1.4.1.4 Installing on SCSI RAID Devices

If you are installing the operating system on a SCSI RAID device, only LUN 0 can be used for the installation's target device. The RAID device's LUN 0 must be configured before you attempt to install the software. Refer to Section 1.4.7.2 for more information about RAID devices.

1.4.2 Check the Software Distribution Kit

You should have received a Software Distribution Kit that contains, among other items, the operating system CD-ROMs. A *Parts Listing* included in the box lists the contents of the Software Distribution Kit. At a minimum, the Software Distribution Kit contains the following CD-ROMs and documents:

- Operating system CD-ROMs:
 - The base operating system software *Operating System Volume 1* CD-ROM
 - The additional software products *Associated Products Volume 1* CD-ROM
 - The additional software products *Associated Products Volume 2* CD-ROM
 - The documentation *Documentation Volume 1* CD-ROM
- The current version of the *Alpha Systems Firmware CD-ROM*
- The current version of the firmware release notes *Alpha Systems Firmware Update Release Notes Overview*
- This document, the current version of the *Installation Guide*

- The current version of the *Release Notes*
- The current version of the *Technical Overview*
- The current version of the operating system *Software Product Description (SPD)*

Your Software Distribution Kit may also include a hardware product kit CD-ROM with installation instructions.

1.4.3 Check Network Connections for RIS Installations

If you have a RIS server at your site, ask the RIS server administrator whether or not you can perform a RIS installation.

You need a connection to the network (using Ethernet, Token Ring, or FDDI) and to a RIS server if you plan to perform a Remote Installation Services (RIS) installation over a local area network (LAN). Refer to your hardware installation guide for information about network connections.

If you are installing over a network connection to a RIS server, follow these steps:

1. Your machine must be registered as a client of a RIS server that is serving this version of the operating system. If your RIS server administrator has set up your system for a cloned installation, ask the RIS server administrator to ensure that your system is registered to the appropriate RIS environment and configuration description file (CDF). Section 1.5.4 describes a cloned installation.
2. If your system is already running a version of the operating system, ensure your system can communicate with the RIS server by executing the `/sbin/ping` command to verify the network connection. Enter the command in the following format and replace *server* with the name of your local RIS server:

```
# /sbin/ping -c2 server
```

Successful output of the `/sbin/ping` command is similar to the following:

```
# ping -c2 system9
PING system9 (16.59.124.96): 56 data bytes
64 bytes from 16.59.124.96: icmp_seq=0 ttl=255 time=1 ms
64 bytes from 16.59.124.96: icmp_seq=1 ttl=255 time=0 ms

----system9 PING Statistics----
2 packets transmitted, 2 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 0/0/1 ms
```

In the previous example, `system9` is the name of the RIS server.

Your system is not able to communicate with the RIS server if you obtain the following results from the `/sbin/ping` command:

- Only your system name and IP address is displayed if the name server recognizes your system name but the network connection is not set up.
- The message `Unknown host` is displayed if your system does not recognize the RIS server name.

If you obtain the previous results, ask the RIS server System Administrator to troubleshoot the problem.

Refer to *Sharing Software on a Local Area Network* for more information about RIS.

1.4.4 Read the Current Release Notes

Read the current version of the operating system *Release Notes* before beginning any software installation procedure. The *Release Notes* document any last-minute changes to the software. This information might be required for a successful installation.

The *Release Notes* also provide descriptions of features that are new to this version of the operating system or have changed significantly from previous releases.

A printed version of the *Release Notes* is included in the operating system Software Distribution Kit that you received.

1.4.5 Back Up the System

This step applies only if your system is already running the operating system and you have critical files that you want to preserve.

Before you begin any software installation procedure, you should perform a full backup of your current operating system. Refer to *System Administration* for information about backing up your system.

1.4.5.1 Special Considerations for Systems Running LSM, LVM, Prestoserve, and AdvFS

If your system is currently running the operating system and is using the Logical Storage Manager (LSM), the Logical Volume Manager (LVM), Prestoserve, or the Advanced File System (AdvFS), refer to Appendix A for special preinstallation backup tasks for these products.

1.4.6 Update System Firmware

Console firmware is distributed for certain processors whenever the operating system is updated or as is required. To run this version of the operating system, your system may require a firmware update. Firmware updates for all supported processors are located on the current *Alpha Systems Firmware CD-ROM* that is included with your operating system Software Distribution Kit. The firmware revision level may be different for each processor.

Refer to the *Alpha Systems Firmware Update Release Notes Overview* for instructions on how to mount the firmware CD-ROM and determine processor-specific firmware update instructions.

To mount the firmware CD-ROM on a running system, the kernel must first be configured for the ISO 9660 Compact Disc File System (CDFS). The CDFS option must be present in the kernel configuration file to configure CDFS in the kernel. Refer to *System Administration* and the `doconfig(8)` reference page for more information.

Note

The EB64+ single-board computer uses a socketed firmware ROM chip. The EB66+, AlphaPC64, AlphaPC164, and EB164 single-board computers use an EPROM that can be updated with new firmware. Refer to your hardware documentation for details on how to update the console firmware on these systems.

1.4.7 Run Hardware Configuration Utilities

As described in the following sections, depending upon the type of hardware you have, you may have to run hardware configuration update utilities before the installation.

Hardware configuration diskettes are usually shipped with a system when you first receive it. If you do not have the appropriate diskette and did not receive one in the Software Distribution Kit, contact your local sales office or the vendor from which you obtained the hardware.

1.4.7.1 Minimum EISA Configuration Utility (ECU) Firmware Revision Level

Before installing the operating system on a system with an Extended Integrated System Architecture (EISA) bus, you must run the EISA

Configuration Utility (ECU). Follow the instructions in your hardware owner's guide.

For this version of the operating system software, the supported ECU firmware revision is 1.9 or higher. If your system has an EISA bus you will receive a floppy disk that contains the ECU. This floppy disk may be included in the operating system Software Distribution Kit.

1.4.7.2 Minimum RAID Configuration Utility (RCU) Revision Level

Before installing the operating system on a system employing RAID technology, you must run the RAID Configuration Utility (RCU). Follow the instructions provided in your hardware owner's guide.

For this version of the operating system software, the supported RCU revision level is 3.11 or higher. The RCU is included on the *Alpha Systems Firmware CD-ROM*.

1.4.7.3 Updating the Advanced RISC Computing (ARC) Console

Advanced RISC Computing (ARC) is an alternate console interface that was designed to support the Windows NT[®] operating system. Some system configuration utilities may require you to switch to the ARC console. Refer to your hardware owner's guide for more information. To run the operating system, you may need to update the console firmware. The ARC firmware update is included on the *Alpha Systems Firmware CD-ROM*.

1.4.7.4 Updating the System Reference Manual (SRM) Console

To run the operating system, you may need to update the SRM console firmware. The SRM firmware update is included on the *Alpha Systems Firmware CD-ROM*. Refer to your hardware owner's guide for more information.

1.5 Installation Types: Update, Full, and Cloned

You can perform an update installation, a full installation which has default or custom procedures, or a cloned installation procedure to install the operating system.

Note

If you plan to run this system as a dataless client of a DMS server, refer to the *Sharing Software on a Local Area Network* guide for more information.

An update installation updates your operating system from Version 4.0D or 4.0E to Version 4.0F. If your operating system predates either of these versions, you can perform successive update installations to reach the current version of the operating system. Refer to Table 2–3 for instructions on how to perform successive update installations.

A full installation affects many of the system files from the previous version of the operating system. File systems and swap areas created during a full installation will overwrite existing data on disks and partitions where they are installed. The full installation searches for and invokes user-supplied files to enable customizations on the system to be installed. The files can be on diskette, a RIS server, the `/var/tmp` directory on the system to be installed, or on CD-ROM.

A cloned installation refers to the process of configuring file systems and installing software on your system exactly as another similar-type system is configured. The cloned installation searches for and invokes user-supplied files to enable customizations on the system to be installed. The files can be on diskette, a RIS server, the `/var/tmp` directory on the system to be installed, or on CD-ROM.

The following sections describe these types of installations.

NOTE

See Appendix C for more information on installation cloning and user-supplied scripts.

1.5.1 Description of an Update Installation

An update installation updates the base operating system from Version 4.0D or 4.0E to Version 4.0F. The update installation preserves user files, data files, print and network configurations, user accounts, and any other system setup and customization you may have done. Preserving this data is an advantage over the full installation because a full installation creates new file systems and swap areas that overwrite any existing data on the disk partitions where the file systems and swap areas are to be installed.

You should not perform an update installation if you want to change file system type or change the location of file systems. An update installation does not permit changes to file systems or disk layout.

An update installation does not update optional layered products, but you can still perform an update installation if you have layered products installed. Some layered products operate properly with this version of the operating system and others must be reinstalled with a compatible version.

Some layered products, such as DECnet/OSI for this operating system, must be deleted before the update begins and then reinstalled after the update completes. Section 2.5 provides a complete list of the layered products that must be deleted before the update installation.

Completion time varies depending on your processor type, the number of software subsets to be updated, whether you are using CD-ROM or RIS to perform the update, and the speed of your CD-ROM drive if you are using CD-ROM. You need to respond to prompts only during the initial phase of the update. After that, the update installation runs unattended.

How do you start an update installation?

Follow the instructions in Chapter 2.

1.5.2 Description of a Default Installation

A default installation is a full installation that installs a default, mandatory set of operating system software subsets on a predetermined file system layout on a single disk. The only decision you have to make is what single disk will contain the `root` and `/usr` file systems and swap area.

The file system type for all file systems is the UNIX File System (UFS). One swapping area is configured; other swap areas can be added after the installation. Optional software subsets can be installed later by using the `setld` command. By performing a default installation, you can have your operating system running with a minimum amount of work because a default installation uses preset defaults for file system layout, file system type, and kernel build options. Following is the file system layout for a default installation:

- The `root` file system is on the `a` partition.
- The `/usr` file system is on the `g` partition.
- The `var` area is a directory in the `/usr` file system.
- The swapping area (`swap1`) is on the `b` partition.

How do you start a default installation?

1. Perform the prerequisite tasks described in Section 1.4
 2. Shut down your system to console mode (>>>) and boot the system off the CD-ROM or RIS distribution media as shown in Chapter 4.
-

1.5.3 Description of a Custom Installation

A custom installation is a full installation that lets you customize the file system layout and lets you select optional software to install. You can use one or more disks, and you have the option to configure a second swap area. You can choose the UNIX File System (UFS) or the Advanced File System (AdvFS) as the file system type for the `root`, `/usr`, and `/var` file systems. You may also choose additional kernel options to tailor your kernel for specific use.

In addition to installing the mandatory set of operating system software subsets, the custom installation lets you select optional software subsets to customize your system. Dependencies between optional software subsets are checked and resolved.

The amount of free space remaining in the `root`, `/usr`, and `/var` file systems is displayed as you select each optional software subset to install.

The graphical user interface provides access to the Disk Configuration Utility. This utility lets you repartition disks before or after you select optional software if the partition you chose is too small for a particular file system.

How do you start a custom installation?

1. Perform the prerequisite tasks shown in Section 1.4
 2. Read the disk planning information in Chapter 3 to decide which disks and partitions to use for file systems and then decide whether or not you should use the default disk partitions or customize them.
 3. Shut down your system to console mode (>>>) and boot the system off the CD-ROM or RIS distribution media as described in Chapter 4 .
-

1.5.4 Description of a Cloned Installation

A cloned installation lets you duplicate the file system layout, file system type, and software subset selections from a system that has already been installed with this version of the operating system.

When a system is installed with this version of the operating system, a configuration description file (CDF) is generated that contains installation-specific configuration information based on the results of the questions answered during the installation. This file is located on the installed system in the `/var/adm/smlogs` directory under the file name `install.cdf`. The CDF contains all the configuration information required to perform an initial system installation on a client system.

Once a suitable CDF has been located and optionally modified, the administrator has minimal involvement in the installation cloning process on the client systems. A cloned installation procedure uses the same disks and partitions to create a file system layout and installs the same set of software subsets as defined in the CDF. If your system is set up to perform a cloned installation, you do not have to answer any installation questions related to disk and software selections because the answers are already stored in the CDF.

1.6 UNIX Shell Option

Both the text-based and graphical installation interfaces provide a way for you to access a UNIX shell. The primary purpose of the UNIX shell option is to provide a way to perform disk and file system maintenance before the installation and to perform disaster recovery tasks.

When you start a text-based, menu-driven installation, the UNIX shell is presented as an option from the first menu. If you are using the graphical interface, you access the UNIX shell from a button labeled `UNIX Shell`. Regardless of the interface, this option puts your system into a Bourne shell in single-user mode with superuser privileges. To restart the installation procedure for the UNIX shell, enter `restart`.

The distribution media (CD-ROM or RIS) contains file systems that are laid out just as the software would be installed on the system and contains directly accessible `root`, `/usr`, and `/var` areas. This format makes almost every command and utility available in the shell even if your operating system is not yet fully functional. In effect, the mounted distribution media is a complete operating system file system.

The UNIX shell provides a way for you to recover from serious problems such as `root` file system corruption and enables you to perform general file system and disk maintenance tasks during the installation. Only experienced users should choose the UNIX shell option.

Refer to Chapter 9 for more information about the command shell.

1.7 Summary of the Installation Procedure

Table 1–5 summarizes the procedure for the default and custom installations regardless of the interface (graphical or text-based). Review these steps to prepare yourself for the information you must enter during the actual installation procedure.

If you decided to perform an update installation, Chapter 2 contains all the information you need.

If the RIS administrator has set up your system for a cloned installation, make sure you perform the preinstallation tasks described in Section 1.4 and then boot your system from the RIS server as described in Chapter 4. Refer to Section 5.1.3 for the sequence of events during a cloned installation.

Table 1–5: Summary of the Full Installation Procedure

Installation Task	Applies to Default or Custom Installation?	Information Located In:
Complete preinstallation tasks.	Default/Custom	Section 1.4
Plan disk space and file system layout.	Custom	Chapter 3
Optionally, create user-supplied files.	Default/Custom	Appendix C
Invoke the full installation procedure by booting the system from the network or CD-ROM.	Default/Custom	Chapter 4
Select the type of installation to perform.	Default/Custom	Section 5.3
Enter a host name, location and time zone, and date and time for CD-ROM installations.	Default/Custom	Section 5.4 through Section 5.7
Select a disk for the <code>root</code> file system.	Default/Custom	Section 5.8
Select the file system type for the <code>root</code> file system.	Custom	Section 5.9
Select the disk and partitions for the <code>/usr</code> and <code>/var</code> file systems.	Custom	Section 5.10 and Section 5.11
Select the file system type for <code>/usr</code> and <code>/var</code> .	Custom	Section 5.9

Table 1–5: Summary of the Full Installation Procedure (cont.)

Installation Task	Applies to Default or Custom Installation?	Information Located In:
Select up to two swap areas.	Custom	Section 5.12
Install mandatory software subsets only.	Default	Section 5.13
Install mandatory and select optional software subsets.	Custom	Section 5.14
Enter commands to reboot the system.	Default/Custom	Section 5.18
The installation procedure configures the system and software.	Default/Custom	Section 5.19
The installation procedure builds the kernel for default installations.	Default	Section 5.20
After you select kernel options, the installation procedure builds the kernel.	Custom	Section 5.20.1
Log in for the first time as the user <code>root</code> .	Default/Custom	Section 5.21
Set up system for general use.	Default/Custom	Chapter 7

1.8 If Your System Has Factory Installed Software (FIS)

Your system may have been delivered to you with Factory Installed Software (FIS); that is, a version of the operating system is already installed. Included in the box with your system is the *Factory Installed Software Information Sheet* that describes the software products that are preinstalled for you and how the system is configured.

Connect the hardware as shown in the hardware documentation, and turn on power to the processor and monitor. After some initial system initialization messages are displayed, you are prompted to enter information such as the system's host name, `root` password, geographic location and time zone, and the current date and time. The *FIS Quick Reference Card* is also included in the box with your system and describes how to respond to the prompts for this information. After the kernel build process is complete, refer to Chapter 7 for information about setting up your system for general use.

If the FIS setup halts unexpectedly and you see the `root` system prompt (`#`), make a note of any error messages that appear on the screen. Then, press `Ctrl/d` to restart the configuration phase. Usually the installation

continues, but you will need to correct the error when setup is complete. Refer to the appropriate operating system document or hardware document to identify and correct the error.

If the error prevents the configuration from proceeding, it may be necessary to reinstall the operating system. To do this, boot your processor as shown in Chapter 4 and refer to Section 1.5 to decide whether you need to do a default or custom installation. You can also consult the RIS system administrator to determine if your system is a suitable candidate for a cloned installation. If you choose the custom installation, be aware that the system disk may already have a customized disk partition table. The customization is usually done at the factory to create disk partitions that are large enough to hold all the software originally installed on the disk.

During the text-based custom installation, you are asked whether you want to preserve the customized partitions or use the default partition table. This option is described in Section 5.8.5. If you choose not to preserve the customized partitions, you may not be able to reload all the software that was originally installed.

A FIS system is generally installed with all base operating system software subsets (those that are prefixed with OSF) and some associated products. If you do not need to reinstall all the original software subsets and want to install mandatory software subsets only, perform a default installation. If you want to install mandatory and optional software, perform a custom installation. Use the `setld` command if you want to install or remove software subsets after an installation.

The default and custom installation procedures are described in Chapter 5.

1.9 Installing Worldwide Language Support Software

This version of the operating system is internationalized. The Worldwide Language Support software subsets provide support for various native languages and countries. Installing the Worldwide Language Support software subsets enables software developers to develop internationalized software that can be used in different countries.

The Worldwide Language Support software subsets are located on the operating system *Associated Products Volume 1* CD-ROM.

- If you want to install the latest version of the Worldwide Language Support software subsets, your system must already be installed with this version of the base operating system. Then, follow the worldwide installation instructions in Chapter 11.

- If you want to perform an update installation of the latest version of the Worldwide Language Support subsets, follow the worldwide update installation instructions in Chapter 12.

Descriptions of the Worldwide Language Support software subsets are provided in Appendix F.

2

Performing an Update Installation

All the information you need to perform an update installation is included in this chapter. This chapter includes the following information:

- Quick start instructions for users experienced with update installation
- An overview of update installation
- A summary of the update installation procedure
- Preparing for an update installation
- Starting an update installation from a CD-ROM
- Starting an update installation from a RIS server
- A description of what happens during the update installation process
- Responding to the different phases of the update installation, including merging software subsets, configuring software subsets, and building the kernel
- Logging in after the update installation completes
- Performing administrative tasks after the update is complete by using the Update Administration utility
- Updating the `whatis` reference page database after the update installation

Note

If you want to update a system that has Worldwide Language Support (WLS) installed, use the update procedures shown in Chapter 12. The `winstallupdate` program deletes worldwide support subsets, invokes `installupdate` to update the base operating system software subsets, and then updates worldwide support subsets and merges the saved system files.

The goal of this chapter is to provide the information necessary for you to perform the user actions shown in Table 2-1.

Table 2–1: Summary of User Actions

After reading this chapter, you will ...

- Perform prerequisite tasks before starting the update.
 - Decide whether to use CD-ROM or the network as the distribution media.
 - Perform prerequisite tasks based on the media you choose.
 - Start the update installation from CD-ROM or RIS.
 - Respond to prompts during the early phase of the update.
 - Use the Update Administration Utility to perform postinstallation tasks.
 - Run the `catman -w` command to update the `whatis` reference page database.
-

2.1 Quick Start for Experienced Users

If you have performed an update installation before, you probably do not have to read the detailed information in this chapter. The *Update Installation Quick Reference Card* is intended for experienced users, and you may want to consider using it as a guide when performing the update installation.

Table 2–2 provides the steps to get you started quickly.

Table 2–2: Steps for Experienced Users

If you have experience performing update installations...	Follow Instructions In:
Perform prerequisite tasks.	Section 2.5
Start the update installation from CD-ROM.	Section 2.6
Start the update installation from RIS.	Section 2.7
Manually merge files if necessary.	Section 2.11
Perform file administration tasks using the Update Administration Utility.	Section 2.16

2.2 What Is an Update Installation?

An update installation updates your operating system from the previous version to the current version. You cannot update your system directly to the current version of the operating system from an earlier version; you must perform successive updates to reach the current version of the operating system.

Table 2–3 provides the steps necessary to perform successive updates.

Table 2–3: Successive Update Paths

If you are currently using...	Update the operating system to..
Version 3.2, 3.2A, or 3.2B	Version 3.2C by using the <code>installupdate</code> command
Version 3.2C, 3.2D-1, or 3.2D-2	Version 4.0 by using the <code>installupdate</code> command
Version 3.2E-1, 3.2E-2, or 3.2F	Version 3.2G by using <code>setld -l</code>
Version 3.2G	Version 4.0A by using the <code>installupdate</code> command
Version 4.0 or 4.0A	Version 4.0B by using the <code>installupdate</code> command
Version 4.0B or 4.0C	Version 4.0D or 4.0E by using the <code>installupdate</code> command
Version 4.0D or 4.0E	Version 4.0F by using the <code>installupdate</code> command

If you require additional versions of the operating system, contact your customer service representative.

An update installation preserves disk partitions, file systems, file customizations, your print and network configuration, user accounts, user files, and any other system setup you may have done on a system that is running the previous version of the operating system. Preserving this data is an advantage over a full installation, because a full installation creates new file systems and swap areas that overwrite any existing data on the disk partitions where the file systems and swap areas are to be installed.

You should not perform an update installation if you want to change file system type or change the location of file systems. An update installation does not permit changes to file systems or disk layout.

Base software subsets that are already installed on your system are updated to the current version. In addition, any mandatory base software subsets that were introduced in this version are installed automatically. Operating system base software subset names start with the prefix `OSF` and can be viewed by using the following command line:

```
# setld -i | grep ^OSF
```

You cannot install additional optional software subsets during an update installation. Additional optional software subsets can be installed by using the `setld` command when the update installation is complete. Refer to Chapter 10 for more information about using the `setld` command.

Layered products are not updated by the update installation process. To update layered products, it may be necessary to delete the existing version and reinstall the new version after the base update installation process completes. Refer to the installation instructions provided with the layered product.

2.2.1 Completion Time for an Update Installation

Update installations from RIS complete in 90 to 120 minutes. Update installations from CD-ROM complete in 90 to 150 minutes. Actual time depends on your processor type, the number of software subsets to be updated, the type of media used to perform the update (CD-ROM or RIS), the speed of your CD-ROM drive if you are using CD-ROM, and network traffic if you are using RIS.

2.2.2 How Existing Files Are Affected During an Update Installation

This section describes the files that are affected by the update installation.

The update installation does not delete any user files (that is, files that have been created by system users that were not shipped as part of the operating system). The files that the update installation affects are the following:

- Protected System Files (.new. .)

An inspection of your system will show a number of files labeled with .new. . at the beginning of the file name. These files are special to the update installation process. The .new. . prefix lets a file be delivered to the system without overwriting the existing, and possibly customized, version of the file. One example of a protected file is the /etc/hosts file that is shipped as /etc/.new. .hosts. The existing /etc/hosts file is considered the configured version of the file and typically contains customizations that are not present in the /etc/.new. .hosts file. Only the configured version of protected system files should be customized. The .new. . version of a file should never be customized.

Similar to the .new. . prefix, the .proto. . prefix also exists for all protected system files. Every .new. . file has a corresponding .proto. . file. The .proto. . files have special significance for Dataless Management Services (DMS) environments where a centralized server maintains the root, /usr, and /var file systems for client systems. DMS server System Administrators provide site-wide customizations in the .proto. . files before the configured versions are used by the server's dataless clients.

A benefit of performing an update installation is that customizations to protected system files are preserved. The mechanism for preserving customizations is the merge process. The update procedure detects

whether customizations exist by comparing the existing `.new..` file against the configured version. If customizations have been made, new functionality is merged into the configured file. In the event of a failure, the customized version of the file is saved with a `*.PreMRG` extension before the merge process.

It is important that you do not delete the `.new..` and `.proto..` versions of protected system files because they are crucial to the proper operation of the update procedure.

- **Unprotected System Files**

There are other customized system files that may be on your system that are not **merge protected** by the update installation. Each file is saved to a `.PreUPD` extension and is recorded in the log file `/var/adm/smlogs/upd_custom_files`. You must merge your customizations manually into the new files when the update is complete.

When your manual merges are complete, invoke the Update Administration utility by entering `/usr/sbin/updadmin` to perform administrative tasks on the saved file versions.

Any changes to system files, not just the files that you deliberately modified, are found. Some system files might be changed by a process such as installing a software application. Other system files might be changed as part of the normal system operation. For example, an empty log file becomes filled with data as the system runs.

- **Obsolete System Files**

Obsolete files are files that were shipped in previous versions of the operating system, but are no longer part of the current version. After an update installation you have an opportunity to save these obsolete files so that you can archive them or delete them from the operating system with the Update Administration Utility (`updadmin`).

2.3 Source of the Update Installation

There are two distribution methods from which to invoke an update installation:

- From the operating system CD-ROM distribution media
- Over a network connection to a Remote Installation Services (RIS) server that is serving the current version of the operating system

The update installation is performed from single-user mode. You must be superuser or the user `root` to bring a system down to single-user mode. How you bring the system down to single-user mode depends on the following:

- If your system is running in an environment with multiple users, issue the `shutdown` command with the following syntax:

```
shutdown time [message to users]
```

- If your system is at the UNIX Shell prompt (`#`) in single-user mode because you exited from the full installation procedure, halt the system to bring the system to the console mode (`>>>`), and then enter the `boot` command as follows:

```
# halt  
>>> boot -flag s system_disk
```

In the previous example, *system_disk* is the disk where your current root file system resides. The system disk is usually the value specified by the `bootdef_dev` console variable.

The procedure to start the update from the command line depends on whether you are using CD-ROM or RIS as the source of the update. Section 2.6 describes how to start the update from CD-ROM, and Section 2.7 describes how to start the update from RIS.

Caution

Do not use the `setld -l` command to update from Version 4.0D or 4.0E to the current version of the operating system. The only method to update your system other than performing a full installation is to use the `/sbin/installupdate` program that is described in this chapter.

2.4 Summary of the Update Installation Procedure

The following list summarizes the steps in an update installation:

1. Perform the prerequisite tasks that must be completed regardless of the distribution media you are using. These tasks include backing up your system, deleting layered products that will halt the update process, updating your system firmware, and checking disk space. These tasks are described in Section 2.5.
2. Decide whether you are updating from the CD-ROM or RIS distribution media and perform prerequisite tasks depending upon what distribution media you choose. Refer to Section 2.6.1 for CD-ROM prerequisite tasks. Refer to Section 2.7.1 for RIS prerequisite tasks.
3. Start the update installation.
4. Respond to prompts during the initial phase of the update.

5. Perform postinstallation tasks:
 - Check the installation logs to make sure all file merges were successful
 - Manually merge customizations where necessary
 - Use the Update Administration Utility to perform file administration tasks
 - Install optional software subsets if desired

2.5 Preparing for an Update Installation

Whether you are performing the update installation from CD-ROM or a RIS server, you must perform the following tasks before you begin:

1. If you are not using AdvFS on your system, proceed to the next step.
If you are using AdvFS on your system, perform the following procedure to protect your data on AdvFS file domains:
 - a. Log in as `root` or use the `su` command to gain super-user privileges.
 - b. Use the `shutdown` command to put your system into single-user mode. Refer to the `shutdown(8)` reference page.
 - c. Use the `umount -A` command to unmount all local file systems. Refer to the `mount(8)` reference page.
 - d. Run the `verify` utility on each local file system. If you find any problems, correct them before continuing. Refer to the `verify(8)` reference page.
 - e. Use the `mount` command to mount all of the verified local file systems. Refer to the `mount(8)` reference page.
 - f. Use the `quotacheck` command to fix the quotas on the mounted local file systems. If you have problems running the `quotacheck` command, you may have to edit your `/etc/fstab` file and try again.
2. If you previously performed an update installation on your system, you should have used the Update Administration Utility to remove unnecessary files before attempting the next update installation. When you invoke the Update Administration Utility to view files, the message `deleted from system` indicates that you had used the utility to delete files after the last update installation. If you have not removed any files, please do so now. The Update Administration Utility lets you remove `.PreMRG`, `.PreUPD`, and obsolete files that may

conflict with the newly loaded software subsets. Removing these files also frees up disk space. Refer to Section 2.16 for more information about using the Update Administration Utility.

3. Back up your current operating system.

You should back up your operating system before beginning an update installation. If there are any interruptions when the update process is loading software subsets, it is unlikely that the update will complete successfully. Should this happen, you must restore the original version of the operating system that was previously installed on your system before you can attempt another update. Refer to *System Administration* for information about backing up your current system.

4. Delete layered products that block the update installation before starting the process..

Some layered products must be deleted before the update installation can proceed. Section 2.8.3.1 shows an example of the messages you will see if these layered products are detected during the update process. The software subsets associated with the layered products in Table 2–4 halt the update installation and must be deleted before beginning the update:

Table 2–4: Update Install Blocking Products

Product Description	Subset Prefix
ADP Subsets	ADP
DECsafe Available Server Environment (ASE)	ASE
Atom Advanced Developers Kit	ATM
Distributed Computing Environment/Distributed File System (DCE/DFS)	DCE
DECnet OSI	DNA
Event Manager (EVM) Subsets	EVM
Worldwide Language Support ^a	IOS
Internet Protocol (IP) Version 6 Early Release Kit	IP6
Kubota Workstation Software	KWS
Multimedia Services ^b	MME
Open 3D Subsets	O3D

Table 2–4: Update Install Blocking Products (cont.)

Product Description	Subset Prefix
Pathworks Subsets	PWK
System V Environment (SVE) Subsets	SVE

^aIf you want to update a system that has Worldwide Language Support (WLS) installed, use the `winstallupdate` command. Refer to Chapter 12.

^bNot all of the Multimedia Services subsets include the *Multimedia* string in their description; you must use the subset prefix to locate all of these subsets.

Use the `setld` command to delete the software subsets associated with these layered products. Section 2.8.3.1 describes how to delete layered products.

5. Check disk space.

If your file systems have less space available than the amount shown in the Software Subsets Information appendix to the *Release Notes*, consider using the `setld` command to delete unnecessary software subsets before you begin the update. You should also remove all unnecessary kernel files and `core` files that are consuming space. Refer to Chapter 10 for more information about using the `setld` command.

Use the `df` command to check your current disk usage. Refer to the Software Subsets Information appendix to the *Release Notes* for information on the disk space requirements for the update installation.

6. Update system firmware.

To run this version of the operating system, your system might require a firmware update. Firmware updates are located on the *Alpha Systems Firmware* CD-ROM that is included with your operating system software distribution kit. Update your system's firmware before beginning the update installation. Section 1.4.6 provides the minimum firmware revision for each supported processor.

After you have completed all prerequisite tasks, proceed to Section 2.6 if you are using the operating system CD-ROM to perform the update. Proceed to Section 2.7 if you are using RIS to perform the update.

2.6 Running the Update Installation from CD-ROM

Read this section if you are performing an update installation from CD-ROM media.

2.6.1 Before You Start

If you are updating your system from CD-ROM, you need to know the system device name of the drive where you will load the CD-ROM.

If you do not know the system device name of your CD-ROM drive, log in as `root` or use the `su` command to gain `root` privileges, and enter the following command:

```
# file /dev/rrz*c | grep RRD
/dev/rrz4c: character special (8/4098) SCSI #0 RRD44 disk #32 (SCSI ID #4)
```

In this example, the CD-ROM device is `RRD44` on device `/dev/rz4c`. If you have more than one `RRD` device connected to your system, determine the device where you will mount the CD-ROM.

Note

You must have `root` privileges to get this information with the `file` command.

Standard device names begin with `rz` for the block special file and `rrz` for the raw (character) special file. The result of the `file` command displays the *raw* device name, but you must specify the block special file when mounting the CD-ROM device. In this example, the displayed device name is `/dev/rrz4c`, but you will use `/dev/rz4c`.

If any hardware product kit installed on your system will need to be updated to work with the new operating system version, you also need to know the console device name of the CD-ROM drive you will use to load the new version of the kit. To determine the console device name of your CD-ROM drive, shut down your system and enter the following command at the console prompt:

```
>>> show dev
```

Your output will be similar to the following:

```
dka0.0.0.1001.0      DKA0      RZ28D      0010
dka500.5.0.0.1001.0 DKA500    RRD46      0557
dva0.0.0.0.1        DVA0
ewa0.0.0.1000.0     EWA0      hw_ethernet_address
pka0.7.0.1001.0     PKA0      SCSI Bus ID 7 5.01
pkb0.7.0.1001.0     PKB0      SCSI Bus ID 7 5.01
```

CD-ROM drive types have an `RRD` prefix; in this example, the console device name of the `RRD46`-type CD-ROM drive is `DKA500`.

2.6.2 Starting the Update Installation from CD-ROM

Perform the following steps to start the update installation from CD-ROM:

Note

Before beginning the update installation, be aware that the process takes from 90 to 150 minutes to complete. Actual time depends on your processor type, the speed of your CD-ROM drive, and the number of software subsets to be updated.

1. Verify that your system is backed up so that you can recover the previous version if necessary. The *System Administration* guide documents backup procedures (using the `dump` command).
2. As superuser or `root`, boot to single-user mode or shut down your system.
 - The following example shows how to switch to superuser and then shut down the system to single-user mode:

```
# su -  
password:  
# shutdown +10 Please log out
```

In the previous example, `+10` shuts down the system in ten minutes and sends the message `Please log out` to all logged in users.

- If your system is at the console mode prompt (`>>>`), you can boot to single-user mode by entering the following command:

```
>>> boot -flag s system_disk
```

In the previous example, `system_disk` is the value specified by the `bootdef_dev` console variable.

Once your system is in single-user mode, the screen looks similar to the following:

```
INIT: SINGLE-USER MODE  
#
```

3. Follow this step only if you installed and are using the Logical Storage Manager (LSM); otherwise, proceed to Step 4.

Enter the following command to activate LSM before running `bcheckrc` (in Step 4):

```
# /sbin/lsmbootstrap
```

4. Mount the local file systems as follows:

```
# /sbin/bcheckrc
```

The `bcheckrc` command also runs `fsck` to check the file system. If `fsck` finds a problem with the `root (/)` partition, the system shuts down and reboots.

5. Load the CD-ROM into the drive. Refer to Appendix B if you need additional information.

6. Use one of the following methods to start the update installation from CD-ROM.

Note

The optional `-i` flag invokes an interactive kernel build where you can select kernel options from a menu and edit the configuration file to include any kernel customizations that you had in the previous kernel that your system may require.

- Enter the `/sbin/installupdate` command with the following syntax:

`/sbin/installupdate [-i] cdrom_device`

The `cdrom_device` parameter is the device special file name of the CD-ROM drive. For example, to invoke `/sbin/installupdate` with an interactive kernel build from CD-ROM device `rz4c`, enter the following command:

```
# /sbin/installupdate -i /dev/rz4c
```

- If you already have an instruction in your `/etc/fstab` file to mount the CD-ROM device, the distribution media is mounted automatically on the mount point that is specified in your existing `/etc/fstab` file. In that case, enter the `/sbin/installupdate` command with the following syntax:

`/sbin/installupdate [-i] mount_point`

The `mount_point` parameter specifies the mount point of the CD-ROM device in the `/etc/fstab` file. For example:

```
# /sbin/installupdate -i /cdrom
```

In the previous example, `/cdrom` is the mount point specified in the `/etc/fstab` file.

Caution

Pressing `Ctrl/C` during the update installation causes `installupdate` to exit. However, if you press `Ctrl/C` while software subsets are loading, serious operating system corruption can occur that may render the operating system unusable. In that case, you may have to restore the backed-up version of the operating system before you can attempt another update.

Proceed to Section 2.8 to continue the update installation.

2.7 Running the Update Installation from a RIS Server

Read this section if you are performing an update installation from a RIS server.

2.7.1 Before You Start

Complete these steps before you start the update installation from a RIS server:

1. Ask the RIS server administrator to ensure that your system is registered as a client of the RIS server and is able to access the RIS area that includes the current version of the operating system. Refer to *Sharing Software on a Local Area Network* for more information about RIS.
2. The Internet name and address of the server may need to be in your system's `/etc/hosts` file in order for you to execute the `showmount` command. You can invoke the `netconfig` application to add the name and address of the server or edit the `/etc/hosts` file to include an entry for the server, similar to the following:

```
16.141.113.221 system9.dec.com system9
```

The hosts entry in `/etc/svc.conf` must allow for local resolution of host (Internet) addresses, for example: `hosts=local,yp`. You can invoke the `svcsetup` command to modify hosts to local or edit the `/etc/svc.conf` file. Refer to *Network Administration* if you need more information about obtaining network status. Refer to *Sharing Software on a Local Area Network* if you need more information about RIS.

3. Ensure that your system can communicate with the RIS server by executing the `/sbin/ping` command to verify the network connection. Enter the command in the following format and replace `ris_server_name` with the name of your local RIS server:

```
# /sbin/ping -c2 ris_server_name
```

Successful output of the `/sbin/ping` command is similar to the following:

```
# ping -c2 system9
PING system9 (16.59.124.96): 56 data bytes
64 bytes from 16.59.124.96: icmp_seq=0 ttl=255 time=1 ms
64 bytes from 16.59.124.96: icmp_seq=1 ttl=255 time=0 ms

----system9 PING Statistics----
```

```
2 packets transmitted, 2 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 0/0/1 ms
```

In the previous example, `system9` is the name of the RIS server. Your system is not able to communicate with the RIS server if you obtain the following results from the `/sbin/ping` command:

- Only your system name and IP address are displayed if the name server recognizes your system name but the network connection is not set up.
 - The message `Unknown host` is displayed if your system does not recognize the RIS server.
4. Verify that your system is backed up so that you can recover the previous version of the operating system if necessary.

2.7.2 Starting the Update Installation from a RIS Server

Perform the following steps to start the update installation from a RIS server:

Note

Before beginning the update installation, be aware that the process takes from 90 to 150 minutes to complete. Actual time depends on your processor type, the speed of your CD-ROM drive, and the number of software subsets to be updated.

1. Log in as `root` or use the `su` command to gain superuser privileges.
2. Boot to single-user mode or shut down your system.
 - The following example shows how to shut down the system:

```
# shutdown +10 Please log out
```

In the previous example, `+10` shuts down the system in ten minutes and sends the message `Please log out` to all logged in users.

- If your system is at the console mode prompt (`>>>`), you can boot to single-user mode by entering the following command:

```
>>> boot -flag s system_disk
```

In the previous example, `system_disk` is an entry such as `DKA0`.

When your system is in single-user mode, the screen looks similar to the following:

```
INIT: SINGLE-USER MODE
#
```

3. Follow this step only if you installed and are using the Logical Storage Manager (LSM); otherwise proceed to the next step.

Enter the following command to activate LSM before running `bcheckrc` (in Step 3):

```
# /sbin/lsmbootstrap
```

4. Mount the local file systems as follows:

```
# /sbin/bcheckrc
```

The `bcheckrc` command also runs `fsck` to check the file system. If `fsck` finds a problem with the `root (/)` partition, the system shuts down and reboots to multiuser mode.

5. Enter the following command to delete the table of Internet addresses to ensure that the `routed` and `gated` daemons do not start up during the update installation:

```
# route flush
```

Successful completion of the `route flush` command looks similar to the following:

```
default      16.70.223.135  done
16.70.143    16.70.223.198  done
```

6. Enter the `/sbin/installupdate` command with the following syntax:

`/sbin/installupdate [-i] ris_server_name:`

The optional `-i` flag invokes an interactive kernel build where you can select kernel options from a menu and edit the configuration file to include any kernel customizations that you had in the previous kernel that your system may require.

For example, to run `/sbin/installupdate` from a RIS server named `system9` with an interactive kernel build, enter a command similar to the following:

```
# /sbin/installupdate -i system9:
```

The RIS server name must be followed by a colon (:).

Caution

Pressing `Ctrl/c` during the analysis phase of the update installation causes `installupdate` to exit. However, if you press `Ctrl/c` while software subsets are loading, serious operating system corruption can occur that may render the operating system unusable. In that case, you may have to restore the backed-up version of the operating system before you can attempt another update.

Proceed to Section 2.8 to continue the update installation.

2.8 What Happens During the Update Installation Process

This section describes the information and prompts that are displayed during the update installation process.

The number of software subsets installed on your system and the type of installation media used affects the time required for an update. You are required to enter information during the early phases of the update. You do not need to monitor the update under most circumstances. However, if an error occurs, messages notify you and offer options for proceeding.

The phases of the update installation include the following:

- Analyzing installed hardware product kits
- Verifying the system state
- Checking for layered products that may halt the update installation
- Checking the system status
- Checking for file type conflicts
- Checking file space requirements
- Detecting unprotected customized files
- Loading and merging software subsets
- Configuring and merging software subsets
- Building the kernel. This step may require interaction from you if you invoked `installupdate` with the `-i` option.

Note

If you are updating from an earlier version of the operating system and you are using the Dynamic Driver Recognition (DDR) database, it is converted to a new format that includes formerly unrecognized SCSI device types and IDE/ATAPI entries. However, the running kernel is still based on the older DDR database format and the following messages are reported to the system console:

```
DDR: Invalid Database Header  
DDR: Invalid Database Header
```

You can ignore these messages. At the end of the update installation, the updated `ddr.mod` binary is included in the new kernel that recognizes the converted DDR database.

The following sections describe the information displayed on your screen during each phase of the update.

2.8.1 Checking for Installed Hardware Product Kits

If the update installation process finds an installed hardware product kit, it is checked for compatibility with the new version of the operating system. One or more of the following conditions may apply:

- If an existing kit will continue to work with the new version of the operating system it will be retained. You see a prompt similar to the following:

```
The following hardware was installed using a supplemental hardware
kit and will continue to work under the new operating system without
any modifications.
```

```
KIT_NAME_1
KIT_NAME_2
```

```
:
```

```
Press <RETURN> to continue...
```

Listed kits will be retained.

- If an existing kit is integrated into the new version of the operating system it will be removed. You see a prompt similar to the following:

```
The following hardware support was integrated into the new release of
the Operating System product (Ver_num). As part of the update
installation the associated hardware subsets will be removed from the
system. These subsets will be replaced by the support delivered as
part of the new Operating System product.
```

```
KIT_NAME_1
KIT_NAME_2
```

```
:
```

```
Press <RETURN> to continue...
```

Listed kits will be removed.

- If an existing kit is not supported in the new version of the operating system, you are prompted to load an updated hardware product kit with the following procedure:

1. You see a prompt similar to the following:

```
The Update Installation has detected that the hardware support listed
below is loaded on your system and is not supported in the new
release of the Operating System (Ver_num). In order for the update to
complete successfully, you must provide the distribution media that
contains the Ver_num version of the hardware support listed below. The
update installation procedure will verify that the media you provide
contains the correct software.
```

KIT_NAME_1
KIT_NAME_2

:

Enter kit locations (e.g: /dev/rz3a or /mnt):

You must provide new versions of the listed kits.

If you press Return without entering a location for the listed kits, you see a prompt similar to the following:

If you choose to continue the update without providing the necessary hardware support media, the following hardware will not function after the update installation completes. Also, without the necessary hardware support the update installation may not complete successfully and may leave your system in an unusable state. Compaq recommends that you do not continue with the update installation without the appropriate hardware support.

KIT_NAME_1
KIT_NAME_2

:

Do you want to to continue? (y/n) [n]:

- Enter **y** to continue the update installation without updating the listed kits.

Caution

This option is not recommended. Your system may be unusable or related hardware may be inaccessible if you continue without updating the listed kits.

- Enter **n** to return to the beginning of this step.
2. Make sure that the hardware product kit CD-ROM is loaded into the CD-ROM drive.
 3. In response to the Enter kit locations prompt, enter the system device name or mount point of the CD-ROM drive where the hardware product kit is located and press Return.
 4. You see a message similar to the following:

The kit located at *location* contains support for hardware that is currently installed on your system and is not supported under the new version of the operating system (*Ver_num*). In order for your hardware to continue to function properly you will be asked to supply the following kit file names when the update installation reboots the system for the first time. Be sure to record these file names for future use within the update install process. Each kit file will only need to be entered once for all of the associated hardware support to be loaded.


```
KIT_NAME_1 (Kit File: path_to_kit_file)
KIT_NAME_2 (Kit File: path_to_kit_file)
```

```
:
```

Press <RETURN> to continue...

In this prompt, *location* is the kit file location that you specified in Step 1 and *path_to_kit_file* is the path to each listed kit file relative to *location*. Record the information in this message; you will need it later in the update installation.

After you record the kit information, press Return to continue.

5. If there are still kits to update for the new version of the operating system, the process returns you to Step 1. If all of the necessary hardware kits have been read, the update installation process continues as described in Section 2.8.2.

2.8.2 Verifying the System State

The first message displayed on your screen confirms the new version of the operating system, and the version that you are updating from. This message also reminds you that your system should be backed up so that you can recover the current version of the system if an interrupt should occur.

```
The DIGITAL UNIX Version 4.0F (Rev. nnn) Update Installation will
update the following DIGITAL UNIX products:
```

```
DIGITAL UNIX V4.0D
DIGITAL UNIX V4.0E
```

Compaq Computer Corporation recommends that you perform complete system software backups before proceeding.

At this point, the update procedure also checks for certain layered products that may be incompatible with update installations. If these products are found on your system, warning messages are displayed as described in Section 2.8.3. If the layered product messages are not displayed, and you are satisfied with the state of your system backup, you can proceed with the update. A prompt is displayed as follows:

```
Do you want to continue the update installation? (y/n) [n]:
```

Enter *y* to proceed with the installation or *n* if you want to exit and back up your system.

2.8.3 Checking for Layered Products

This section applies only if the update installation detects layered products that may not be compatible with this version of the operating system.

If no layered products are found, proceed to Section 2.8.4 to continue the update installation.

In this version of the operating system, `installupdate` checks if certain layered products are installed on your system. Layered products are products that are installed on top of the operating system. If detected, these layered products may be affected by the update as follows:

- Some layered products must be deleted before the update can proceed. Section 2.8.3.1 shows an example of the messages you will see.
- Some layered products operate correctly after an update. However, you will see a warning about these layered products to remind you to test the layered product after the update is complete. Section 2.8.3.2 shows an example of the messages you see.

2.8.3.1 Layered Products That Halt the Update Installation

If applications or layered products installed on your system prevent `installupdate` from continuing, a message similar to the following is displayed:

```
-----  
This system cannot be updated with the following layered products  
installed on it. Please remove these products from your system  
before attempting an update installation:
```

```
DECnet/OSI  
DEC Open3D  
DECsafe Available Server Environment  
Kubota Workstation Software  
Multimedia Services  
Distributed Computing Environment  
System V Environment  
Worldwide Language Support
```

```
-----  
Press <RETURN> to review message again.
```

If this message appears, the update installation cannot proceed and you must exit at the following prompt:

```
Enter 'stop' and press <Return> to stop:
```

When you enter a character and press `Return`, your system is returned to its original state, that is, the state your system was in before the update procedure.

Follow these steps to delete the layered product that is preventing the update installation from continuing:

1. Use the `setld -i` command to determine the correct software subset names to delete.

In the following example, assume that DECnet/OSI prevented your update installation from continuing. Refer to Table 2-4 to determine that the subset prefix associated with DECnet/OSI is DNA, and use the following command to determine the software subset names associated with DECnet/OSI:

```
# setld -i | grep DNA | grep installed
DNABASE440      installed      DECnet/OSI Base Components
                  (DECnet/OSI Standard Run-time
                  Environment)
DNADLI440       installed      DECnet/OSI Datalink Components
                  (DECnet/OSI Standard Run-time
                  Environment)
DNAMOP440       installed      DECnet/OSI MOP Utilities
                  (Optional DECnet/OSI
                  Components)
DNANETMAN440    installed      DECnet/OSI Network Management
                  (DECnet/OSI Standard Run-time
                  Environment)
```

The output shows that DNABASE440, DNADLI440, DNAMOP440, and DNANETMAN440 are the installed DECnet/OSI software subsets that must be deleted.

2. Use the `setld -d` command to delete the software subsets:

```
# setld -d DNABASE440 DNADLI440 DNAMOP440 DNANETMAN440
```

3. After software subset deletion is complete, restart the update installation:

- Follow the procedure in Section 2.6.2 to start the update installation from a CD-ROM device.
- Follow the procedure in Section 2.7.2 to start the update installation from a RIS server.

When the update installation is complete, use the `setld` command to reinstall the version of the layered product that is compatible with this version of the operating system.

2.8.3.2 Layered Products That Do Not Halt the Update Installation

If any layered products currently installed on your system let `installupdate` continue but may require reinstallation, a message similar to the following is displayed:

```
-----
The following layered products may require re-installation after
the update installation has completed:
```

```
Product A
:
:
```

Product Z

Press <RETURN> to review message again.

You have the option to exit from the installation procedure at this point and the following prompt is displayed:

Do you want to continue the update installation? (y/n) [n]:

Enter **y** to proceed with the update installation or **n** if you want to exit the update installation and remove the layered products before restarting the update.

If you decide to proceed without removing these layered products, test the layered product when the update is finished. You should reinstall any layered products that are critical to the use of the updated operating system. Proceed to Section 2.8.4 to continue the update installation.

2.8.4 Checking the System Status

The next step in the update involves checking the system status and collecting data that is used in the update. This step takes up to 10 minutes, and you are not required to enter any data.

A `Working...` message displays approximately once every two minutes while system status is checked. These messages are similar to the following:

```
*****  Checking current state of system

Depending on the system configuration, this may take
up to 10 minutes...
  Working...Fri Dec 17 12:10:27 EST 1999
  Working...Fri Dec 17 12:11:52 EST 1999
  Working...Fri Dec 17 12:13:59 EST 1999
```

During this phase of the update, the update procedure does the following:

- Makes a list of installed software subsets. This list is used for selecting and loading operating system software subsets.
- Runs `fitset` to ensure that there is adequate disk space for the updated software subsets.
- Checks for file type conflicts. File type conflicts are described in Section 2.8.5.
- Makes a list of files that are obsolete in this version of the operating system.
- Makes a list of unprotected system files that have been customized.

If no problems are detected during the checking phase, you do not need to enter any more information beyond this point. If no conflicts are displayed, proceed to Section 2.8.8 to continue the update installation process.

2.8.5 Checking for File Type Conflicts

This section applies only if file type conflicts are found by the update installation procedure.

System file types can be files, directories, symbolic links, block devices, or pipes. The update installation procedure expects to find system file types currently installed as they were shipped with the base operating system. The status of each file type is verified during the system status check. For example, if a file is shipped as type symbolic link in an earlier version of the operating system and you later customize it to a type directory, when the same file ships as type symbolic link in this version of the operating system, the update installation detects the difference and exits.

When file system types are modified as part of a system customization, the update installation cannot proceed. This is intended to preserve the integrity of the software product about to be installed.

Messages display when file type conflicts are found. In the following sample message, `/usr/tmp` was shipped as a symbolic link and was changed to a directory:

```
The following directories on this system conflict with assigned file
types originally shipped in the DIGITAL UNIX operating system. This
can be caused, for example, if a symbolic link is replaced with a
real directory.
```

```
These conflicts must be resolved before an update installation can be
performed on this system. Additional file status information can be
found in subset inventory files located in the /usr/.smdb. directory.
```

```
For later review, this message is also logged in
```

```
    /var/adm/smlogs/update.log
```

```
The update procedure will exit and return the system to its original state
```

```
    ./usr/tmp should be Symbolic Link to ../var/tmp
```

You can review the list of file conflicts or exit as follows:

```
Press <RETURN> to review message again.
Enter any character and press <RETURN> to exit:
```

When you exit from the update procedure, the following message is displayed:

```
Returning system to Pre-Update state...done.
Exiting Update Installation.
```

You must resolve any conflicts shown in the message before you can restart the update installation. If you do not resolve the conflicts, you cannot perform an update installation.

2.8.6 Checking File Space Requirements

The update installation procedure performs file system size checks to make sure that the list of new software subsets fits on your system. In the preparation stage before the update, you should have removed all unwanted `core` files, crash dumps, and extra kernels that may be consuming space.

This section describes what happens when your system has sufficient disk space and what happens when your system has insufficient disk space. It also provides guidelines on how to recover additional free disk space.

2.8.6.1 System Has Sufficient Disk Space

If the update installation process determines that there is adequate space for all new software subsets, no user interaction is required, and the process continues by loading the software subsets as shown in Section 2.8.8.

2.8.6.2 System Has Insufficient Disk Space

If the update installation determines that there is inadequate space for the loading of new software subsets, it attempts to recover space from saved unprotected customized files (such as files with the `.PreUPD` extension). One of the following three instances may occur:

- If there are no unprotected customized files on the file system, then the update installation process displays a message similar to the following:

```
-----  
file system / needs 985 Kbytes more to install the software specified.  
-----
```

```
The DIGITAL UNIX Ver_num (Rev. nnn) Update Installation has determined  
that there is not enough disk space to continue the installation.  
You will need to remove files and/or subsets from the file systems  
mentioned above and then attempt the update again.
```

```
Returning system to Pre-Update state...done.
```

```
Exiting Update Installation...
```

The system exits from the update installation process.

After the system exits from the update installation procedure, you will need to remove files and subsets from the file systems that require more space *before* attempting to run the update installation procedure again. Refer to Section 2.8.6.4 for information on how to obtain additional space.

- If the amount of space it can recover from removing saved copies of unprotected customized files is *greater than* the space it needs to load new software subsets, a message similar to the following is displayed:

file system /usr needs 2631 Kbytes more to install the software specified.

file system / needs 985 Kbytes more to install the software specified.

The DIGITAL UNIX Ver_num (Rev. nnn) Update Installation has determined that there is not enough disk space to continue the installation. The update procedure has used some disk space to save unprotected customized system files on your system to a '.PreUPD' suffix. If these files are removed, the installation can proceed.

The unprotected customized system files are typically DIGITAL UNIX system files that have been customized by the user or by layered products. These files will be overwritten once the update procedure begins to install new subsets and are therefore saved to a '.PreUPD' suffix to avoid any loss of data.

If you wish to backup the unprotected customized system files, you can do so by choosing 'u' from the menu below, which will put you into the Update Administration Utility.

If you choose to continue the update installation, by choosing 'c' from the menu below, the '.PreUPD' files will be removed from the system.

The current disk usage per file system for .PreUPD files is:

File System	.PreUPD usage (Kbytes)	Space Needed (Kbytes)
/usr	7200	2631
/	1055	985

DIGITAL UNIX Update Installation Main Menu

- (c) Continue the update installation
- (q) Quit the update installation
- (u) Update Administration Utility
- (v) View error message again

Enter your choice:

Enter one of the following:

- Type **c** to continue the update installation.

The update installation process removes the unprotected customized files for you automatically and continues with the update installation process.

- Type **q** to exit from the update installation procedure.

- Type **u** to invoke the Update Administration Utility.

The Update Administration Utility lets you save the unprotected customized files to another file system and delete the files after they have been saved. After you recover the required disk space, return to the Update Installation Main Menu and continue the update installation procedure.

- Type `v` to display the error message again.
- If the amount of space it can recover from removing saved copies of unprotected customized files is *less than* the space it needs to load new software subsets, a message similar to the following is displayed:

```
-----
file system /usr needs 2631 Kbytes more to install the software specified.

file system / needs 985 Kbytes more to install the software specified.

-----
```

The DIGITAL UNIX Ver_num (Rev. nnn) Update Installation has determined that there is not enough disk space to continue the installation. The update procedure has used some disk space to save unprotected customized system files on your system to a '.PreUPD' suffix.

The unprotected customized system files are typically DIGITAL UNIX system files that have been customized by the user or by layered products. These files will be overwritten once the update procedure begins to install new subsets and are therefore saved to a '.PreUPD' suffix to avoid any loss of data.

If you wish to backup the unprotected customized system files, you can do so by choosing 'u' from the menu below, which will put you into the Update Administration Utility. This utility will allow you to save off and/or remove these .PreUPD files from the system.

Once you remove the .PreUPD files you will still need to free up some additional disk space, since the current amount of disk space you need is greater than the total disk space used by the .PreUPD files, as indicated by the chart below.

The current disk usage per file system for .PreUPD files is:

File System	.PreUPD usage (Kbytes)	Space Needed (Kbytes)
/usr	1500	2631
/	350	985

DIGITAL UNIX Update Installation Main Menu

- ```

(q) Quit the update installation
(u) Update Administration Utility
(v) View error message again
```

Enter your choice:

**Enter one of the following:**

- Type `q` to exit from the update installation procedure.

After the system exits from the update installation procedure, you will need to remove files and/or subsets from the file systems that require more space *before* attempting to run the update installation procedure again. Refer to Section 2.8.6.4 for information on how to obtain additional space.

- Type `u` to invoke the Update Administration Utility.



The Update Administration Utility lets you save the unprotected customized files to another file system or delete the files manually. However, you still will need to exit from the update installation procedure after you move or delete the unprotected customized files. After the system exits from the update installation procedure, recover more disk space and run the update installation procedure again. Refer to Section 2.8.6.4 for information on how to obtain additional space.

- Type `v` to display the error message again.

### 2.8.6.3 Deleting Individual System Files Does Not Free Space for the Update

Deleting individual files that are part of installed base or layered product subsets will not produce additional free space because the update installation takes into account that these old files will be replaced by new versions. The disk space calculation determines how much additional space is needed to replace an old version of a file with its new version.

If the old version of a file is removed without removing the entire subset in which it resides, the update installation Administration Utility lets you save the unprotected customized files to another file system or delete the files manually. However, you still will put the new version on the system. In this situation, the full size of the new file will be allocated instead of the difference between the size of the original and new versions.

For example, if `/genvmunix` was 7MB and a new version of `/genvmunix` was 8MB, update would need to reserve 1MB of free space for the new version. If `/genvmunix` was deleted before the update, the disk space calculation would then reserve the full 8MB for the new file. So, although, 7MB was freed before the update, 7MB more would be reserved during the update, which would result in no difference in the amount of additional space needed to continue the update.

### 2.8.6.4 How to Obtain Additional Space

To obtain additional space necessary to perform the update installation, follow these guidelines:

- Remove any noncritical optional subsets using the `setld -d` command. Deleting or moving system files without using `setld` will not give you the additional space needed.

Refer to Appendix F, which lists the software subset sizes, to help you decide which subsets to remove.

- Delete any noncritical user-added files that are not part of the base or layered product inventory. For example, delete core files and kernels that are no longer required.

- Delete obsolete system files, `.PreUPD` files, and `.PreMRG` files. Use the `updadmin` utility to back up and delete these files.
- For AdvFS file systems, it is possible to save approximately 3 MB in root by building a default mandatory only kernel rather than performing an interactive kernel build by not specifying the `-i` flag to the `installupdate` command. However, you must specify the `-i` flag if there are optional kernel selections that your system depends on that cannot be satisfied by a mandatory kernel. For descriptions of the kernel selection options, see Section 5.20.1.

## 2.8.7 Detecting Unprotected Customized File

This section applies only if unprotected customized files are detected during the update installation.

If `installupdate` detects any unprotected customized system files as described in Section 2.2.2, an attempt is made to save them to a `.PreUPD` extension, for example, `custom_file.PreUPD`, so that you can decide what to do with them after the update is complete.

If for any reason unprotected customized files cannot be saved, the Update Administration Utility is invoked automatically and lets you view these files and save them to backup media. The file name of each unprotected customized file is also logged in the `/var/adm/smlogs/upd_custom_files` file as a reminder of the files that require recustomization.

Files that are successfully saved to the `.PreUPD` extension are listed as such in the file `/var/adm/smlogs/upd_custom_files`.

The following message is displayed if customized files are found and successfully saved:

```
Unprotected customized system files have been found on
this system and have been saved by renaming them with
'PreUPD' file name extension. A listing of the files
and their associated subset, can be found in
/var/adm/smlogs/upd_custom_files.
```

After the update installation has completed, you can use the Update Administration Utility (`/usr/sbin/updadmin`) to perform system administration tasks on these files.

The following message from the Update Administration Utility is displayed if customized files are found but could not be saved:

```
**** Unprotected Customized System File Administration ****
```

There are unprotected customized versions of DIGITAL UNIX system files currently installed on your system that are in danger of being overwritten by new DIGITAL UNIX Version ver\_num(Rev. nnn) versions of the files.

These files are typically customized by users for projects they may be working on, or by layered product software implementation.

If you haven't already backed up your system, save these files to back up media at this time. You can restore these files back onto your system after the update installation has completed.

```
Unprotected Customized System File Admin Menu
```

```

```

- s) Save files
- d) Delete files
- v) View list of files
- x) Return to installation

Enter your choice:

**In the previous example, the Update Administration Utility is invoked automatically, and the menu shows the available options. The Update Administration Utility is described in Section 2.16. If you choose to continue with the update, the following message is displayed:**

```
A listing of unprotected customized system files
found by the Update Installation has been logged
in /var/adm/smlogs/upd_custom_files.
```

```
After the update installation has completed, you can use
the Update Administration Utility (/usr/sbin/updadmin)
to perform system administration tasks on these files.
```

## 2.8.8 Loading Software Subsets

Next, `installupdate` loads the operating system software subsets that match the software subsets already loaded on your system. Additionally, all new mandatory software subsets that were introduced in this version of the operating system are loaded automatically. Optional software subsets are loaded only if they were loaded previously. If you want to install additional optional software subsets provided in this version of the operating system, you must load these by using the `setld` command when `installupdate` is complete.

---

### Caution

---

If you press `Ctrl/c` while software subsets are loading, serious operating system corruption can render the operating system unusable. You may have to restore the backed-up version of the operating system before you can attempt another update.

---

**While software subsets are being loaded, a series of messages similar to the following is displayed:**

```
***** Updating system to DIGITAL UNIX Ver_num (Rev.nnn)

43 subset(s) will be installed.

Loading 1 of 43 subset(s)....

Base System
 Copying from system9 (inet)
 Working....Fri Dec 17 15:21:01 EST 1999
 Verifying

Loading 2 of 43 subset(s)....

Base System - Hardware Support
 Copying from system9 (inet)
 Working....Fri Dec 17 15:23:28 EST 1999
 Verifying

Loading 3 of 43 subset(s)....

Compiler Back End
 Copying from system9 (inet)
 Working....Fri Dec 17 15:24:06 EST 1999
 Verifying

:
:

Loading 33 of 43 subset(s)....

Graphical Base System Management Utilities
 Copying from system9 (inet)
 Verifying

Loading 34 of 43 subset(s)....

Graphical System Administration Utilities
 Copying from system9 (inet)
 Verifying

Loading 35 of 43 subset(s)....

Graphical Print Configuration Application
 Copying from system9 (inet)
 Verifying

:
:

Loading 42 of 43 subset(s)....

Motif 1.1
 Copying from system9 (inet)
 Verifying

Loading 43 of 43 subset(s)....

Ref Pages: Admin/User
 Copying from system9 (inet)
 Working....Fri Dec 17 15:49:57 EST 1999
 Verifying
```

```
43 of 43 subset(s) installed successfully.
```

Individual software subsets can fail to load if a network interrupt, hardware problem, or file verification error occurs during the load process:

- If an optional software subset that has no dependencies fails to load, you can install it later by using the `setld` command after the update installation is complete.
- If an optional software subset upon which other software subsets have dependencies fails to load, you can install the software subset plus the dependent software later by using the `setld` command after the update installation is complete.
- In the event a mandatory software subset fails to load, the update installation procedure exits. Your system may be rendered unusable and you may have to restore the backed up version of the operating system before attempting another update installation. If the OSFBASE440 mandatory software subset was installed successfully, you may be able to retry the update installation without first restoring the backed up version of the operating system.

## 2.8.9 Recovering from Subset Load Failures

If the update installation fails before software subsets are loaded, you can usually recover. If necessary, you can bring your system back to multiuser mode by issuing the following command:

```
init 3
```

Error messages describe the type of error that occurred. Fix the errors reported by the messages and restart the update installation process. Refer to Section 2.6 if you are running `installupdate` from a CD-ROM, or Section 2.7 if you are running `installupdate` from a RIS server.

If the update installation fails during the loading of mandatory software subsets, you must restore your operating system back to the previous version that was installed on your system and reattempt the update installation after the failure is corrected.

---

### Note

---

You may see the following message when installing subsets from a RIS server:

```
Broken Pipe
```

You can ignore this message.

---

## 2.9 Merging Software Subsets

When all software subsets are successfully loaded and verified, the protected customized system files are automatically merged with any customized files found on your system. Refer to Section 2.2.2 for a description of the protected files. A series of merge messages similar to the following may be displayed:

```
*** Merging new file ../new..DXsession into
 existing ../proto..DXsession

Merge completed successfully.

*** Merging new file ../etc/.new..passwd into
 existing ../etc/.proto..passwd

 adding wnn entry

Merge completed successfully.

*** Merging new file ../etc/.new..rc.config into
 existing ../etc/.proto..rc.config

 Adding DHCP hooks

Merge completed successfully.

:
:

*** Merging new file
 ./usr/var/adm/sendmail/.new..sendmail.cf into
 existing
 ./usr/var/adm/sendmail/.proto..sendmail.cf

 adding local.users to sendmail.cf
 adding Mlocal "F=u" flag in sendmail.cf
 correcting Mlocal "F=r" flag in sendmail.cf

Merge completed successfully.

*** Merging new file
 ./usr/share/lib/kernel_options/.new..kernel_options .db into
 existing
 ./usr/share/lib/kernel_options/.proto..kernel_options.db

 modifying Asynchronous Transfer Mode option
 deleting Local Area Transport option
 adding Point-to-Point (PPP)
 adding ACL Subsystem
 adding NTP_TIME

Merge completed successfully.
```

**When all merges are complete, the following message is displayed:**

```
Update Installation complete with loading of subsets.
Rebooting system with DIGITAL UNIX Ver_num (Rev. nnn)
generic kernel for configuration phase...
```

Exiting Update Installation...

A log file, `/var/adm/smlogs/update.log`, stores the results of software subset loading and merging for your reference.

If the update installation did not detect a hardware product kit in the analysis phase described in Section 2.8.1, the system reboots with a generic kernel and proceeds to configure software subsets as described in Section 2.11.

## 2.10 Bootlinking Supplemental Hardware Support

If the update installation detected a hardware product kit in the analysis phase described in Section 2.8.1, the system bootlinks the hardware support kernel modules.

1. The `boot` utility issues the following prompt:

Enter Device Name:

Enter the console device name for your CD-ROM drive, such as `DKA500`, and press Return.

2. The `boot` utility issues the following prompt:

Enter Kit Name:

Enter the name of the hardware product kit that you want to install and press Return. This is the information that you saved in Step 4 of Section 2.8.1.

3. The `boot` utility issues the following prompt:

Insert media for kit '`device:hw_kit_name`', press Return when ready:

In this prompt, `device` is the device name that you entered in Step 1, and `hw_kit_name` is the hardware product kit name that you entered in Step 2.

Load the CD-ROM into the drive and press Return. The `boot` utility reads the selected hardware product kit information into memory.

4. The `boot` utility reissues the `Enter Kit Name:` prompt.
  - If you are installing another hardware product kit from the same device, enter the kit name, press Return, and return to the previous step.
  - If you are not installing another hardware product kit or you are using another device, just press Return and continue to the next step.
5. The `boot` utility reissues the `Enter Device Name:` prompt.

- If you are installing another hardware product kit, enter the device name, press Return, and return to Step 2.
- If you are not installing another hardware product kit, just press Return and continue.

6. The `boot` utility and issues the following prompt:

Insert boot media, hit <return> when ready:

Since you are adding hardware support to a running system and the system disk is your boot media, just press Return. The generic kernel modules are read so that the bootlink process can build the kernel in memory in the next step.

7. The `boot` utility links the kernel objects, and issues the following prompt:

Insert media for kit '*dev\_name:hw\_kit\_name*', press Return when ready:

In this prompt, *dev\_name* is the device name that you entered in Step 6 and *hw\_kit\_name* is the hardware product kit name that you entered in Step 7.

Put the CD-ROM into the drive and press Return. The hardware product kit kernel modules are read and the bootlink process builds the kernel in memory.

8. The `boot` utility issues the following prompt:

Insert boot media, press Return when ready:

Since the boot media is still your installed system disk, just press Return.

## 2.11 Configuring Software Subsets

If your system boots to multiuser mode, operating system software subset configuration starts automatically. If your system reboots to single-user mode, initialize multiuser mode with the following command:

```
init 3
```

Configuration refers to the process of tailoring the software subsets, setting the host name, `root` password, date and time, and time zone, system tuning, and building a kernel that is required to have your hardware operate correctly with the new operating system. The software configuration display is similar to the following:

```
*** SYSTEM CONFIGURATION ***

Configuring "Base System " (OSFBASE440)

*** Merging new file ./new..DXsession into
```



```

 existing ./DXsession

Merge completed successfully.

*** Merging new file ./etc/.new..passwd into
 existing ./etc/passwd

adding wnn entry

Merge completed successfully.

*** Merging new file ./etc/.new..rc.config into
 existing ./etc/rc.config

Adding DHCP hooks

Merge completed successfully.

 :

Configuring "Base System - Hardware Support " (OSFHWBASE440)
Configuring "Compiler Back End " (OSFCMPLRS440)
Configuring "Kernel Header and Common Files " (OSFBINCOM440)

 *** Merging new file
./usr/share/lib/kernel_options/.new..kernel_options.db into*
 existing
./usr/share/lib/kernel_options/kernel_options.db

 modifying Asynchronous Transfer Mode option
 deleting Local Area Transport option
 adding Point-to-Point (PPP)
 adding ACL Subsystem
 adding NTP_TIME

Merge completed successfully.

 :

Configuring "Hardware Kernel Objects " (OSFHWBINOBJECT440)
Configuring "Motif 1.1 " (OSFMOTIF11440)
Configuring "Ref Pages: Admin/User " (OSFMANOS440)

```

**After the update installation completes, a record of the software subset configuration information is located in `/var/adm/smlogs/it.log`. Examine this log closely to check for merge failures because you will have to manually merge your customizations into these files. Manually merging means using the text editor of your choice to cut and paste customizations from the old version of a file into the new version. Refer to Section 2.15.3 for more information about manually merging files.**

## 2.12 Loading and Configuring Hardware Support

If your system bootlinked supplemental hardware support as described in Section 2.10, the update installation loads and configures the hardware support kernel modules.

1. If your hardware product kit CD-ROM is not in the drive or if additional kits are located on other media, you may see a prompt similar to the following:

```
The Update Installation has detected that the hardware support listed
below is loaded on your system and is not supported in the new
release of the Operating System (Ver_num). In order for the update to
complete successfully, you must provide the distribution media that
contains the Ver_num version of the hardware support listed below. The
update installation procedure will verify that the media you provide
contains the correct software.
```

```
KIT_NAME_1
KIT_NAME_2
```

```
:
```

```
Enter kit locations (e.g: /dev/rz3a or /mnt):
```

If you press Return without entering a location for the listed kits, you see a prompt similar to the following:

```
If you choose to continue the update without providing the necessary
hardware support media, the following hardware will not function
after the update installation completes. Also, without the necessary
hardware support the update installation may not complete successfully and
may leave your system in an unusable state. Compaq recommends that
you do not continue with the update installation without the appropriate
hardware support.
```

```
KIT_NAME_1
KIT_NAME_2
```

```
:
```

```
Do you want to to continue? (y/n) [n]:
```

- Enter **y** to continue the update installation without updating the listed kits.

---

### Caution

---

This option is not recommended. Your system may be unusable or related hardware may be inaccessible if you continue without updating the listed kits.

---

- Enter `n` to return to the beginning of this step.
2. Make sure that the hardware product kit CD-ROM is loaded into the CD-ROM drive.
  3. In response to the `Enter kit locations` prompt, enter the system device name or mount point of the CD-ROM drive where the hardware product kit is located and press Return.
  4. You see a series of load progress messages, then a series of configuration progress messages.
  5. Until all required hardware kits are loaded and configured, the process returns to Step 1.

## 2.13 Building the Kernel

The kernel is built after software subset configuration is complete.

- If you did not invoke the `/sbin/installupdate` with the `-i` (interactive) option, the system automatically builds a kernel with default (mandatory) options for the installed software subsets and then reboots. In this case, proceed to Section 2.14.
- If you invoked `/sbin/installupdate` with the `-i` (interactive) option or if a hardware product kit required that a new kernel be bootlinked, a Kernel Option Selection menu is displayed to select kernel options to build into the kernel. After selecting kernel options, you are asked if you want to edit the configuration file. The configuration file is a text file that defines the components built into the kernel.

---

### Note

---

Under most circumstances, you do not have to edit the kernel configuration file.

---

Refer to Section 5.20.1 for information about selecting kernel options, and Section 5.20.2 for more information about editing the kernel configuration file.

During the kernel build, the system configuration file `/sys/conf/SYSNAME` is automatically saved to `/sys/conf/SYSNAME.bck`, and a message similar to the following is displayed:

```
Saving /sys/conf/LANSING as /sys/conf/LANSING.bck
```

In the previous example, `lansing` is the system's host name. If you customized this file, one of the postinstallation tasks is to edit the new version, include your customizations, and rebuild a tailored kernel with the customized configuration file.

The kernel build proceeds with the following messages:

```
The system will now automatically build a kernel
and then reboot. This will take approximately 15
minutes, depending on the processor type.
```

```
*** PERFORMING KERNEL BUILD ***
Working...Fri Dec 17 13:25:43 EST 1999
Working...Fri Dec 17 13:27:44 EST 1999
```

After the kernel builds successfully, you are prompted to log in to your system.

### 2.13.1 Manually Adding Special Configuration Options to the Kernel

The update installation provides a basic kernel configuration file that includes only the required options and pseudodevices needed to be compatible with the current installed version of the operating system. However, the update installation does not propagate any special configuration options such as those required for layered products.

If your system also has devices supplied by other manufacturers, you must add these options or devices to the kernel configuration file. Refer to *System Administration* for kernel build instructions.

Unless you invoked the update installation with the `-i` option or a hardware product kit was detected, you will not have the option to edit the configuration file before the kernel build and you must use the `doconfig` command to rebuild a customized kernel with any special options. Refer to Section 5.20 and the `doconfig(8)` reference page for more information.

### 2.13.2 Recovering from Kernel Build Failures

The tailored kernel build can fail at the end of your update installation because of an incompatibility of a kernel layered product with this version of the operating system.

In this case, the system will reboot with the generic kernel. The update installation log file located in `/var/adm/smlogs/it.log` contains the reasons for the kernel build failure. After examining the log, use the `setld` command to deinstall the layered product that caused the failure and then use the `setld` command to reinstall the most recent version of the layered product. You should then be able to build a new customized kernel with support for the layered product by using the `doconfig` command.

## 2.14 Logging In After the Update Completes

After the update installation is complete, log in to the system as the user `root`. You should log in as `root` so you immediately can perform the

postinstallation tasks shown in Section 2.15, which can be done only by the user `root`.

What happens when you log in for the first time depends upon whether you have a graphics workstation or a text-based terminal without graphics capabilities:

- If you have a graphics—capable workstation, a Common Desktop Environment (CDE) login window is displayed. When you log in as the user `root` and enter the `root` password, the following displays:

```
Starting the
Common Desktop Environment
```

When the desktop appears, the following windows are displayed:

- A Help Viewer window, `Introducing the Desktop` describes basic desktop skills and how to activate online help for the desktop.
- A popup window labeled `Action Required` provides information about reading the new `.dtprofile` file that describes how to modify your `.login` or `.profile` files to interact correctly with the new Common Desktop Environment (CDE).
- The CDE front panel is displayed at the bottom of your screen. The CDE front panel replaces the `Session Manager`.

Refer to the *CDE Companion* guide for an introduction to CDE and for information about migrating from the DECwindows Motif environment to CDE.

- If you do not have a workstation with graphics capabilities, log in as the user `root` at login prompt and enter the `root` password at the password prompt.

---

**Note**

---

Device special file names may change as a result of the update installation. After successfully completing an update installation, it is possible that if you added tape devices to your system after the initial installation, the unit numbers and device special file names may be reordered as a result of the update process.

As an example, tape device `tz13` is installed with device special file names `*rmt0*`. Then, tape device `tz12` is installed and assigned device special file names `*rmt1*`. After an update installation, tape device `tz12` is assigned device special file names `*rmt0*`, and tape device `tz13` is assigned device special file names `*rmt1*`.

---

After you successfully log in, the update installation procedure is complete; your system is fully updated to this version of the operating system. Go to Section 2.15 for a description of the postinstallation tasks to perform. You can perform these postinstallation tasks only as the user `root`.

## 2.15 Postinstallation Tasks

This section describes tasks that must be completed after the update is complete.

### 2.15.1 Checking Installed Version String

To verify that you have installed all of the correct elements in this version of the operating system software kit, check the operating system revision level in the `/etc/motd` file. The correct version string is `Tru64 UNIX V4.0F`.

### 2.15.2 Reviewing Update Installation Log Files

Information about the update installation is stored in log files for you to review. Installation and configuration data is appended to any existing log files. Review the last entries in the following files to check the latest installation and configuration data:

- The update installation log is located in:  
`/var/adm/smlogs/update.log`
- Information about the system configuration is located in:  
`/var/adm/smlogs/it.log`
- Obsolete files are located in: `/var/adm/smlogs/upd_obsolete_files`
- Customized files are located in:  
`/var/adm/smlogs/upd_custom_files`
- Failed merges are located in:  
`/var/adm/smlogs/upd_mergefail_files`

If no obsolete, customized, or failed merge files are detected during the update installation, the relevant log files do not contain any data.

You should examine the log files when the update is complete to ensure that all files merged successfully.

### 2.15.3 Manually Merging Customizations

Some protected files may not be merged correctly during the update and all unprotected files are not merged automatically. Manual merging involves editing the new versions of system files with a text editor to apply your

customizations. The following information is saved so that you can merge your customizations into the new versions.

- Unprotected system files

When the update is complete, check for any saved files in:

`/var/adm/smlogs/upd_custom_files`. Edit the new version of each logged file to include your customizations.

- Configuration file

Edit the system configuration file `/sys/conf/system_name` if you customized this file in the previous version of the operating system. The saved version is located in `/sys/conf/system_name.bck`. You will then need to build a tailored kernel with the customized configuration file.

- Failed merges

If any files failed to merge during the update, an error message is displayed on your screen. Failed merge errors are located in:

`/var/adm/smlogs/upd_mergefail_files`. Check the log to identify any failed merges and manually edit any files that failed to merge by adding your customizations. The original version of the files is always preserved for your reference as: `filename.PreMRG`. Refer to Section 2.16 for information on how to access the original version of a file.

When all manual merges are complete, your system is ready to use. At this time you can install additional optional software subsets provided on the operating system distribution media. Refer to Chapter 10 for information about installing optional software subsets.

## 2.16 Using the Update Administration Utility After the Update Installation

When you are satisfied that all merges are correct and your system is working as expected, use the Update Administration Utility to perform management tasks (such as saving, viewing, or deleting files) on the unprotected customized, obsolete, and PreMRG files. Unprotected customized files are saved to files with `.PreUPD` extensions.

Apart from managing system resources effectively, using this utility provides two important safeguards:

- You can archive and delete customized files so that future update installations can reuse the file names. If you attempt to run an update without having first used this utility to administer PreUPD files from the previous update, you are prompted to overwrite the existing PreUPD files or to exit the utility.

- You can remove obsolete files that may cause problems when running the new version.

### 2.16.1 Invoking the Update Administration Utility

If your system has graphics capabilities, use one of the following methods to access the Update Administration Utility from the SysMan Configuration Checklist:

- To open the SysMan Configuration Checklist from the UNIX command line, as superuser or root, enter the following command:  

```
/usr/sbin/checklist
```
- To open the SysMan Configuration Checklist from the Common Desktop Environment (CDE) front panel:
  1. Click on the Application Manager icon on the CDE front panel.
  2. Double click on the System\_Admin application group icon.
  3. Double click on the SysMan Configuration Checklist application icon.

If your system does not have graphics capabilities, use one of the following methods to invoke the Update Administration Utility:

- To invoke the Update Administration Utility from the UNIX command line, as superuser or root, enter the following command:  

```
/usr/sbin/updadmin
```
- To access the Update Administration Utility from the Setup menu, as superuser or root, invoke the menu by entering the following command:  

```
/usr/sbin/setup
```

The options displayed on the Setup menu vary depending on the software installed on your system. Choose the Update Administration option from this menu. The Update Administration Utility can be invoked only after an update.

Regardless of the manner in which you invoked the utility, the Update Administration Utility Main menu is displayed as follows:

The Update Administration Utility is used to perform administration functions on a system that has been updated by /sbin/installupdate.

Please make a selection from the following menu.

```
Update Administration Utility Main Menu

c) Unprotected Customized File Administration
o) Obsolete System File Administration
p) PreMRG File Administration
```



x) Exit this utility

To exit from the utility and return to the operating system prompt at any time, choose the exit option as follows:

# Enter your choice: **x**

Choose the following options to perform file administration tasks (such as saving, viewing, or deleting files):

- **Unprotected Customized File Administration**

When you choose this option, the following information is displayed:

```
***** Unprotected Customized System File Administration *****
```

Unprotected customized system files are typically DIGITAL UNIX system files that have been customized by users for projects they may be working on, or by layered product software implementation.

Some of these customized files may no longer be compatible with the DIGITAL UNIX Ver\_num operating system.

- **Obsolete System File Administration**

When you choose this option, the following information is displayed:

```
*** Obsolete System File Administration ***
```

There are DIGITAL UNIX files currently installed on your system that are no longer shipped or supported in DIGITAL UNIX Ver\_num.

Some of these Obsolete files may no longer be compatible with the DIGITAL UNIX Ver\_num operating system. You may want to back up these files and then delete them from your system to regain disk space. For your reference, the Obsolete files are listed in /var/adm/smllogs/upd\_obsolete\_files.

- **PreMRG File Administration**

**Premerge (PreMRG) files are copies of protected system files as they existed before any merge was attempted during the update installation.**

When you choose this option, the following information is displayed:

```
***** PreMRG System File Administration *****
```

There are .PreMRG files left over on your system from an update installation. PreMRG files are copies of system files as they existed prior to updating your system. They are left on the system after an update installation for reference purposes only.

If any system file customization merges were not successful, you can reference the .PreMRG file to include those customizations in the post merged file now residing on the system.

In most cases, PreMRG files can be deleted from the system.

If you choose any of the three main menu options, a submenu is displayed. This submenu displays options to view, save, or delete the unprotected, obsolete, or PreMRG files.

The following examples show only Unprotected Customized File Administration. The administration process and the submenu options are exactly the same for Obsolete System File Administration and PreMRG File Administration.

To choose an option from any menu, enter the character displayed before each option and press the Return key. For example:

```
Enter your choice: c Return
```

## 2.16.2 File Administration Menu Options

If you choose any of the three Administration options from the main menu, the File Admin Menu is displayed as follows:

```
Unprotected Customized System File Admin Menu

s) Save files
d) Delete files
v) View list of files
x) Return to previous menu
```

The type of the submenu depends on the option you chose from the Main menu. Enter x to return to the Main menu. The other options in this submenu are described in the following sections.

## 2.16.3 Save Files Option

This option lets you decide where to save the files that are found during the update installation. This option is useful for managing disk space.

If you choose this option, another menu is displayed as follows:

```
Select a method of archiving your files:

d) Save files to directory on disk
i) Save files to tar image on disk
t) Save files to tape media device

Enter your choice from the menu above, or
press <RETURN> to go back to the previous menu:
```

- If you want to save the files to a tape device, enter t and press Return. You are prompted to enter the name of a backup device, as follows:

```
Enter the name of the tape backup device (for example: /dev/nrmt0h)
that you want to use to back up customized files, or press <RETURN>
to go back to the previous menu:
```

Enter the device name as follows:

```
....previous menu: /dev/nrmt0h
```

The save utility verifies the device and saves the files as follows:

```
Inspecting /dev/nrmt0h...
```

```
Saving customized files to /dev/nrmt0h...
done.
```

- **If you want to save files to a directory, enter d. The following message is displayed:**

```
Enter the directory that you want to use to back up obsolete
files, or press <RETURN> to go back to the previous
menu:
```

**If the pathname that you specify does not already exist, you are asked to confirm if the directory or file should be created (in this example the /obsolete was specified and does not exist):**

```
There is no /obsolete directory on this system.
```

```
Do you want to create one? (y/n) [y]: y
Saving obsolete files to /obsolete
```

```
Finished saving obsolete files.
```

**The files are now saved. You can return to the File Admin Menu to choose either another option or exit to the Update Administration Utility Main menu.**

## 2.16.4 Delete Files Option

This option lets you delete all the files (obsolete, PreMRG, or unprotected customized) that are found and created during the update installation. Use this option if you have either backed up the files to a storage device or if you no longer need them and you want to recover the disk space.

**If you choose this option, the following prompt is displayed:**

```
Please confirm your intent to delete customized system files from the
system. (y/n) [n]: y
```

**If you confirm the deletion, a message is displayed as follows:**

```
Removing customized files...
```

```
Finished deleting customized files.
```

**When the deletion is complete, the File Admin Menu is displayed again.**

## 2.16.5 View List of Files Option

This option is used to display a list of the customized files that are found during the update installation. It can be used to verify what files were found, before you decide whether you want to save or delete the files.

If you choose this option, the list of files is displayed screen by screen and you can press Return to display each screen. At the end of the list you can

display the complete list again or return to the File Admin Menu. A sample of the output follows:

```
./etc/zoneinfo/Australia/South.PreUPD
./sbin/named.PreUPD
./usr/sbin/screend.PreUPD

Enter 'r' to review files again, or press RETURN
to go back to the previous menu:
```

## 2.16.6 Messages and Archive Options

There are several messages and options that the Update Administration Utility displays only under certain conditions. These messages are explained as follows:

- If you choose an option to process certain files and the list of files has already been removed from the system, one or more of the following messages is displayed:

```
No customized file list exists.
No obsolete file list exists.
No PreMRG file list exists.
```

- If you attempt to save files to a directory that does not exist, you are prompted to confirm that you want this new directory to be created.

```
There is no <name> directory on this system.
Do you want to create one? (y/n) [y]:
```

- If the program cannot create the directory that you specified, the following message is displayed:

```
Cannot create <directory name>.
```

- If you choose an option relating to `.PreMRG` files, the following message warns you that the utility will search every file system that is UNIX File System (UFS) mounted:

```
Checking system for .PreMRG files. Depending on the number
of file systems mounted, this may take a few minutes...
```

- If you choose an option to save files to a tar image, the following message gives you a further option to compress your tar file and save storage space.

```
Compressing the tar image will result in less disk space used.
Do you want to compress the tar image? (y/n) [y]:
```

- If the save program was unable to compress the tar file, the following warning message is displayed:

```
Unable to compress <tar file>
```

- If you chose an option to delete files that are not backed up, you are given an option to select another menu item and save the files first.

Back up of <file type> files not detected.

If you have not backed up the <file type> files yet, please do so at this time by answering 'no' to the question below and selecting the 's' option from the previous menu.

Please confirm your intent to delete obsolete system files from the system. (y/n) [n]:

- **If you are attempting to save files that are saved, the following message is displayed:**

You have already saved the <file type> files.  
Do you want to save them again? (y/n) [n]:

- **If you specify a device for a save operation, and the save program cannot access that device, the following message is displayed:**

Cannot locate a special device named <device name>

- **If the device that you specified was available, but the save program was not able to write to that device, the following message is displayed:**

Cannot write to <device name>

- **If you specify an existing tar file name, you are given the option to append saved files to the existing file:**

A file named <file name> already exists on this system.  
If this is a tar archive file you can append additional files to it. Otherwise, answer 'n' to the question below.

Do you want to try appending to it? (y/n) [n]:

## 2.17 Updating the Reference Page Database

If the `whatis` database exists on your system, you should update the database by executing the `catman -w` command whenever you perform an update installation. The `apropos` and `whatis` commands access reference page entries in the `whatis` database.

An update installation does not delete entries from an existing `whatis` database. You must rebuild the database to synchronize it with reference page files that currently exist on the system. Rebuild the `whatis` database after you use the Update Administration Utility to remove reference pages that are flagged as obsolete after the update installation and after you are finished adding layered product reference pages.

For information about using the `catman -w` command to rebuild the `whatis` database, refer to the `catman(8)` reference page.

## 2.18 Postinstallation File Disposition

Several files are left over after the installation process completes. The following files are of particular interest:

- The installation procedure leaves the `init` file in the `/tmp` directory. This is an unnecessary file that you can delete.
- Many files with the prefixes `.new..` and `.proto..` are left on the system. The update installation process documented in Chapter 2 requires these `.new..` and `.proto..` files to retain customized system files.

---

### Caution

---

Do not remove these `.new..` and `.proto..` files!

---

- A list of the log files created during the installation is displayed on the screen (or in the console log if you have a workstation) after you log in for the first time. The display is similar to the following:

```
DIGITAL UNIX Ver_num (Rev. nnn); Fri Dec 17 15:54:51 EST 1999
DIGITAL UNIX Ver_num Worksystem Software (Rev. nnn)
```

```
The installation software has successfully installed your system.
```

```
There are log files that contain a record of your installation.
These are:
```

```
/var/adm/smlogs/install.cdf - configuration description file
/var/adm/smlogs/install.log - general log file
/var/adm/smlogs/install.FS.log - file system creation logs
/var/adm/smlogs/setld.log - log for the setld(8) utility
/var/adm/smlogs/fverify.log - verification log file
```

The previous message is also recorded in the `/etc/motd` file for your future reference. The `/etc/motd` file contains the **message of the day** that is displayed each time a user logs in. The installation log files are located in the `/var/adm/smlogs` directory and include the choices you made during the installation such as the disks and partitions you chose, the software subsets you installed, and so on.

# 3

---

## Planning Disk Space for a Custom Installation

This chapter applies only to custom installations.

The custom installation procedure lets you select the disks and disk partitions on which to install the required `root (/)`, `/usr`, and `/var` file systems and `swap` areas.

This chapter contains information to help you determine whether you can use the default partition table and default file system layout or if you should customize the partition table and file system layout.

Before beginning disk planning exercises, you should know what the file systems will be used for and understand the concepts associated with allocating a file system to a disk partition.

The goal of this chapter is to provide the information necessary for you to perform the user actions shown in Table 3–1.

**Table 3–1: Summary of User Actions**

---

**After reading this chapter, you will ...**

---

Decide whether you should use the default disk partitions and default file system layout.

Determine whether or not you need to customize the disk partition table and file system layout.

Decide which disks and partitions you want to select during the custom installation.

---

### 3.1 Commonly Used Terms

The following terms are used throughout this chapter:

- **custom partition table**

Any partition table that differs from the default partition table. Disks preinstalled with the operating system typically use a custom partition table as does any other disk whose partition has been modified.

Customizing a partition table lets you divide or partition the disk in a fashion best suited to your needs. See **partition table**.

- **default file system layout**

The default file system layout consists of separate `root (/)` and `/usr` file systems and a single swap area, `swap1`. Furthermore, they are all installed on the same disk in the `a`, `g`, and `b` partitions, respectively. See **file system layout**.

- **default partition table**

The default disk partition specification as obtained from the `/etc/disktab` file or, in the absence of an entry in that file, the disk driver itself. The default disk partition table varies with disk type because it depends upon the size of the disk itself. A default disk partition is designed to fit the default file system layout, therefore, consider using the default partition table when using the default file system layout. Otherwise, there is no particular reason to use this partition table. See **partition table**.

- **disk label**

A disk label contains information about the disk such as the disk type, physical parameters, and partition sizes. Without a disk label, a disk is not bootable.

- **file system**

A hierarchical structure consisting of directories and files. Each hierarchy starts with the `/ (root)` directory. There is a one-to-one correspondence between file systems and partitions. For example, the `a` partition of the disk that contains the `root` file system contains all the files and directories in the `root` file system.

- **file system layout**

The location of the basic file systems and swap areas: `/ (root)`, `/usr`, `/var`, `swap1`, and `swap2` on the disk.

- **partition**

Logical divisions (groups of sectors) of a disk that are labeled `a` through `h`. Each partition may differ in size and can overlap other partitions. The `c` partition usually represents the entire disk. Partitions are sometimes known as *slices*.

- **partition table**

A component of a disk label that specifies how a physical disk is divided or partitioned into what appears to be several virtual disks. This operating system supports up to eight partitions per disk. Each partition is identified by a letter from `a` through `h`.



- **system disk**

The disk containing the `root` file system is known as the system disk.

## 3.2 Determining Default Disk Partitions

There are two steps to determine default partitions for the disk where you plan to install the operating system:

1. Find out if the disk is supported for this release of the operating system. The current version of the *Software Product Description (SPD)* includes a table of supported storage devices.
2. Use one of the following methods to display the default partitions for that disk type:
  - You can use the `disklabel -p disk_dev` command to display the default partitions for `disk_dev`. Refer to the `disklabel(8)` reference page for additional information.
  - You can use the disk configuration utility to display default disk partitions:
    - a. Log in as `root` or use the `su` command to gain superuser privileges.
    - b. Invoke the disk configuration utility either with the `diskconfig` command or from the CDE Application Manager's Configuration category.
    - c. Select the disk you want to query and click on the **Configure...** button to display the Configure Partitions dialog box.
    - d. Click on the **Default** button next to the `Get Disk Partitions:` title to display the default partitions for the selected disk.
    - e. Click on the **Partition Table** button to view the partition table for the default disk partitions.

You can also access the Disk Configuration Utility from the Installation Setup dialog box.

Click on the **Help** button to access the Disk Configuration Utility online help. Refer to the `diskconfig(8)` reference page for additional information.

A recommended disk partition table is available for 1 Gb and larger disks (for example, RZ26 disk type) during a full installation. You can apply the recommended disk partition table or use your existing disk partition table when you choose to install the operating system onto a single disk. If your

operating system is installed across multiple disks, this option will not be offered to you.

For single disk installations, you should choose the recommended disk partition table over the default partition table.

This recommended partition table creates the partitions listed in Table 3–2. Note that these partition sizes are subject to change in future releases as the size of the operating system continues to grow.

**Table 3–2: Recommended Partitions for 1 Gb and Larger Disks**

| Partition | Description                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a         | The size of the a partition is 128 Mb, regardless of the size of the disk. For example, a 1 Gb disk and a 4 Gb disk would both have a 128 Mb a partition if you select the recommended disk partitions.                                                                                                                                                                                                 |
| b         | The size of the b partition is either its default value for a given disk or 128 Mb, whichever is larger. For example, an RZ28 has a default b partition size of 196 Mb. This default size will be maintained instead of reducing it to 128 Mb.                                                                                                                                                          |
| g         | The size of the g partition is 700 Mb, regardless of the size of the disk. For example, a 1 Gb disk and a 4 Gb disk would both have a 700 Mb g partition if you select the recommended disk partitions.<br>If you will be installing many layered products, this value may be too small. If sufficient disk space is available, you may want to consider making this value larger for future expansion. |
| h         | The size of the h partition is whatever space is left over, unless it is less than 100 Mb, in which case the space is added to the size of g. In the case of a 1 Gb disk, approximately 45 Mb would be left over, so it would be included in the size of g instead of h.                                                                                                                                |

Partitions d, e, and f are split evenly between the size of g added to h, and they overlap g and h.

If the disk has an existing partition table with a, b, and g partitions each greater than 90 percent of their recommended sizes, then the existing partition table is accepted as the recommended partition table.

If you use `installupdate` to update an existing system, you will not be offered the new partition sizes because the procedure updates the system on your existing partitions. You may want to adjust your disk partitions to meet or exceed the recommendations in Table 3–2 before you begin the update. If you have a small system disk, you may want to migrate to a 1 Gb or larger disk at this time.

### 3.3 Using the Default Disk Partitions and the Default File System Layout

Every supported disk has a preset default partition table. With the exception of the RZ55 disk type, the default partition table and default file system layout is designed so that the entire base operating system can fit on the disk when the `root (/)` and `/usr` file systems and `swap` space are installed on the same disk. The default file system layout is:

- The `root` file system is on the `a` partition.
- The `/usr` file system is on the `g` partition and `var` is a directory under `/usr`.
- The `swap` area is on the `b` partition.

The design of the default file system layout along with the default disk partition sizes allows the entire operating system to fit on a supported disk. Therefore, you do not have to perform any disk planning exercises if you are comfortable using the default disk partition sizes and default file system layout because all disk and partition selection decisions have already been made for you. However, if you plan to install the POLYCENTER Advanced File System (AdvFS), the Logical Storage Manager (LSM), or both, you should consider expanding the size of the `root` partition. If both AdvFS and LSM are installed using a default file system layout, the `root` partition will be almost full after an installation.

Also remember that the custom installation procedure calculates the amount of free space remaining in the `root`, `/usr`, and `/var` file systems as you select optional software subsets. This information helps you decide whether the disk partitions you chose are large enough to hold the software subsets you want to install. This file system status is useful during the installation procedure because you can go back and change your disk and partition selections if the partitions are running out of space.

During a text-based custom installation, if a customized disk partition table exists on the disk chosen for the `root` file system, you have the option to use either the default disk partitions or the existing customized partitions. If neither the default nor existing partitions are suitable, you can exit the installation process to invoke the UNIX shell and use the `disklabel` command to modify disk partitions.

### 3.4 When to Perform Disk Planning Exercises

You should perform disk planning exercises if you plan to:

- Use a non-standard file system layout, such as a separate `/var` file system or two `swap` areas
- Install more than the mandatory base software subsets
- Preserve existing data

If your plans include any of the previous, you should read the disk planning information in this chapter.

Throughout this chapter you are encouraged to complete worksheets to calculate the size of a file system. These worksheets will help you:

- Identify available disks
- Plan the swap space
- Plan the `var` area as a directory under the `/usr` file system or as a separate file system
- Plan the `/usr` file system
- Decide whether to use the default partition table, an existing customized partition table (if there is one), or change the partition table if necessary

It will be helpful to keep in mind the following equations:

- One block equals one half-kilobyte (Kb) or 512 bytes
- One megabyte (Mb) equals 1024 Kb (1,048,576 bytes), or 2048 blocks

If you need to determine the size in Mb of the default disk partitions for a disk, divide the size in blocks by 2048.

The file system planning information in Section 3.5, Section 3.8, Section 3.9, and Section 3.10 will help you complete the file system summary worksheet in Section 3.11. If you perform the planning exercises and fill in the requested information, this worksheet provides the file system layout information that is required during a custom installation.

## 3.5 Choosing the Disk for the root File System

There are two requirements for the disk that contains the `root` file system:

1. The disk you choose for the `root` file system must be one of the supported disks shown in Table 3-3.
2. The `root` file system is always located on partition `a` of the disk you choose. Partition `a` must be at least 98,304 blocks (48 Mb) and must start at block 0 (zero), the beginning of the disk. You should select a disk where the size of partition `a` is 64 Mb, the default size on most supported disks.

If you are using AdvFS or LSM, 64 Mb will be insufficient for future growth because these subsets have substantial root file system content (approximately 3 Mb each). If you use a 64 Mb partition when you select either AdvFS or LSM, you may not be able to perform an update installation to the next release of the operating system. Use the disk configuration worksheet in Section 3.6.1 to identify how much space you should allocate for the `root` file system.

**Table 3–3: Supported Disks for root File System**

| Software Device Name         | Disk Type                                                                                                                                                                            |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>ra</code> <sup>a</sup> | RA60, RA71, RA72, RA73, RA81, RA82, RA90, RA92                                                                                                                                       |
| <code>re</code> <sup>b</sup> | HSZ10, , HSZ22, HSZ40, HSZ50, HSZ70                                                                                                                                                  |
| <code>rz</code> <sup>c</sup> | RZ26, RZ26F, RZ26L, RZ26N, RZ28, RZ28D, RZ28L, RZ28M, RZ29B, RZ29L, RZ40, RZ57, RZ58, RZ73, RZ74, RZ1BB, RZ1BC, RZ1CC, RZ1CD, RZ1CF, RZ1DB, RZ1DD, RZ1DF, RZ1ED, RZ1EF, RZ2CC, RZ2DC |

<sup>a</sup>Software device names prefixed with `ra` identify DIGITAL Storage Architecture (DSA) disk drives.

<sup>b</sup>Software device names prefixed with `re` identify SCSI disks employing RAID technology.

<sup>c</sup>Software device names prefixed with `rz` identify Small Computer System Interface (SCSI) disk drives.

Refer to the operating system *Software Product Description* (SPD) for a list of all supported disks on all processors. A printed copy of the SPD is included in the operating system Software Distribution Kit. Files containing the SPD are located on the *Operating System Volume 1* CD-ROM. Refer to Chapter 8 for information about accessing the online documentation set.

The unit number for the disk that contains the `root` file system must be in the range 0 to 255 for `ra` type devices, in the range 0 to 47 for `re` type devices (SCSI disks employing RAID technology), and in the range 0 to 511 for `rz` type devices. The installation procedure automatically displays the device name, with unit numbers, for each disk connected to your system.

The installation procedure prevents you from installing the operating system on a disk that is too small. Refer to Section 5.8.1 for restrictions about putting the `root` file system on smaller-capacity disks.

## 3.6 Recording Disk Partition Sizes

The purpose of this section is for you to review the disks connected to your system, select the disks you want to use during the installation, and then record information about those disks on the worksheet shown in Table 3–4.

- If you are installing the operating system for the first time (possibly on a brand new AlphaServer or AlphaStation), do the following:
  1. At the console mode prompt (>>>), enter the console command `show device` to determine the disks on your system.
  2. Review the entries under the `DEVTYPE` column; disks are identified by the word `DISK`. Disk types are displayed under the `DEVNAM` column where you will see entries such as `RZ26`, `RZ26L`, `RZ73`, `RZ58`, and so forth.
  3. Use your system's hardware documentation and the disk partition information in the *Software Product Description (SPD)* to determine the device name and the size of each disk partition.
  4. Decide which disks you will use, and record the device names and partition sizes on the worksheet shown in Table 3-4.
- If you are installing this version of the operating system on a system that is already running a version of the operating system, the disks may have a customized disk partition table. To check the disk layout, you have to examine the existing disk label. A disk label contains information about the disk such as the disk type, physical parameters, and partition sizes. Without a disk label, a disk is not bootable. To check the disk label on an already installed system, do the following:
  1. Follow the instructions in Section 3.6.2 to review an existing disk label.
  2. Record the disk label information on the worksheet shown in Table 3-4.

### 3.6.1 Completing the Disk Configuration Worksheet

The disk configuration worksheet provides space for five disks, which is the maximum number of disks that can be used and configured during an installation. Your system may have many more disks, but even if you choose a separate disk for the `root`, `/usr`, and `/var` file systems and a separate disk for the `swap1` and `swap2` areas, a total of five disks are used. You can configure and use the other disks connected to your system after the installation. Refer to the *Software Product Description (SPD)* for the number of disks that can be configured on each type of system.

**Table 3-4: Disk Configuration Worksheet**

| Disk Number | Device Name | Partition | Size (Mb) |
|-------------|-------------|-----------|-----------|
| 1           | _____       | a         | _____     |
|             |             | b         | _____     |

**Table 3–4: Disk Configuration Worksheet (cont.)**

| Disk Number | Device Name | Partition | Size (Mb) |
|-------------|-------------|-----------|-----------|
|             |             | c         | _____     |
|             |             | d         | _____     |
|             |             | e         | _____     |
|             |             | f         | _____     |
|             |             | g         | _____     |
|             |             | h         | _____     |
| 2           | _____       | a         | _____     |
|             |             | b         | _____     |
|             |             | c         | _____     |
|             |             | d         | _____     |
|             |             | e         | _____     |
|             |             | f         | _____     |
|             |             | g         | _____     |
|             |             | h         | _____     |
| 3           | _____       | a         | _____     |
|             |             | b         | _____     |
|             |             | c         | _____     |
|             |             | d         | _____     |
|             |             | e         | _____     |
|             |             | f         | _____     |
|             |             | g         | _____     |
|             |             | h         | _____     |
| 4           | _____       | a         | _____     |
|             |             | b         | _____     |
|             |             | c         | _____     |
|             |             | d         | _____     |
|             |             | e         | _____     |
|             |             | f         | _____     |
|             |             | g         | _____     |
|             |             | h         | _____     |

**Table 3–4: Disk Configuration Worksheet (cont.)**

| Disk Number | Device Name | Partition | Size (Mb) |
|-------------|-------------|-----------|-----------|
| 5           | _____       | a         | _____     |
|             |             | b         | _____     |
|             |             | c         | _____     |
|             |             | d         | _____     |
|             |             | e         | _____     |
|             |             | f         | _____     |
|             |             | g         | _____     |
|             |             | h         | _____     |

### 3.6.2 Reviewing Existing Disk Labels to Determine Disk Layout

If you are installing this version of the operating system on a system that is already running a version of the operating system, use the `disklabel` command to look at the existing disk partition layout and sizes. A disk label looks similar to the following:

```

type: SCSI
disk: RZ26L
label:
flags:
bytes/sector: 512
sectors/track: 57
tracks/cylinder: 14
sectors/cylinder: 798
cylinders: 2570
sectors/unit: 2050860
rpm: 3600
interleave: 1
trackskew: 0
cylinderskew: 0
headswitch: 0 # milliseconds
track-to-track seek: 0 # milliseconds
drivedata: 0

8 partitions:
size offset fstype [fsize bsize cpg]
a: 131072 0 4.2BSD 1024 8192 16 # (Cyl. 0 - 164*)
b: 262144 131072 swap # (Cyl. 164*- 492*)
c: 2050860 0 unused 1024 8192 # (Cyl. 0 - 2569)
d: 552548 393216 unused 1024 8192 # (Cyl. 492*- 1185*)
e: 552548 945764 unused 1024 8192 # (Cyl. 1185*- 1877*)
f: 552548 1498312 unused 1024 8192 # (Cyl. 1877*- 2569)
g: 819200 393216 4.2BSD 1024 8192 16 # (Cyl. 492*- 1519*)
h: 838444 1212416 unused 1024 8192 # (Cyl. 1519*- 2569)

```

The procedure to display a disk label differs upon the following:



- If your system is already running a version of the operating system, log in as `root` and enter the `disklabel` command using the following syntax:

```
disklabel -r disk
```

Enter a command similar to the following to read the disk label for disk `rz0`:

```
disklabel -r rz0
```

- If you have already started a text-based installation procedure from the operating system CD-ROM or from a RIS server, choose option 3 from the first menu to access the UNIX Shell option. If you are past the first menu, enter the `history` command to go back to the first menu. Then, invoke the `disklabel` command from the UNIX Shell. Refer to Section 3.6.3 for more information about running `disklabel` from the UNIX Shell.
- If you have already started a graphical custom installation procedure from the operating system CD-ROM or from a RIS server, view the current disk partition information by clicking on the `Partition Disks...` pushbutton to open the `Disk Configuration` application.

### 3.6.3 Using the `disklabel` Command in the UNIX Shell to View Disk Labels

If you are invoking the `disklabel` command from the UNIX Shell, you must make the device special file for the device. This example shows how to make the device special file for a SCSI device, `rz1`:

```
cd /dev
./MAKEDEV rz1
disklabel -r rz1
```

When you execute the `disklabel` command, the existing disk partition layout is read and displayed. If you want to display the default disk label for `rz1` (or any other device), enter the following command:

```
disklabel -p rz1
```

Refer to Section 9.8 for more information about using the `disklabel` command in the UNIX Shell environment to customize disk partitions.

## 3.7 File System Overhead

When calculating the available disk space for the `root`, `/usr`, and `/var` file systems, the installation procedure uses the following approximations for file system overhead based on the file system type selected for a particular file system:

- UNIX File System (UFS): 4 percent
- Advanced File System (AdvFS): 5 percent

That is, 4 percent of a file system (for UFS) and 5 percent of a file system (for AdvFS) is allocated for file system housekeeping and is not available to the partition for holding software. Additionally, UFS file systems are created with a default 10 percent `minfree` value, the minimum free space threshold, which holds back 10 percent of a UFS file system from users without `root` privileges. Privileged users still have access to this free space. Refer to the `newfs(8)` and `tunefs(8)` reference pages for a description of the `minfree` value.

In addition to the space set aside for file system overhead, additional space is reserved for kernel build considerations as follows:

- `root` file system: 13 Mb
- `/usr` file system: 20 Mb

This allows room for the kernel to be built in `/usr` and subsequently copied to the `root` file system.

During an installation, the free space shown during software subset selection includes these overhead requirements; you do not have to calculate this yourself.

If you plan to use the POLYCENTER Advanced File System (AdvFS) as the file system type and you install the optional AdvFS Utilities, which are available on a separate CD-ROM distribution and require a special license, modifying file system space is simplified. After the installation, the AdvFS utilities let you add or remove volumes from the AdvFS file systems with no changes to the directory structure and with no user interruption. There is no need to overallocate file system space for AdvFS file systems.

With the exception of the `root` file system, AdvFS file system size can be modified at any time (with the `addvol` command). Increases or decreases to file system size are transparent to the user.

## 3.8 Planning the `/usr` File System

The `/usr` directory contains the majority of the operating system files, including libraries, executable programs, and documentation. The directory structure contains directories such as `/usr/sys`, `/usr/adm`, and `/usr/bin`. These directories contain required system files and UNIX command binary files that require a considerable amount of space in the `/usr` file system.

During the installation procedure, you allocate the `/usr` file system either by accepting the default partition or by specifying another partition. If you

choose the default allocation, the installation procedure uses the `g` partition of the disk that contains the `root` file system.

To determine the size of the `/usr` file system, consider the following:

- Software subsets you plan to install on `/usr`
- The number of accounts (users) and the amount of space needed by each user if their home directories are in `/usr`. You should use a separate file system or file systems be used for user accounts.
- Size of the `/var` area if it is on the same partition as `/usr`
- File system overhead as described in Section 3.7

Over time, you probably will add files to the `/usr` file system. Because of this, the file system can run out of space. Be sure to allow for future growth on the `/usr` file system.

If you plan to use the POLYCENTER Advanced File System (AdvFS) as the file system type and install the AdvFS Utilities (available with a separate license), you do not need to greatly overallocate space for the `/usr` file system. AdvFS file system space can be dynamically increased without changing directory structures and without system interruption. Refer to *System Administration* for more information about the AdvFS file system.

Section 3.8.1 to Section 3.9.7 briefly describe how these items affect the size of the `/usr` file system. As you work through each section, complete the worksheet in Table 3–5.

### 3.8.1 Software Subsets Within the `/usr` File System

The `/usr` file system must be large enough to accommodate the software subsets that will reside within it. A software subset is a collection of executable files and data files needed to perform a specific function or to provide a particular class of services; for example, you need the System Accounting Utilities software subset to perform system accounting.

Appendix D contains software subset descriptions along with the dependent software subsets and kernel configuration file options related to each software subset. The Software Subset Information appendix to the *Release Notes* contains tables of software subset sizes.

The mandatory software subsets are always installed. The optional software subsets are not required for the operating system to be fully functional; you can choose none, some, or all of the optional software subsets, depending on your requirements and available disk space.

You may want to consider allocating space for other associated or layered products that are available for the operating system. When planning space

requirements for `/usr`, allow additional space if you will be adding products in the future. Refer to the specific layered product's *Release Notes* for the exact block size of the application.

Determine which subsets you will install, add their sizes together, and include any additional space that will be required for large applications in the near future. Enter the total on the first line of Table 3-5.

### 3.8.2 Space for Users' Accounts and Files

The custom installation does not provide an area for user accounts and files; you need to set up this area after the installation.

However, you should consider the amount of space needed for user files when planning your system. If you plan to place users' home directories on `/usr`, you should reserve at least 10 Mb of disk space for each user on the system. For example, if there are 10 users, you should reserve a minimum of 100 Mb of disk space.

---

#### Note

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You should create a separate file system (on another disk) for users' home directories and mounting the new file system perhaps under the `/usr` file system. Mounting users' home directories in another file system ensures that the directories will not be overwritten during future full installations.

---

If you intend to set quotas on the user area, multiply the quota for each user by the number of users to determine the amount of user space. Refer to *System Administration* for information on disk quotas.

Enter the amount of space needed for the users directory on the second line of Table 3-5.

### 3.8.3 Completing the `/usr` Worksheet

Add the values in column 3 of Table 3-5 to determine the total space requirements for the `/usr` file system.

**Table 3-5: `/usr` Worksheet**

| Item                     | Obtain Number from ...                                           | Space Required in <code>/usr</code> |
|--------------------------|------------------------------------------------------------------|-------------------------------------|
| Size of software subsets | Software Subset Information appendix to the <i>Release Notes</i> | _____                               |
| Size of the user area    | Section 3.8.2                                                    | _____                               |

**Table 3–5: /usr Worksheet (cont.)**

| Item                                                            | Obtain Number from ... | Space Required in /usr |
|-----------------------------------------------------------------|------------------------|------------------------|
| Size of the <code>var</code> area<br>(if in <code>/usr</code> ) | Table 3–6              | _____                  |
| Total space required in /usr                                    |                        | _____                  |

Refer to Table 3–4 to identify partitions that are large enough for the `/usr` file system.

In the following table, record the disk number (for example 3), device name (for example, `rz0`), and partition where you plan to allocate the `/usr` file system:

| Disk Number | Device Name | Partition |
|-------------|-------------|-----------|
| _____       | _____       | _____     |

### 3.9 Planning the /var Area

The `/var` area contains volatile, machine-specific directories and directories such as `tmp` and `adm`.

You can allocate the `/var` area either as a file system on its own partition or in a directory under the `/usr` file system. Depending on system use, the `/var` area can potentially use large amounts of space in the `/usr/var` directory. If system use is heavy, you might want to create a separate `/var` file system.

If you choose the default file system layout, the installation procedure places the `var` area as a directory in the `/usr` directory.

To determine the size of the `var` area, consider the following:

- Crash dump space
- Error logger files
- System accounting files
- Size of the `/var/adm/ris` directory, if your system is to be used as a Remote Installation Services (RIS) server
- Size of the `/var/adm/dms` directory if your system is to be used as a Dataless Management Services (DMS) server
- Space required for `mail`, `print`, and `uucp` spooling

As you read through each of the following sections, complete the worksheet in Table 3–6.

If you plan to use the POLYCENTER Advanced File System (AdvFS) as the file system type for `/var` along with the AdvFS Utilities (available with a separate license), you do not need to greatly overallocate space for the `/var` file system. AdvFS file system space can be dynamically increased without changing directory structures and without system interruption. Refer to *System Administration* for more information about AdvFS.

### 3.9.1 Crash Dump Space

Two disk areas are used when the system produces a crash dump:

- As described in Section 3.10, the first area is located in the `swap` partition and is used to hold the crash dump until the system is rebooted. This area must be large enough to hold a single crash dump.
- The second area is where the `savecore` utility copies the crash dump and a copy of the kernel, `/vmunix`, when the system is rebooted. This area is located in the `/var/adm/crash` directory. The disk partition that contains `/var/adm/crash` must be at least large enough to hold one crash dump and one copy of `/vmunix` which is 7 to 10 Mb in size, but can be made as large as resources permit if you want to retain multiple crash dumps.

The crash dump partition must be as large as the size of physical memory on systems configured for full dumps, and can be somewhat smaller on systems configured for partial dumps.

If you want to retain multiple crash dumps, estimate the size of this partition by multiplying the total size required for a single crash dump and a copy of `/vmunix` by  $n$ , where  $n$  is the number of crash dumps to retain.

The *Kernel Debugging* guide contains a chapter devoted to managing crash dumps and crash dump files. This chapter includes information about how crash dumps are written, choosing partial or full dumps, deciding how much space to reserve for both crash dumps and crash dump files, and much more.

To determine the size and to record the location of the crash dump space, provide the following information:

1. The memory size in Mb for your system is \_\_\_\_\_.

If you do not know the amount of memory on your system, do one of the following:

- As superuser or `root`, enter the following command:

```
uerf | grep -i memory
```

- If your system is at the console mode prompt (`>>>`), enter the following command:

```
>>> show mem
```

2. You need \_\_\_\_\_ memory to accommodate your crash dump partition. Refer to Table 3–4 to identify the partitions that are large enough for the crash dump space.
3. Enter the amount of space needed for the `/var/adm/crash` directory on the first line of Table 3–6.

### 3.9.2 Error Logger and syslog Files

The `var` area requires room to accommodate the log files produced by both `syslog` and the binary error logger. These log files are a record of system events and errors in ASCII text (`syslog`) and binary formats.

The `syslog` utility collects information regarding such system activities as mail, system startup, shutdown, rebooting, root account logins, time daemon, printer subsystem, and `syslog` itself. Summary information on hardware errors is also logged. The amount of data logged is related to system activity and the number of users.

The binary error logger records information on hardware errors and system startup.

If you are creating a new system, estimate your total requirements at about 500 Kb per week. There is no limit to how large the `/var/adm/binary.errlog` and the `/var/adm/syslog` files can grow, so they might eventually fill their partition. If you plan to back up or remove these log files once a month, you need to plan your total requirements at about 2 Mb.

Enter the amount of space needed for the error logger on the second line of Table 3–6.

### 3.9.3 System Accounting Files

The `/var/adm` directory in the `var` area contains data files generated by administrative programs such as `acct` and `wtmp`. The data that these programs generate can vary widely from system to system and over time. For example, if you create a `/var/adm/acct` file, it can grow by 50 Kb a day for a large system and by 5 Kb a day for a workstation.

As a general guideline for system accounting, you should allot 10 Kb per day for workstations and 100 Kb per day for larger systems. If you back up or remove the system accounting file once a month, you should plan for accounting files that occupy about 300 Kb for workstations and 3 Mb for large systems. Refer to *System Administration* for more information on the space requirements for system accounting.

Enter the amount of space needed for system accounting on the third line in Table 3–6 that is located in Section 3.9.6.

### 3.9.4 Size of the `/var/adm/ris` Directory

The information in this section applies only if you are setting up the system to be a Remote Installation Services (RIS) server.

If you are planning to set up your system as a RIS server, you can transfer software subsets from the distribution media to the `/var/adm/ris` directory in the `var` area.

You must reserve enough space in the `/var/adm/ris` directory in the `var` area for the software you want to install in each RIS environment. Refer to Appendix D for a description of each software subset and the names of other subsets or kernel configuration file options related to its operation. Refer to the Software Subset Information appendix to the *Release Notes* for the subset sizes.

Fill in the fourth line on the worksheet in Table 3–6 with the amount of space needed for the `/var/adm/ris` directory in the `var` area. If you plan to mount a separate partition on the `/var/adm/ris` directory after the installation, enter a 0 (zero) for item 4 in Table 3–6 that is located in Section 3.9.6.

Refer to *Sharing Software on a Local Area Network* for more information about RIS and setting up the network kit.

### 3.9.5 Size of the `/var/adm/dms` Directory

The information in this section applies only if you are setting up this system to be a Dataless Management Services (DMS) server.

If you want the system to serve a dataless environment, you should decide whether you want `/var` on a separate file system or whether you want to reserve a partition to mount under `/var/adm/dms`.

In a dataless management environment, the dataless server's environment file systems are located in `/var/adm/dms/dmsn.alpha`. Each environment must have at least the operating system mandatory subsets installed as well as other optional software subsets. Space must be reserved for associated or layered products plus an additional 10 percent for file system administration tasks and file system information. Refer to Software Subset Information appendix to the *Release Notes* for software subset sizes. For more information about the size requirements of a dataless environment, refer to *Sharing Software on a Local Area Network*.



A worksheet in that guide is provided to help you calculate the amount of space required for a single `/var/adm/dms` file system.

Fill in the fifth line on the worksheet in Table 3–6 with the amount of space needed for the `/var/adm/dms` environments in the `var` area. If you plan to mount a separate partition on the `/var/adm/dms` area after the installation, enter a 0 (zero) for item 5 in Table 3–6 which is located in Section 3.9.6.

### 3.9.6 Completing the var Worksheet

Add the values in column 3 of Table 3–6 to determine the space requirements for the `var` area.

**Table 3–6: var Worksheet**

| Item                                              | Obtain Number from... | Space Required in var |
|---------------------------------------------------|-----------------------|-----------------------|
| Size of the <code>/var/adm/crash</code> directory | Section 3.9.1         | _____                 |
| Error logger                                      | Section 3.9.2         | _____                 |
| System accounting                                 | Section 3.9.3         | _____                 |
| Size of the <code>/var/adm/ris</code> directory   | Section 3.9.4         | _____                 |
| Size of the <code>/var/adm/dms</code> directory   | Section 3.9.5         | _____                 |
| <b>Total space required in var</b>                |                       | _____                 |

### 3.9.7 Placing the var Area in the /usr File System

If you plan to place the `var` area on the same partition as `/usr`, you must add the total size of the `var` area from the worksheet in Table 3–6 to the total of `/usr`.

If appropriate for your system, enter the amount of space needed for `/var` on the third line of Table 3–5.

### 3.10 Planning the Swap Space

Virtual memory is implemented in the operating system by transparently moving pages back and forth between physical memory and swap space. The amount of virtual address space that can be created is limited only by

the amount of swap space. This section discusses some of the factors to consider when configuring swap space on your system. *System Configuration and Tuning* provides additional information about optimizing the use of swap space.

The custom installation procedure lets you configure two swap areas: a primary swap partition named `swap1` and an optional swap partition named `swap2`. Additional swap partitions can be configured after the installation is complete by using the procedures described in *System Administration*.

During a custom installation, you are asked to choose which disk partition to use for `swap1`. The default choice is partition `b` of the system disk.

---

**Note**

---

You should use a minimum of 128 Mb of swap space. On supported disks, the default size of the `b` partition is 128 Mb.

---

To optimize the use of your swap space, spread out your swap space across multiple devices and use the fastest disks for swap devices. To ensure the best performance, place swap areas on different disks instead of placing multiple swap areas on the same disk. The amount of swap space you allocate also depends on the virtual memory requirements of the applications you plan to install.

If you want to calculate the true amount of swap space your system needs, an effective strategy to determine how much disk space to set aside for swapping is to compare the aggregate modifiable virtual address space needs of the processes that you plan to run with the size of your system's physical memory. Modifiable virtual address space holds data elements and structures that are modified during process execution, such as heap space, stack space, and data space. If you expect the aggregate need for modifiable virtual address space to be greater than your system's physical memory, consider allocating at least as much swap space as the size of your system's physical memory.

Although you cannot choose swap strategy modes during the installation procedure, there are two strategies for swap allocation: *immediate* and *over-commitment*. By default, the swap strategy mode used for this operating system is *immediate* mode which means that swap space is allocated when modifiable virtual address space is created. This mode requires more swap space than *over-commitment* mode because it guarantees that there will be enough swap space if every modifiable virtual page is modified. Refer to *System Administration* for more information

about swap allocation strategies and how to switch from one swap allocation mode to the other after the installation.

Also keep in mind that by default, crash dumps are temporarily stored on the swap partition. This area is used to hold the crash dump until the system is rebooted and must be large enough to hold a single crash dump. This area is referred to as the crash dump partition. In the event of a system crash, the kernel writes the contents of physical memory to the swap partition. The amount of information written, and hence the size of the crash dump, depends on several factors:

- If the system is configured to produce full dumps as described in the *System Administration* guide, the size of the crash dump will be the same as the size of the system's physical memory.
- If the system is configured to produce partial dumps, the crash dump might be considerably smaller.

The factor that determines the size of a partial crash dump is the amount of physical memory in use at the time of the crash by various kernel data structures that define the state of the system. The more tasks and threads that are active, the more kernel data structures that will be in use, and the larger the resulting partial crash dump.

Be prepared to add more swap space later if the system issues warning messages that indicate that swap space is approaching exhaustion. On systems where the balance between modifiable virtual address space usage and available physical memory is more even, less swap space is required.

Refer to the worksheet in Table 3–4 to identify partitions that are large enough for use as swap partitions. Record the location of the swap space in the following table:

| Swap Space | Size in Mb | Device Name | Partition |
|------------|------------|-------------|-----------|
| swap1      | _____      | _____       | _____     |
| swap2      | _____      | _____       | _____     |

### 3.11 Finalizing the File System Layout

After you determine how much space each file system needs, determine whether you can accept the default disk partition table. If you need to customize the disk partition table, do one of the following:

- If you are using the text-based interface, choose the UNIX Shell option from the installation menu to use the `disklabel` command to modify the disk partitions. Section 3.6.3 describes how to use the `disklabel` command in the UNIX Shell. Refer to the *Software Product Description*

(SPD) for information on the default disk partition layout and sizes. When you are finished modifying the default disk partitions, enter the `restart` command to start the installation procedure again. Once in installation setup, be sure not to select a default installation because doing so overwrites your customized disk partitions.

- If you are using the graphical user interface to perform a custom installation, in the `Installation Setup` window, click on `Partition Disks...` to access the `Disk Configuration` application to reconfigure only those disks that will be used during the installation process. The utility can also be launched from the `SysMan Configuration Checklist` to reconfigure disks that were not used during the installation procedure.

The following guidelines apply if you modify the partition table for the disk that contains the `root` file system:

- The `root` file system is always located on partition `a`. Partition `a` must be a minimum of 98,304 blocks (48 Mb). However, you should use at least 131,000 blocks (64 Mb) if you are not using AdvFS and/or LSM, and more if you are using these products.
- Partition `a` must start at block 0 (`zero`), the beginning of the disk.

If the modified partition does not meet these requirements, the custom installation requires that you choose the default partition table or select a different disk.

Enter the values that you determined in the previous sections in Table 3–7. This table will provide you with the complete file system layout and space requirements for your system.

**Table 3–7: File System Worksheet**

| Items                                                                  | Obtain From... | Approximate Size | Device Name | Partition |
|------------------------------------------------------------------------|----------------|------------------|-------------|-----------|
| <code>root</code>                                                      | Section 3.5    | _____            | _____       | _____     |
| <code>/usr</code>                                                      | Table 3–5      | _____            | _____       | _____     |
| <code>swap1</code>                                                     | Section 3.10   | _____            | _____       | _____     |
| <code>swap2</code>                                                     | Section 3.10   | _____            | _____       | _____     |
| <code>/var</code> (if applicable, otherwise add to <code>/usr</code> ) | Table 3–6      | _____            | _____       | _____     |

After completing the worksheet, verify the disk partition table. If you are installing a system for the first time, refer to Table 3–4 and the *Software*

*Product Description (SPD)* for the default partition table for your disk or disks.

Compare the disk partition table with the total `var` and `/usr` values in Table 3-7. If the space required consumes more than 75 percent of the available disk space, not including the file system overhead, consider expanding the partition. Also, if your system has insufficient disk space (that is, the space required consumes more than 75 percent of the available disk space), you may not be able to perform update installations on your system later. After determining your disk space needs, use either the `disklabel` command (if you are using the text-based installation interface) or use the Disk Configuration application (if you are using the graphical installation interface) to modify the default partition table before beginning the installation.



# 4

---

## Processor-Specific Boot Instructions for Full Installations

To invoke a full default, custom, or cloned installation of the operating system software, you boot your processor or single-board computer (SBC) from either of these sources:

- Operating system software distribution media on CD-ROM
- A Remote Installation Services (RIS) server that is set up to serve this version of the operating system

This chapter provides the information necessary for you to perform the user actions shown in Table 4-1.

**Table 4-1: Summary of User Actions**

| After reading this chapter, you will ...                                                                                                                          | As shown in ... |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Shut down and halt your processor.                                                                                                                                | Section 4.2     |
| Locate your processor in the table and use the appropriate boot commands to boot your system off the CD-ROM or network to invoke the full installation procedure. | Table 4-2       |

If you are using a CD-ROM to boot your system, Section B.1 and Section B.2 describe how to load the CD-ROM into a caddy and disk drive.

An automatic reboot feature is available for systems that have unattended installation capability. Refer to Table 4-3 for a list of the systems that support this feature.

---

### Note

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Unlike full installations, you do not boot from the distribution media to perform an update installation. Update installations are performed from the command line in single-user mode. Refer to Chapter 2 for information about performing update installations.

---

If you are booting your system over the network, you are initiating an installation from a remote server. To boot over the network, your processor

or SBC must be registered as a client on a Remote Installation Services (RIS) server. Refer to *Sharing Software on a Local Area Network* for information about setting up a RIS server, loading software into a RIS area, and registering a RIS client.

---

### Caution

---

Observe the following general guidelines:

- You must use additional parameters with the `boot` command if you are installing a hardware product kit during a full installation. Refer to Section 6.4 for the correct `boot` command parameters to use when installing a hardware product kit.
- On some systems, console commands return an error if their arguments include other than alphanumeric characters. For example:

```
>>> set bootdef_dev 1/dka300
```

```
?2C UNK SYM
```

If this occurs, enclose the argument in double quotes. For example:

```
>>> set bootdef_dev "1/dka300"
```

Do not use double quotes indiscriminately; some systems do not process double quotes in console command arguments.

- On systems that support more than one type of operating system, make sure that your `OS_TYPE` console variable is set to `unix` before you execute the `boot` command.
- 

## 4.1 Upgrading Your Hardware

Follow the instructions in this guide and those provided in your hardware and firmware documentation when you add or upgrade your system hardware. However, if the new hardware option is only supported by the new version of the operating system, you must perform the upgrade in the following sequence:

1. Update your operating system software to the version that supports the new hardware option.
2. Upgrade your firmware to the appropriate level for your system and the new version of the operating system.



3. Follow the instructions in Chapter 6 to install the hardware product kit that supports your new hardware option.

## 4.2 Shutting Down and Booting the Processor

To prepare the hardware for the installation booting process, do the following:

1. If your system is already running a version of the operating system, you must shut down and halt the processor using a command similar to the following:

```
shutdown -h +NN Please log out
```

In the previous example, the system is shut down and halted in *NN* minutes and sends the message `Please log out to all logged in users`. Refer to the *System Administration* guide or the `shutdown(8)` reference page if you need more information about shutting down a system.

- If you are adding peripheral devices to your system at this time, proceed to the next step.
  - If you are not connecting additional peripheral devices to your system, go to Step 3.
2. If you are adding additional peripheral devices, turn off your system.
    - a. Connect the peripheral devices while your system is turned off.
    - b. Turn on power to the console terminal and all additional peripheral devices; otherwise, the peripheral devices are not automatically configured by your system.

If you connect additional peripherals or controllers after the installation, refer to the *System Administration* guide for instructions about how to reconfigure your system.
    - c. Turn on power to the processor. The console subsystem prints various startup and diagnostic messages and ends with the console mode prompt (`>>>` ).
  3. Before starting the full installation, make sure your system's firmware has been updated. Firmware update instructions are in Section 1.4.6.
  4. Boot your system from the console mode prompt (`>>>` ). The boot command you enter depends on the processor and whether you are booting from CD-ROM or over the network. The DEC 2000 and DEC 7000 servers can be booted only from CD-ROM.

---

**Note**

---

Be sure to review your console firmware update documentation and perform the firmware update at the appropriate time. If you added peripherals, you may also need to run configuration utilities such as the EISA Configuration Utility (ECU) or the RAID Configuration Utility (RCU).

---

Locate your processor in Table 4–2 and follow the booting instructions in the corresponding section. After you have booted your processor, proceed to Chapter 5 to continue the default, custom, or cloned installation process.

**Table 4–2: Location of Processor-Specific Boot Instructions**

| <b>Alpha System</b>                                                   | <b>Booting Instructions</b> |
|-----------------------------------------------------------------------|-----------------------------|
| DEC 2000 Server                                                       | Section 4.5                 |
| DEC 3000 Server                                                       | Section 4.6                 |
| DEC 4000 Server                                                       | Section 4.7                 |
| DEC 7000 Server                                                       | Section 4.8                 |
| AlphaServer 300, 400                                                  | Section 4.9                 |
| AlphaServer 800, 1000, 1000A                                          | Section 4.10                |
| AlphaServer 1200, DS20                                                | Section 4.11                |
| AlphaServer 2000, 2100, 2100A                                         | Section 4.12                |
| AlphaServer 4000, 4100, ES40                                          | Section 4.13                |
| AlphaServer 8200, 8400, GS60, GS140                                   | Section 4.14                |
| AlphaStation 200, 250, 255, 400                                       | Section 4.15                |
| AlphaStation 500, 600, 600A                                           | Section 4.16                |
| Personal Workstation 433au, 500au, 600au; Ultimate Workstation 533au2 | Section 4.17                |
| Professional Workstation XP1000                                       | Section 4.18                |
| AXPvme, AlphaVME, AXPpci SBCs; PICMG Alpha CPUs                       | Section 4.19                |

**Table 4–2: Location of Processor-Specific Boot Instructions (cont.)**

| Alpha System                                                                                               | Booting Instructions                     |
|------------------------------------------------------------------------------------------------------------|------------------------------------------|
| EB66+, EB164, AlphaPC SBCs                                                                                 | Section 4.20                             |
| SBCs and processors supported in hardware releases higher than the current version of the operating system | hardware documentation and release notes |

**Note**

If you have problems booting your system, refer to the hardware documentation for your particular processor. If the problem is not hardware related, refer to the *System Administration* guide. This guide provides information about boot options such as booting a generic kernel (`genvmunix`) or booting an alternate custom kernel.

Some systems are rebooted automatically during the installation process. This automatic reboot feature is available on systems with unattended installation capability. Table 4–3 lists the systems that support unattended installation.

**Table 4–3: Systems that Support Unattended Installation**

**Systems with Unattended Installation Capability**

AlphaServer 800

## 4.3 Fiber Distributed Data Interface (FDDI) Boot Instructions

Table 4–4 shows the required boot devices for booting over the network if your system uses FDDI. Follow the instructions in your hardware owner's guide to update the FDDI firmware before booting over the network.

**Table 4–4: FDDI Boot Devices By Bus Type**

| Bus Type                                       | Boot Device                   |
|------------------------------------------------|-------------------------------|
| EISA (Extended Integrated System Architecture) | <code>fra0<sup>a</sup></code> |
| PCI (Peripheral Component Interconnect)        | <code>fwa0<sup>a</sup></code> |

**Table 4–4: FDDI Boot Devices By Bus Type (cont.)**

| Bus Type                        | Boot Device          |
|---------------------------------|----------------------|
| Turbochannel                    | "#/ez0" <sup>b</sup> |
| XMI (Extended Memory Interface) | fxa0 <sup>a</sup>    |

<sup>a</sup>Before you boot over the network, your system must be registered with the RIS server and you need to know the hardware address. To determine the hardware address, at the console mode prompt (>>> ), enter the `show dev` command.

<sup>b</sup>In the boot command, replace the number sign (#) with the slot number for your FDDI card. To determine the slot number, look at the slot where your FDDI card is installed and then find the number for that slot.

Before you boot over the network, your system must be registered with the RIS server and you will need to know your FDDI address. To determine your FDDI address, enter the following command:

```
t tc# cnfg
```

Replace the number sign (#) with the slot number of your FDDI card.

## 4.4 Determining Console Device Names

You need the console device name of your CD-ROM drive or your network interface when you boot your system for a full installation. Shut down your system to the system console prompt (>>> ), and follow the instructions in this section.

### 4.4.1 Finding the CD-ROM Drive Console Device Name

Enter the following command from the system console to display system device information:

```
>>> show dev
```

Your output will be similar to one of the following:

- In this format, the output is displayed with column headings:

| BOOTDEV        | ADDR              | DEVTYPE | RM/FX | DEVNAM   | REV  | NUMBYTES |
|----------------|-------------------|---------|-------|----------|------|----------|
| EZ0A           | 08-00-2B-38-A1-92 |         |       |          |      |          |
| FD0            | PC Floppy         | DISK    | RM    |          |      |          |
| SCSI Devices.. |                   |         |       |          |      |          |
| DKA200         | A/2/0             | DISK    | FX    | RZ25     | 0700 | 426.25MB |
| DKA400         | A/4/0             | RODISK  | RM    | RRD43    | 4.5d | .....    |
| DKA500         | A/5/0             | DISK    | FX    | RZ25L    | 0006 | 535.65MB |
| DKA600         | A/6/0             | DISK    | FX    | RZ28     | 435E | 2.10GB   |
| HOST           | A/7/0             | PROC    |       | AHA1742A | G.2  |          |

Look for the line with the CD-ROM device string `RRD`. In this example, the CD-ROM device is `RRD43` and its corresponding console device name is `DKA400`.

- In this format, the output is displayed without column headings:

```
dka200.2.0.2.0 DKA200 RZ26 T392
dka400.4.0.2.0 DKA400 RRD42 4.5d
```

```

ewa0.0.0.1.0 EWA0 08-00-2B-39-88-3A
pka0.7.0.2.0 PKA0 SCSI Bus ID 7

```

Look for the line with the CD-ROM device string RRD. In this example, the CD-ROM device is RRD42 and its corresponding console device name is DKA400.

#### 4.4.2 Finding the Network Interface Console Device Name

Enter the following command from the system console to display system device information:

```
>>> show dev
```

Your output will be similar to one of the following:

- In this format, the output is displayed with column headings:

| BOOTDEV        | ADDR              | DEVTYPE | RM/FX | DEVNAM   | REV  | NUMBYTES |
|----------------|-------------------|---------|-------|----------|------|----------|
| EZ0A           | 08-00-2B-38-A1-92 |         |       |          |      |          |
| FD0            | PC Floppy         | DISK    | RM    |          |      |          |
| SCSI Devices.. |                   |         |       |          |      |          |
| DKA200         | A/2/0             | DISK    | FX    | RZ25     | 0700 | 426.25MB |
| DKA400         | A/4/0             | RODISK  | RM    | RRD43    | 4.5d | .....    |
| DKA500         | A/5/0             | DISK    | FX    | RZ25L    | 0006 | 535.65MB |
| DKA600         | A/6/0             | DISK    | FX    | RZ28     | 435E | 2.10GB   |
| HOST           | A/7/0             | PROC    |       | AHA1742A | G.2  |          |

Look for the line with your system's network address. In this example, the Ethernet address is 08-00-2B-38-A1-92 and its corresponding console device name in the BOOTDEV column is EZ0A.

- In this format, the output is displayed without column headings:

```

dka400.4.0.6.0 DKA400 RRD43 2893
dva0.0.0.0.1 DVA0
ewa0.0.0.13.0 EWA0 08-00-2B-3E-B6-C8
pka0.7.0.6.0 PKA0 SCSI Bus ID 7

```

Look for the line with your system's network address. In this example, the Ethernet address is 08-00-2B-38-A1-92 and its corresponding console device name is EWA0.

### 4.5 DEC 2000 Server

The following section describes how to boot the DEC 2000 server from a CD-ROM optical disk. Booting from the network is not supported for the DEC 2000 server.

### 4.5.1 Setting Console Flags

Before starting the boot procedure, enter the following commands. Each command is echoed by the system when you press Return:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the keyboard variable to match the keyboard type on the system. Use the `help set` command to list the available keyboard types.

```
>>> set keyboard type
```

### 4.5.2 Booting from CD-ROM

Place the CD-ROM optical disk into a caddy as described in Appendix B.

Use this procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

The following information is displayed about the devices on your system:

| BOOTDEV        | ADDR              | DEVTYPE | RM/FX | DEVNAM   | REV  | NUMBYTES |
|----------------|-------------------|---------|-------|----------|------|----------|
| -----          | ----              | -----   | ----- | -----    | ---  | -----    |
| EZ0A           | 08-00-2B-38-A1-92 |         |       |          |      |          |
| FD0            | PC Floppy         | DISK    | RM    |          |      |          |
| SCSI Devices.. |                   |         |       |          |      |          |
| DKA200         | A/2/0             | DISK    | FX    | RZ25     | 0700 | 426.25MB |
| DKA400         | A/4/0             | RODISK  | RM    | RRD43    | 4.5d | .....    |
| DKA500         | A/5/0             | DISK    | FX    | RZ25L    | 0006 | 535.65MB |
| DKA600         | A/6/0             | DISK    | FX    | RZ28     | 435E | 2.10GB   |
| HOST           | A/7/0             | PROC    |       | AHA1742A | G.2  |          |

The numbers under `BOOTDEV` represent the unit number assigned to each drive on your system:

- The letters `DK` refer to a SCSI disk device.
- The third letter (A or B) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.

- The number refers to the drive number.

In the `DEVNAM` column, look for the line with the CD-ROM device string `RRD`. In the previous display from the `show dev` command, the CD-ROM device is `RRD43`. The device boot string for your system appears in that same line under the `BOOTDEV` column as `DKA400`.

3. Enter the `boot` command with the following syntax to boot from a CD-ROM.

**boot** *device*

For example, to boot the system from CD-ROM drive number 4, enter the following command:

```
>>> boot dka400
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.6 DEC 3000 Server

The following sections describe how to boot the DEC 3000 server from a CD-ROM optical disk, from the network, from the SCSI TURBOchannel option card, and from an FDDI network interface.

### 4.6.1 Setting Console Flags

Before starting the boot procedure, enter the following commands. Each command is echoed by the system when you press Return:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_reset` variable to `on`. This ensures that all devices are initialized prior to booting.

```
>>> set boot_reset on
```

4. Set the `scsi_reset` variable to 4. This ensures that all devices have adequate time to initialize during the boot sequence.

```
>>> set scsi_reset 4
```

## 4.6.2 Booting from CD-ROM

Place the CD-ROM optical disk into a caddy as described in Appendix B.

Use the following procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

The output of the `show dev` command displays information about the devices on your system:

| BOOTDEV    | ADDR  | DEVTYPE | NUMBYTES | RM/FX | WP | DEVNAM | REV  |
|------------|-------|---------|----------|-------|----|--------|------|
| DKA0       | A/0/0 | DISK    | 426.25MB | FX    |    | RZ25   | 0700 |
| DKA200     | A/2/0 | DISK    | 426.25MB | FX    |    | RZ25   | 0700 |
| DKA400     | A/4/0 | DISK    | .....    | RM    | WP | RRD42  | 4.3d |
| MKA500     | A/5/0 | TAPE    |          | RM    |    | TZK10  | 01B4 |
| ..HostID.. | A/6   | INIT    |          |       |    |        |      |
| ..HostID.. | B/6   | INITR   |          |       |    |        |      |
| MKB500     | B/5/0 | TAPE    |          | RM    |    | TLZ04  |      |

The numbers under `BOOTDEV` represent the unit number assigned to each drive on your system:

- The letters `DK` refer to a SCSI disk device.
- The letters `MK` refer to a SCSI magnetic tape device.
- The third letter (A or B) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.
- `HostID` represents the SCSI id of the host adapter. In the previous example, `A/6 INIT` represents `INITiator` on bus A, id 6.

In the `DEVNAM` column, look for the line with the CD-ROM device string `RRD`. In the previous display from the `show dev` command, the CD-ROM device is `RRD42`. The device boot string for your system appears in that same line under the `BOOTDEV` column as `DKA400`.

3. Enter the `boot` command with the following syntax to boot from a CD-ROM.

**boot** *device*

For example, to boot the system from the CD-ROM drive with console device name `dka400`, enter the following command:

```
>>> boot dka400
```



You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.6.3 Booting from RIS

To boot your system from the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client.

When booting from a RIS server, the system uses the `bootp` protocol. Enter the following command to boot your system over the network:

```
>>> boot ez0
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS install, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.6.4 Booting from the SCSI TURBOchannel Option Card

To boot from the dual SCSI TURBOchannel option card (PMAZB or PMAZC), complete the following steps:

1. Determine which controllers and devices are configured on your system by entering the following command at the console prompt:

```
>>> show conf
```

Your system displays output similar to the following (the output differs depending on your system configuration):

```
DEC 3000 - M500
Compaq Computer CorporationVPP PAL X5.37-82000101/OSF PAL X1.28-82000201 -
Built on 13-DEC-1996 13:39:58.02
TCINFO DEVNAM DEVSTAT
----- -----
CPU OK KN15-AA -V2.0-S1F4-I039-sV1.0-DECchip 21064
P3.0
 ASIC OK
 MEM OK
8
 CXT OK
7
 NVR OK
 SCC OK
 NI OK
 ISDN OK
```

```

6
 SCSI OK
3-PMAF-AA TC3
2-PMAZ-AA TC2
1-PMAZB-AA TC1
0-PMTNV-AA TC0

```

The numbers under the TCINFO column (and the entries in the DEVNAM column) represent the unit number assigned to the PMAZB or PMAZC option card.

2. Determine the number of your boot device by entering a command with the following syntax:

```
t tc slot_number cnfg
```

For example, to determine the device number of a disk on a PMAZB option card, enter the following command:

```
>> t tc1 cnfg
```

A table similar to the following is displayed:

```

DEC PMAZB-AA V1.0 (Dual SCSI [53C96])
BOOTDEV ADDR DEVTYPE NUMBYTES RM/FX WP DEVNAM REV

DKA200 A/2/0 DISK 426MB FX RZ25 0700
(rz200A)
DKA400 A/4/0 RODISK 409MB RM WP RRD42 4.3d
(rz400A)
..HostID.. A/7 INITR
..HostID.. B/7 INITR

```

To boot from the PMAZB (or PMAZC) option card, enter the `boot` command with the following syntax:

```
boot "slot_number/device_number"
```

For example, to boot from disk number 4 on the PMAZB option card located in slot 1, enter the following command:

```
>>> b "1/dka400"
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.6.5 Booting from an FDDI Network Interface

Booting over an FDDI network interface is supported for DEFTA and CRE-DEFTA devices.

To boot from an FDDI network interface device, find the device names as described in Section 4.6.4. For example, a DEFTA device appears as PMAF-FA when you use the `show conf` command. Identify the slot number and enter the following commands to boot from a RIS server using the `bootp` protocol:

```
>>> b "1/ez0"
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.7 DEC 4000 Server

The following sections describe how to boot the DEC 4000 server from a CD-ROM optical disk and from the network.

### 4.7.1 Setting Console Flags

Before starting the boot procedure, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Enter the `init` command with the following syntax:

```
>>> init
```

### 4.7.2 Booting from CD-ROM

If your CD-ROM optical disk is not already in a caddy, follow the instructions in Appendix B.

Use the following procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:

|                |        |       |
|----------------|--------|-------|
| dka0.0.0.0.0   | DKA0   | RZ73  |
| dkb0.0.0.1.0   | DKB0   | RZ73  |
| dkc0.0.0.2.0   | DKC0   | RZ26  |
| dkc100.1.0.2.0 | DKC100 | RZ26  |
| dkc200.2.0.2.0 | DKC200 | RZ26  |
| dkc300.3.0.2.0 | DKC300 | RZ26  |
| dke100.1.0.4.0 | DKE100 | RRD42 |
| mka500.0.0.0.0 | MKA500 | TLZ04 |

|              |      |                   |
|--------------|------|-------------------|
| mke0.0.0.4.0 | MKE0 | TZ85              |
| eza0.0.0.6.0 | EZA0 | 08-00-2B-2C-CE-DE |
| ezb0.0.0.7.0 | EZB0 | 08-00-2B-2C-CE-DF |
| p_d0.7.0.3.0 |      | Bus ID 7          |
| pka0.7.0.0.0 | PKA0 | SCSI Bus ID 7     |
| pkb0.7.0.1.0 | PKB0 | SCSI Bus ID 7     |
| pkc0.7.0.2.0 | PKC0 | SCSI Bus ID 7     |
| pke0.7.0.4.0 | PKE0 | SCSI Bus ID 7     |

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The letters MK refer to a SCSI magnetic tape device.
- The third letter (A, B, C, D, or E) refers to the SCSI or DSA bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string RRD. In the previous display from the `show dev` command, the CD-ROM device is RRD42. The device boot string for your system appears in that same line. The device boot string begins with the letters DKE.

3. Enter the `boot` command with the following syntax to boot from a CD-ROM:

**boot** *device*

For example, to boot the system from the CD-ROM drive with console device name `dke400`, enter the following command:

```
>>> boot dke100
```

Output similar to the following is displayed:

```
(boot dke100.1.0.4.0)
block 0 of dke100.1.0.4.0 is a valid boot block
reading 16 blocks from dke100.1.0.4.0
bootstrap code read in
base = 1ee000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1e0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
OSF boot - Fri Dec 17 15:49:49 EST 1999
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.7.3 Booting from RIS

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client.

The `device` parameter is the network device from which you want to boot. The DEC 4000 server supports two network adapters: `eza0` and `ezb0`.

Set your device protocols to boot from a RIS server.

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp
```

For example, if the device you are booting from with the `bootp` protocol is `eza0`, enter the following commands:

```
>>> set eza0_protocols bootp
>>> boot eza0
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.7.4 Prestoserve Option

The following instructions apply to DEC 4000 systems equipped with the Prestoserve option.

### 4.7.4.1 The `prcache` Command

The DEC 4000 system console provides the `prcache` command to support the Prestoserve option (NVRAM). Refer to the hardware documentation for a description of this command.

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.8 DEC 7000 Server

The following sections describe how to boot the DEC 2000 and DEC 7000 server from a CD-ROM optical disk and from the network.

### 4.8.1 Setting Console Flags

Before starting the boot procedure, enter the following commands. Each command is echoed by the system when you press Return:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the keyboard variable to match the keyboard type on the system. Use the `help set` command to list the available keyboard types.

```
>>> set keyboard type
```

### 4.8.2 Booting from CD-ROM

Place the CD-ROM optical disk into a caddy as described in Appendix B.

Use this procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

The following information is displayed about the devices on your system:

| BOOTDEV        | ADDR              | DEVTYPE | RM/FX | DEVNAM   | REV  | NUMBYTES |
|----------------|-------------------|---------|-------|----------|------|----------|
| -----          | ----              | -----   | ----- | -----    | ---  | -----    |
| EZ0A           | 08-00-2B-38-A1-92 |         |       |          |      |          |
| FD0            | PC Floppy         | DISK    | RM    |          |      |          |
| SCSI Devices.. |                   |         |       |          |      |          |
| DKA200         | A/2/0             | DISK    | FX    | RZ25     | 0700 | 426.25MB |
| DKA400         | A/4/0             | RODISK  | RM    | RRD43    | 4.5d | .....    |
| DKA500         | A/5/0             | DISK    | FX    | RZ25L    | 0006 | 535.65MB |
| DKA600         | A/6/0             | DISK    | FX    | RZ28     | 435E | 2.10GB   |
| HOST           | A/7/0             | PROC    |       | AHA1742A | G.2  |          |

The numbers under `BOOTDEV` represent the unit number assigned to each drive on your system:

- The letters `DK` refer to a SCSI disk device.
- The third letter (`A` or `B`) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.

- The number refers to the drive number.

In the `DEVNAM` column, look for the line with the CD-ROM device string `RRD`. In the previous display from the `show dev` command, the CD-ROM device is `RRD43`. The device boot string for your system appears in that same line under the `BOOTDEV` column as `DKA400`.

3. Enter the `boot` command with the following syntax to boot from a CD-ROM.

**boot** *device*

For example, to boot the system from the CD-ROM drive with console device name `dka400`, enter the following command:

```
>>> boot dka400
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.8.3 Booting from RIS

Booting from the network is not supported for the DEC 7000 servers.

## 4.9 AlphaServer 300, 400 Servers

The following sections describe how to boot an AlphaServer 300 or AlphaServer 400 server from a CD-ROM and from the network.

### 4.9.1 Setting Console Flags

Before starting the boot procedure on an AlphaServer 300 or AlphaServer 400 server, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the `Halt` button.

```
>>> set auto_action halt
```

### 4.9.2 Booting from CD-ROM

If your CD-ROM is not already in a caddy, follow the instructions in Appendix B.

Follow this procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the init command with the following syntax:

```
>>> init
```

3. Enter the boot command with the following syntax to boot from a CD-ROM:

**boot** *device*

For example, to boot the system from the CD-ROM drive with console device name dka400, enter the following command:

```
>>> boot dka400
```

Output similar to the following is displayed:

```
(boot dka400.4.0.6.0)
block 0 of dka400.4.0.6.0 is a valid boot block
reading 16 blocks from dka400.4.0.6.0
bootstrap code read in
base = 11e000, imagestart = 0, imagebytes = 2000
initializing HWRPB at 2000
initializing page table at 110000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
OSF boot - Fri Dec 17 17:18:57 EST 1999
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.9.3 Booting from RIS

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information about registering a client.

The device parameter is the network device from which you want to boot. The AlphaServer 300 and AlphaServer 400 servers support two network adapters: ewa0 and ena0.

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp
set device_inet_init bootp
```

For example, if the device you are booting from with the bootp protocol is ewa0, enter the following commands:

```
>>> set ewa0_protocols bootp
>>> set ewa0_inet_init bootp
```



```
>>> boot ewa0
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network* for more information.

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.10 Alpha Server 800, 1000, 1000A Servers

This section provides instructions for booting AlphaServer 800, 1000, and 1000A servers.

### 4.10.1 The `bus_probe_algorithm` Environment Variable

The `bus_probe_algorithm` console environment variable must be set to `new`. To verify that the `bus_probe_algorithm` environment variable is set to `new`, enter the following console firmware command:

```
>>> show bus_probe_algorithm
```

If the environment variable is set to `old`, set the variable to `new` and initialize the console as shown in the following example:

```
>>> set bus_probe_algorithm new
>>> init
```

### 4.10.2 Setting Console Flags

Before starting the boot procedure on an AlphaServer 800, 1000, or 1000A server, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

---

#### Note

---

If your system has unattended installation capability, the system will reboot automatically from the newly installed disks after the software subsets are loaded during the installation process. However, if you want to halt the system immediately after the software subsets are loaded (that is,

you do not want to perform an automatic reboot), enter the following command:

```
>>> set boot_osflags h
```

Remember to use this command only if your system has unattended installation capability. See Table 4-3 for a list of the systems that support this capability.

---

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time it is turned on, when it crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.

```
>>> set boot_file
```

### 4.10.3 Booting from CD-ROM

Follow these steps to boot AlphaServer 800, 1000, or 1000A servers from a CD-ROM:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

|                |        |                   |      |
|----------------|--------|-------------------|------|
| dka400.4.0.6.0 | DKA400 | RRD43             | 2893 |
| dva0.0.0.0.1   | DVA0   |                   |      |
| ewa0.0.0.13.0  | EWA0   | 08-00-2B-3E-B6-C8 |      |
| pka0.7.0.6.0   | PKA0   | SCSI Bus ID 7     |      |

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string `RRD`. In the previous example, the CD-ROM device is `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKA`.

3. Enter the `boot` command and the appropriate boot device string for your system. For example:

```
>>> boot dka400
```

#### 4.10.4 Booting from RIS

To boot an AlphaServer 800, 1000, or 1000A server over the network, make sure it is registered as a client of a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client.

Use the `show device` command to determine which network adapter (such as `ewa` or `era`) is in use:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka400.4.0.6.0 DKA400 RRD43 2893
dva0.0.0.0.1 DVA0
ewa0.0.0.13.0 EWA0 08-00-2B-3E-B6-C8
pka0.7.0.6.0 PKA0 SCSI Bus ID 7
```

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot -fi "" ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.11 AlphaServer 1200, DS20 Servers

This section provides instructions for booting AlphaServer 1200 and DS20 servers.

### 4.11.1 The `bus_probe_algorithm` Environment Variable

The `bus_probe_algorithm` console environment variable must be set to `new`. To verify that the `bus_probe_algorithm` environment variable is set to `new`, enter the following console firmware command:

```
>>> show bus_probe_algorithm
```

If the environment variable is set to `old`, set the variable to `new` and initialize the console as shown in the following example:

```
>>> set bus_probe_algorithm new
>>> init
```

### 4.11.2 Setting Console Flags

Before starting the boot procedure on an AlphaServer 1200 or DS20 server, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

---

#### Note

---

If your system has unattended installation capability, the system will reboot automatically from the newly installed disks after the software subsets are loaded during the installation process. However, if you want to halt the system immediately after the software subsets are loaded (that is, you do not want to perform an automatic reboot), enter the following command:

```
>>> set boot_osflags h
```

Remember to use this command only if your system has unattended installation capability. See Table 4-3 for a list of the systems that support this capability.

---

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time it is turned on, when it crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.

```
>>> set boot_file
```

### 4.11.3 Booting from CD-ROM

Follow these steps to boot AlphaServer 1200 or DS20 servers from a CD-ROM:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka400.4.0.6.0 DKA400 RRD43 2893
dva0.0.0.0.1 DVA0
ewa0.0.0.13.0 EWA0 08-00-2B-3E-B6-C8
pka0.7.0.6.0 PKA0 SCSI Bus ID 7
```

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string RRD. In the previous example, the CD-ROM device is RRD43. The device boot string for your system appears in that same line. The device boot string begins with the letters DKA.

3. Enter the `boot` command and the appropriate boot device string for your system. For example:

```
>>> boot dka400
```

#### 4.11.4 Booting from RIS

To boot an AlphaServer 1200 or DS20 server over the network, make sure it is registered as a client of a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client.

Use the `show device` command to determine which network adapter (such as `ewa` or `era`) is in use:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka400.4.0.6.0 DKA400 RRD43 2893
dva0.0.0.0.1 DVA0
ewa0.0.0.13.0 EWA0 08-00-2B-3E-B6-C8
pka0.7.0.6.0 PKA0 SCSI Bus ID 7
```

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot -fi an ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.12 AlphaServer 2000, 2100, 2100A Servers

The following sections describe how to boot AlphaServer 2000, 2100, and 2100A servers from a CD-ROM and from the network.

### 4.12.1 The bus\_probe\_algorithm Environment Variable

The `bus_probe_algorithm` console environment variable must be set to `new`. To verify that the `bus_probe_algorithm` environment variable is set to `new`, enter the following console firmware command:

```
>>> show bus_probe_algorithm
```

If the environment variable is set to `old`, set the variable to `new` and initialize the console as shown in the following example:

```
>>> set bus_probe_algorithm new
>>> init
```

### 4.12.2 Setting Console Flags

Before starting the boot procedure, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

---

#### Note

---

If your system has unattended installation capability, the system will reboot automatically from the newly installed disks after the software subsets are loaded during the installation process. However, if you want to halt the system immediately after the software subsets are loaded (that is, you do not want to perform an automatic reboot), enter the following command:

```
>>> set boot_osflags h
```

Remember to use this command only if your system has unattended installation capability. See Table 4-3 for a list of the systems that support this capability.

---

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Enter the `init` command with the following syntax:

```
>>> init
```

### 4.12.3 Booting from CD-ROM

If your CD-ROM is not already in a caddy, follow the instructions in Appendix B.

Follow this procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:

|                |        |                   |
|----------------|--------|-------------------|
| dka0.0.0.0.0   | DKA0   | RZ28              |
| dkb0.0.0.1.0   | DKB0   | RZ28              |
| dkc0.0.0.2.0   | DKC0   | RZ26              |
| dkc100.1.0.2.0 | DKC100 | RZ26              |
| dkc200.2.0.2.0 | DKC200 | RZ26              |
| dkc300.3.0.2.0 | DKC300 | RZ26              |
| dke100.1.0.4.0 | DKE100 | RRD43             |
| mka500.0.0.0.0 | MKA500 | TLZ04             |
| mke0.0.0.4.0   | MKE0   | TZ85              |
| ewa0.0.0.6.0   | EWA0   | 08-00-2B-2C-CE-DE |
| ewb0.0.0.7.0   | EWB0   | 08-00-2B-2C-CE-DF |
| p_d0.7.0.3.0   |        | Bus ID 7          |
| pka0.7.0.0.0   | PKA0   | SCSI Bus ID 7     |
| pkb0.7.0.1.0   | PKB0   | SCSI Bus ID 7     |
| pkc0.7.0.2.0   | PKC0   | SCSI Bus ID 7     |
| pke0.7.0.4.0   | PKE0   | SCSI Bus ID 7     |

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The letters MK refer to a SCSI magnetic tape device.
- The third letter (A, B, C, D, or E) refers to the SCSI or DSA bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string `RRD`. In the previous example, the CD-ROM device is `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKE`.

3. Enter the `boot` command with the following syntax to boot from a CD-ROM:

**boot** *device*

For example, to boot the system from the CD-ROM drive with console device name `dke400`, enter the following command:

```
>>> boot dke100
```

Output similar to the following is displayed:

```
(boot dke100.1.0.4.0)
block 0 of dke100.1.0.4.0 is a valid boot block
reading 16 blocks from dke100.1.0.4.0
bootstrap code read in
base = 1ee000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1e0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
OSF boot - Fri Dec 17 15:49:49 EST 1999
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

#### 4.12.4 Booting from RIS

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client.

The `device` parameter is the network device from which you want to boot. AlphaServer 2000, 2100, and 2100A servers support two network adapters: `ewa0` and `ewb0`.

Use the following command syntax to boot your system over the network:

```
set device _protocols bootp
set device _inet_init bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols bootp
>>> set ewa0_inet_init bootp
>>> boot ewa0
```



Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS install, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.12.5 Prestoserve Option

These instructions apply to AlphaServer 2000, 2100, and 2100A servers equipped with the Prestoserve option.

#### 4.12.5.1 The `prcache` Command

AlphaServer 2000, 2100, and 2100A system consoles provide the `prcache` command to support the Prestoserve option (NVRAM). Refer to your hardware owner's guide for a description of this command.

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.13 AlphaServer 4000, 4100, ES40 Servers

The following sections describe how to boot AlphaServer 4000, 4100, and ES40 servers from a CD-ROM and from the network.

### 4.13.1 The `bus_probe_algorithm` Environment Variable

The `bus_probe_algorithm` console environment variable must be set to `new`. To verify that the `bus_probe_algorithm` environment variable is set to `new`, enter the following console firmware command:

```
>>> show bus_probe_algorithm
```

If the environment variable is set to `old`, set the variable to `new` and initialize the console as shown in the following example:

```
>>> set bus_probe_algorithm new
>>> init
```

### 4.13.2 Setting Console Flags

Before starting the boot procedure, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

---

**Note**

---

If your system has unattended installation capability, the system will reboot automatically from the newly installed disks after the software subsets are loaded during the installation process. However, if you want to halt the system immediately after the software subsets are loaded (that is, you do not want to perform an automatic reboot), enter the following command:

```
>>> set boot_osflags h
```

Remember to use this command only if your system has unattended installation capability. See Table 4-3 for a list of the systems that support this capability.

---

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Enter the `init` command with the following syntax:

```
>>> init
```

### 4.13.3 Booting from CD-ROM

If your CD-ROM optical disk is not already in a caddy, follow the instructions in Appendix B.

Follow this procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:

|                |        |       |
|----------------|--------|-------|
| dka0.0.0.0.0   | DKA0   | RZ28  |
| dkb0.0.0.1.0   | DKB0   | RZ28  |
| dkc0.0.0.2.0   | DKC0   | RZ26  |
| dkc100.1.0.2.0 | DKC100 | RZ26  |
| dkc200.2.0.2.0 | DKC200 | RZ26  |
| dkc300.3.0.2.0 | DKC300 | RZ26  |
| dke100.1.0.4.0 | DKE100 | RRD43 |
| mka500.0.0.0.0 | MKA500 | TLZ04 |
| mke0.0.0.4.0   | MKE0   | TZ85  |

|              |      |                   |
|--------------|------|-------------------|
| ewa0.0.0.6.0 | EWA0 | 08-00-2B-2C-CE-DE |
| ewb0.0.0.7.0 | EWB0 | 08-00-2B-2C-CE-DF |
| p_d0.7.0.3.0 |      | Bus ID 7          |
| pka0.7.0.0.0 | PKA0 | SCSI Bus ID 7     |
| pkb0.7.0.1.0 | PKB0 | SCSI Bus ID 7     |
| pkc0.7.0.2.0 | PKC0 | SCSI Bus ID 7     |
| pke0.7.0.4.0 | PKE0 | SCSI Bus ID 7     |

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The letters MK refer to a SCSI magnetic tape device.
- The third letter (A, B, C, D, or E) refers to the SCSI or DSA bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string RRD. In the previous example, the CD-ROM device is RRD43. The device boot string for your system appears in that same line. The device boot string begins with the letters DKE.

3. Enter the `boot` command with the following syntax to boot from a CD-ROM:

**boot** *device*

For example, to boot the system from the CD-ROM drive with console device name `dke400`, enter the following command:

```
>>> boot dke100
```

Output similar to the following is displayed:

```
(boot dke100.1.0.4.0)
block 0 of dke100.1.0.4.0 is a valid boot block
reading 16 blocks from dke100.1.0.4.0
bootstrap code read in
base = 1ee000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1e0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
OSF boot - Fri Dec 17 15:49:49 EST 1999
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

#### 4.13.4 Booting from RIS

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client.

The `device` parameter is the network device from which you want to boot. The AlphaServer 4000, 4100, and ES40 servers support two network adapters: `ewa0` and `ewb0`.

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp
set device_inet_init bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols bootp
>>> set ewa0_inet_init bootp
>>> boot -fl a ewa0
```

To stop the autoreboot feature on the AlphaServer 4000, 4100, or ES40 server, enter the following command:

```
>>> boot -fl ah ewa0
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.13.5 Prestoserve Option

These instructions apply to AlphaServer 4000, 4100, and ES40 servers equipped with the Prestoserve option.

#### 4.13.5.1 The `prcache` Command

The AlphaServer 4000, 4100, and ES40 system consoles provide the `prcache` command to support the Prestoserve option (NVRAM). Refer to hardware documentation for a description of this command.

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.14 AlphaServer 8200, 8400, GS60, GS140 Servers

The following sections describe how to boot AlphaServer 8200, 8400, GS60, and GS140 servers from a CD-ROM optical disk and from RIS.

---

**Note**

---

The AlphaServer GS60 and AlphaServer GS140 are upgrades of the AlphaServer 8200 and AlphaServer 8400, respectively, with the Alpha 21264 (EV6) processor chip.

The displays in this section reflect AlphaServer 8200 and AlphaServer 8400 systems, but the same examples and descriptions apply to AlphaServer GS60 and AlphaServer GS140 systems. Only the identification line at the bottom of the display is different.

---

#### 4.14.1 Setting Console Flags

Before starting the boot procedure, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

---

**Note**

---

If your system has unattended installation capability, the system will reboot automatically from the newly installed disks after the software subsets are loaded during the installation process. However, if you want to halt the system immediately after the software subsets are loaded (that is, you do not want to perform an automatic reboot), enter the following command:

```
>>> set boot_osflags h
```

Remember to use this command only if your system has unattended installation capability. See Table 4-3 for a list of the systems that support this capability.

---

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_reset` variable to `on`. This must be done if you need to reboot the generic kernel (`genvmunix`) at any time to reconfigure your system for additional peripherals.

```
>>> set boot_reset on
```

4. Set the `os_type` variable to `unix`:

```
>>> set os_type unix
```

5. Set the `console` variable to `serial`:

```
>>> set console serial
```

### 4.14.2 Booting from CD-ROM

If your CD-ROM optical disk is not already in a caddy, follow the instructions in Appendix B.

Use the following procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A display appears showing information about the devices on your system. For example:

```
dka0.0.0.5.0 DKA0 RZ73
dkb4.4.1.14.0 DKB400 RRD43
```

The numbers in the second column are the unit numbers assigned to each drive on your system:

- The letters DK refer to a SCSI CD-ROM or disk device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The numbers refer to the drive number.

In the third column, look for the line with the CD-ROM device string `RRD`. In the previous example, the CD-ROM device is `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKB`.

3. Enter the `boot` command with the following syntax to boot from a CD-ROM:

```
boot device-number
```

For example, to boot the system from the CD-ROM drive with console device name `dkb400`, enter the following command:

```
>>> boot dkb400
```

Output similar to the following is displayed:

```
Initializing...
F E D C B A 9 8 7 6 5 4 3 2 1 0 NODE #
```

```

A M M P TYP
o + + + ST1
. B BPD
o + + + ST2
. B BPD
+ + + + ST3
. B BPD

+ . + . + . + CO XMI +
:
:
. A0 B0 LV
. 256 64 320Mb

Firmware Rev = V2.3 SROM Rev = V2.0 SYS SN = GA12345678

Booting...
Connecting to boot device dkb400
:
:

```

You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.14.3 Booting from RIS

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client.

The `device` parameter is the network device from which you want to boot. The AlphaServer 8200, 8400, GS60, and GS140 servers support two network adapters: `ewa0` and `ewb0`.

---

**Note**

---

RIS installations of this version of the operating system are not supported on AlphaServer 8200, 8400, GS60, and GS140 servers with XMI Ethernet devices.

---

Use the following command syntax to boot your system over the network:

```

set device_protocols bootp
set device_inet_init bootp

```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```

>>> show net
>>> set ewa0_protocols bootp
>>> set ewa0_inet_init bootp
>>> boot -fl a ewa0

```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.15 AlphaStation 200, 250, 255, 400 Workstations

The following sections describe how to boot AlphaStation 200, 250, 255, and 400 workstations from a CD-ROM optical disk and from a RIS server.

### 4.15.1 Setting Console Flags

Before starting the boot procedure on an AlphaStation 200, 250, 255, or 400 workstation, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the `Halt` button.

```
>>> set auto_action halt
```

3. Enter the `init` command with the following syntax:

```
>>> init
```

### 4.15.2 Booting from CD-ROM

If your CD-ROM optical disk is not already in a caddy, follow the instructions in Appendix B.

Follow this procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:



|                |        |                   |
|----------------|--------|-------------------|
| dka0.0.0.6.0   | DKA0   | RZ25L 0003        |
| dka100.1.0.6.0 | DKA100 | RZ26 T386         |
| dka400.4.0.6.0 | DKA400 | RRD43 2893        |
| dva0.0.0.0.1   | DVA0   |                   |
| ewa0.0.0.11.0  | EWA0   | 08-00-2B-E2-74-32 |
| pka0.7.0.6.0   | PKA0   | SCSI Bus ID 7     |

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string RRD. In the previous example, the CD-ROM device is RRD43. The device boot string for your system appears in that same line. The device boot string begins with the letters DKA.

3. Enter the boot command with the following syntax to boot from a CD-ROM:

**boot** *device*

For example, to boot the system from the CD-ROM drive with console device name dka400, enter the following command:

```
>>> boot dka400
```

Output similar to the following is displayed:

```
(boot dka400.4.0.6.0)
block 0 of dka400.4.0.6.0 is a valid boot block
reading 16 blocks from dka400.4.0.6.0
bootstrap code read in
base = 11e000, imagestart = 0, imagebytes = 2000
initializing HWRPB at 2000
initializing page table at 110000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
OSF boot - Fri Dec 17 15:49:49 EST 1999
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.15.3 Booting from RIS

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information about registering a client.

The device parameter is the network device from which you want to boot. The AlphaStation 200, 250, 255, and 400 workstations support two network adapters: ewa0 and ena0.

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp
set device_inet_init bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols bootp
>>> set ewa0_inet_init bootp
>>> boot ewa0
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network* for more information.

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.16 AlphaStation 500, 600, and 600A Workstations

This section provides instructions for booting AlphaStation 500, 600, and 600A processors.

### 4.16.1 Setting Console Flags

Before starting the boot procedure on AlphaStation 500, 600, and 600A processors, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:  

```
>>> set boot_osflags ""
```
2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time it is turned on, when it crashes, or when you press the Halt button.  

```
>>> set auto_action halt
```
3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.  

```
>>> set boot_file
```

## 4.16.2 Booting from CD-ROM

Follow these steps to boot AlphaStation 500, 600, and 600A processors from a CD-ROM optical disk:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

|                |        |                   |
|----------------|--------|-------------------|
| dka400.4.0.6.0 | DKA400 | RRD43 2893        |
| dva0.0.0.0.1   | DVA0   |                   |
| ewa0.0.0.13.0  | EWA0   | 08-00-2B-3E-B6-C8 |
| pka0.7.0.6.0   | PKA0   | SCSI Bus ID 7     |

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string `RRD`. In the previous example, the CD-ROM device is `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKA`.

3. Enter the `boot` command and the appropriate boot device string for your system. For example, to boot the system from the CD-ROM drive with console device name `dka400`, enter the following command:

```
>>> boot dka400
```

## 4.16.3 Booting from RIS

To boot an AlphaStation 500, 600, or 600A workstation over the network, make sure it is registered as a client on a RIS server. Refer to the *Sharing Software on a Local Area Network* guide for information on registering a client.

Use the `show device` command to determine which network adapter (such as `ewa` or `era`) is in use:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka400.4.0.6.0 DKA400 RRD43 2893
dva0.0.0.0.1 DVA0
ewa0.0.0.13.0 EWA0 08-00-2B-3E-B6-C8
pka0.7.0.6.0 PKA0 SCSI Bus ID 7
```

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot -fi "" ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.17 Personal Workstation 433au, 500au, 600au; Ultimate Workstation 533-au2

This section provides instructions for booting Personal Workstation 433au, 500au, 600au and Ultimate Workstation 533-au2 workstations.

### 4.17.1 Setting Console Flags

Before starting the boot procedure, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `os_type` variable to `unix`:

```
>>> set os_type unix
```

4. Enter the `init` command:

```
>>> init
```

### 4.17.2 Booting from CD-ROM

If your CD-ROM optical disk is not already in a caddy, follow the instructions in Appendix B.

Use the following procedure to boot the system:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka400.4.0.6.0 DKA400 RRD43 2893
dva0.0.0.0.1 DVA0
ewa0.0.0.13.0 EWA0 08-00-2B-3E-B6-C8
pka0.7.0.6.0 PKA0 SCSI Bus ID 7
```

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string `RRD`. In the previous example, the CD-ROM device is `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKA`.

3. Enter the `boot` command with the following syntax to boot from a CD-ROM:

```
boot device-number
```

For example, to boot the system from the CD-ROM drive with console device name `dkb400`, enter the following command:

```
>>> boot dkb400
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

### 4.17.3 Booting from RIS

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
```

```
>>> boot -fi "" ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.18 Professional Workstation XP1000

This section provides instructions for booting Professional Workstation XP1000 workstations.

### 4.18.1 The `bus_probe_algorithm` Environment Variable

The `bus_probe_algorithm` console environment variable must be set to `new`. To verify that the `bus_probe_algorithm` environment variable is set to `new`, enter the following console firmware command:

```
>>> show bus_probe_algorithm
```

If the environment variable is set to `old`, set the variable to `new` and initialize the console as shown in the following example:

```
>>> set bus_probe_algorithm new
>>> init
```

### 4.18.2 Setting Console Flags

Before starting the boot procedure on a Professional Workstation XP1000, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:  

```
>>> set boot_osflags ""
```
2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time it is turned on, when it crashes, or when you press the Halt button.  

```
>>> set auto_action halt
```
3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.  

```
>>> set boot_file
```

### 4.18.3 Booting from CD-ROM

Follow these steps to boot Professional Workstation XP1000 workstations from a CD-ROM:

1. Insert the *Operating System Volume 1* CD-ROM.

2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka400.4.0.6.0 DKA400 RRD43 2893
dva0.0.0.0.0.1 DVA0
ewa0.0.0.13.0 EWA0 08-00-2B-3E-B6-C8
pka0.7.0.6.0 PKA0 SCSI Bus ID 7
```

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string `RRD`. In the previous example, the CD-ROM device is `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKA`.

3. Enter the `boot` command and the appropriate boot device string for your system. For example, to boot the system from the CD-ROM drive with console device name `dka400`, enter the following command:

```
>>> boot dka400
```

## 4.18.4 Booting from RIS

To boot a Professional Workstation XP1000 workstation over the network, make sure it is registered as a client of a RIS server. Refer to the *Sharing Software on a Local Area Network* guide for information on registering a client.

Use the `show device` command to determine which network adapter (such as `ewa` or `era`) is in use:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka400.4.0.6.0 DKA400 RRD43 2893
dva0.0.0.0.0.1 DVA0
ewa0.0.0.13.0 EWA0 08-00-2B-3E-B6-C8
pka0.7.0.6.0 PKA0 SCSI Bus ID 7
```

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot -fi "" ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.19 AXPpci, AXPvme, AlphaVME SBCs; PICMG Alpha CPUs

This section provides instructions for booting AXPvme, AlphaVME, and AXPpci single-board computers (SBCs) and PICMG Alpha CPUs (EBM2 $n$ -AZ). You must update your system's firmware before installing this version of the operating system. Refer to Section 1.4.6 for more information about updating firmware.

### 4.19.1 Setting Console Flags

Before starting the boot procedure, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the SBC at the console prompt each time the SBC is turned on, when the SBC crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.

```
>>> set boot_file
```

### 4.19.2 Booting from CD-ROM

Follow these steps to boot the AXPvme 64, AXPvme 100, AXPvme 160, AXPvme 166, AXPvme 230, Alpha VME 4/224, Alpha VME 4/288, and Alpha VME 5/nnn SBCs from a CD-ROM optical disk:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:



```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka200.2.0.2.0 DKA200 RZ26 T392
dka400.4.0.2.0 DKA400 RRD42 4.5d
ewa0.0.0.1.0 EWA0 08-00-2B-39-88-3A
pka0.7.0.2.0 PKA0 SCSI Bus ID 7
```

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string RRD. In the previous example, the CD-ROM device is RRD42. The device boot string for your system appears in that same line. The device boot string begins with the letters DKA.

3. Enter the `boot` command and the appropriate boot device string for your system. For example, to boot the system from the CD-ROM drive with console device name `dka400`, enter the following command:

```
>>> boot dka400
```

### 4.19.3 Booting from RIS

To boot your SBC over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client.

Use the `show device` command to determine which network adapter is in use. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka200.2.0.2.0 DKA200 RZ26 T392
dka400.4.0.2.0 DKA400 RRD42 4.5d
ewa0.0.0.1.0 EWA0 08-00-2B-39-88-3A
pka0.7.0.2.0 PKA0 SCSI Bus ID 7
```

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the bootp protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

## 4.20 AlphaPC64, AlphaPC164, EB64+, EB66+, EB164

This section provides instructions for booting AlphaPC64, AlphaPC164, EB64+, EB66+, and EB164 single-board computers (SBCs).

### 4.20.1 Setting Console Flags

Before starting the boot procedure on AlphaPC64, AlphaPC164, EB64+, EB66+, and EB164 SBCs, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the kernel takes correct action upon boot:

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the SBC at the console prompt each time it is turned on, when it crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.

```
>>> set boot_file
```

### 4.20.2 Booting from CD-ROM

Follow these steps to boot AlphaPC64, AlphaPC164, EB64+, EB66+, and EB164 single-board computers from a CD-ROM optical disk:

1. Insert the *Operating System Volume 1* CD-ROM.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka400.4.0.6.0 DKA400 RRD43 2893
dva0.0.0.0.1 DVA0
ewa0.0.0.13.0 EWA0 08-00-2B-3E-B6-C8
```

```
pka0.7.0.6.0 PKA0 SCSI Bus ID 7
```

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

In the third column, look for the line with the CD-ROM device string RRD. In the previous example, the CD-ROM device is RRD43. The device boot string for your system appears in that same line. The device boot string begins with the letters DKA.

3. Enter the `boot` command and the appropriate boot device string for your system. For example, to boot the system from the CD-ROM drive with console device name `dka400`, enter the following command:

```
>>> boot dka400
```

### 4.20.3 Booting from RIS

To boot your AlphaPC64, AlphaPC164, EB64+, EB66+, or EB164 SBC over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client. Set your device protocols to boot from a RIS server.

Use the `show device` command to determine which network adapter is in use. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

```
dka200.2.0.2.0 DKA200 RZ26 T392
dka400.4.0.2.0 DKA400 RRD42 4.5d
ewa0.0.0.1.0 EWA0 08-00-2B-39-88-3A
pka0.7.0.2.0 PKA0 SCSI Bus ID 7
```

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the bootp protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.



# 5

---

## Performing Full Installations

This chapter describes how to perform a full installation, including the information you supply for a default or custom installation and how to respond to prompts for a cloned installation.

---

### Note

---

This release provides enhancements to the full (default or custom) installation process and to the installation cloning process. Administrators can modify the configuration description file (CDF) to achieve an unattended installation cloning process. In addition, the installation process searches for and invokes user-supplied files to enable customizations on the system to be installed. Refer to Appendix C for more information.

---

The goal of this chapter is to provide the information necessary for you to perform the user actions shown in Table 5-1.

**Table 5-1: Summary of User Actions**

---

**By reading this chapter, you will ...**

---

Respond to prompts for a cloned installation or use the text-based or graphical interface to enter all information required by the full installation procedure.

Enter boot commands when requested by the installation procedure.

Select kernel options for custom installations.

Log in to the newly-installed system as the user `root`.

---

Remember that neither the cloned, default, nor custom installation preserves user or data files, so make sure your current operating system has been backed up. If errors occur that prevent a successful installation of this version of the operating system, you may need to restore the previous version of the operating system.

Before beginning the installation, ensure that you have performed all prerequisite tasks as described in Section 1.4.

## 5.1 What You See After Booting the System

What you see after you boot your system from the distribution media depends on the following:

- If you are installing a hardware product kit during a full installation, refer to Section 6.4.
- If you are performing a full installation without a hardware product kit, refer to Section 5.1.1 if your system console has graphics capabilities, or refer to Section 5.1.2 if your system console does not have graphics capabilities.
- If you are performing a cloned installation, refer to Section 5.1.3.

### 5.1.1 If Your System Has Graphics Capabilities

If your system console has graphics capability, the X Server is started and an `Installation Setup` window displays.

#### 5.1.1.1 Unique Features of the Graphical User Interface

This section describes the unique features of the graphical user interface:

- Click on the fields in the `Installation Setup` window to enter your responses to the installation procedure.
- With the exception of the `Root Password` and `Date and Time` fields, you can enter the information on the `Installation Setup` window in any sequence. When you specify a password in the `Root Password` field, you are required to validate the password by entering it again. When you enter either a date or a time, you are required to enter the other as well.
- The graphical user interface contains extensive online help. To display the online help, click on the **Help** button.
- For ease of use, you can click on the **Setup Done** button as soon as the `Installation Setup` window displays because default responses have been provided in all fields where an entry is required. Keep in mind that if you do this, only the mandatory software subsets are installed and the installation will occur on the default disk that is chosen by the installation procedure.
- If you do not provide certain essential site-specific information (such as `root password`, your system's host name, the date and time, and location and time zone), you will be prompted to enter that information during the configuration phase of the installation process.

- If you are performing a custom installation, you can select to install all software subsets at once by clicking on the **Add All** button in the Software Selection window.
- You can access the Disk Configuration application directly from the Installation Setup window to view or modify disk partitions.

## 5.1.2 If Your System Does Not Have Graphics Capabilities

If your system console does not have graphics capability, the following text-based installation procedure is displayed:

```

Welcome to the DIGITAL UNIX Installation Procedure

This procedure installs DIGITAL UNIX onto your system. You will
be asked a series of system configuration questions. Until you
answer all questions, your system is not changed in any way.

During the question and answer session, you can go back to any
previous question and change your answer by entering: history
You can get more information about a question by entering: help

There are two types of installations:

o The Default Installation installs a mandatory set of
 software subsets on a predetermined file system layout.

o The Custom Installation installs a mandatory set of
 software subsets plus optional software subsets that you
 select. You can customize the file system layout.

The UNIX Shell option puts your system in single-user mode with
superuser privileges. This option is provided for experienced
UNIX system administrators who want to perform file system or
disk maintenance tasks before the installation.

The Installation Guide contains more information about installing
DIGITAL UNIX.

1) Default Installation
2) Custom Installation
3) UNIX Shell

Enter your choice:

```

You may want to refer to Section H.1 and Section H.2 in Appendix H to review sample text-based installations before you actually start your own text-based installation. Reviewing these sample installations gives you an idea of what to expect. You can also use these sample installations to follow the progress of your own system installation.

### 5.1.2.1 Unique Features of the Text-Based Interface

This section describes the unique features of the text-based interface:

- The text-based interface presents a series of questions that you must answer before any disk configuration or software installation begins.

Until you answer all questions and start the installation, your system is not changed in any way.

- At any time during the question and answer session, you can enter the word `history` to go back and change your answers.
- Online help is available for every question by entering the word `help` or a `?` (question mark) at the corresponding prompt.

Section 5.2 summarizes the information you must enter.

### 5.1.3 If You are Performing a Cloned Installation

When the system to be installed is booted either from the distribution media or from a RIS server, the system checks to see if a Configuration Description File (CDF) is available for a cloned installation. If a CDF is found and the `prompt` variable in the CDF is either not set or set to `yes`, then the system displays the following:

```
A Configuration Description File, was specified for use during the
installation of this system.
The Configuration Description File can be used by the installation to
provide the information related to file system layout and software
selection.
```

```
If you choose to use the Configuration Description File, the installation
will proceed and you will not have to answer any questions. If you decide
not to use the Configuration Description File, the installation will
continue interactively.
```

```
Would you like to use the Configuration Description File? (y/n) [y]:
```

- If you decide not to use the CDF for a cloned installation and enter `n`, an interactive installation procedure begins. What you see next depends on whether or not the system console has graphics capabilities. Refer to Section 5.1.1 or Section 5.1.2 as appropriate.
- If you enter `y`, the CDF is read in, either from the local media or from the RIS server, and is validated for use on your system. Validation includes ensuring that the disk name and disk type specified in the CDF exists on your system. Refer to Section 5.1.3.1 and Section 5.1.3.2 for more information about CDF validation.

If the `prompt` variable in the CDF is set to `no`, then the system will use the CDF without prompting the user. The system displays the following:

```
A Configuration Description File, was specified for use during the
installation of this system.
The Configuration Description File will be used by the installation to
provide the information related to file system layout and software
selection.
```

For information on the `prompt` variable and other variables in a CDF, see Appendix C.



### 5.1.3.1 Successful CDF Validation

If CDF validation is successful, the installation procedure continues as shown in Section 5.16. File systems and swap space are created as specified in the CDF, and the software subsets defined in the CDF begin loading after file system creation. Site-specific information such as host name, geographic location and time zone, and date and time is obtained from the RIS server if a RIS installation is performed. If a CD-ROM installation is performed, the host name, geographic location, and time zone are all provided by fields in the CDF. If the CDF variable `timeset` is blank or is set to `no`, the system will request the date and time be entered during the installation. If `timeset` is set to `yes`, then the system will set the system time automatically as specified by the system clock.

Later in the installation process, you will be required to boot from the newly installed disks, as shown in Section 5.18 and to enter a `root` password as shown in Section 5.5 (if a password is not already contained in the CDF).

### 5.1.3.2 CDF Validation Failures

This section describes the types of CDF validation failures that may occur. If you encounter CDF validation failures during a RIS installation, you should verify with your RIS system administrator that your system is registered to the correct CDF. If you encounter CDF validation failures during an installation using a diskette or CD-ROM, you should verify that you have the proper CDF for the type of system being installed.

- If CDF validation fails because the disk name specified in the CDF does not match a disk name attached to your system, the following message displays:

```
*** Validating CDF prior to starting installation...
*** Validation Error:

The disk name "rz8" was not found on this system when
attempting to validate the following filesystem(s): root usr
```

- If CDF validation fails because the CDF file includes a disk type for a specific device but the device on your system has a different disk type, the following message displays:

```
*** Validating CDF prior to starting installation...
*** Validation Error:

The rz25 disk type specified in the Configuration Description
File does not match the name/type found on this system for the
following device(s): rz3/rz261
```

The previous validation errors are saved in the `/var/tmp/install.log` file for your reference until you reboot the system.

You may restart the cloned installation procedure by doing one of the following:

- Enter `restart` at the `root (#)` system prompt
- Reboot the system from the RIS server

## 5.2 Summary of User Input

Regardless of the user interface (graphical or text-based), you should be prepared to provide the information shown in Table 5–2 for default and custom installations.

**Table 5–2: User Input Required for Installation Procedure**

| User Input                                           | Default Installation | Custom Installation |
|------------------------------------------------------|----------------------|---------------------|
| Installation Type                                    | X                    | X                   |
| Host name <sup>a</sup>                               | X                    | X                   |
| Root password <sup>b</sup>                           | X                    | X                   |
| Root password verification <sup>b</sup>              | X                    | X                   |
| Date <sup>a</sup>                                    | X                    | X                   |
| Time <sup>a</sup>                                    | X                    | X                   |
| Location <sup>a</sup>                                | X                    | X                   |
| Time zone <sup>a</sup>                               | X                    | X                   |
| Disk for root file system                            | X                    | X                   |
| File system type for root file system                |                      | X                   |
| Disk and partition for <code>/usr</code> file system |                      | X                   |
| File system type for <code>/usr</code>               |                      | X                   |
| Disk and partition for first swap area               |                      | X                   |
| Disk and partition for optional second swap area     |                      | X                   |
| Disk and partition for <code>/var</code> file system |                      | X                   |
| File system type for <code>/var</code>               |                      | X                   |
| Optional software subsets to install                 |                      | X                   |

**Table 5–2: User Input Required for Installation Procedure (cont.)**

| User Input                           | Default Installation | Custom Installation |
|--------------------------------------|----------------------|---------------------|
| Boot commands <sup>c</sup>           | X                    | X                   |
| Kernel options                       |                      | X                   |
| Log in as the user <code>root</code> | X                    | X                   |

<sup>a</sup>This site-specific information is obtained from the RIS server during Remote Installation Services (RIS) installations and cannot be edited. Enter this information only if you are using the CD-ROM as the distribution source of the software. If you do not make an entry in these fields, you are prompted for this information during the installation configuration phase.

<sup>b</sup>If you do not specify a root password, you are prompted for one during the installation configuration phase.

<sup>c</sup>The boot commands you have to enter are supplied by the installation procedure. When appropriate, enter the boot command sequence exactly as shown on your screen. However, if your system has unattended installation capability, your system will reboot automatically and, therefore, will not prompt you to enter the boot commands.

Section 5.3 through Section 5.20 provide additional reference information for each piece of information required by the installation procedure.

## 5.3 Choosing the Installation Type

Table 5–3 compares the features of the default and custom installation types to help you decide which installation type best suits your needs.

**Table 5–3: Comparison of the Default and Custom Installations**

| Default Installation                                                                                                                                                                                | Custom Installation                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The <code>root</code> and <code>/usr</code> file systems and swap space will be on the same disk; <code>/var</code> is a directory under <code>/usr</code> .                                        | The <code>root</code> , <code>/usr</code> , and <code>/var</code> file systems and swap space can be on any disk and each can be put on separate disks.             |
| Always uses the default partition table.                                                                                                                                                            | Option to use the default or custom partition table.                                                                                                                |
| Uses the default file system layout: <code>root</code> is on the <code>a</code> partition; <code>/usr</code> is on the <code>g</code> partition, and swap space is on the <code>b</code> partition. | Except for the <code>root</code> file system, which is always on the <code>a</code> partition, uses any disk partition on any disk for file systems and swap space. |
| UFS (UNIX file system) is the file system type for all file systems.                                                                                                                                | Choice between UFS or the Advanced File System (AdvFS) as the file system type.                                                                                     |

**Table 5–3: Comparison of the Default and Custom Installations (cont.)**

| Default Installation                                    | Custom Installation                                                                                                  |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Configures one swap area.                               | Option to configure two swap areas.                                                                                  |
| Automatically installs mandatory software subsets only. | Installs mandatory software subsets automatically and then offers the option to install additional software subsets. |

You should perform a custom installation if any one of the statements shown in Table 5–4 is true.

**Table 5–4: Criteria for Deciding to Perform a Custom Installation**

**Choose the custom installation if you want to...**

Keep or modify the existing customized disk partition table.

Allocate two swap areas.

Use either the Advanced File System (AdvFS) or the UNIX File System (UFS) as the file system type for `root`, `/usr`, or `/var`.

Customize the file system layout by choosing the disk and the disk partitions on which the `root`, `/usr`, and `/var` file systems and swap area will reside.

Create a separate file system for `/var`.

Customize the software on your system by installing additional optional software subsets.

Customize kernel options.

Use the system as a dataless management services (DMS) server.<sup>a</sup>

Use the system as a remote installation services (RIS) server.<sup>b</sup>

<sup>a</sup>If you are installing a system that you plan to use as a dataless management services (DMS) server, you must perform a custom installation because you need more than just the mandatory software subsets on a DMS server. Instead of creating a link from `/var` to a mount point, you may want to create a separate file system for `/var` because the file systems needed for the dataless areas are located in the `/var/adm/dms` directory. Refer to *Sharing Software on a Local Area Network* for information about setting up disk partitions for DMS servers, software requirements for DMS servers, and installing software on DMS clients.

<sup>b</sup>If you plan to install software on a remote installation services (RIS) server, you must perform a custom installation because you need more than just the mandatory software subsets on a RIS server. Instead of creating a link from `/var` to a mount point, you may want to create a separate file system for `/var` because the file systems needed for RIS areas are located in the `/var/adm/ris` directory. Refer to *Sharing Software on a Local Area Network* for information about setting up RIS servers.

You should perform a default installation if all of the statements shown in Table 5–5 are true.

**Table 5–5: Criteria for Deciding to Perform a Default Installation**

---

**Choose the default installation if you want to ...**

---

Use only one disk to contain the `root` and `/usr` file systems and swap space.

Make the `var` area a directory under `/usr`.

Make no decisions about which disk partitions are used for the `root` and `/usr` file systems.

Use the UNIX file system (UFS) as the file system type for the `root` and `/usr` file systems.

Use the default partition table.<sup>a</sup>

Allocate one swap area.

Install only the mandatory software subsets; optional software can be installed after the default installation completes.

Get your operating system up and running with limited decision-making. The default installation may be more appropriate for users with no previous UNIX experience.

---

<sup>a</sup>The sizes of the default disk partitions were designed so that a default installation fits on the disk. The default disk layout is: `root` is on partition `a`, `/usr` is on partition `g`, the `var` area is a directory under `/usr`, and the `swap` area is on partition `b`. If you perform a default installation, you cannot preserve existing custom partition tables or disk labels. Custom partition tables are partition tables that have been changed to sizes other than the default values. If a customized partition table exists, it will be overwritten.

If you are planning to install additional layered products later or may use this system as a DMS or RIS server, the default installation will not suit your needs.

The default installation is recommended for systems with limited disk space.

### 5.3.1 Navigating Through the Installation Setup Window

Table 5–6 describes how to navigate through the `Installation Setup` window for custom installations:

**Table 5–6: Quick Navigation Through the Custom Installation Setup Window**

---

**For custom installations...**

---

Make an entry in the text entry fields in the `Installation Setup` window.

Optionally click on `Partition Disks...` if you want to use the `Disk Configuration Utility` to resize disk partitions.

Optionally click on `Select Software...` to display the software selection window. When you are finished selecting optional software, click on `OK` to return to the `Installation Setup` window.

### **Table 5–6: Quick Navigation Through the Custom Installation Setup Window (cont.)**

---

#### **For custom installations...**

---

Click on `Setup Done`.

Click on `OK` to verify that you are ready to begin the installation procedure.

---

Table 5–7 describes how to navigate through the `Installation Setup` window for default installations:

### **Table 5–7: Quick Navigation Through the Default Installation Setup Window**

---

#### **For default installations...**

---

Make an entry in the text entry fields on the `Installation Setup` window.

Optionally click on `View Software` to view the mandatory software that will be installed. You cannot change (add or delete) the software subsets on this list during default installations. Click on `OK` to return to the `Installation Setup` window.

Click on `Setup Done`.

Click on `OK` to verify that you are ready to begin the installation procedure.

---

## **5.4 Specifying a Host Name**

If the host name was not obtained from the server (during a RIS installation), you must give your system a name. The host name is used to identify your system on the network. The following lists the guidelines for host names:

- Host names may contain from 2 to 63 alphanumeric upper or lower case characters (a-z, A-Z, 0-9).
- The first character in a host name must be a letter.
- Hyphens (-) are permitted in host names. Periods (.) are permitted only if you are entering the fully qualified domain name. Fully qualified host names can contain a maximum of 254 characters.

Following are examples of correct and incorrect host names:

|                   |                        |                           |                                 |
|-------------------|------------------------|---------------------------|---------------------------------|
| <b>Correct:</b>   | <code>mysystem</code>  | <code>mysystem.com</code> | <code>abc-university.edu</code> |
| <b>Incorrect:</b> | <code>my_system</code> | <code>1999.com</code>     | <code>binary</code>             |

---

#### Note

---

**Do not** use the words `generic` or `binary` for your host name because they have been reserved for use by the operating system.

---

You may want to consult your site system administrator before choosing your host name because site-specific restrictions (such as maximum length) may have been defined. You also do not want to choose a host name that is already being used by another system. If your system is already running a previous version of the operating system and is connected to a network, you should keep the same host name because changing it would impact how your system is recognized on the network.

If you do not supply a host name, you are prompted for one during the installation configuration phase.

## 5.5 Specifying a Root Password

Every operating system has a superuser who has permissions that supersede those of ordinary users. This superuser is often referred to as the `root` user. The superuser is usually the system administrator. This user has access to all files and all devices and can make any changes to the operating system. The `root` user is said to have *superuser privileges*. For that reason, the `root` user (or `root` account), needs a special password.

Passwords should contain a combination of upper and lower case letters and a minimum of six to a maximum of 16 characters. The operating system verifies only the first eight characters. You should use numbers and special characters such as the dollar sign (`$`), the percent sign (`%`), the number sign (`#`), the period (`.`), the hyphen (`-`), the underscore (`_`), or the at sign (`@`) in your password.

When choosing a password, you should **not** use:

- Words found in any dictionary (in any language)
- Personal information about you or your family such as names, addresses, birthdays, social security numbers, telephone numbers, names of pets
- Any combination of words in the dictionary and personal information

Do not choose a password that can be easily guessed by someone who knows you. Because the `root` user has absolute power over the operating system, the `root` password should be carefully protected.

The following are examples of correct and incorrect root passwords:

|                   |           |            |           |          |
|-------------------|-----------|------------|-----------|----------|
| <b>Correct:</b>   | U8one2too | wht%IZ-dne | DL_wrks@9 | 9Pnt.99% |
| <b>Incorrect:</b> | lowercase | nonumbers  | Spot      | 7-6-58   |

Remember this password because you will need it to log in as the user `root` the first time you log in to the system after the installation. You can change your `root` password at any time with the `passwd` command. When you enter the password, it is not displayed on your screen for security reasons. You must enter your new password again for verification.

If you do not supply a `root` password, you will be prompted for one during the installation configuration phase.

## 5.6 Entering the Date and Time

If the date and time was not obtained from the server (during a RIS installation), you must enter the current date and time. If you enter either the date or the time, you must enter the other.

If you do not supply a date and time, you are prompted to enter the date and time during the installation configuration phase.

The date is entered in the format `mm-dd-yyyy`. The `mm` represents the month, `dd` represents the day of the month, and `yyyy` represents the year. For example, the digits entered in the order `12 17 1999` represent December 17, 1999. The text-based interface requires that a hyphen (-) separate each set of digits, for example, `12-17-1999`.

Enter the time in digits using the 24-hour clock in the format `hh:mm`. The `hh` represents the current hour, for example, `14` for 2 o'clock in the afternoon. The `mm` represents the minutes, for example, `06` for the sixth minute of the hour.

If you do not specify the time, messages displayed during the installation procedure are shown in Greenwich Mean Time (GMT).

If you do not specify a date and time for CD-ROM installations, the date and time recorded by the installation procedure might be later or earlier than the date and time for your time zone because the procedure has no way to determine date and time until the configuration phase when you will be required to enter a date and time. Although the absolute time displayed in the installation is incorrect, relative time elapsed is accurate. Therefore, you can still use time-stamping to determine how long the installation is taking.



## 5.7 Entering the Location and Time Zone

If the location was not obtained from the server (during a RIS installation), a menu lists the locations that are available. The location is used to set the time zone. If the location has more than one time zone, for example the United States, you must specify a time zone for the location. You should select the location that best describes your geographic location. If you do not select a location during a text-based installation, the default is Greenwich Mean Time (GMT). Table 5–8 describes the acronyms that appear in the location menu:

**Table 5–8: Definitions of Location Acronyms**

| Location Acronym | Description                            |
|------------------|----------------------------------------|
| CET              | Central European Time                  |
| EET              | Eastern European Time                  |
| Factory          | Specifies No Time Zone                 |
| GB-Eire          | Great Britain/Ireland                  |
| GMT              | Greenwich Mean Time                    |
| MET              | Middle European Time                   |
| NZ               | New Zealand                            |
| NZ-CHAT          | New Zealand, Chatham Islands           |
| PRC              | Peoples Republic of China              |
| ROC              | Republic of China                      |
| ROK              | Republic of Korea                      |
| SystemV          | Specific to System V operating systems |
| UCT              | Greenwich Mean Time                    |
| US               | United States                          |
| UTC              | Greenwich Mean Time                    |
| Universal        | Greenwich Mean Time                    |
| W-SU             | Western Soviet Union <sup>a</sup>      |
| WET              | Western European Time                  |
| Zulu             | Coordinated Universal Time             |

<sup>a</sup>The W-SU time zone follows MET time zone rules. W-SU is provided only for backward compatibility and the MET time zone should be used instead.

If you do not supply a geographic location and time zone, you are prompted for this information during the installation configuration phase.

## 5.8 Choosing the Disk for the Root File System

The installation procedure requires that you specify a disk to contain the `root` file system. If you are performing a default installation, this is the only decision you have to make.

There are two requirements for the disk that contains the `root` file system:

1. The disk you choose for the `root` file system must be one of the supported disks shown in Table 3-3.
2. The `root` file system is always located on partition `a` of the disk you choose. Partition `a` must be at least 98,304 blocks (48 Mb) and must start at block 0 (`zero`), the beginning of the disk. You should select a disk where the size of partition `a` is at least 64 Mb (131,000 blocks). Refer to Chapter 3 for root file system considerations.

The following information is displayed for each disk connected and available to your system:

- Device name, for example, `rz0`
- Disk type, for example, `RZ26`
- Disk number, for example, `0`
- Controller type to which the disk is connected, for example, `SCSI`
- Controller number to which the disk is connected, for example, `0`

The unit number for the disk that contains the `root` file system must be in the range 0 to 255 for `ra` type devices, in the range 0 to 47 for `re` type devices (SCSI disks employing RAID technology), and in the range 0 to 511 for `rz` type devices. This information is pertinent if your system has, for example, more than 511 `rz` disks because the disks with unit numbers greater than 511 will not be displayed for selection during the installation. The installation procedure automatically displays the device name (with unit numbers) for each disk connected to your system.

### 5.8.1 Disk Size Restrictions

If you are using the text-based installation interface, disks that do not have partitions large enough to hold the `root` and `/usr` file systems and the `swap1` area on the same disk are marked with an asterisk to the left of the `Disk Type` column. Some disks have a partitions large enough to contain the root file system, but neither disk has a `g` (or other) partition large

enough for the `/usr` file system. Neither disk type is able to hold all file systems and another disk is required.

This is not a problem during custom installations because you have the opportunity to select different disks and partitions. If you are performing a custom installation, you can, for example, use smaller-capacity disks to hold the root file system and allocate the `/usr` (and other) file system to other disks and disk partitions on your system. The default installation uses only default partitions and puts all file systems on a single disk. Therefore, a smaller-capacity disk cannot be used for a default installation.

If you are performing a default installation with the text-based interface, and you try to install the operating system on a disk that is too small, you will see a message similar to the following:

```
The disk you selected is too small for a Default installation.
You may switch to a Custom installation to distribute the software
on multiple disks, or you may select a larger disk to continue the
Default installation.
```

```
1) Switch to Custom installation
2) Select a different disk
```

```
Enter your choice:
```

If you select option 1, you can use the custom installation procedure to allocate partitions on other disks for the `/usr` and other file systems or spread the software across multiple disks. Review Chapter 1 and read Chapter 3 before you continue with the custom installation.

Option 2 lets you choose a different disk. You must choose a disk large enough to contain `root` file system, `/usr` file system, and `swap1` area to continue the default installation or the same message is repeated. If your system has another disk and it is not marked with an asterisk, you can choose this option and continue with the installation. Refer to Software Subset Information appendix to the *Release Notes* and the *Software Product Description* (SPD) to ensure that the disk you choose has enough space.

## 5.8.2 Disk Label Handling

The disk selected to contain the `root` file system always has a new disk label written to it, regardless of whether one already exists or not. This ensures that a valid bootstrap exists on the disk. Without one, the disk is not bootable.

Before writing a new disk label, the disk is checked for a preexisting disk label. If none is found, which is typical for a disk that has never been used for the operating system before, a disk label is written using the default partition information.

The following describes how disk labels are handled by the installation procedure:

- During a default installation, if the disk chosen for `root` already had a default disk label, the disk label is preserved, new boot blocks are written, and the disk label is restored. If the disk chosen for `root` had a customized disk label, a default disk label is applied, and the partitions used for `root`, `/usr`, and `var` and any previously used partitions that overlap may be overwritten.
- During a custom text-based installation, if no disk label exists, a disk label containing the default partition information is used. If a disk label does exist, its partition information is compared to the default partition information. If the disk labels differ, you can choose either the customized or the default.
- During a custom graphical installation, if no disk label exists, a disk label containing the default partition information is used. A warning displays if an existing disk label does not match the default partition table and the default file system layout was used. You then have the option to invoke the `Disk Configuration` application to change the partition table.

If an existing disk label is selected, it is saved and rewritten to the disk with a valid bootstrap. The new disk label is identical to the previous disk label. If the default disk label is selected, a disk label containing the default partition information is used.

### 5.8.3 Preserving Data on an Existing Disk

During a custom installation, you can choose the disk partitions on which the `root`, `/usr`, and `/var`, file systems and `swap` areas will be installed. If the chosen partitions contain data or user files, the data is lost (overwritten). Selecting a partition for one of these file systems that overlaps the partitions containing the data to be preserved has the same effect. Also, modifying the partition information in the disk label in such a way that the partitions containing data have their size, offset, or both modified causes the data to be lost. However, if the partitions containing the data are undisturbed, their contents will be untouched.

Assuming that the partitions to be preserved were undisturbed during the installation, the partitions can be used on the newly-installed system. If the partition contained a file system, it should be capable of being mounted and accessed. If the partition you are preserving were using the Advanced File System (AdvFS), make sure you select AdvFS as the file system type.

## 5.8.4 ULTRIX Partition Tables

This section applies only if you chose the custom installation.

If the disk you choose to contain the root file system was previously used on an ULTRIX system, it will be formatted with ULTRIX partition tables. You will see a message similar to the following:

```
ULTRIX compatible partition data found.
This data may be different than the standard
partition layout information in /etc/disktab.
```

```
ULTRIX partition table layout is:
partition bottom top size overlap
a 0 40959 40960 c,h
b 40960 163839 122880 c
c 0 832526 832527 a,b,d,e,f,g,h
d 163840 386735 222896 c,g
e 386736 609631 222896 c,g
f 609632 832526 222895 c,g
g 163840 832526 668687 c,d,e,f
h 0 0 0 a,c
```

```
Use the ULTRIX-style partition data? [y]:
```

If you enter `y` to use the ULTRIX layout, an operating system disk label is created for the disk. This label will correspond to the existing ULTRIX partition table. If you enter `n`, the default partitions for the operating system are created.

## 5.8.5 Using the Default or Existing Disk Partition Table

During a custom installation, the graphical user interface detects a customized partition table when `root`, `/usr`, and `var` are on the same disk. When you click on the **Select Software...** button, a dialog box notifies you that the existing, customized disk partition table does not match the default partition table.

- If you want to view or change the existing partition table, click on **Cancel** to dismiss the dialog box and then click on **Partition Disks...**
- If you want to use the customized disk partition table and proceed directly to software selection, click on **OK** to dismiss the dialog box and display the software selection window.

If you are using the text-based user interface to perform a custom installation and your system has nonstandard disk partitions on the disk that contains the `root` file system, you are prompted to keep the nonstandard partitions or replace them with the disk's default partitions.

If you have carefully planned your partition layout and you want to keep the partitions you have on the disk, choose the existing partition table. If neither the default nor existing partition tables are suitable, exit the installation procedure and use either the `Disk Configuration` application or the `disklabel` command to modify the partitions on the disk.

The following information is shown for each disk partition:

- **Partition** - provides the name of the partition (the letters a through h).
- **Start** - the block number at which the partition begins.
- **Size** - the total number of 512-byte blocks in the partition. One block equals  $\frac{1}{2}$  kilobyte (Kb) or 512 bytes. One megabyte (Mb) equals 1024 Kb (1,048,576 bytes), or 2048 blocks. If you need to determine the size in Mb, divide the size in blocks by 2048.
- **End** - the block number at which the partition ends.
- **Overlaps** - displays the other partitions with which the partition overlaps.

If the disk you chose has a customized partition table, the display is similar to the following:

The rz3 disk has a non-default partition table.

|          | Partition | Start   | Size    | End     | Overlaps      |
|----------|-----------|---------|---------|---------|---------------|
| Default  | a         | 0       | 131072  | 131071  | c             |
|          | b         | 131072  | 262144  | 393215  | c             |
|          | c         | 0       | 2050860 | 2050859 | a b d e f g h |
|          | d         | 393216  | 552548  | 945763  | c g           |
|          | e         | 945764  | 552548  | 1498311 | c g h         |
|          | f         | 1498312 | 552548  | 2050859 | c h           |
|          | g         | 393216  | 819200  | 1212415 | c d e         |
|          | h         | 1212416 | 838444  | 2050859 | c e f         |
| Existing | a         | 0       | 263340  | 263339  | c             |
|          | b         | 263340  | 1787520 | 2050859 | c d e f g h   |
|          | c         | 0       | 2050860 | 2050859 | a b d e f g h |
|          | d         | 393216  | 552548  | 945763  | b c g h       |
|          | e         | 945764  | 552548  | 1498311 | b c g h       |
|          | f         | 1498312 | 552548  | 2050859 | b c h         |
|          | g         | 393216  | 819200  | 1212415 | b c d e h     |
|          | h         | 263340  | 1787520 | 2050859 | b c d e f g   |

Choose which partition table to use.

- 1) Default table
- 2) Existing table

Enter your choice:

## 5.9 Description of File System Types: UFS and AdvFS

This section describes the two file system types, UFS and AdvFS, that are available for custom installations. This information may help you decide

whether or not to perform a custom installation because the default installation does not give you the option to choose file system type.

The custom installation lets you choose between the UNIX file system (UFS) or the Advanced File System (AdvFS) as the file system type for the `root`, `/usr`, and `/var` file systems.

Unless you choose otherwise, UFS is the default file system for this operating system.

UFS has a more rigid hierarchy than AdvFS. In a UFS file system, each disk (or disk partition) contains one separate file system. The UFS file system is characterized by a hierarchical structure, the ability to create and delete files, dynamic growth of files, the protection of file data, and the treatment of peripheral devices.

UFS is compatible with the Berkeley 4.3 Tahoe release. UFS allows a pathname component to be 255 bytes, with the fully qualified pathname length restriction of 1023 bytes. This operating system's implementation of UFS supports a maximum file size equivalent to the largest supported file system (128 Gb).

Refer to the *System Administration* guide for more information about UFS.

The POLYCENTER Advanced File System (AdvFS) is a journaled local file system that provides higher availability and greater flexibility than traditional UNIX file systems. Using transaction journaling, AdvFS recovers file domains in seconds rather than minutes after an unexpected restart such as a power failure. AdvFS journaling also provides increased file system integrity. AdvFS provides greater flexibility by allowing file sets (file systems) to share a single storage pool and enabling hard and soft file set quotas in addition to user and group quotas. AdvFS supports a maximum file size of 128 Gb.

Refer to the *System Administration* guide or the *POLYCENTER Advanced File System and Utilities Guide to File System Administration* for more information about AdvFS. Contact your customer representative about obtaining POLYCENTER documentation.

## 5.10 Choosing the Location and File System Type for `/usr`

This section applies only if you are performing a custom installation.

If you chose not to use the default file system layout, you must choose a disk and partition on which the `/usr` file system will reside. You have the option to choose between UFS or AdvFS as the file system type for the `/usr` file system.

You can go back and change the disk and partition for `/usr` if the partition is too small to hold the optional software you select later on in the installation procedure.

If you need more information about the contents of the `/usr` file system, refer to Section 3.8.

## 5.11 Choosing the Location of the `var` Area

This section applies only if you are performing a custom installation.

You can place the `var` area either as a directory under the `/usr` file system or create a separate `var` file system.

If the system you are installing is a Dataless Management Services (DMS) server, you should allocate a separate file system for `/var` because all dataless environments reside in `/var/adm/dms` on the server. Putting `var` under `/usr` could mean that your system will run out of disk space when you create dataless environments. Refer to *Sharing Software on a Local Area Network* for more information about allocating the `var` area and calculating disk space for DMS environments and RIS servers.

If you plan to set up your system as a RIS server, you should allocate a separate file system for `/var` because all RIS environment information is stored in the `/var/adm/ris` directory. In addition, if the RIS user chooses to extract the data for the RIS area from the distribution media rather than symbolically linking to the area, this data also will be stored in `/var/adm/ris`. Refer to *Sharing Software on a Local Area Network* for more information about allocating the `var` area and calculating disk space requirements for RIS servers.

If you decide to create a separate file system for `/var`, you can choose between UFS or AdvFS as the file system type for `var`.

If you need more information about the contents of the `/var` file system, refer to Section 3.9.

## 5.12 Choosing the Location of Swap Space

You must select the disk and partition on which you want to allocate the primary `swap` space. On systems with more than one disk, you should allocate the primary swap partition on a disk other than the disk that contains the `root` file system. You should allocate a minimum of 128 Mb of swap space. If your swap partition selections do not amount to 128 Mb, a warning message is displayed as a reminder that you should allocate more swap space.



Although you cannot choose the swap strategy modes during the installation procedure, there are two strategies for swap allocation: *immediate* and *over-commitment*. The swap strategy mode for systems with greater than 32 Mb of memory is *immediate* mode which means that swap space is allocated when modifiable virtual address space is created. This mode requires more swap space than *over-commitment* mode because it guarantees that there will be enough swap space if every modifiable virtual page is modified. Refer to *System Administration* for more information about swap allocation strategies and how to switch from one swap allocation mode to the other after the installation.

If you need more information about planning swap space, refer to Section 3.10.

### 5.12.1 Allocating a Second Swap Area

This section applies only if you are performing a custom installation.

You have the option to allocate a second swap area during a custom installation.

To optimize the performance of your swap space, spread out your swap space across multiple devices and use the fastest disks for swap devices. To ensure the best performance, place each swap area on a separate disk instead of placing multiple swap areas on the same disk.

## 5.13 Installing Mandatory Software Subsets

The following software subsets are the minimum required for this version of the operating system. A default installation automatically installs only these software subsets; a custom installation installs these software subsets plus the optional software subsets you select. Some of the software subsets designated as mandatory depend on your system's hardware. For example, there are four supported keyboard types; only the software subset supporting the keyboard type connected to your system is mandatory.

```
Base System
Base System - Hardware Support
Base System Management Applications and Utilities
Basic Networking Configuration Applications
Basic Networking Services
Compiler Back End
Hardware Kernel Header and Common Files
Hardware Kernel Modules
Kernel Header and Common Files
Keyboard Support
NFS(tm) Configuration Application
NFS(tm) Utilities
Standard Kernel Modules
Tcl Commands
```

Depending on your system's graphics options, either `DECwindows 75dpi Fonts` or `DECwindows 100dpi Fonts` is mandatory. The mandatory X Server software subset depends on whether your system has a TurboChannel bus, QVision graphics adapter, or PCI bus. If your system has graphics capability, the following windowing and graphical applications software subsets are installed automatically as mandatory:

```
Adobe Fonts
Basic X Environment
CDE Desktop Environment
CDE Mail Interface
CDE Minimum Runtime Environment
DECwindows Fonts
Graphical Base System Management Utilities
Graphical Print Configuration Application
Graphical System Administration Utilities
Netscape Navigator Gold V3.0
Old X Environment
Tk Toolkit Commands
X Fonts
X Servers Base
X Servers
```

If Asynchronous Mode Transfer (ATM) hardware is detected during the installation process, the following software subsets are also installed as mandatory:

```
ATM Commands
ATM Kernel Header and Common Files
ATM Kernel Objects
ATM Kernel Modules
```

The following POLYCENTER AdvFS software subsets usually are optional. They become mandatory during a custom installation if AdvFS is chosen as the file system type for `root`, `/usr`, or `/var`:

```
POLYCTR advfs
POLYCTR advfs Kernel Modules
```

Refer to Appendix D for descriptions of the mandatory software subsets.

The amount of free space remaining in the `root`, `/usr`, and `/var` file systems is displayed to indicate if the disk partitions you chose for those file systems are large enough to hold the mandatory software subsets. Space remaining is shown in gigabytes (Gb), megabytes (Mb), or kilobytes (Kb):

- If you click on `View Software...` for default installations or `Select Software...` for custom installations, the graphical user interface shows the amount of free space remaining in the File System Status fields at the bottom of the software selection window.
- The text-based interface shows space remaining in a display similar to the following:

```
Free space remaining (root/usr/var): 18.4MB/176MB/192MB
```

The installation procedure will prevent you from selecting a disk that is too small to hold the mandatory software subsets. However, if you feel that the disks will not have enough free space remaining after the installation of the mandatory software subsets, go back and select another larger disk. You can also go back and perform a custom installation where you can customize the file system layout.

## 5.14 Selecting Optional Software Subsets

This section applies only if you are performing a custom installation because you cannot select optional software during a default installation. Default installations only let you view the mandatory software that will be installed automatically.

When you select optional software subsets, the amount of free space remaining in the `root`, `/usr`, and `/var` file systems is displayed to indicate if the disk partitions you chose are large enough to hold the software you are selecting. Space remaining is shown in gigabytes (Gb), megabytes (Mb), or kilobytes (Kb).

- The graphical user interface shows the amount of space remaining in the `File System Status` fields at the bottom of the `Software Selection Window`. The amount of space remaining is displayed and updated as you select each optional software subset.
- The text-based interface shows space remaining in a display similar to the following:

```
Free space remaining (root/usr/var): 18.4MB/176MB/192MB
```

The figures are updated after pressing the Return key as each optional software subset is selected.

If you select a software subset that has a dependency with another subset that is not yet selected, the other subset is selected automatically.

- The graphical interface displays a dialog box alerting you of dependent software; clicking on `OK` automatically selects the other software for installation.
- The text-based interface automatically installs software subset dependencies. When you select a software subset with a dependency, a message similar to the following displays:

```
The chosen subset(s) require one or more additional subset(s)
which will be loaded automatically:
* Doc. Preparation Tools (OSFDCMT440)
```

Some optional software subsets are hardware specific; that is they are optional because you do not have the hardware or graphics capabilities

which they support. The `Windowing Environment` category, which provides support for numerous keyboard types, is an example of this situation. Therefore, during text-based installations, it is not necessary to select ALL mandatory and all optional subsets, or during a graphical installation to click on `Add All` because you will install hardware-specific software that your system does not need.

Section H.2.1 in Appendix H provides a list of the optional software subsets that are available to install regardless of the interface you are using. Refer to Appendix D for descriptions of the optional software subsets.

### 5.14.1 Selecting Optional Software Using the Text-Based Interface

When making software subset selections with the text-based interface, separate multiple selections with a space and enter consecutive ranges with a hyphen between the beginning and ending range of numbers. There may be more optional software subsets than can fit on one screen. You may enter your selections screen by screen or all at once at the end of the list.

If you want to change your selections, press the `Return` key until you reach the end of the software subset list. Select the option to `CANCEL` selections and `redisplay menus` to start the selection process again.

It may not be wise to select ALL software subsets because you will select hardware-specific software subsets that your system does not need (such as fonts, keyboard types, and Xservers).

When you are finished making optional software subset selections, press `Return` at the prompt displayed at the end of the software subset list:

```

:
The following choices override your previous selections:
77) ALL mandatory and all optional subsets
78) MANDATORY subsets only
79) CANCEL selections and redisplay menus

Add to your choices, or press RETURN to confirm previous choices.
Free space remaining (root/usr/var): 18.4MB/176MB/192MB
```

```
Choices (for example, 1 2 4-6): 2 5 21-27 Return
```

You have the opportunity to confirm your selections before software subset loading begins.

#### 5.14.1.1 If File Systems Are Full After Selecting Optional Software

As you are selecting optional software subsets using the text-based interface, free disk space is calculated automatically. Review these numbers

as you make your selections because if your file systems are near capacity, you have a few options:

- Use the `history` command to go back and start software selection again or choose the selection number that corresponds to `CANCEL` selections and `redisplay` menus to reselect optional software subsets. This time, select only those software subsets actually needed.
- Use the `history` command to go back and select a different disk with larger partitions to contain the `root`, `/usr`, and `/var` file systems and swap space.
- Use the `history` command to go back and place the file systems and swap space on separate disks.
- If you are an experienced UNIX user, enter the `history` command to return to the first screen and choose the `UNIX Shell` option. Then, use the `disklabel` command to resize your disk partitions.

### 5.14.2 Selecting Optional Software Using the Graphical User Interface

When making software subset selections with the graphical user interface, you can click on an individual software subset or a software subset category (such as `Reference Pages`). Then, click on the **Add** button to add the software subset or software subset category to the list of selected software to install. Double clicking on an individual subset or subset category has the same effect.

It may not be wise to click on the **Add All** button because you will select hardware-specific software subsets that your system does not need. However, an alternative to selecting one software subset (or category) at a time is to add all subsets in one step and then double click on the subsets you do not want. Adding all subsets results in more software than your system needs, so remember to remove all of the hardware-specific subsets related to keyboard types, Xservers, and fonts. The user interface will not let you remove software subsets that are mandatory for your system's hardware configuration.

If you want to remove (or deselect) optional software selections, position the cursor in the `Selected Software` window and double click on the software subset or software subset category you want to remove. Another way is to click on the software subset or software subset category and then click on the **Remove** button to remove the software subset or software subset category from the list. The **Remove** button is enabled only if the selected software subset or software subset category is removable.

When you are finished selecting optional software, click on `OK` to return to the `Installation Setup` window. Click on `Setup Done` to start the installation procedure. Then, click on `OK` to verify that you want the installation to begin.

#### 5.14.2.1 If File Systems Are Full After Selecting Optional Software

As you are selecting optional software subsets using the graphical interface, free disk space is calculated automatically and is shown at the bottom of the window. Review this information periodically to make sure your file systems are not full. You cannot proceed if a file system is full. If the file systems are at or near capacity, you have a few options:

- To free up disk space, remove (or deselect) optional software subsets in the `Selected Software` window.
- Click on `Remove All` to remove all selected optional software. Then, only mandatory software will remain in the `Selected Software` window.
- Return to the `Installation Setup` window and click on the **Partition Disks...** button to resize the disk partitions.
- Return to the `Installation Setup` window and select a different, larger partition on the same or different disk or put file systems and swap space on separate disks.

### 5.15 Verifying the Start of the Installation Procedure

Regardless of whether you choose a default or custom installation, you must indicate that you are ready to begin the installation. Up until this point, except for disk label changes (if any), your system is not changed in any way. This is the last chance you have to verify your disk, partition, and software selections.

- If you are using the text based interface, press the `Return` key at the following prompt to start the installation:

```
You have now answered all questions needed to install
DIGITAL UNIX on this system. Press CTRL/C to cancel the
installation; or type "history" to modify your earlier
answers; or press RETURN to proceed with installation:
```

- If you are using the graphical interface, click on `OK` in the confirmation dialog box to begin the installation.

### 5.16 File System Creation

When the installation procedure starts, the `root`, `/usr`, and `/var` file systems and swap areas are created on the disks and partitions you

selected for a custom installation, or are created on the default disk layout for a default installation.

The screen display looks similar to the following.

```
*** Creating the root file system on device rz1a ***

*** Creating the usr file system on device rz1g ***

*** Creating the swap1 file system on device rz1b ***
```

## 5.17 Loading Software Subsets

Software subsets are loaded after file systems are created. Even though disk space was checked during software selection, disk capacity is checked again before actual software subset loading begins. The software load display shows you how many software subsets will be installed and includes an incremental counter to show progress as the load proceeds.

---

### Note

---

You may see the following message when installing subsets from a RIS server:

```
Broken Pipe
```

You can ignore this message.

---

The software load display looks similar to the following:

```
Checking file system space required to install specified subsets:

File system space checked OK.

*** Loading the operating system software subsets ***

The installation procedure will now load the software on your
disk partitions. This process will take from 45 to 120 minutes
to complete depending on your distribution media and processor
type.

Loading 1 of 28 subset(s)...

Base System
 Copying from system9 (inet)
 Working...Fri Dec 17 13:21:30 EST 1999
 Verifying
 Working...Fri Dec 17 13:23:31 EST 1999

Loading 2 of 28 subset(s)...

Base System - Hardware Support
 Copying from system9 (inet)
 Working...Fri Dec 17 13:24:18 EST 1999
```

```

Verifying
Loading 3 of 28 subset(s)....

Compiler Back End
 Copying from system9 (inet)
 Working...Fri Dec 17 13:24:59 EST 1999
 Verifying
 :
 :
Loading 26 of 28 subset(s)....

Graphical Base System Management Utilities
 Copying from system9 (inet)
 Verifying

Loading 27 of 28 subset(s)....

Graphical System Administration Utilities
 Copying from system9 (inet)
 Verifying

Loading 28 of 28 subset(s)....

Graphical Print Configuration Application
 Copying from system9 (inet)
 Verifying

28 of 28 subset(s) installed successfully.

```

## 5.18 Rebooting the System

When you began the installation process, you booted either from the CD-ROM or over the network. If your system has unattended installation capability, the system is automatically rebooted off the newly installed disks after the software subsets are loaded. If your system does not have this capability, then the screen displays the `boot_osflags` variable, the `bootdef_dev` variable, and the `boot` command that you must enter to reboot your system. At the console prompt (`>>>`), enter the boot command sequence shown on your screen. The boot device you use depends upon your processor type and the installation media you are using. **DO NOT** enter the boot variables that are shown in the example.

---

### Note

---

If your system has a graphics device on its ISA bus that requires a kernel device driver, you must modify the `isacfg` entry to match the kernel device driver before rebooting the system. When you issue this command, let the input line wrap; do not press the Return key in the middle of the line.

```
>>> isacfg -mod -slot slot_number -dev device_number
 -handle vendor_handle -etyp 1 -enadev 1
```



In the previous example, replace *vendor\_handle* with the handle supplied in the vendor's installation documentation. If you performed a RIS installation from a RIS area that already has a kernel device graphics device driver installed and you already set the handle to the one specified in the vendor's installation documentation, you do not need to execute this command.

---

Your screen will look similar to the following if your system does not have unattended installation capability:

Issue the following console commands to set your default bootpath variable and to boot your system disk to multiuser mode:

```
>>> set boot_osflags A
>>> set bootdef_dev DKA0
>>> boot
```

```
syncing disks... done
CPU 0: Halting... (transferring to monitor)
```

```
?05 HLT INSTR
PC= FFFFFC00.0044CA90 PSL= 00000000.00000005
```

Enter the displayed boot commands at the console prompt (>>>).

Software configuration begins after the system boots. Section 5.19.1 provides samples of system configuration screens. A kernel build procedure begins after software configuration.

## 5.19 Software Configuration

Software configuration occurs automatically and refers to the process of tailoring the software subsets, setting the host name, `root` password, date and time, and time zone, system tuning, and building a kernel for use by the operating system and by your hardware.

### 5.19.1 Configuring Base Operating System Software Subsets

The name of each software subset is displayed as it is being configured. Your output depends upon the software subsets you chose to install and your processor type. The display is similar to the following:

```
** SYSTEM CONFIGURATION ***

Configuring "Base System " (OSFBASE440)

Configuring "Base System - Hardware Support " (OSFHWBASE440)

Configuring "Compiler Back End " (OSFCMPLRS440)
```

```
⋮
Configuring "Graphical Base System Management Utilities"
(OSFXSYSMAN440)

Configuring "Graphical System Administration Utilities"
(OSFXADMIN440)

Configuring "Graphical Print Configuration Application"
(OSFXPRINT440)
```

If you did not provide certain essential site-specific information (such as a root password, your system's host name, the date and time, and location and time zone) earlier in the installation procedure, you will be prompted to enter that information now.

What happens after software configuration completes depends on whether you performed a default, custom, or cloned installation. Proceed to Section 5.20 for more information.

## 5.20 Building the Kernel

If you performed a default installation, the kernel is built automatically with the mandatory kernel parameters for your system configuration. None of the options shown in Section 5.20.1 will be included in the kernel. After the kernel build, continue with Section 5.21, which shows you how to log in to your system for the first time. If you want to build a kernel with selected options after the default installation, refer to the `doconfig(8)` reference page.

- If you performed a custom installation or invoked the update installation with the `-i` option, go to Section 5.20.1 to select kernel options.
- If you performed a cloned installation, how the kernel build occurs is defined in the configuration description file (CDF). If the CDF was originally created during a default installation, the kernel is built automatically. If the CDF was originally created during a custom installation, you have the opportunity to select kernel options.

---

### Caution

---

You must configure the ISO 9660 Compact Disc File System (CDFS) kernel option and reboot your system before you can mount the online document set on your CD-ROM drive.

Refer to Section 5.20 and the `doconfig(8)` reference page for information about configuring kernel options.

---

### 5.20.1 Selecting Kernel Options

The kernel options you see on the Kernel Option Selection menu depend on the software subsets that were installed. The installation (or update installation) of certain base operating system software subsets contain a kernel component, and the installation procedure gives you the option to include or exclude the use of the software in the kernel.

If you do not select the kernel option for the product, you will not be able to use that product. For example, if you do not select the Logical Storage Manager (LSM) kernel option, even though you installed the LSM software subsets, you will not be able to use LSM. When you select a kernel option, additional code to support the option is loaded into the kernel. Therefore, selecting All of the above kernel options significantly increases the size of the kernel.

The following kernel subsystems are mandatory on all systems:

- The `/proc` File System - required for System V Environment and used by debuggers
- Quotas - UNIX File System (UFS) file quotas
- Serial Line Interface Protocol (SLIP)
- Network File System (NFS<sup>®</sup>) Server
- STREAMS protocol

The Kernel Option Selection menu has a Help option that displays online help about each kernel option.

The Kernel Option Selection menu is similar to the following:

```
*** KERNEL CONFIGURATION AND BUILD PROCEDURE ***

*** KERNEL OPTION SELECTION ***

Selection Kernel Option

1 LAN Emulation over ATM (LANE)
2 Classical IP over ATM (ATMIP)
3 ATM UNI 3.0/3.1 Signalling for SVCs
4 Asynchronous Transfer Mode (ATM)
5 Advanced File System (ADVFS)
6 System V Devices
7 Kernel Breakpoint Debugger (KDEBUG)
8 NTP V3 Kernel Phase Lock Loop (NTP_TIME)
```

```

9 Packetfilter driver (PACKETFILTER)
10 Point-to-Point Protocol (PPP)
11 STREAMS pkt module (PKT)
12 X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
13 File on File File System (FFM)
14 ISO 9660 Compact Disc File System (CDFS)
15 Audit Subsystem
16 ACL Subsystem
17 Logical Storage Manager (LSM)
18 All of the above
19 None of the above
20 Help
21 Display all options again

```

-----  
Enter the selection number for each kernel option you want. For example,  
1 3 [19]:

**The following is a description of each kernel option:**

#### **LAN Emulation over ATM (LANE)**

This option provides the ATM Forum standard LAN Emulation module. This should be configured when interoperating with other LANE end-systems or routers. This option is not required for Classical IP over ATM.

#### **Classical IP over ATM (ATMIP)**

This option provides IETF standard IP over ATM (RFC 1577). This module should be configured when interoperating with other end-systems and routers that also use Classical IP. This option is not required in configurations that communicate using only LANE.

#### **ATM UNI 3.0/3.1 Signalling for SVCs**

This option provides ATM Forum standard UNI 3.0 and UNI 3.1 signaling protocols. This option should be configured when connected to an ATM network that supports SVCs using UNI signaling. This module does not need to be configured when using PVCs only. In general, UNI signaling and one or both of Classical IP over ATM or LANE will be configured. At least Classical IP over ATM or LANE is required to use TCP/IP over ATM.

#### **Asynchronous Transfer Mode (ATM)**

The ATM option installs the kernel software and applications necessary to use an ATM network. ATM technology is a connection-oriented wide area/local area technology based on the high-speed switching of 53-byte cells across a network. ATM can traverse microwave, copper, and fiber and is not limited to one kind of data. The ATM software subsets are installed automatically if the installation process detects ATM hardware. The operating system's

ATM subsystem supports the ATM Forum User-Networking (UNI) Version 3.0 specification, including ILMI for registration of a single address, UNI signaling for point-to-point connections, and QOS class 0 with best effort delivery.

### System V Devices

The System V Devices option includes kernel options for devices required for the System V environment product. These devices are `/dev/prf` (System V kernel profiler) and `FPM_FS` (File On File File System).

### Advanced File System (AdvFS)

The Advanced File System is a log-based, local file system that allows modification and expansion of file systems by mounting on different devices or adding devices to that file system.

If you chose AdvFS as the file system type for `root`, `/usr`, or `/var`, the subset is mandatory and is not displayed in the menu; AdvFS is configured automatically.

### NTP V3 Kernel Phase Lock Loop (NTP\_TIME)

The `NTP_TIME` kernel option enables the kernel phase lock loop (PLL) time adjusting algorithm described by RFC 1589, for use with the NTP V3 daemon. The NTP V3 daemon can be used without the `NTP_TIME` kernel option.

If the `NTP_TIME` kernel option is configured, a new system call is available to `xntpd` that uses a PLL algorithm in the kernel for improved accuracy when adjusting the system clock frequency. A detailed description of the PLL algorithm can be found in RFC 1589. Refer to *Network Administration* for more information about NTP.

### Kernel Breakpoint Debugger (KDEBUG)

The Kernel Breakpoint Debugger loads the kernel debugger `kdebug` and provides physical memory space for debugging custom kernels.

### `/proc` Application Debugger

The `/proc` file system enables running processes to be accessed and manipulated as files by the system calls `open`, `close`, `read`, `write`, `lseek`, and `ioctl`. While the `/proc` file system is most useful for debuggers, it enables any process with the correct permissions to control another running process. Thus, a parent/child relationship does not have to exist between a debugger and the process being debugged.

### Packetfilter driver

The packetfilter is a software interface that allows an application to send and receive packets directly to or from a local area network (Ethernet or FDDI). The packetfilter provides flexible demultiplexing (filtering) of incoming packets, so that many such applications may run simultaneously.

The operating system's packetfilter implementation supports two filtering models: the original CMU/Stanford model, as supported in ULTRIX, and the BSD Packet Filter (BPF), which provides more flexible and efficient filtering. (BPF was developed by the University of California, Lawrence Berkeley Laboratory.) Several public domain applications that use the packetfilter are integrated in the operating system, including rarpd, tcpdump, tcpslice, nfswatch, and nfslogsum. Refer to the packetfilter(7) reference page for more information.

### Point-to-Point Protocol (PPP)

The Point-to-Point Protocol (PPP) supports an asynchronous serial line or a pseudo-device terminal so that users can transfer files or NFS mount file systems across phone lines. Applications such as telnet, ftp, ping, Worldwide Web browsers, or any X program can be run over the IP network facility of the PPP data link layer. PPP is more configurable and robust than SLIP.

Refer to *Network Administration* for more information about PPP.

### STREAMS pkt module (PCKT)

The STREAMS pkt module provides emulation for the SVR4 pty packet module.

### Data Link Bridge (DPLI V2.0 Service Class 1)

Provides a DLPI V2.0 (Service Class 1) interface to BSD IFNET based network interfaces that allows STREAMS based protocol stacks to utilize BSD IFNET based network interfaces. This kernel option is mandatory for LAT (Local Area Transport).

If you installed LAT, Data Link Bridge does not appear as a kernel option.

### Serial Line Interface Protocol (SLIP)

Interface protocol support for a serial line so that users can transfer files or NFS mount file systems across phone lines.

This functionality is mandatory on systems with greater than 24 Mb of memory.

Refer to *Network Administration* for more information about SLIP.

#### Quota

UFS disk quotas provide users with the ability to establish a limit on the number of blocks and inodes (or files) that a user or a group of users can allocate.

This functionality is mandatory on systems with greater than 24 Mb of memory. Disk quotas for AdvFS are configured into the kernel by default, on systems in which AdvFS is installed.

#### STREAMS protocol (STREAMS, STRKINFO, LDTTY, RPTY)

The STREAMS framework provides an alternative to sockets. The STREAMS interface was developed by AT&T and consists of system calls, kernel routines, and kernel utilities that are used to implement everything from networking protocol suites to device drivers.

Applications in user space access the kernel portions of the STREAMS framework using system calls such as `open`, `close`, `putmsg`, `getmsg`, and `ioctl`.

This functionality is mandatory on systems with greater than 24 Mb of memory. The STREAMS framework is required by many of the personal computer protocols and DECnet.

#### X/Open Transport Interface (XTISO)

The X/Open Transport Interface (XTISO) defines an application interface that is independent of any transport provider. Programs written to XTI can be run over a variety of transport providers, such as Transmission Control Protocol (TCP) or User Datagram Protocol (UDP). The application specifies which transport provider to use.

Selecting this kernel option allows DECnet/OSI to load its kernel modules dynamically; you do not have to rebuild the kernel and reboot.

#### File-on-File File System (FFM)

File-on-File (FFM) is a file system that permits mounting a regular, character, or block special file on top of a regular file to support the STREAMS subsystem. This feature is used mainly by SVR4 compatible system calls. It can be viewed as a dynamic version of named pipes. The contents of the covered file are still available to any process that had the file open at the time of the FFM mount. FFM is required for the System V Environment.

### ISO 9660 Compact Disc File System (CDFS)

CDFS provides the ability to mount CD-ROMs formatted to the ISO 9660 standard or the High Sierra Group (HSG) format.

### Audit Subsystem

The Audit Subsystem provides a security audit system configurable through the `audit_setup` command. The subset provides additional security on system features such as passwords, account ownership, and remote access.

### ACL Subsystem

Loading the optional ACL kernel subsystem causes the system to enforce any access control lists (ACLs) that may be present on files. ACLs can be set and displayed with or without having the ACL subsystem loaded. An ACL is an extension to the traditional permission bits that normally control access to a file. ACLs allow additional users, groups, or both to be specified along with the permission bits that should apply for a matching request. Refer to the `acl(4)`, `getacl(1)`, and `setacl(1)` reference pages for more information.

### Simple Network Management Protocol (SNMP)

The Simple Network Management Protocol (SNMP) is the Internet standard protocol for exchanging network management information. The SNMP agent provides a local or remote network manager with system information, network interface data, address resolution information (ARP), information about the routing layer (IP and ICMP), and information about the transport layer (TCP and UDP). The operating system includes an SNMP agent that allows a host to be managed by a network manager.

### Local Area Transport Support

The LAT protocol provides an efficient means of logically connecting terminal servers to one or more nodes on the same local area network (LAN).

LAT software has the features required for a host to function as a service node so that requests for connections can be made by server users. LAT also permits host applications to initiate connections to the server's ports, designated as applications ports, to access remote devices such as printers. The operating system supports 1,500 logins using LAT.



If you chose the LAT subset when you made your subset selections, the option is not displayed in the kernel option menu and is configured automatically. If you add the LAT subset after the installation, you must reconfigure the kernel using the `doconfig` command.

Refer to *Network Administration* for more information about LAT.

### Logical Storage Manager (LSM)

The Logical Storage Manager is an integrated, host-based disk storage management tool that protects against data loss and improves disk input/output (I/O) performance. Basic LSM functionality includes disk spanning and concatenation. System administrators use LSM to perform disk management functions without disrupting users or applications accessing data on those disks.

### NFS Server

The Network File System Server option allows systems to export various file systems to other nodes.

This functionality is mandatory on systems with greater than 24 Mb of memory.

Refer to *Network Administration* for more information about NFS.

After entering your choice of kernel options, the system displays a list of options you selected and asks you to verify your choice. For example:

```
You selected the following kernel options:
```

```
Asynchronous Transfer Mode (ATM)
System V Devices
Logical Volume Manager (LVM)
Kernel Breakpoint Debugger (KDEBUG)
Packetfilter driver (PACKETFILTER)
STREAMS pkt module (PKT)
Data Link Bridge (DLPI V2.0 Service Class 1)
X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
File on File File System (FFM)
ISO 9660 Compact Disc File System (CDFS)
Audit Subsystem
Local Area Transport Support
Logical Storage Manager (LSM)
```

```
Is that correct? (y/n) [y]:
```

If the displayed kernel options are the ones you want, enter `y` or press Return to accept the default response. If the displayed kernel options are not the ones you want, enter `n` at the prompt. The Kernel Option Selection menu is redisplayed for you to select kernel options again.

## 5.20.2 Editing the Configuration File

This section applies to custom installations or to update installations that were invoked with the `-i` option.

After you select kernel options, you have the option to edit the configuration file. The configuration file is a text file that defines the components built into the kernel; it is located in the `/usr/sys/conf/SYSTEM_NAME` file.

You may want to edit the configuration file to add devices, tune parameters, enable realtime preemption, or add third party layered product support. You may also want to recreate any customizations you may have made in a previous version of this file.

The *Command and Shell User's Guide* contains a tutorial that teaches you how to use the `ed` text editor (as well as the `vi` text editor). Refer to *System Administration* for information about the contents of the configuration file and the entries that you may want to edit.

You will see a prompt similar to the following:

```
Do you want to edit the configuration file? (y/n) [n]:
```

If you enter `n` or press Return (to enter the default response) to skip the edit of the configuration file, the kernel build process begins as shown in Section 5.20.3.

If you enter `y` to edit the configuration file, the following message displays:

```
Using 'ed' to edit the configuration file. Press return
when ready, or type 'quit' to skip the editing session:
```

Enter the word `quit` if you want to skip the editing session and start the kernel build process or press the Return key if you want to edit the configuration file.

The following example shows an editing session using the `ed` text editor where the value of `maxusers` is changed to a value of 64:

```
Using ed to edit the configuration file. Press return when
ready, or type quit to skip the editing session: Return
```

```
1907
/maxuser
maxusers 32
s/32/64
maxusers 64
w
```

```
1
2
3
4
5
6
```

1907

q

7  
8

- 1 The number of lines in the configuration file.
- 2 Entering `/maxuser` searches for the line containing the word `maxusers`.
- 3 The line containing the word `maxusers` displays.
- 4 Entering `/s/32/64` substitutes the value 32 for the value 64.
- 5 When you press the Return key, the line is redisplayed with the changed value.
- 6 Enter `w` to write (save) the change you made.
- 7 The total number of lines in the file is displayed, 1907. Because new lines were not added to the file, the number of lines displayed is the same as when the editing session began.

---

**Note**

---

The operating system kernel provides options to enhance the performance of realtime applications, making it possible for the operating system to guarantee that an application has access to resources in a timely and predictable manner.

Realtime preemption is included in the kernel automatically and are disabled by default, but can be selected and enabled when the kernel is configured and built.

To enable realtime preemption in the kernel during a full installation, modify the kernel configuration file and insert the following line in the `Standard options` section:

```
options RT_PREEMPT
```

After you insert this line, enter `w` to save the change. The total number of lines in the file is displayed, reflecting the new line that you inserted.

For more information and instructions to enable realtime preemption after your installation is complete, refer to Section 7.5.

- 
- 8 Enter `q` to quit (exit) the editing session.

The kernel build begins when you write and quit the editing session.

### 5.20.3 Kernel Build Messages

When the subsets are configured and the configuration file is completed, the installation procedure invokes the `doconfig` utility to automatically make the device special files needed by the hardware and build the kernel for your system. Messages similar to the following are displayed:

```
The system will now automatically build a kernel
and then reboot. This will take approximately 15
minutes, depending on the processor type.
```

```
When the login prompt appears after the system
has rebooted, use 'root' as the login name and
the SUPERUSER password that was entered during
this procedure, to log into the system.
```

```
*** PERFORMING KERNEL BUILD ***
Working...Fri Dec 17 15:45:24 EST 1999
Working...Fri Dec 17 15:47:24 EST 1999
Working...Fri Dec 17 15:49:25 EST 1999
Working...Fri Dec 17 15:51:26 EST 1999
```

Your system may boot to single-user mode if the `boot_osflags` variable was not set as described in Section 5.18. The system reboots using the new kernel when `doconfig` completes. To bring the system to multiuser mode, press `Ctrl/d` at the `root` prompt (`#`). You are prompted to enter the run level. Four run levels are available:

- 0 specifies the halt state
- S or s specifies single-user mode
- 2 specifies multiuser mode without network services
- 3 specifies multiuser mode with network services

Another method to bring the system to multiuser mode is to use the following syntax for the `init` command and specify one of the run levels shown in the previous list:

```
init [0 | s | S | 2 | 3]
```

## 5.21 Logging in to the System for the First Time

Logging in to a system means typing in a user name and password to gain access into the operating system. If the user name and password match an account name on the system, the user is permitted access to that account. On newly-installed systems, the only user name recognized by the system is the user `root`. After installation is complete, the system administrator sets up an *account* for each user. Chapter 7 describes how to set up the system for general use.

What happens when you log in for the first time depends upon whether you have a graphics workstation or a text-based terminal without graphics capabilities:

- If you have a graphics workstation, a Common Desktop Environment (CDE) login window is displayed. Enter `root` as the user name and then enter the `root` password you specified during the installation procedure. The `root` password is sometimes called the *superuser* password. When you correctly enter this information, the following displays:
  - A Help Viewer window, *Introducing the Desktop*. This online help describes basic desktop skills and how to activate online help for the desktop.
  - A dialog box labeled *Action Required*. This dialog box provides information about reading the new `/.dtprofile` file that describes how to modify your `.login` or `.profile` files to interact correctly with the new Common Desktop Environment (CDE).
  - The File Manager application displays the contents of the `root (/)` directory.
  - A SysMan Configuration Checklist contains a list of the configuration applications that you should run to set up your system for general use. Section 7.2 provides more information about the checklist.
  - The CDE Front Panel displays at the bottom of the screen. This Front Panel has replaced the DECwindows environment *Session Manager*.

Refer to the *CDE Companion* guide for an introduction to CDE and for information about migrating from DECwindows Motif to CDE.
- If you do not have a system console with graphics capabilities, at the `login:` prompt, enter `root` as the login name and at the `password:` prompt, enter the `root` password you specified during the installation procedure.

Go to Chapter 7 for information about setting up your system for general use.



# 6

---

## Installing Supplemental Hardware Support

Supplemental hardware support provides the kernel modules required for your system to interface with new hardware without upgrading to a new version of the operating system.

This chapter provides the information necessary for you to perform the user actions shown in Table 6-1.

**Table 6-1: Summary of User Actions**

---

**By reading this chapter, you will ...**

---

Understand supplemental hardware support concepts.

Know what to do before you install a hardware product kit.

Be able to install a hardware product kit onto a running system.

Be able to install a hardware product kit while performing a full installation.

---

### 6.1 Supplemental Hardware Support Overview

All system hardware requires supporting modules in the operating system kernel. Without this kernel support, the operating system cannot interact with the hardware and may fail to function altogether. Before this release of the operating system, you had to update your system to a newer version that included kernel support for your new hardware.

A **hardware product kit** includes kernel modules that let your system support new or upgraded hardware without updating to new version of the operating system. They are distributed on CD-ROM and can be installed either directly from the distribution media or loaded onto a Remote Installation Services (RIS) area for installation by RIS clients over a local area network (LAN). Refer to *Sharing Software on a Local Area Network* for information about loading a hardware product kit onto a RIS area.

These kits let you install supplemental hardware support without reinstalling the base operating system. However, you must reboot your

system to build a kernel that includes the modules that support your new hardware. The **bootlink** process builds a generic kernel in memory, using generic kernel modules along with those included in your hardware product kit. This bootlinked kernel is not written to disk, but allows the `boot` utility to include the hardware support modules into your running kernel.

You must be running or installing an operating system version that includes supplemental hardware support to use this feature.

---

**Note**

---

If you are performing an update installation *from* an operating system version that includes supplemental hardware support, the update installation process checks for installed hardware product kits and verifies their applicability to the new version of the operating system. This analysis is described in Section 2.8.1.

---

## 6.2 Hardware Support Installation Prerequisites

Before you install a hardware product kit, do the following:

1. Back up your system.
2. Have in your possession the hardware product kit CD-ROM and installation instructions.
3. Determine the name of the hardware product kit that you want to install. This information is part of the installation instructions included with the hardware product kit.
4. Determine whether you are installing from a CD-ROM or a RIS area.
  - Perform the following tasks if you are installing from a CD-ROM:
    - a. Determine the console device name of any CD-ROM drives you will be using for the installation.

Enter the following command at the console prompt:

```
>>> show dev
```

Your output will be similar to the following:

```
dka0.0.0.1001.0 DKA0 RZ28D 0010
dka500.5.0.0.1001.0 DKA500 RRD46 0557
dva0.0.0.0.1 DVA0
ewa0.0.0.1000.0 EWA0 hw_ethernet_address
pka0.7.0.1001.0 PKA0 SCSI Bus ID 7 5.01
pkb0.7.0.1001.0 PKB0 SCSI Bus ID 7 5.01
```



CD-ROM drive types have an RRD prefix; in this example, the console device name of the RRD46-type CD-ROM drive is DKA500.

- b. Have in your possession the CD-ROMs included in the Software Product Kit.
- Perform the following tasks if you are installing from a RIS area:
  - a. Determine the name of your RIS server
  - b. Install the base operating system and hardware product kit into a RIS area in accordance with the instructions in *Sharing Software on a Local Area Network*
  - c. Register your system as a RIS client with access to the correct RIS area
5. Shut down your system and get the following information from the system console:

- a. Determine if the `bootdef_dev` console variable is set. To find out, enter the following command at the console prompt:

```
>>> show bootdef_dev
```

Your output will be similar to the following:

```
bootdef_dev dka0.0.0.1001.0
```

In this example, the `bootdef_dev` console variable is set to `dka0.0.0.1001.0`. If the `bootdef_dev` console variable is not set, you must determine the console device name of your system disk.

To determine the console name of your system disk, enter the following command at the console prompt:

```
>>> show dev
```

Your output will be similar to the following:

```
dka0.0.0.1001.0 DKA0 RZ28D 0010
dka500.5.0.0.1001.0 DKA500 RRD46 0557
dva0.0.0.0.1 DVA0
ewa0.0.0.1000.0 EWA0 hw_ethernet_address
pka0.7.0.1001.0 PKA0 SCSI Bus ID 7 5.01
pkb0.7.0.1001.0 PKB0 SCSI Bus ID 7 5.01
```

Hard disk drive types have an RZ prefix; in this example, the console device name of the RZ28D-type hard disk drive is DKA0.

- b. Determine if the `auto_action` console variable is set to `HALT`. To find out, enter the following command at the console prompt:

```
>>> show auto_action
```

Your output will be similar to the following:

```
auto_action BOOT
```

In this example, the `auto_action` console variable is set to `BOOT`.

If the `auto_action` console variable is not set to `HALT`, enter the following command at the console prompt:

```
>>> set auto_action HALT
```

- c. Determine the console device name of your CD-ROM drive if you are installing from CD-ROM. To find out, enter the following command at the console prompt:

```
>>> show dev
```

Your output will be similar to the following:

```
dka0.0.0.1001.0 DKA0 RZ28D 0010
dka500.5.0.0.1001.0 DKA500 RRD46 0557
dva0.0.0.0.1 DVA0
ewa0.0.0.1000.0 EWA0 hw_ethernet_address
pka0.7.0.1001.0 PKA0 SCSI Bus ID 7 5.01
pkb0.7.0.1001.0 PKB0 SCSI Bus ID 7 5.01
```

CD-ROM drive types have an `RRD` prefix; in this example, the console device name of the `RRD46`-type CD-ROM drive is `DKA500..`

## 6.3 Adding Hardware Support to a Running System

Before you follow the procedure in this section, make sure that you have completed the applicable prerequisite tasks in Section 6.2.

---

### Note

---

You must use a hardware product kit on CD-ROM to add hardware support to a running system; RIS installation is not supported.

---

Follow these steps to install a hardware product kit onto a system running a version of the operating system that supports supplemental hardware support:

1. Log in as `root` or use the `su` command to gain superuser privileges.

2. Use the `shutdown` command to halt your system:

```
% shutdown -h now
```

3. Enter the following command at the console prompt:

```
>>> set auto_action halt
```

4. Power down your system, install the new hardware, and power up your system.

5. Enter the following command at the console prompt:

```
>>> boot -fl fa -fi "/GENERIC" sys_disk
```

The following list describes this command line:

- The `-fl fa` option defines boot flags: `f` for a hardware product kit and `a` for multiuser mode.
- The `-fi "/GENERIC"` option tells the kernel to bootlink using the file `/GENERIC`.
- The optional `sys_disk` argument is the console device name of your running system disk. You only need to use this argument if your `bootdef_dev` console variable is not set to the system disk.

6. After the boot process, the `boot` utility issues the following prompt:

```
Enter Device Name:
```

Enter the console device name for your CD-ROM drive, such as `DKA500`, and press Return.

7. The `boot` utility issues the following prompt:

```
Enter Kit Name:
```

Enter the name of the hardware product kit that you want to install and press Return. This information is part of the installation instructions included with the hardware product kit.

8. The `boot` utility issues the following prompt:

```
Insert media for kit 'device:hw_kit_name', press Return when ready:
```

In this prompt, `device` is the device name that you entered in Step 6, and `hw_kit_name` is the hardware product kit name that you entered in Step 7.

Load the CD-ROM into the drive and press Return. The `boot` utility reads the selected hardware product kit information into memory.

9. The `boot` utility reissues the `Enter Kit Name:` prompt.

- If you are installing another hardware product kit from the same device, enter the kit name, press Return, and return to the previous step.

- If you are not installing another hardware product kit or you are using another device, just press Return and continue to the next step.
10. The `boot` utility reissues the `Enter Device Name:` prompt.
    - If you are installing another hardware product kit, enter the device name, press Return, and return to Step 7.
    - If you are not installing another hardware product kit, just press Return and continue.
  11. The `boot` utility and issues the following prompt:
 

Insert boot media, hit <return> when ready:

Since you are adding hardware support to a running system and the system disk is your boot media, just press Return. The generic kernel modules are read so that the bootlink process can build the kernel in memory in the next step.
  12. The `boot` utility links the kernel objects, and issues the following prompt:
 

Insert media for kit '*dev\_name:hw\_kit\_name*', press Return when ready:

In this prompt, *dev\_name* is the device name that you entered in Step 6 and *hw\_kit\_name* is the hardware product kit name that you entered in Step 7.

Put the CD-ROM into the drive and press Return. The hardware product kit kernel modules are read and the bootlink process builds the kernel in memory.

This step is repeated for every device and hardware product kit that you entered in Steps 6 and 7.
  13. The `boot` utility issues the following prompt:
 

Insert boot media, press Return when ready:

Since the boot media is still your installed system disk, just press Return. The `boot` utility loads and configures the hardware product kit.
  14. If you installed more than one hardware product kit from different media on the same device, the `boot` utility may prompt you for the location of some of the hardware support subsets. If you see this prompt, load the appropriate CD-ROM into the CD-ROM drive and enter the appropriate system device name, such as `/dev/rz4c`.
 

This could include, for example, multiple CD-ROM disks on the same drive.
  15. If a kernel build is required, the installation process issues the following prompt:

Enter a name for the kernel configuration file. [*SYS\_NAME*]:

In this prompt, the default *SYS\_NAME* is the name of your existing kernel configuration file, usually your system name in upper case characters.

If you select the default, you are asked to confirm your selection. If you then confirm your selection of the default, the old kernel configuration file is backed up to *SYS\_NAME.bck*.

Perform the following steps:

- a. You see a prompt similar to the following:

```
*** KERNEL OPTION SELECTION ***

 Selection Kernel Option

 1 System V Devices
 2 Logical Volume Manager (LVM)
 3 NTP V3 Kernel Phase Lock Loop (NTP_TIME)
 4 Kernel Breakpoint Debugger (KDEBUG)
 5 Packetfilter driver (PACKETFILTER)
 6 Point-to-Point Protocol (PPP)
 7 STREAMS pkt module (PCKT)
 8 Data Link Bridge (DLPI V2.0 Service Class 1)
 9 X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
 10 ISO 9660 Compact Disc File System (CDFS)
 11 Audit Subsystem
 12 ACL Subsystem
 13 Logical Storage Manager (LSM)
 14 Advanced File System (ADVFS)
 15 All of the above
 16 None of the above
 17 Help
 18 Display all options again

```

Enter the selection number for each kernel option you want.  
For example, 1 3 [16]:

The options you see depend upon the software subsets that you have installed. See Section 5.20.1 for information about selecting kernel options and the `doconfig(8)` reference page for information about the kernel build process.

- b. After selecting kernel options, you see a prompt similar to the following:

```
You selected the following kernel options:

System V Devices
Logical Volume Manager (LVM)
NTP V3 Kernel Phase Lock Loop (NTP_TIME)
Kernel Breakpoint Debugger (KDEBUG)
Packetfilter driver (PACKETFILTER)
Point-to-Point Protocol (PPP)
STREAMS pkt module (PCKT)
Data Link Bridge (DLPI V2.0 Service Class 1)
```

```
X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
ISO 9660 Compact Disc File System (CDFS)
Audit Subsystem
ACL Subsystem
Logical Storage Manager (LSM)
Advanced File System (ADVFS)
```

Is that correct? (y/n) [y]:

- If the list is correct, enter **y** and continue to the next step.
  - If the list is not correct, enter **n** to return to Step 15a and select kernel options again.
- c. The boot utility asks if you want to edit the `/usr/sys/conf/SYS_NAME` kernel configuration file.

---

**Note**

---

Under most circumstances, you do not have to edit this file.

---

For information about editing this file, refer to Section 5.20.2.

16. The system reboots with the new kernel, and you see the operating system login window.
17. Log in as `root` and use the `setld -i` command to verify that your hardware product kit is installed. Refer to the `setld(8)` reference page for additional information.
18. Check to make sure that the installed files are where you want them and that the new hardware product is operational. You can use the `setld -i` command to verify installed software subsets.
19. Check to make sure that the `/GENERIC` file was rebuilt correctly by issuing the following command for every hardware product kit that you installed:

```
cat /GENERIC | grep -e module_name.mod
```

In this example, `module_name.mod` is the name of the module file or files that you loaded. If the `.mod` file was supplied in the `/opt` directory, the full path name and file name should be in the `/GENERIC` file.

## 6.4 Adding Hardware Support During a Full Installation

Before you follow the procedure in this section, make sure that you have completed the applicable prerequisite tasks in Section 6.2.

Follow these steps to install a hardware product kit when you perform a full installation of a version of the operating system that supports this feature:

1. Log in as `root` or use the `su` command to gain superuser privileges.
2. Perform the appropriate preinstallation tasks described in Chapter 1.
3. Proceed to the next step if you are performing a default or cloned installation.

If you are performing a custom installation, plan your system disk space as described in Chapter 3 before proceeding to the next step.

4. Use the `shutdown` command to halt your system:

```
% shutdown -h now
```

5. Enter the following command at the console prompt:

```
>>> set auto_action halt
```

6. Power down your system, install the new hardware, and power up your system.
7. Perform the appropriate processor-specific boot instructions described in Chapter 4, except for the actual `boot` command.
8. Enter one of the following commands at the console prompt:

- If you are booting from CD-ROM, enter the following command:

```
>>> boot -fl fa -fi "/GENERIC" location
```

- If you are booting from RIS, enter the following command:

```
>>> boot -fl fa location
```

The following list describes these command lines:

- The `-fl fa` option defines boot flags: `f` for a hardware product kit and `a` for multiuser mode.
- The `-fi "/GENERIC"` option tells the kernel to bootlink using the file `/GENERIC`. This is only used if you are booting from CD-ROM.
- The `location` argument is one of the following:
  - If you are booting from CD-ROM, the console device name of the boot disk, such as `DKA500`
  - If you are booting from RIS, the console device name of your network adapter, such as `EWA0`

9. During the boot process, the `boot` utility issues the following prompt:

```
Enter Device Name:
```

- If you are installing the hardware product kit from CD-ROM, enter the console device name for your CD-ROM drive and press Return.

- If you are installing the hardware product kit from a RIS area, enter `local:` and press Return.

10. The `boot` utility issues the following prompt:

Enter Kit Name:

Enter the name of the hardware product kit that you want to install and press Return. This information is part of the installation instructions included with the hardware product kit.

11. The `boot` utility issues the following prompt:

Insert media for kit '`dev_name:hw_kit_name`', press Return when ready:

In this prompt, `dev_name` is the kit location you entered in Step 9 and `hw_kit_name` is the hardware product kit name that you entered in Step 10.

- If you are installing the hardware product kit from CD-ROM, put the CD-ROM into the drive and press Return.
- If you are installing the hardware product kit from a RIS area, press Return.

The `boot` utility reads the selected hardware product kit into memory.

12. The `boot` utility reissues the `Enter Kit Name:` prompt.

- If you are installing another hardware product kit from the same device, enter the kit name, press Return, and return to the previous step.
- If you are not installing another hardware product kit or are installing one from a different device, just press Return and continue.

13. The `boot` utility reissues the `Enter Device Name:` prompt.

- If you are installing another hardware product kit, enter the device name, press Return, and return to Step 10.
- If you are not installing another hardware product kit, just press Return and continue.

14. The `boot` utility reissues the following prompt:

Insert boot media, press Return when ready:

- If you are installing the operating system from CD-ROM, insert the *Operating System Volume 1* CD-ROM into the drive and press Return.
- If you are installing the operating system from a RIS area, just press Return.

The generic kernel modules are read so that the bootlink process can build the kernel in memory in the next step.



15. The `boot` utility reissues the following prompt:

```
Insert media for kit 'location:hw_kit_name', press Return when ready:
```

- If you are installing the hardware product kit from CD-ROM, put the kit CD-ROM into the drive and press Return.
- If you are installing the hardware product kit from a RIS area, press Return.

The hardware product kit kernel modules are read and the bootlink process builds the kernel in memory.

16. The `boot` utility issues the following prompt:

```
Insert boot media, press Return when ready:
```

- If you are installing the operating system from CD-ROM, insert the boot media in your CD-ROM drive and press Return.
- If you are installing the operating system from a RIS area, just press Return.

17. Perform the appropriate system setup tasks described in Section 5.1 through Section 5.14.
18. Verify the start of installation as described in Section 5.15.
19. The installation process creates the file systems, loads operating system subsets, and reboots.
20. After the system reboots, perform Steps 9 through 15.
21. The installation process links the kernel objects, configures software subsets, and loads hardware kits.

---

**Note**

---

If you installed more than one hardware product kit from different media on the same device, the `boot` utility may prompt you for the location of some of the hardware support subsets. If you see this prompt, load the appropriate CD-ROM into the CD-ROM drive and enter the appropriate system device name, such as `/dev/rz4c`

This could include, for example, multiple CD-ROM disks on the same drive or multiple hardware kits from the same RIS area.

---

22. The `boot` utility issues the following prompt:

```
Enter a name for the kernel configuration file. [SYS_NAME]:
```

In this prompt, the *SYS\_NAME* is the name of your kernel configuration file, set to your system name in upper case characters. For example, if your system name is `portland`, your kernel configuration file is `PORTLAND`.

23. If the `boot` utility prompts you to rebuild the kernel, perform the following steps:

- a. You see a prompt similar to the following:

```
*** KERNEL OPTION SELECTION ***

 Selection Kernel Option

 1 System V Devices
 2 Logical Volume Manager (LVM)
 3 NTP V3 Kernel Phase Lock Loop (NTP_TIME)
 4 Kernel Breakpoint Debugger (KDEBUG)
 5 Packetfilter driver (PACKETFILTER)
 6 Point-to-Point Protocol (PPP)
 7 STREAMS pckt module (PCKT)
 8 Data Link Bridge (DLPI V2.0 Service Class 1)
 9 X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
 10 ISO 9660 Compact Disc File System (CDFS)
 11 Audit Subsystem
 12 ACL Subsystem
 13 Logical Storage Manager (LSM)
 14 Advanced File System (ADVFS)
 15 All of the above
 16 None of the above
 17 Help
 18 Display all options again

```

Enter the selection number for each kernel option you want.  
For example, 1 3 [16]:

The options you see depend upon the software subsets that you have installed. See Section 5.20.1 for information about selecting kernel options and the `doconfig(8)` reference page for information about the process.

- b. After selecting kernel options, you see a prompt similar to the following:

```
You selected the following kernel options:

System V Devices
Logical Volume Manager (LVM)
NTP V3 Kernel Phase Lock Loop (NTP_TIME)
Kernel Breakpoint Debugger (KDEBUG)
Packetfilter driver (PACKETFILTER)
Point-to-Point Protocol (PPP)
STREAMS pckt module (PCKT)
Data Link Bridge (DLPI V2.0 Service Class 1)
X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
ISO 9660 Compact Disc File System (CDFS)
Audit Subsystem
ACL Subsystem
Logical Storage Manager (LSM)
```

Advanced File System (ADVFS)

Is that correct? (y/n) [y]:

- If the list is correct, enter **y** and continue to the next step.
  - If the list is not correct, enter **n** to return to Step 21a and select kernel options again.
- c. The `boot` utility asks if you want to edit the `/usr/sys/conf/SYS_NAME` kernel configuration file.

---

**Note**

---

Under most circumstances, you do not have to edit this file.

---

For information about editing this file, refer to Section 5.20.2.

24. The `boot` utility rebuilds your operating system kernel and reboots with the new kernel. After a successful reboot, you see the operating system login window.
25. Log in as `root` and use the `setld -i` command to verify that your hardware product kit is installed. Refer to the `setld(8)` reference page for information about this command.
26. Perform the appropriate postinstallation tasks described in Chapter 7.
27. Check to make sure that the installed files are where you want them and that the new hardware product is operational. You can use the `setld -i` command to verify installed software subsets.
28. Check to make sure that the `/GENERIC` file was rebuilt correctly by issuing the following command for every hardware product kit that you installed:

```
cat /GENERIC | grep -e module_name.mod
```

In this example, `module_name.mod` is the name of the module file or files that you loaded. If the `.mod` file was supplied in the `/opt` directory, the full path name and file name should be in the `/GENERIC` file.

29. Check the install logs for errors. These logs are located in the `/var/adm/smlogs` directory after the system has been installed.



# 7

---

## Setting Up Your System After Installation

This chapter provides information about:

- Checking the installed version string to verify installation
- Configuring your system for general use, either with the SysMan Configuration Checklist or from the command line
- Enabling realtime preemption after the installation
- Enabling unattended reboots on multiprocessor systems

The goal of this chapter is to provide the information necessary for you to perform the user actions shown in Table 7-1.

**Table 7-1: Summary of User Actions**

---

**By reading this chapter, you will ...**

---

Check the installed version string to verify installation.

Invoke the SysMan applications using either the graphical or text-based interface to configure your system for general use.

Know the disposition of files left over after the installation.

Enable realtime preemption after the installation.

Enable unattended reboots on multiprocessor systems.

---

If you need more information about setting up the system for general use, read the relevant manuals in the documentation set:

- The *Network Administration* guide provides information about setting up and administering a network.
- The *System Administration* guide provides information about system administration tasks such as configuring printers, adding user accounts, backing up and restoring files, shutting down the system, and so on.
- The *Software License Management* guide provides information about loading and registering license PAKs.

Chapter 8 describes how to view the online documentation set and copy the documentation files from CD-ROM to your system.

## 7.1 Checking the Installed Version String

To verify that you have installed all of the correct elements in this version of the operating system software kit, check the operating system revision level in the `/etc/motd` file. The correct version string is `DIGITAL UNIX V4.0F`.

## 7.2 Using the SysMan Configuration Checklist

If your system has graphics capabilities, system setup is done from the SysMan Configuration Checklist. This checklist provides access to the SysMan applications that are available to set up your system for general use. There are three ways to invoke the checklist:

- The first time you log in as `root` after a system installation or the first time you log in to a factory installed software (FIS) system with graphics capabilities, the SysMan Configuration Checklist displays automatically.
- To open the SysMan Configuration Checklist from the UNIX command line, as superuser or `root`, enter the following command:

```
/usr/sbin/checklist
```

- To invoke the SysMan Configuration Checklist from the Common Desktop Environment (CDE) front panel:
  1. Click on the Application Manager icon on the CDE front panel.
  2. Double click on the System\_Admin application group icon.
  3. Double click on the SysMan Configuration Checklist application icon.

For your system to be fully productive and communicative with other systems and users, you may want to add user accounts, and configure the network, mail, and printers. In addition, when you buy a product, you receive a license for its use. The license is described by the license Product Authorization Key (PAK) you received. To be officially authorized to use the operating system, you must register the license information on the PAK by using the License Manager application.

The SysMan Configuration Checklist provides access to a number of SysMan applications including but not limited to the applications shown in Table 7-2. Table 7-2 also lists the reference pages associated with the SysMan applications.

**Table 7–2: SysMan Configuration Checklist Applications and Associated Reference Pages**

| <b>SysMan Application</b>         | <b>Reference Page</b> |
|-----------------------------------|-----------------------|
| Network Configuration Application | netconfig(8)          |
| BIND Configuration Application    | bindconfig(8)         |
| NIS - Network Information Service | nissetup(8)           |
| NFS Configuration Application     | nfsconfig(8)          |
| License Manager                   | dxlicenses(8)         |
| Account Manager                   | dxaccounts(8)         |
| Mail Configuration Application    | mailconfig(8)         |
| Disk Configuration Application    | diskconfig(8)         |
| LAT - Local Area Transport        | latsetup(8)           |
| UUCP - UNIX-to-UNIX Copy System   | uucp(1)               |
| NTP - Network Time Protocol       | ntpupdate(8)          |
| Printer Configuration Application | printconfig(8)        |
| Security (BSD/2)                  | secsetup(8)           |
| Security Auditing                 | audit_setup(8)        |
| Prestoserver I/O Acceleration     | presto(8)             |
| Update Administration Utility     | updadmin(8)           |
| Graphical UI Selection Utility    | 0                     |

To invoke a SysMan application, double click on the icon that appears to the left of the application name. After you invoke and exit an application, a check mark appears in the box to the left of the icon. The date and time you last accessed an application is shown under the application name.

You can view an online overview of the SysMan Configuration Checklist applications by clicking on the Help button located at the lower right hand corner of the SysMan Configuration Checklist main window.

The applications on the SysMan Configuration Checklist appear in the approximate order in which they should be run. For instance, if you plan to connect or add the system to a network, the first task you should perform is to set up the network by using the Network Configuration Application followed by the BIND Configuration Application, NIS - Network Information Service, and the NFS Configuration Application. If you do not want to set up networking, the first task you

should perform is to load and register your Product Authorization Keys (PAKs) using the License Manager.

An application that is *dimmed* is not available from the checklist because it is not installed on the system.

Online help is available for each SysMan application by clicking on the Help button in the application. The online help describes how to use the application, the entries to make in the text entry fields, and reference material.

## 7.3 Setting Up the System from the Command Line

If your system does not have graphics capabilities, you can access a set of menu-driven, text-based system setup scripts to set up your system for general use.

You can access this setup menu from the command line as the user `root` by entering the following commands:

```
su -
password:
/usr/sbin/setup
```

A menu similar to the following is displayed:

Use this menu to set up your system and network. When you select an item, you will be asked a series of questions.

For more information about the items on the menu and the questions you must answer, see the System Administration and Network Administration guides.

- 1) Network Configuration Application
- 2) BIND Configuration Application
- 3) NIS - Network Information Service
- 4) NFS Configuration Application
- 5) License Manager
- 6) Mail Configuration Application
- 7) LAT - Local Area Transport
- 8) UUCP - UNIX-to-UNIX Copy System
- 9) NTP - Network Time Protocol
- 10) Printer Configuration Application
- 11) Security (BSD/C2)
- 12) Security Auditing
- 13) Prestoserve I/O Acceleration
- 14) Update Administration Utility
- 15) Graphical UI Selection Facility
- 16) Exit

Enter the menu item number that you want:

Availability of the setup scripts on this menu depends on the software subsets that were installed. In the previous sample menu, all mandatory and optional software subsets were installed, so all setup scripts are



available. If a setup script does not have an option number next to it, the setup script is not available for use.

Each of the setup scripts is a series of interactive prompts during which questions are displayed on the screen and you respond accordingly. Most questions provide you with default responses and in most cases, you can choose the defaults. Any default parameters that you accept can always be changed at a later time.

The setup scripts appear on the menu in the order in which they should be run. For instance, if you want to set up the system to run in a networked environment, the first task you should perform is to set up networking information by using the Network Configuration Application followed by the BIND Configuration Application, NIS - Network Information Service, and the NFS Configuration Application. If you do not want to set up your system to run in a networked environment, the first task you should perform is to load and register your Product Authorization Keys (PAKs) using the License Manager.

You should read the relevant sections of the documentation set before running a setup program or choosing an option from the Setup menu. The documentation lists the prerequisites to running a specific setup program.

- The *Network Administration* guide provides information about setting up and administering a network.
- The *System Administration* guide provides information about system administration tasks such as configuring printers, adding user accounts, backing up and restoring files, shutting down the system, and so on.
- The *Software License Management* guide provides information about loading and registering license PAKs.

Chapter 8 describes how to view the online documentation set.

## 7.4 Postinstallation File Disposition

Several files are left over after the installation process completes. The following files are of particular interest:

- The installation procedure leaves the `init` file in the `/tmp` directory. This is an unnecessary file that you can delete.
- Many files with the prefixes `.new..` and `.proto..` are left on the system. The update installation process documented in Chapter 2 requires these `.new..` and `.proto..` files to retain customized system files.

---

### Caution

---

Do not remove these `.new..` and `.proto..` files!

---

- A list of the log files created during the installation is displayed on the screen (or in the console log if you have a workstation) after you log in for the first time. The display is similar to the following:

```
DIGITAL UNIX V4.0F (Rev. nnn); Fri Dec 17 15:54:51 EST 1999
DIGITAL UNIX V4.0F Worksystem Software (Rev. nnn)
```

```
The installation software has successfully installed your system.
```

```
There are log files that contain a record of your installation.
These are:
```

```
 /var/adm/smlogs/install.cdf - configuration description file
 /var/adm/smlogs/install.log - general log file
 /var/adm/smlogs/install.FS.log - file system creation logs
 /var/adm/smlogs/setld.log - log for the setld(8) utility
 /var/adm/smlogs/fverify.log - verification log file
```

The previous message is also recorded in the `/etc/motd` file for your future reference. The `/etc/motd` file contains the **message of the day** that is displayed each time a user logs in. The installation log files are located in the `/var/adm/smlogs` directory and include the choices you made during the installation such as the disks and partitions you chose, the software subsets you installed, and so on.

## 7.5 Enabling Realtime Preemption After the Installation

The operating system kernel provides options to enhance the performance of realtime applications conforming to POSIX<sup>®</sup> 1003.1b-1993 (formerly 1003.4 Draft 14). The realtime kernel makes it possible for the operating system to guarantee that an application has access to resources in a timely and predictable manner.

The realtime kernel that supports kernel preemption was previously installed as an option during base system installation. Now, the POSIX 1003.1b portions are included in the kernel automatically and a separate kernel is not needed. Preemption capabilities are disabled by default, but can be selected and enabled when the kernel is configured and built.

There are two methods to obtain additional realtime capabilities:

- Use a text editor of your choice to edit the `/etc/sysconfigtab` file and set the `rt_preempt_opt` parameter in the `generic` section equal to 1 as shown in the following example:

```
generic:
 rt_preempt_opt=1
```

After setting this parameter, you must reboot your system. When the `rt_preempt_opt` parameter is set, the system chooses the correct lockmode to support realtime preemption. On a single processor system, the lockmode is set to 1. On a multiprocessor system, the lockmode is set to 3.

- You can also use the `setld` command to enable realtime preemption as shown in the following example:

1. Use the `setld` command as follows to configure the OSFBIN440 subset:

```
setld -c OSFBIN440 RT_ON
```

Refer to the `setld(8)` reference page for additional information.

After this operation, the kernel configuration file contains the entry `options rt_preempt_opt` that causes preemption to be on by default (in the appropriate lockmode).

2. Run `doconfig` without any options to generate a new kernel configuration file. If necessary, refer to the `doconfig(8)` reference page.
3. Copy the new kernel file created in `/usr` to the `root` directory as the file `/vmunix`.
4. Reboot your system.

## 7.6 Enabling Unattended Reboots on Multiprocessor Systems

An unattended reboot feature is available for multiprocessor platforms to reduce system down time because of a processor failure.

To enable unattended reboot functionality, halt the system and set the following console parameters:

```
>>> set boot_osflags a
>>> set boot_reset off
>>> set auto_action restart
```

When processor failures are detected on a multiprocessor platform, the system marks the faulting processor as failed, and the entire system is rebooted without any operator intervention. The faulting processor will not be restarted when the reboot occurs. To restart the faulting processor, corrective action must be taken. The system will not try to restart the failed processor until the power has been recycled on the system or the console `init` command is issued at the console prompt (`>>>` ).



---

## Using Online Documentation

The online documentation set is available in both Hypertext Markup Language (HTML) and Portable Document Format (PDF) versions.

- You can use the Netscape Navigator® application to view HTML or PDF versions of the documentation. This version of the operating system is shipped with Netscape Communicator 4.5, which includes Netscape Navigator. The Netscape software subset is installed automatically if the installation process detects graphics capability on your system.

After installing the operating system, you can invoke Netscape through the CDE front panel or from the command line in a terminal emulator window. Detailed help for Netscape is available through the Help menu.

- You can use the Adobe® Acrobat® Reader application to view PDF versions of the documentation.

After installing the operating system, you can invoke Acrobat Reader either as a Netscape helper application or from the command line in a terminal emulator window. Detailed help for Acrobat Reader is available through the Help menu.

Refer to the *Adobe Acrobat Reader Online Guide* for information about setting up Netscape Navigator to view PDF files. You can access this document from the Acrobat Reader Help menu.

---

### Caution

---

You must configure the ISO 9660 Compact Disc File System (CDFS) kernel option and reboot your system before you can mount the online documentation set on your CD-ROM drive. Refer to Section 5.20 and the `doconfig(8)` reference page for information about configuring kernel options.

---

The goal of this chapter is to provide the information necessary for you to perform the user actions shown in Table 8-1.

**Table 8–1: Summary of User Actions**

---

**By reading this chapter, you will ...**

---

Access the HTML and PDF versions of the online documentation set.

Copy the online documentation set to your system's hard disk.

---

## 8.1 Mounting the Documentation Set CD-ROM

To mount the operating system documentation CD-ROM so that you can view the online documentation set with Netscape Navigator or Acrobat Reader, follow these steps:

1. Log in as `root` or use the `su` command to gain `root` privileges.
2. Verify the existence of the directory `/usr/share/doclib/online`. If it does not exist, create it with the following command:  

```
mkdir -p /usr/share/doclib/online
```
3. Insert the Volume 1 of the documentation CD-ROM in your system's CD-ROM drive.

If you do not know the system device name of your CD-ROM drive, log in as `root` or use the `su` command to gain `root` privileges, and enter the following command:

```
file /dev/rrz*c | grep RRD
/dev/rrz4c: character special (8/4098) SCSI #0 RRD44 disk #32 (SCSI ID #4)
```

In this example, the CD-ROM device is `RRD44` on device `/dev/rrz4c`. If you have more than one `RRD` device connected to your system, determine the device where you will mount the CD-ROM.

---

**Note**

---

You must have `root` privileges to get this information with the `file` command.

---

Standard device names begin with `rz` for the block special file and `rrz` for the raw (character) special file. The result of the `file` command displays the `raw` device name, but you must specify the block special file when mounting the CD-ROM device. In this example, the displayed device name is `/dev/rrz4c`, but you will use `/dev/rz4c`.

4. Use the `mount` command to mount the CDE document set.

---

### Caution

---

The result of the command in the previous step displays the raw device name (`rrz*`), but you must specify the block special file (`rz*`) when you mount the CD-ROM device.

---

For example, if your CD-ROM device is `rz4c`, you would use this command to mount the CD-ROM on `/usr/share/doclib/online`:

```
mount -r -t cdfs -o rrip /dev/rz4c /usr/share/doclib/online
```

## 8.2 Viewing Online Documents with Netscape

To view the online documentation set with Netscape Navigator, follow these steps:

1. Mount the operating system documentation CD-ROM as described in Section 8.1.
2. Start Netscape Navigator by using one of the following methods:
  - From the CDE desktop:
    - a. Click on the arrow above the Text Editor icon on the CDE Front Panel to display the Personal Applications subpanel.
    - b. Click on the Netscape icon.
  - From a terminal emulator window, enter the following command to run Netscape Navigator in the background:

```
$ /usr/bin/X11/netscape &
```

Refer to the `netscape(1)` reference page for additional information.

3. Click on the Home icon button to access the default home page at `/usr/doc/netscape/Digital_UNIX.html`. This page includes links to other documentation, including a local copy of the *Netscape Navigator Online Handbook* that you can access from the **Other documentation** link.
4. Select the operating system **Documentation** link to go to the operating system Documentation page.
5. Select one of the available document categories to see a list of those documents, including links to HTML and PDF versions.

Proceed to Section 8.4 to install Acrobat Reader. The *Adobe Acrobat Reader Online Guide*, available from the Acrobat Reader Help menu, provides information about setting up Netscape Navigator to view PDF files.

## 8.3 Netscape Application Integration

The following information is provided to help you when you use Netscape applications on this operating system:

- A sample resource defaults file for Netscape Communicator can be found at `/usr/doc/netscape/Netscape.ad`. Comments within this file indicate possible settings for each resource. This file is provided for informational purposes and need not be installed.
- The file `/usr/bin/X11/netscape` is actually a shell script that performs the following actions:
  - Creates a Communicator user configuration directory if `$HOME/.netscape` does not already exist. If you have a file or directory in `$HOME` called `.netscape`, it is highly recommended that you rename it prior to running this version. If you do not, there is a possibility that you could lose data contained in this directory such as old preferences, bookmarks, and cookies.
  - Copies the Navigator preferences file from `/usr/doc/netscape/default-netscape-preferences` to `$HOME/.netscape/preferences.js` if it does not already exist in the `$HOME` directory.
  - Sets the `MOZILLA_HOME` environment variable to point to the Communicator installation directory `/usr/lib/netscape`. The Communicator Java™ class files, nethelp files, plugins, registry, and others are all installed under this directory. See the `/usr/lib/netscape/README` file for more information on `MOZILLA_HOME` and other environment variables.
  - Invokes the actual Communicator binary at `/usr/bin/X11/real-netscape`.

This information may be important to know if you should download newer copies of Navigator from other sources (for example, the Netscape web site) and install the files from those kits over the links in `$HOME/.netscape`. If you want to use the previous version, you need to remove these files so that the `/usr/bin/X11/netscape` script is able to recreate the symbolic links listed above that point to the older versions of these files.

Also, if you choose to run a version of Navigator directly (that is, not through the `/usr/bin/X11/netscape` script), you should first set the value of the `LD_LIBRARY_PATH` environment variable to `/usr/lib/netscape` to ensure the proper functioning of Java applets.



## 8.4 Installing Acrobat Reader

The PDF versions of the online documents are best viewed by using Acrobat Reader as a Netscape Navigator helper application. This section tells you how to install Acrobat Reader on your system.

To install Acrobat Reader on your system, follow these steps:

1. Log in as `root` or use the `su` command to gain `root` privileges.
2. Mount the operating system documentation CD-ROM as described in Section 8.1.
3. Change directory to `/usr/share/doc/lib/online/ACROREAD/DIG_UNIX`. The `00README.TXT` file explains how to uncompress the `ACROREAD.Z` installation file.

4. Enter the following command to uncompress the installation file:

```
% uncompress -c ACROREAD.Z > /tmp/acroread_osf_301.tar
```

5. Change directory to `/tmp`:

```
% cd /tmp
```

6. Enter the following command to unpack the installation files:

```
% tar xf /tmp/acroread_osf_301.tar
```

Detailed instructions in the `INSTGUID.TXT` file explain how to run the `INSTALL` script.

7. Enter the following command to run the Acrobat Reader installation script:

```
% ./INSTALL
```

8. After you read the license agreement, enter `accept` to accept the license terms and continue.
9. Select an installation directory for Acrobat Reader. The default is `/usr/local/Acrobat3`.

---

### Caution

---

Acrobat Reader requires 1 Mb of free disk space. Ensure that the file system where you install Acrobat Reader has sufficient space for the application.

---

If necessary you are prompted to allow the installation script to create the installation directory.

10. The application installation completes and you see the command line prompt.

The *Adobe Acrobat Reader Online Guide*, available from the Acrobat Reader Help menu, provides information about setting up Netscape Navigator to view PDF files.

## 8.5 Viewing Online Documents with Acrobat

The PDF versions of the online documents are best viewed by using Acrobat Reader as a Netscape Navigator helper application. You can, however, view them directly with Acrobat Reader. You should review the `00README.TXT` file in the `ACRO_DUX` and `ACRO_SUP` subdirectories under the `/usr/share/doc/lib/online/DOCS` directory. These files map file names to document names so that you can locate specific documents.

To view the online documentation set with Acrobat Reader, follow these steps:

1. Mount the documentation CD-ROM as described in Section 8.1.
2. Install Acrobat Reader as described in Section 8.4.
3. From a terminal emulator window, enter the following command to run Acrobat Reader in the background:

```
$ /usr/local/Acrobat3/bin/acroread &
```

Refer to the *Adobe Acrobat Reader Online Guide*, available from the Help menu, for information on how to use Acrobat Reader.

4. Select `Open . . .` from the File menu. This displays the Open dialog box, where you can select a PDF file.

The PDF documents reside under the `DOCS` directory on the documentation CD-ROM.

- The `ACRO_DUX` subdirectory includes the base operating system documentation set.
- The `ACRO_SUP` subdirectory includes the supplementary documentation set.

The `00README.TXT` file in both subdirectories maps file names to document names so that you can locate specific documents.

---

### Note

---

You cannot use Acrobat Reader to view text files.

---

Refer to Section 8.6 for instructions on copying online documentation to your system.

## 8.6 Copying Online Documentation to Disk

Instead of reading the online documentation set from the CD-ROM, you can copy the documentation files to a disk on your system. Copying the document files to a disk eliminates the need to keep the CD-ROM permanently mounted. The entire set of online documentation files consumes about 135 Mb of disk space.

Follow these procedures to copy the documentation files to a disk on your system. Use the same directories shown in the examples so you will not have to modify library bookshelf files.

1. Log in as `root` or use the `su` command to become superuser.
2. Ensure that the Volume 1 of the Documentation CD-ROM is mounted on `/mnt`. Refer to Appendix B if you do not know how to mount the CD-ROM.
3. Enter commands similar to the following examples to copy the online documents from the CD-ROM to the appropriate subdirectories in the `/usr/share/doclib/online/DOCS` directory. This example illustrates the process with the CD-ROM mounted on the directory `/mnt`.

- To copy the online documentation set HTML files, enter the following:

```
cd /mnt/DOCS/HTML
tar chpvf - . |\
 (cd /usr/share/doclib/online/DOCS/HTML;tar xvpf -)
```

The online documentation set HTML files take up about 155 Mb of disk space.

- To copy the base operating system online documentation set PDF files, enter the following:

```
cd /mnt/DOCS/ACRO_DUX
tar chpvf - . |\
 (cd /usr/share/doclib/online/DOCS/ACRO_DUX;tar xvpf -)
```

The base operating system online documentation set PDF files take up about 35 Mb of disk space.

- To copy the supplemental online documentation set PDF files, enter the following:

```
cd /mnt/DOCS/ACRO_SUP
tar chpvf - . |\
```

```
(cd /usr/share/doclib/online/DOCS/ACRO_SUP;tar xvpf -)
```

The supplemental online documentation set PDF files take up about 15 Mb of disk space.

---

**Note**

---

The backslashes (\) in the previous examples are for line continuation; you need not enter them.

---

4. Unmount the CD-ROM using a command similar to the following:

```
umount /dev/rz4c
```

Refer to Appendix B if you do not know how to unmount a CD-ROM.

Follow the instructions in Section 8.2 to start Netscape Navigator or Section 8.5 to start Acrobat Reader.

---

## UNIX Shell Option

The goal of this chapter is to provide the information necessary for you to perform the following tasks:

- Invoke the UNIX shell from the text-based or graphical user interface
- Access devices
- Mount file systems
- Restore UFS or AdvFS file systems
- Use the `disklabel` command to change the size of disk partitions
- Access Logical Storage Manager (LSM) volumes

### 9.1 What Is the UNIX Shell Option?

The primary purpose of the UNIX shell option is to provide a way to perform disk and file system maintenance before the installation and to perform disaster recovery processes. The UNIX shell provides a way to access all UNIX commands that help you recover from serious problems such as `root` file system corruption and enables you to perform general file system and disk maintenance tasks.

The distribution media (CD-ROM or RIS) contains file systems that are laid out just as the software would be installed on the system and provides direct access to the `root`, `/usr`, and `/var` directories. This format makes almost every command and utility available in the UNIX shell even if your operating system is not yet fully functional. In effect, the mounted distribution media is a full operating system environment.

You should perform system management activities in the UNIX shell only if you have extensive UNIX operating system experience and a full operating system environment is not available.

The following system management activities can be performed from the UNIX shell:

- Restoring a damaged `root` file system
- Checking the consistency of the `root` file system

- Restoring the boot block image
- Performing disk maintenance operations such as changing the disk partition layout before performing a text-based custom installation
- Correcting errors in LSM volumes used for `root (/)` or `/usr` file systems or the primary swap

## 9.2 Invoking the UNIX Shell

How you invoke the UNIX shell from the installation procedure depends upon whether you are using the graphical or text-based interface. When you invoke the UNIX shell option, the system is in a Bourne shell in single-user mode with superuser privileges.

### 9.2.1 Invoking the UNIX Shell from the Text-Based Interface

After you boot your processor from the operating system distribution media, your screen will look similar to the following:

```

Welcome to the DIGITAL UNIX Installation Procedure

This procedure installs DIGITAL UNIX onto your system. You will
be asked a series of system configuration questions. Until you
answer all questions, your system is not changed in any way.

During the question and answer session, you can go back to any
previous question and change your answer by entering: history
You can get more information about a question by entering: help

There are two types of installations:

o The Default Installation installs a mandatory set of
 software subsets on a predetermined file system layout.

o The Custom Installation installs a mandatory set of
 software subsets plus optional software subsets that you
 select. You can customize the file system layout.

The UNIX Shell option puts your system in single-user mode with
superuser privileges. This option is provided for experienced
UNIX system administrators who want to perform file system or
disk maintenance tasks before the installation.

The Installation Guide contains more information about installing
DIGITAL UNIX.

1) Default Installation
2) Custom Installation
3) UNIX Shell

Enter your choice:

```

**Choose option 3 from the menu to access the UNIX shell option.**

## 9.2.2 Invoking the UNIX Shell from the Graphical Interface

After you boot your processor from the operating system distribution media, the `Installation Setup` screen displays. Invoke the UNIX shell from the button labeled `UNIX shell`.

## 9.3 UNIX Shell Capabilities

The UNIX shell is an environment that has most of the capabilities of a full operating system environment. This environment works without a swap device and with very limited free disk space within the memory file system (MFS). These two factors mean that tasks requiring large amounts of memory that create the need to swap or tasks requiring large amounts of disk space (such as `/tmp` space) are likely to encounter failures in the UNIX shell environment.

Use the UNIX shell to perform the following tasks:

- Edit a file with the `ed` text editor. By default the `EDITOR` environment variable is set to `ed`. On systems with VGA monitors, you can enable the `vi` text editor by entering:

```
TERM=vt100
export TERM
```

- Create new file systems with the `newfs` command for UNIX File Systems (UFS) or with the `mkfdmn` and `mkfset` commands for Advanced File Systems (AdvFS).
- Restore file systems with the `restore` command (for UFS) or the `vrestore` command (for AdvFS).
- Modify partition tables with the `disklabel` command before the custom installation if you are using the text-based interface. Otherwise, use the graphical Disk Configuration Utility, `diskconfig`, which is accessed by clicking on the `Partition Disks...` button on the `Installation Setup` window.

Remember to use the `-t advfs` or `-t ufs` option with the `disklabel` command depending upon which file system type is in use (AdvFS or UFS) for the `root` file system. Boot blocks must match the file system type of `root`. Refer to the `disklabel(8)` reference page for more information.

- Mount other disks and file systems with the `mount` command.
- Fix UFS file systems with the `fsck` command. The `fsck` command is not required for AdvFS file systems.

---

### Note

---

The `root` file system located on the CD-ROM or the RIS server is mounted with read permissions. The memory file systems (MFS) at `/var` and `/dev` are mounted with read-write permissions. However, any changes that you make on files that you create in `root` are volatile and will not be saved when you halt the UNIX shell.

---

## 9.4 Creating Swap Space

If you need to perform a task that needs swap space, you can turn swapping on in the UNIX shell. The only suggestion for turning on swap space in the UNIX shell environment is that you should not use an area that contains data you want to preserve because it will be overwritten. To avoid this problem, use an area that previously has been used for swap space.

Follow these steps to turn on swapping in the UNIX shell:

1. Decide which device (that is, the device name and partition) you want to use for the swap area. Be careful not to choose an area that has data that you want to preserve.

2. Change to the `/dev` directory:

```
cd /dev
```

3. Use the `MAKEDEV` command with the following syntax to make the device special file for the swap area:

```
./MAKEDEV swap_device
```

For example, to create a swap area on device `rz0` in the `h` partition, enter a command similar to the following:

```
./MAKEDEV rz0h
```

4. Turn the swap device on. In this example, the swap device is `rz0h`:

```
swapon /dev/rz0h
```

5. Enter the following command to verify that the swap device is turned on:

```
swapon -s
```

## 9.5 Accessing Devices

Device special files must be present in the `/dev` directory to access your system's disk and tape devices. Enter the `ls /dev` command to see if the



required device special files exist. If these files do not exist, use the `MAKEDEV` command to create them.

For example, to create the device special file for a SCSI disk, unit number 0 (zero), execute the following commands:

1. Change to the `/dev` directory by entering:

```
cd /dev
```

2. Use the `MAKEDEV` command to create the disk device special file for `rz0` by entering:

```
./MAKEDEV rz0
```

## 9.6 Mounting File Systems

The UNIX shell is used to perform maintenance operations on existing file systems. For instance, if the kernel (`vmunix`) on your `root` file system becomes damaged and you have a good backup, you can mount your `root` file system and replace the damaged kernel. If you are using LSM volumes for the `root` file system, refer to Section 9.9 for information about how to start LSM.

To mount an existing `root` file system located on `/dev/rz0a`, execute the following commands:

1. Create the device special files for the disk containing the `root` file system:

```
cd /dev
./MAKEDEV rz0
```

2. To prepare to mount the file system, create a mount point in `/var` or `/tmp`:

```
mkdir /var/mnt
```

3. Mount the file system:

- a. For UNIX file systems (UFS), enter:

```
mount /dev/rz0a /var/mnt
```

- b. For Advanced File Systems (AdvFS), enter:

```
mkdir -p /etc/fdmns/root_domain
cd /etc/fdmns/root_domain
ln -s /dev/rz0a
mount root_domain#root /var/mnt
```

The existing `root` file system is accessible at `/var/mnt` and can be modified at this point.

## 9.7 Restoring File Systems

The UNIX shell is ideal for restoring damaged `root` file systems. To restore your `root` file system, first create the device special files for the disk on which the `root` file system is to reside. Next create the device special files for the tape device that contains the dump of the `root` file system to be restored. Create these device special files using the `MAKEDEV` command as shown in Section 9.5.

If your system is using the Logical Storage Manager (LSM) volume `rootvol` for the `root` file system, refer to Section 9.9 for information about how to start LSM in the UNIX shell.

### 9.7.1 Restoring UNIX File Systems (UFS)

Use the following procedure to restore a UNIX file system:

1. If the disk does not have a label, which could occur if the disk was physically damaged or replaced, write the default disk partition tables and bootstrap programs. The disk partitions and bootstrap programs should be operational. To determine if the disk has a valid label, use the `disklabel` command with the following syntax:

```
disklabel -r disk
```

If there is no disk label, a message displays.

If a disk label does not exist, use the `disklabel` command with the following syntax to write the default disk partition table:

```
disklabel -rw -t ufs disk disk_type
```

The `-t ufs` specifies that the UNIX file system bootstrap programs are installed. The `disk` parameter specifies the disk that includes the device mnemonic and unit number. The `disk_type` parameter specifies the type of disk associated with `disk` as described in the `/etc/disktab` file.

For example, to write the default disk partition tables on an RZ57 disk, unit 0, on the `a` partition, enter the following command:

```
disklabel -rw -t ufs rz0 rz57
```

---

#### Note

---

The `disklabel` command used in this procedure writes the default disk partition tables to the disk. Writing a label with

customized partition table settings may affect the entire disk. If the disk you are restoring has customized partition table settings, invoke the editing option of the `disklabel` command after writing the default disk label. Refer to *System Administration* or to the `disklabel(8)` reference page for more information.

---

2. Create a new `root` file system by using the following command syntax:

```
newfs raw_device disk_type
```

The *raw\_device* parameter specifies the full raw device pathname of the disk device on your system. For example, to create a new file system on an RZ57, unit 0, enter the following command:

```
newfs /dev/rrz0a rz57
```

3. To prepare to mount the file system, create a mount point in `/var` or `/tmp`:

```
mkdir /var/mnt
```

You should create mount points under the `/var` or `/tmp` directories.

4. Mount the file system by using the following command syntax:

```
mount block_device /var/mnt
```

The *block\_device* parameter specifies the full block device pathname of the disk device. For example, to mount the file system created in the previous step, enter the following command:

```
mount /dev/rz0a /var/mnt
```

5. Next, restore the file system. If you are restoring dump files from a local file system, change to the `/var/mnt` directory, insert the medium containing the dump file, and enter the `restore` command with the following command syntax:

```
restore -Yrf dumpfile
```

The *dumpfile* parameter specifies the pathname of the file containing the dump data. For a tape, enter the following commands:

```
cd /var/mnt
restore -Yrf /dev/rmt0h
```

You can use the UNIX shell to restore other file systems. You should restore file systems from a full operating system environment. If such an environment is unavailable due to the need to restore either `/var` or `/usr`, you should boot your system to single-user mode by using your existing or restored `root` file system. In the single-user mode, more disk space is

available, and swap space can be made available in the UNIX shell as shown in the instructions in Section 9.4.

## 9.7.2 Restoring Advanced File Systems (AdvFS)

Use the following procedure to restore AdvFS file systems:

1. If the disk does not have a label, which could occur if the disk was physically damaged or replaced, write the default disk partition tables and bootstrap programs. The disk partitions and bootstrap programs should be operational. To determine if the disk has a valid label, use the `disklabel` command with the following syntax:

```
disklabel -r disk
```

If the disk has no label, a message is displayed. If the disk has no label, use the `disklabel` command with the following syntax to write the default disk partition table:

```
disklabel -rw -t advfs disk disk_type
```

The `-t advfs` option must be used when creating an AdvFS `root` fileset to ensure that the correct boot blocks are in use in the boot partition. The `disk` parameter specifies the disk that includes the device mnemonic and unit number. The `disk_type` parameter specifies the type of disk associated with `disk` as described in the `/etc/disktab` file. For example, to write the default disk partition tables on an RZ57 disk, unit 0, enter the following command:

```
disklabel -rw -t advfs rz0 rz57
```

---

### Note

---

The `disklabel` command used in this procedure writes the default disk partition tables to the disk. Writing a label with customized partition table settings may affect the entire disk. If the disk you are restoring has customized partition table settings, invoke the editing option of the `disklabel` command after writing the default label. Refer to *System Administration* or to the `disklabel(8)` reference page for more information.

---

2. Create a new `root` file domain by using the following command syntax:

```
mkfdmn -t disk_type raw_device domain
```

The `raw_device` parameter specifies the full raw device pathname of the disk device on your system. For example, to create a new file system on an RZ57, unit 0, enter the following command:

```
mkfdmn -t rz57 /dev/rz0a root_domain
```

3. Create a root fileset in the `root_domain` file by using the following command:

```
mkfset domain fileset
```

The `domain` parameter specifies the name of the root file domain. For example, to create the root fileset in the `root_domain` file domain, enter the following command:

```
mkfset root_domain root
```

4. To prepare to mount the fileset, create a mount point in `/var` or `/tmp`:

```
mkdir /var/mnt
```

You should create mount points under the `/var` or `/tmp` directories.

5. Mount the root fileset by using the following command syntax:

```
mount domain#fileset mount_point
```

The `domain#fileset` parameter specifies the root file domain and the root fileset. The `block_device` parameter specifies the full block device pathname of the disk exist (directories are created using the `mkdir` command). For example, to mount the fileset created in the previous steps, enter the following command:

```
mount root_domain#root /var/mnt
```

6. Restore the fileset using the `vrestore` command. To restore files from a local file system, change to the `/var/mnt` directory, insert the medium containing the dump file, and enter the `vrestore` command using the following syntax:

```
vrestore -vxf dumpfile
```

The `dumpfile` parameter specifies the pathname of the file containing the dump data. Enter the following commands for a tape:

```
cd /var/mnt
vrestore -vxf /dev/rmt0h
```

---

#### Note

---

You can restore a UFS format dump tape to AdvFS (for instance if you are converting a UFS root file system to AdvFS) and you can make a `vdump` tape on UFS. The restore command you use depends on the format of the tape (`dump` or `vdump`). Use `vrestore` to restore AdvFS dumps performed with the `vdump` command and `restore` to restore dumps performed with the `dump` command. The

corresponding restore command is used regardless of the target file system type.

---

You can use the UNIX shell to restore other file systems. You should restore file systems from a full operating system environment. If such an environment is unavailable due to the need to restore either `/var` or `/usr`, you should boot your system to single-user mode by using your existing or restored `root` file system. In the single-user mode, more disk space is available, and swap space can be made available by issuing the following command:

```
swapon -a
```

7. Verify the `/etc/fstab` and `/etc/fdmns` directories. The `mkfdmn` command added `/etc/fdmns/root_domain` to the `root` file system in the UNIX shell that is deleted when you exit the UNIX shell.

## 9.8 Changing the Size of a Disk Partition

If you are using the text-based installation interface, use the `disklabel` command and if you are using the graphical installation interface, use the Disk Configuration application to change the drive identification or the disk partitions on the drive or to replace a damaged label or bootstrap. Remember to use the `-t advfs` or `-t ufs` option with the `disklabel` command depending upon which file system type is in use (AdvFS or UFS). UFS boot blocks are installed by default if `-t advfs` is not specified. Refer to the `disklabel(8)` reference page for more information.

---

### Note

---

If you have a VGA monitor and want `disklabel` to use the `vi` editor, you first have to set the following variables:

```
TERM=vt100
export TERM
EDITOR=vi
export EDITOR
```

---

To look at the existing disk partition layout, enter the `disklabel` command in the following format and replace the variable `n` with the unit number of the disk. For example, to look at the existing disk partition layout of an `rz` SCSI disk, enter the following command:

```
disklabel -r /dev/rzn
```

In the previous example, `n` is the unit number of the disk. The system displays the existing disk partition layout.

To change the size of the disk partition, complete the following steps. The following example uses an `rz26` disk, unit number 0. In this example, the size of the `b` partition is decreased and the size of the `g` partition is increased to include the space no longer being used by the `b` partition.

1. Change to the `/dev` directory:

```
cd /dev
```

2. Use the `MAKEDEV` command to create the disk device special files for `rz0`:

```
./MAKEDEV rz0
```

3. Check the disk label information on `rz0`:

```
disklabel -r rz0
```

If there is no label, the following message is displayed:

```
Bad pack magic number (label is damaged, or pack is unlabeled)
```

To label the disk with the default partitions with AdvFS boot blocks, enter the following command:

```
disklabel -rw -t advfs rz0 rz26
```

---

### Note

---

The kernel device drivers do not allow the size of a disk partition to be decreased or the offset of a partition to be changed while it is open. Some device drivers create a label containing only a single large partition if a disk is unlabeled; thus the label must be written to the `a` or `c` partition of the disk while it is open. This sometimes requires that the label be set in two steps: the first one creating at least one other partition, and the second setting the label on the new partition while shrinking the `a` partition.

---

4. Set the EDITOR environment variable to use the `ed` editor:

```
EDITOR=ed
export EDITOR
```

---

**Note**

---

If you have a VGA monitor and want to use the `vi` editor, you first have to set the following variables:

```
TERM=vt100
export TERM
EDITOR=vi
export EDITOR
```

---

The examples shown in the remaining steps use the `ed` text editor.

5. Edit the disk label for `rz0`:

```
disklabel -e rz0
```

6. Display the disk label by entering the following command:

```
l,$p
```

7. Search for the `b` partition by entering the following command:

```
/b:
```

Information similar to the following is displayed:

```
b: 262144 131072 unused 1024 8192 # (Cyl. 164*- 492*)
```

8. Change the size of the `b` partition from 262144 sectors to 131072 sectors by entering the following command:

```
s/262144/131072/p
```

This reduces the size of the `b` partition from 128 MB to 64 MB. The revised information is displayed:

```
b: 131072 131072 unused 1024 8192 # (Cyl. 164*- 402)
```

There is no need to modify cylinder information; cylinder information is modified automatically when you save and exit the file.

9. Search for the `g` partition by entering the following command:

```
/g:
```

Information similar to the following is displayed:

```
g: 819200 393216 unused 1024 8192 # (Cyl. 492*- 1519*)
```

10. Because the size of the `b` partition was reduced by 131072 sectors, the size of the `g` partition should be increased by 131072 sectors. Change the size of the `g` partition from 819200 sectors to 950272 sectors by entering the following command:



```
s/819200/950272/p
```

This increases the size of the `g` partition from 400 MB to 464 MB.

11. Change the offset of the `g` partition by entering the following command:

```
s/393216/262144/p
```

The revised information is displayed:

```
g: 950272 262144 unused 1024 8192 # (Cyl. 402*- 1519*)
```

12. To verify your changes, redisplay the disk label by entering the following command:

```
l,$p
```

13. Save your edits and quit the editor by entering the following command:

```
wq
```

The system prompts if you want to write the new label. If you are satisfied with your changes, press Return to accept the default answer, Y.

```
Write new label? [y] Return
```

14. Display the newly customized disk by entering the following command:

```
disklabel -r rz0
```

15. Make sure you are in the `root` directory (`cd /`). Then, restart the installation by entering the `restart` command:

Choose the custom installation by entering the number 2 at the prompt. If you choose the default installation option, the changes you made to the disk label will be lost because the default partitions are always used on the disk that contains the `root` file system.

```
Welcome to the Digital Installation Procedure
```

```
This procedure installs DIGITAL UNIX onto your system. You will be asked a series of system configuration questions. Until you answer all questions, your system is not changed in any way.
```

```
During the question and answer session, you can go back to any previous question and change your answer by entering: history You can get more information about a question by entering: help
```

```
There are two types of installations:
```

- o The Default Installation installs a mandatory set of software subsets on a predetermined file system layout.
- o The Custom Installation installs a mandatory set of software subsets plus optional software subsets that you select. You can customize the file system layout.

```
The UNIX Shell option puts your system in single-user mode with superuser privileges. This option is provided for experienced UNIX system administrators who want to perform file system or
```

```
disk maintenance tasks before the installation.

The Installation Guide contains more information about installing
DIGITAL UNIX.

1) Default Installation
2) Custom Installation
3) UNIX Shell

Enter your choice:
```

## 9.9 Starting the Logical Storage Manager

If the LSM daemons `vold` and `voliod` fail to restart when your system is rebooted or the LSM configuration database is corrupted, the LSM volume on which the `root` file system exists will not be accessible. Under such circumstances your system cannot be brought up to multiuser mode. To repair possible problems in `/etc/vol/volboot` or the `rootdg` diskgroup, use LSM commands to rectify the problem.

Use commands similar to the following to restart LSM in the UNIX shell:

1. Create device special files for at least one disk that has a valid LSM configuration database:

```
cd /dev
./MAKEDEV rz9 rz10
cd /
```

2. Create LSM device special files:

```
mknod /dev/volconfig c 41 0
mknod /dev/volevent c 41 1
mknod /dev/voliiod c 41 2
mknod /dev/volininfo c 41 3
```

3. Start the LSM error daemons, `voliod`:

```
voliod set 2
mkdir /etc/vol
```

4. Start the LSM configuration daemon in `disable` mode:

```
vold -m disable
```

5. Initialize the `/etc/vol/volboot` file:

```
voldctl init
```

6. Add one of the disks containing the LSM configuration database to the `/etc/vol/volboot` file:

```
voldctl add disk rz9
```

7. Put `vold` in the enabled mode and import all LSM diskgroups:

```
voldctl enable
```

8. Get a list of all disks known to LSM:

```
voldisk list
```

Make sure that all disks have a device special files in `/dev`.

9. Execute the `volprint` command to obtain information about the LSM configuration:

```
volprint -htA
```

10. Start the LSM volumes:

```
volume -g diskgroup -U usetype start volume_name
```

11. To rectify problems in a file, the volume needs to be mounted. For example, the `root` file system may have to be mounted to fix a file such as `/etc/vol/volboot` or `/etc/inittab`.

If the `root` file system was using AdvFS as the file system type, enter commands similar to the following to mount it:

```
mkdir -p /etc/fdmns/root_domain
cd /etc/fdmns/root_domain
ln -s /dev/vol/rootdg/rootvol rootvol
mount root_domain#root /mnt
```

If the `root` file system was using UFS as the file system type, the LSM volume `rootvol` is mounted as follows:

```
fsck /dev/rvol/rootdg/rootvol
mount /dev/vol/rootdg/rootvol /mnt
```

Refer to the *Logical Storage Manager* guide for more information about how to correct problems encountered while enabling LSM or starting LSM volumes.

## 9.10 Using a Disk That Contains ULTRIX Partition Information

Any disk that was used under the ULTRIX operating system will have a partition table. In such cases, the `disklabel` command displays the ULTRIX partition information and gives you the following options:

- Create a disk label based on the contents of the ULTRIX partition table
- Create a disk label based on the default operating system partition information found in `/etc/disktab`

The following is an example of an ULTRIX partition table:

ULTRIX compatible partition data found.  
This data may be different than the standard  
partition layout information in /etc/disktab.

ULTRIX partition table layout is:

| partition | bottom  | top     | size    | overlap       |
|-----------|---------|---------|---------|---------------|
| a         | 0       | 32767   | 32768   | c             |
| b         | 32768   | 163839  | 131072  | c             |
| c         | 0       | 2050859 | 2050860 | a,b,d,e,f,g,h |
| d         | 163840  | 792845  | 629006  | c,g           |
| e         | 792846  | 1421851 | 629006  | c,g,h         |
| f         | 1421852 | 2050859 | 629008  | c,h           |
| g         | 163840  | 983039  | 819200  | c,d,e         |
| h         | 983040  | 2050859 | 1067820 | c,e,f         |

Use the ULTRIX-style partition data? [y]: n

If you want to preserve the ULTRIX partition data, enter `y` at the prompt; otherwise, enter `n`. If you changed the partition data, the installation procedure recognizes the changes to the disk label and prompts if you want to use the customized partition layout or the default layout. To preserve your changes, choose the customized partition layout.

## 9.11 Returning to the Installation Procedure from the UNIX Shell

You must be at the `root` directory to restart the installation from the UNIX shell.

- After performing preinstallation, system maintenance, or troubleshooting activities in the UNIX shell, return to the installation procedure by entering the following command:

```
cd /
restart
```

- If you have a system console with graphics capability and you want to restart the installation procedure with the text-based interface instead of the graphical user interface, enter the following command:

```
cd /
restart nogui
```

- To exit from the UNIX shell and log in to your already installed system, as `superuser` or `root` enter:

```
halt
```

When the console mode prompt (`>>>`) displays, enter:

```
>>> boot system_disk
```

Replace `system_disk` with the device where the current `root` file system is located. The system disk is usually an entry such as `DKA0`.

# 10

---

## Using the setld Command

This chapter tells you how to use the `setld` command to perform the following tasks:

- Display an inventory of software subsets or files within a software subset
- Install or remove software subsets after an update or full installation

For more information about the `setld` command, see the `setld(8)` reference page.

### 10.1 Command Syntax

`setld [-D root-path] -c subset-id message`

`setld [-D root-path] -d subset-id [subset-id...]`

`setld [-D root-path] -i [subset-id [subset-id...]]`

`setld [-D root-path] -l location [subset-id [subset-id...]]`

`setld [-D root-path] -v subset-id [subset-id...]`

Table 10–1 provides a brief description of the options for the `setld` command:

**Table 10–1: Options for the setld Command**

| Option | Description                                                                                                                                                                                                                                                                                                                    |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -D     | In conjunction with any other option, specifies an alternative root directory. For example:<br><code># setld -D /usr/doctools -i</code><br><br>The directory specified must be the root directory of an entire system hierarchy. Do not attempt to use this option to place software in a directory that is not a system root. |
| -l     | Loads the software kits that are in the specified location; if software subsets are specified, only the named software subsets are installed. For example:<br><code># setld -l /mnt/ALPHA/BASE DNABASE100</code>                                                                                                               |

**Table 10–1: Options for the setld Command (cont.)**

| Option | Description                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -c     | Runs the configuration phase of the named software subset's subset control program (SCP). Refer to the document supplied by your software vendor for the command syntax. For example:<br># <code>setld -c DNABASE100 INSTALL</code>                                                                                                                                                                                                                |
| -i     | Displays a list of software subsets and their installation status. If a software subset is named, displays a list of that software subset's contents. For example:<br># <code>setld -i OSFMANOS440</code>                                                                                                                                                                                                                                          |
| -v     | Runs the named software subset's Installation Verification Procedure (IVP). For example:<br># <code>setld -v OSFMANOS440</code><br><br>To verify the files of a specific subset, use the <code>fverify</code> command. The <code>fverify</code> command reports missing files and inconsistencies in file size, checksum, user ID, group ID, permissions, and file type. Refer to the <code>fverify(8)</code> reference page for more information. |
| -d     | Deletes the named software subset or software subsets. For example:<br># <code>setld -d OSFMANOS440 OSFMANOP440</code>                                                                                                                                                                                                                                                                                                                             |

To list all the options available for the `setld` command, use the `-h` option:

```
setld -h
```

## 10.2 Displaying Subset Inventories

You can use the `setld` command to display an inventory of the software subsets recognized by your system, showing the status (installed or not installed) of each software subset.

To display a software subset inventory, use the `setld -i` command with the following syntax:

```
/usr/sbin/setld [-D root_path] -i [subset-id subset-id...]
```

The following command shows the status of the software subsets:

```
/usr/sbin/setld -i
Subset Status Description

OSFACCT440 System Accounting Utilities (System Administration)
OSFAFM440 Adobe Font Metric Files (Printing Environment)
OSFBASE440 installed Base System (- Required -)
OSFBIN440 installed Standard Kernel Objects (Kernel Build Environment)
:
:
```

If you use the `-i` option to specify a software subset, the `setld` command displays a list of the files in the specified software subset. This is useful if

you want to determine which software subset you need to reload or delete if a particular file is damaged or deleted.

The following command displays the files in the OSFCLINET440 software subset:

```
/usr/sbin/setld -i OSFCLINET440
./etc/.new..acucap
./etc/.new..hosts
:
./usr/sbin/bindsetup
./usr/sbin/fddi_config
```

Use the `-D` option to specify a root directory other than the system root.

## 10.3 Installing a Software Subset

This section describes how to install software subsets from a specified location.

---

### Note

---

Use the `df` command to display statistics on free disk space before loading software subsets with the `setld` command. See the `df(1)` reference page for more information.

---

To install a software subset, log in as `root`, and use the `setld -l` command with the following syntax:

```
/usr/sbin/setld [-D root_path] -l location [subset-id [subset-id...]]
```

The *location* variable specifies the location of the software subset that you want to install. You can specify the following *location* variables:

- *hostname*: specifies the name of the remote host (RIS server).
- *directory* specifies the disk distribution directory.

The *subset-id* variable specifies the name of the software subset. If you do not specify a *subset-id* variable, a list of software subsets is displayed, which lets you choose the software subsets to install. If you specify one or more *subset-id* variables, only those software subsets are installed.

To install software subsets from CD-ROM, use the following procedure:

---

**Note**

---

The distribution path given in the following examples is for the base operating system CD-ROM. For other distribution kits, refer to the document supplied by your software vendor.

---

1. Place your CD-ROM optical disk in its caddy and insert the CD-ROM into the disk drive.
2. As superuser or `root`, create a directory to be the mount point for the CD-ROM. This example creates a directory called `/mnt`:

```
mkdir /mnt
```

3. Mount the CD-ROM on `/mnt`. Refer to Appendix B if you do not know how to determine the location of the CD-ROM device. The following example assumes the CD-ROM device is located on the `c` partition of the `rz4` disk:

```
mount -r /dev/rz4c /mnt
```

After mounting the CD-ROM, you can change to the `/mnt` (`cd /mnt`) directory to view the directories located on the CD-ROM.

4. To install a base software subset, enter a command similar to the following:

```
setld -l /mnt/ALPHA/BASE
```

---

**Note**

---

If you are using a RIS server as the source of the software, make sure your system is registered as a client of the RIS server, then enter a command similar to the following:

```
setld -l ris_server_name:
```

---

5. The `setld` command displays a numbered list of software subset descriptions and prompts you to enter the number of the software subsets you want to install.

Enter the number or numbers associated with the software subsets you want to install. There may be more software subsets presented in the menu than can be displayed on a single screen. You can either select software subsets in each screen or select them all together on the last screen. If you select software subsets as each screen is displayed, all your choices are presented for you to confirm on the final screen. You also can change your choices or redisplay the software subset options.



**Only the software subsets not yet installed on your system are displayed. The software subset selection list looks similar to the following:**

The subsets listed below are optional:

There may be more optional subsets than can be presented on a single screen. If this is the case, you can choose subsets screen by screen or all at once on the last screen. All of the choices you make will be collected for your confirmation before any subsets are installed.

- General Applications:
  - 1) Additional Terminfo databases
  - 2) Computer Aided System Tutor
  - 3) DOS tools
  - 4) GNU Emacs
  - 5) Local Area Transport (LAT)
  - 6) UNIX(tm) SVID2 Compatibility
  - 7) UNIX(tm) to UNIX(tm) Copy Facility
- Kernel Build Environment:
  - 8) ATM Kernel Header and Common Files
  - 9) ATM Kernel Modules
  - 10) Logical Storage Manager Kernel Header and Common Files
  - 11) Logical Storage Manager Kernel Modules
  - 12) POLYCTR advfs Kernel Modules
- Kernel Software Development:
  - 13) ATM Kernel Objects
  - 14) Hardware Kernel Objects
  - 15) Logical Storage Manager Kernel Objects
  - 16) POLYCTR advfs Kernel Objects
  - 17) Standard Kernel Objects
- Mail Applications:
  - 18) DECwindows Mail Interface
  - 19) RAND Corp. Mail Handler (MH)
- Network-Server/Communications:
  - 20) ATM Commands
  - 21) Additional Networking Services
  - 22) Dataless Management Services
  - 23) Remote Installation Service

--- MORE TO FOLLOW ---

Enter your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6):

- Printing Environment:
  - 24) Adobe Font Metric Files
- Reference Pages:
  - 25) Ref Pages: Admin/User
  - 26) Ref Pages: CDE Admin/User
  - 27) Ref Pages: CDE Development
  - 28) Ref Pages: Programming
  - 29) Ref Pages: Realtime
  - 30) Ref Pages: Windows Admin/User
  - 31) Ref Pages: Windows Programming
- Software Development:

- 32) CDA(tm) Software Development
- 33) CDA(tm) for X/Motif Development
- 34) CDE Software Development and Programming Examples
- 35) GNU Revision Control System
- 36) Ladebug Debugger Version 4.0
- 37) Ladebug Debugger Version 4.0 Release Notes
- 38) Ladebug Debugger Window Interface
- 39) Ladebug Debugger remote server
- 40) Realtime Software Development
- 41) Software Development Desktop Environment
- 42) Source Code Control System
- 43) Standard Header Files
- 44) Static Libraries
- 45) X Window and X/Motif Header Files
- 46) X Window and X/Motif Programming Examples
- 47) X Window and X/Motif Software Development
- 48) X Window and X/Motif Static Libraries

Choices (for example, 1 2 4-6): **25 30**

- Supplemental Documentation:
  - 49) XIE Version 5 Online Documentation
- System Administration:
  - 50) C2-Security
  - 51) C2-Security GUI
  - 52) Kernel Debugging Tools
  - 53) Logical Storage Manager
  - 54) Logical Storage Manager GUI
  - 55) Logical Volume Manager
  - 56) Obsolete Commands and Utilities
  - 57) Obsolete Locale databases
  - 58) POLYCTR advfs
  - 59) Single-Byte European Locales
  - 60) System Accounting Utilities
  - 61) System Exercisers
- Text Processing:
  - 62) Doc. Preparation Tools
  - 63) Doc. Preparation Tools Extensions
- Windowing Environment:
  - 64) DECwindows 75dpi Fonts
  - 65) LK201 Keyboard Support
  - 66) LK411 Keyboard Support
  - 67) LK421 Keyboard Support
  - 68) LK444 Keyboard Support
  - 69) PCXAL Keyboard Support
  - 70) X Customizations for OEM
  - 71) X Servers for Open3D
  - 72) X Servers for PCbus
  - 73) X/Motif 1.1
- Windows Applications:
  - 74) Additional DECwindows Applications

--- MORE TO FOLLOW ---

Add to your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6): 25 30 **62**

- 75) Additional X Applications
- 76) CDE Additional Applications

```
77) Demo X Applications
78) Nested X Server
79) Old Additional DECwindows Applications
80) Virtual X Frame Buffer
```

The following choices override your previous selections:

```
81) ALL of the above
82) CANCEL selections and redisplay menus
83) EXIT without installing any subsets
```

Add to your choices, choose an overriding action or  
press RETURN to confirm previous selections.

Choices (for example, 1 2 4-6): 25 30 62

**6. After you enter your choices, the following confirmation message is displayed:**

You are installing the following optional subsets:

```
- Reference Pages:
 Ref Pages: Admin/User
 Ref Pages: Windows Admin/User

- Text Processing:
 Doc. Preparation Tools
```

Is this correct? (y/n):

**7. After you confirm your choice, messages similar to the following display as the software subsets are loaded and configured:**

Checking file system space required to install selected  
subsets:

```
File system space checked OK.
3 subset(s) will be installed.
```

Loading 1 of 3 subset(s)...

```
Doc. Preparation Tools
 Copying from server1 (inet)
 Verifying
```

Loading 2 of 3 subset(s)....

```
Ref Pages: Admin/User
 Copying from server1 (inet)
 Working....Fri Dec 17 11:46:17 EST 1999
 Verifying
```

Loading 3 of 3 subset(s)....

```
Ref Pages: Windows Admin/User
 Copying from server1 (inet)
 Verifying
```

3 of 3 subset(s) installed successfully.

Configuring "Doc. Preparation Tools " (OSFDCMT440)

Configuring "Ref Pages: Admin/User " (OSFMANOS440)

```
Configuring "Ref Pages: Windows Admin/User " (OSFMANWOS440)
```

8. If you are installing from CD-ROM, after the software subsets are installed, unmount the CD-ROM.

```
umount /dev/rz4c
```

To install operating system software subsets on Remote Installation Services (RIS) clients, refer to *Sharing Software on a Local Area Network*.

## 10.4 Installing Software Subsets with Dependencies

If you select a software subset that has a dependency on another subset that is not yet selected or is not already installed, you will see a message similar to the following during subset loading:

```
Checking file system space required to install selected subsets:

File system space checked OK.

1 subset(s) will be installed.

Loading 1 of 1 subset(s)...
setld:
Error installing "Ref Pages: Admin/User " (OSFMANOS440)
This subset requires following subset(s) to operate correctly:

 "Doc. Preparation Tools " (OSFDCMT440)
setld:
Please install required subset(s) first.

0 of 1 subset(s) installed successfully.
```

In the previous example, the reference page software subset was not installed because it requires the installation of the Doc. Preparation Tools (OSFDCMT440).

The `setld` command will not install software subsets with dependencies without installing the software subset on which the dependency occurs. You must invoke the `setld` command again and make sure you select all software subsets along with their dependencies.

Appendix D describes each software subset and shows the dependencies between software subsets (if any).

## 10.5 Rebuilding the Kernel After Installing Kernel Build Environment Subsets

Certain base operating system products (such as the Logical Storage Manager, Advanced File System, and Local Area Transport) contain a kernel component. If you use `setld` to install one of these software subsets

after the installation, you must run the `doconfig` utility to rebuild the kernel with the new kernel component; otherwise the option to use the product will not be available. After building a new kernel, reboot with the new kernel to make the product available for use.

Refer to Table D-4 in Appendix D for a list of the base OS software subsets that contain kernel components for which you must run `doconfig` to build a new kernel. Refer to the `doconfig(8)` reference page for more information.

## 10.6 Rebuilding the Kernel After Installing ATM Adapters

If you install the Asynchronous Transfer Mode (ATM) DGLTA adapter after installing the operating system, you must boot the system from the generic kernel `genvmunix`, install the ATM software subsets from the CD-ROM, and then run the `doconfig` program to rebuild your system kernel to enable the added ATM support.



---

## Performing a Worldwide Installation

This operating system is internationalized, meaning that the Worldwide Language Support (WLS) software subsets provide support for various native languages and countries. Installing the Worldwide Language Support software subsets enables software developers to develop internationalized software that can be used in different countries.

This chapter provides information about:

- Installing the operating system WLS software subsets from CD-ROM or remote installation services (RIS) server
- Installing WLS public domain program source and fonts
- Invoking `/usr/sbin/wwconfig` to tailor the Asian terminal options of the kernel
- Invoking `/usr/sbin/wwsetup` to set up wnn
- Changes made to the default operating system by the installation of WLS software
- The backup files created by a worldwide installation

### 11.1 Preparing for a Worldwide Installation

Before you start the worldwide installation procedure, perform the following tasks:

1. Read Chapter 1, which describes the general preparation you should do before the installation.
2. Make sure that the current version of the base operating system is already installed on your system.
3. Refer to the descriptions of the Worldwide Language Support software subsets in Appendix F to determine the software subsets you want to install.

For more information about the terminals and printers supported for different languages, refer to the current *Software Product Description* (SPD). The SPD is located on the *Operating System Volume 1* CD-ROM and

is located in the `/DOCUMENTATION/POSTSCRIPT` and `/DOCUMENTATION/TEXT` directories.

## 11.2 Dependencies on Base Operating System Software Subsets

Some of WLS software subsets have dependencies on base operating system software subsets. Refer to the worldwide software subset descriptions in Appendix F for the dependencies of each worldwide software subset.

## 11.3 Increasing Available Disk Space

The installation of the worldwide software subsets loads most files to the subdirectories that are subordinate to the `/usr/i18n` directory.

If the `/usr/i18n` directory does not exist, the installation procedure creates it. If the `/usr/i18n` directory does exist, the installation procedure uses it. If you find that there is insufficient disk space for the worldwide software subsets, and you know that you have additional space on alternative disks or disk partitions on your system, follow these steps before beginning the installation process:

1. Log in as `root` or `superuser`.
2. Create the directory `/usr/i18n` as follows, if it does not exist:  

```
mkdir /usr/i18n
```
3. Specify in the `/etc/fstab` file that the newly created directory is a mount point to a disk partition where there is additional space.
4. Enter the `mount -a` command to mount the new mount point of `/usr/i18n`.

## 11.4 Starting the Worldwide Installation

Follow these steps to start a worldwide installation.

1. Log in to your system as the `superuser root`.
2. Shut down the system to single-user mode by entering the following command:  

```
shutdown now
```
3. Remount the disks specified in `/etc/fstab` by entering the following command:  

```
mount -a
```



Go to Section 11.4.1 if you are invoking the `winstall` script from the *Associated Products Volume 1* CD-ROM.

Go to Section 11.4.2 if you are invoking the `winstall` script from a remote installation services (RIS) server.

During the installation procedure, you are asked some questions about configuring the system. If you need help, enter a question mark (?) to display online help.

### 11.4.1 Installing from a CD-ROM

The following steps describe how to invoke the `winstall` script from a CD-ROM:

1. Load the *Associated Products Volume 1* CD-ROM into the CD-ROM drive.
2. Make a directory to be the mount point of the CD-ROM and then mount the CD-ROM by entering commands similar to the following:

```
mkdir /cdrom
mount -rd /dev/rz4c /cdrom
cd /cdrom/Worldwide_Language_Support/kit
```

In the previous example, `/dev/rz4c` is the name of the CD-ROM device. Refer to Appendix B if you do not know the device name of your CD-ROM device.

3. Invoke the `winstall` script to install WLS software subsets as shown in the following example:

```
./winstall
```

Go to Section 11.5 to continue the worldwide installation.

### 11.4.2 Installing from a RIS Server

You may install the worldwide support software subsets from a RIS server. However, you have to make sure that your system is registered as a client on the RIS server. The RIS area must have the Worldwide Language Support software subsets installed. Refer to *Sharing Software on a Local Area Network* for more information on how to set up a RIS server and RIS client. Enter the following command to mount the local file systems and install the software subsets from a RIS server:

1. Mount the local file system:

```
/sbin/bcheckrc
```

2. Start the network:

```
/sbin/init.d/inet start
/sbin/init.d/route start
/sbin/init.d/gateway start
/sbin/init.d/nis start
/sbin/init.d/named start
```

3. Mount the RIS server's mount point:

```
setld -l server:
```

Replace *server* with the name of your RIS server appended with a colon (:). Go to Section 11.5 to continue the worldwide installation.

## 11.5 Responding to the wwinstall Script

The prompts displayed by the `wwinstall` script apply to systems where all the prerequisite base software subsets are installed. The screen displays are similar for installations performed from CD-ROM or RIS. If your system does not have the mandatory base operating system software subsets installed, the prompts and displays may be different.

---

### Note

---

You may see the following message during the installation of worldwide subsets:

```
/usr/bin/setld: /usr/sbin/depord: arg list too long
```

The worldwide installation process halts.

This problem occurs if you have chosen too many subsets and the shell runs out of memory during the worldwide installation. If this happens, install fewer subsets during the initial worldwide installation and install additional subsets at a later time.

---

The `wwinstall` script displays the disk space available in the `/usr/i18n` directory. You can quit now if there is insufficient disk space for the worldwide software. Refer to Section 11.3 for information about increasing disk space.

Most of subsets will be installed under the `/usr/i18n` directory. Depending on the number of subsets you choose to install, you may need more than 200 Mbytes of free disk space for installation.

You have the following amount of free disk space available in `/usr`:

```
df -k /usr
Filesystem 1024-blocks Used Avail Capacity Mounted on
usr_domain#usr 828816 200475 592768 25% /usr
```

Two ways to set up the /usr/il8n directory :

- [1] Create the /usr/il8n directory
- [2] Set up a symbolic link to another partition that has enough free disk space for installation

Which way do you want ? [1] : **Return**

**If you press Return or enter 1 to create the /usr/il8n directory, the following message is displayed:**

Directory /usr/il8n has been created

**If you enter 2 to create a symbolic link, the following message is displayed:**

You have chosen to make a symbolic link to another partition.  
Please enter the installation path:

You have the following amount of free disk space available in /usr/il8n :

```
df -k /usr/il8n
Filesystem 1024-blocks Used Avail Capacity Mounted on
/dev/rz3h 405476 372 364556 0% /rz3h
```

Do you want to continue this installation procedure? (y/n) [y]:**y**

**The installation script displays a list of countries to support:**

Do you want to continue this installation procedure? (y/n) [y] :

```

*
* DIGITAL UNIX WORLDWIDE LANGUAGE SUPPORT INSTALLATION PROCEDURE *
*

```

Please select the countries for which you want to install support subsets:

- |                                    |                          |
|------------------------------------|--------------------------|
| 1) Belgium - French                | 2) Canada - French       |
| 3) Czech Republic                  | 4) France                |
| 5) Germany                         | 6) Greece                |
| 7) Hong Kong                       | 8) Hungary               |
| 9) Israel                          | 10) Italy                |
| 11) Japan                          | 12) Korea                |
| 13) Lithuania                      | 14) Poland               |
| 15) Russia                         | 16) Slovakia             |
| 17) Slovenia                       | 18) Spain - Catalan      |
| 19) Spain - Spanish                | 20) Sweden               |
| 21) Switzerland - French           | 22) Switzerland - German |
| 23) Taiwan                         | 24) Thailand             |
| 25) The People's Republic of China | 26) Turkey               |
| 27) All of the above               |                          |

28) None of the above

Choices (for example, 1 2 3) :

**If you specify more than one number at the prompt, separate each number with a space. If you enter 27 in response to the previous prompt to select all countries, the display is similar to the following:**

You are installing localized software for the following countries:

```
Belgium - French
Canada - French
Czech Republic
France
Germany
Greece
Hong Kong
Hungary
Israel
Italy
Japan
Korea
Lithuania
Poland
Russia
Slovakia
Slovenia
Spain - Catalan
Spain - Spanish
Sweden
Switzerland - French
Switzerland - German
Taiwan
Thailand
The People's Republic of China
Turkey
```

Is this correct? [n]

- If you enter *n*, the software subset selection menu is displayed again, and you can reenter your choice.
- If the countries displayed are the ones you want to support, enter *y*.

Depending upon the countries you selected, the following questions may be displayed:

- **To install outline fonts:**

```
Would you like to install outline fonts for printing
and display? [y] :
```

**Enter *y*, to install outline fonts for better printing and displays. Outline fonts consume a considerable amount of disk space.**

- **To install public domain source files:**

```
Would you like to install program sources of the public domain
software packaged in the Worldwide Language Support kit? [y] :
```

Enter `y` to install program sources of the public domain software packaged in the WLS software. The components NEMACS, MULE, and Wnn are sourced from public domain and are shipped with their source code because of GNU license guidelines. MULE is a multilingual enhancement of GNU Emacs and is based on GNU Emacs Version 19.

- To install UCS (Unicode) locales:

```
Would you like to install any UCS (Unicode) support? [y] :
```

Enter `y` to install UCS (Unicode) locales. This operating system provides locales and codeset converters that support the *The Unicode Standard: Worldwide Character Encoding, Version 2.1* and *Information Technology—Universal Multiple-Octet Coded Character Set, ISO/IEC 10646:1993*. These standards define the Universal Character Set (UCS), which includes characters in most native languages. This operating system also supports the Unicode encoding format known as UCS-4, in which characters are encoded in 32-bit units (4 octets). This encoding format is identical to the one specified by the ISO/IEC 10646 standard.

- To enable Euro currency sign support:

```
Would you like to install Euro Currency Sign support? [y]:
```

Enter `y` to install Euro currency sign support.

### 11.5.1 Selecting Worldwide Software Subsets

Next, a menu of available software subsets is displayed. The menu first shows a list of mandatory software subsets upon which country-specific software subsets depend. These software subsets are loaded automatically.

The following example shows the mandatory software that is installed when `Italy` and `Japan` are the countries chosen for worldwide support. The mandatory software subset list is similar to the following:

```
*** Enter subset selections ***
```

```
The following subsets are mandatory and will be installed automatically unless you choose to exit without installing any subsets:
```

```
* Italian CDE Mail Interface
* Italian Basic X Environment
* Italian CDE Desktop Environment
* Italian CDE Minimum Runtime Environment
* Italian Old X Environment
* Italian Additional DECwindows Applications
* Italian CDE Additional Applications
* Italian Old Additional DECwindows Applications
* Japanese CDE Mail Interface
* Japanese Base System
* Japanese Unicode Support
* Japanese Basic X Environment
* Japanese CDE Desktop Environment
```

- \* Japanese CDE Minimum Runtime Environment
- \* Japanese DECwindows 100dpi Fonts
- \* Japanese DECwindows Fonts
- \* Japanese Old X Environment
- \* Japanese Additional DECwindows Applications
- \* Japanese CDE Additional Applications
- \* Japanese Old Additional DECwindows Applications
- \* Universal Locale Unicode Support
- \* Worldwide Kernel Headers and Common Files
- \* Worldwide Standard Kernel Modules
- \* Worldwide Base System
- \* Worldwide Unicode UCS-4 Locales Support
- \* Worldwide Printer Support
- \* Worldwide Basic X Environment
- \* Worldwide Composite Unicode Fonts
- \* Worldwide DECwindows Fonts
- \* Worldwide ISO-LATIN9 DECwindows 100dpi Fonts
- \* Worldwide Motif 1.1
- \* Worldwide CDE Desktop Environment

The installation procedure then displays a list of optional software subsets that you can install depending on which countries you have selected.

The following example shows the optional software that is available when Italy and Japan are the countries chosen for worldwide support. The optional software subset list is similar to the following:

The subsets listed below are optional:

There may be more optional subsets than can be presented on a single screen. If this is the case, you can choose subsets screen by screen or all at once on the last screen. All of the choices you make will be collected for your confirmation before any subsets are installed.

- Italian Support - Software Development:
  - 1) Italian CDE Software Development
  - 2) Italian X Window Software Development
- Italian Support - Windowing Environment:
  - 3) Italian CDE Online Help
- Japanese Support - General Applications:
  - 4) Additional Japanese Software
  - 5) Japanese Nemacs
  - 6) Wnn Input Method
- Japanese Support - Operating System:
  - 7) Japanese (SJIS) Message Catalogs
  - 8) Japanese Message Catalogs
- Japanese Support - Reference Pages:
  - 9) Japanese Ref. Pages for Additional Software
  - 10) Japanese Reference Pages
  - 11) Japanese Windows Reference Pages
- Japanese Support - Software Development:
  - 12) Japanese CDE Software Development
  - 13) Japanese Ladebug Debugger Graphical User Interface
  - 14) Japanese Ladebug Debugger Version 4.0
  - 15) Japanese Software Development
  - 16) Japanese X Window Software Development

- 17) Wnn Software Development
  - Japanese Support - Windowing Environment:
    - 18) Japanese (SJIS) CDE Online Help
    - 19) Japanese CDE Online Help
    - 20) Japanese DECwindows 75dpi Fonts
    - 21) Japanese DECwindows Additional 100dpi Fonts
    - 22) Japanese DECwindows Additional 75dpi Fonts
  - Japanese Support - Windows Applications:
    - 23) Japanese Netscape Communicator V4.5
  - Worldwide Language Support - General Applications:
    - 24) Worldwide MULE
  - Worldwide Language Support - Operating System:
    - 25) Worldwide Phrase Input Support
    - 26) Worldwide User Defined Character Support
  - Worldwide Language Support - Software Development:
    - 27) Worldwide SVE MNL5 Migration Tools
    - 28) Worldwide Software Development
    - 29) Worldwide X Window Software Development
  - Worldwide Language Support - System Configuration:
    - 30) Worldwide Configuration Tool
  - Worldwide Language Support - Windowing Environment:
    - 31) Worldwide DECwindows Additional Fonts
    - 32) Worldwide ISO-LATIN9 DECwindows 75dpi Fonts
    - 33) Worldwide Two-Byte Outline Font Renderer
    - 34) Worldwide User Defined Character Workstation Service
- Or you may choose one of the following options:
- 35) ALL mandatory and all optional subsets
  - 36) MANDATORY subsets only
  - 37) CANCEL selections and redisplay menus
  - 38) EXIT without installing any subsets

Enter your choices or press RETURN to redisplay menus.

Choices (for example, 1 2 4-6): **8-10 23**

**If you specify more than one number at the prompt, separate each number with a space or a comma. Separate a range of numbers with a hyphen (-).**

**You have a chance to verify your choices as shown in the following example:**

You are installing the following mandatory subsets:

```

Italian CDE Mail Interface
Italian Basic X Environment
Italian CDE Desktop Environment
Italian CDE Minimum Runtime Environment
Italian Old X Environment
Italian Additional DECwindows Applications
Italian CDE Additional Applications
Italian Old Additional DECwindows Applications
Japanese CDE Mail Interface
Japanese Base System
Japanese Unicode Support
Japanese Basic X Environment
Japanese CDE Desktop Environment

```

```
Japanese CDE Minimum Runtime Environment
Japanese DECwindows 100dpi Fonts
Japanese DECwindows Fonts
Japanese Old X Environment
Japanese Additional DECwindows Applications
Japanese CDE Additional Applications
Japanese Old Additional DECwindows Applications
Universal Locale Unicode Support
Worldwide Kernel Headers and Common Files
Worldwide Standard Kernel Modules
Worldwide Base System
Worldwide Unicode UCS-4 Locales Support
Worldwide Printer Support
Worldwide Basic X Environment
Worldwide Composite Unicode Fonts
Worldwide DECwindows Fonts
Worldwide ISO-LATIN9 DECwindows 100dpi Fonts
Worldwide Motif 1.1
Worldwide CDE Desktop Environment
```

You are installing the following optional subsets:

- Japanese Support - Operating System:  
Japanese Message Catalogs
- Japanese Support - Reference Pages:  
Japanese Ref. Pages for Additional Software  
Japanese Reference Pages
- Japanese Support - Windows Applications:  
Japanese Netscape Communicator V4.5

Is this correct? (y/n):

Enter **n** if you want to begin the software subset selection again. Enter **y** if the list is correct.

## 11.5.2 Loading Worldwide Software Subsets

The installation process checks to make sure there is enough disk space to load the selected subsets. A message similar to the following is displayed:

```
Checking file system space required to install selected subsets:
Working...Fri Dec 17 09:53:20 EST 1999
```

```
File system space checked OK.
```

If there is not enough disk space to hold all the software subsets you selected, you must go back and select only those optional software subsets you need.

Next, the installation process installs the software subsets on your system. Messages similar to the following are displayed:

```
36 subset(s) will be installed.
```

```
Loading 1 of 36 subset(s)...
```

```
Worldwide Base System
Copying from /cdrom/Worldwide_Language_Support/kit (disk)
```



```
Verifying
Loading 2 of 36 subset(s)...
Worldwide Kernel Headers and Common Files
 Copying from /cdrom/Worldwide_Language_Support/kit (disk)
 Verifying
Loading 3 of 36 subset(s)...
Worldwide Standard Kernel Modules
 Copying from /cdrom/Worldwide_Language_Support/kit (disk)
 Verifying
Loading 4 of 36 subset(s)...
Worldwide Printer Support
 Copying from /cdrom/Worldwide_Language_Support/kit (disk)
 Verifying
 :
Loading 34 of 36 subset(s)...
Italian CDE Mail Interface
 Copying from /cdrom/Worldwide_Language_Support/kit (disk)
 Verifying
Loading 35 of 36 subset(s)...
Italian CDE Additional Applications
 Copying from /cdrom/Worldwide_Language_Support/kit (disk)
 Verifying
Loading 36 of 36 subset(s)...
Universal Locale Unicode Support
 Copying from /cdrom/Worldwide_Language_Support/kit (disk)
 Verifying
36 of 36 subset(s) installed successfully.
```

---

### Note

---

**If you are installing Chinese language support subsets from a RIS server, you may see a message similar to the following:**

```
Common Chinese Unicode Support
Copying from server_name (inet
setld: cannot access server mapping (rcp: risN.alpha/pr_mapping
No such file or directory)
setld: Load from server_name failed, subset SUBSET_NAME440
Verifying
setld:
There were verification errors for 'Chinese Subset Description
(SUBSET_NAME440)
```

**The worldwide installation process halts.**

This problem occurs because of the large number of Chinese language support subsets. If this happens, either create a RIS area containing fewer subsets or one containing only Chinese subsets. To do this, choose option 1 when installing subsets into the RIS area:

Choose one of the following options:

- 1) Extract software from *kit\_location*
- 2) Create symbolic link to *kit\_location*

Enter your choice:

**Do not extract all software subsets; only extract those subsets necessary for the installation.**

---

### 11.5.3 Configuring Worldwide Software Subsets

Subset configuration occurs next, which is the process of tailoring the operating system software for use. Messages similar to the following are displayed.

```
Configuring "Worldwide Base System " (IOSWWBASE440)
Configuring "Worldwide Kernel Headers and Common Files" (IOSWWBINCOM440)
Configuring "Worldwide Standard Kernel Modules " (IOSWWBIN440)
:
Configuring "Japanese Base System " (IOSJPBASE440)
Configuring "Japanese Message Catalogs " (IOSJPMSG440)
Configuring "Japanese Reference Pages " (IOSJPMANOS440)
:
Configuring "Italian Basic X Environment " (IOSITX11440)
Configuring "Italian Old X Environment " (IOSITOLDX11440)
Configuring "Italian Additional DECwindows Applications" (IOSITDECW440)
:
Configuring "Universal Locale Unicode Support " (IOSULUCSBASE440)
```

Review this screen output carefully; depending upon the software subsets you installed, you may be instructed to run setup scripts. If you performed the installation from CD-ROM, after the installation is complete, review the log file, `/var/adm/smlogs/wwinstall.log` file for a record of the installation. A log file is not created during RIS installations.

## 11.5.4 Building the Kernel

A kernel build begins automatically after software subset configuration unless you performed a dataless installation.

---

### Note

---

If you performed a dataless installation, follow the instructions in Section 11.6 to build the kernel.

---

The kernel build screen display is similar to the following:

```

*
* Rebuilding kernel to incorporate Asian/Thai tty drivers *
*

**** Adding Worldwide Support tty Features into Kernel Configuration File

Starting kernel rebuild...

*** KERNEL CONFIGURATION AND BUILD PROCEDURE ***

Saving /sys/conf/KOREA as /sys/conf/KOREA.bck

*** PERFORMING AUTO-EDIT OF CONFIGURATION FILE ***
Auto-editing /sys/conf/KOREA using /tmp/.script2452....done.

*** PERFORMING KERNEL BUILD ***
 Working...Fri Dec 17 11:55:12 EST 1999
 Working...Fri Dec 17 11:57:14 EST 1999

The new kernel is /sys/KOREA/vmunix

Saving /vmunix as /vmunix.IOS440.1
Copying /usr/sys/KOREA/vmunix to /vmunix

Reboot your system using the new kernel.

The installation software has completed the installation process.
The log file /var/adm/smlogs/wwinstall.log contains a record of
your installation.

Total installation time = 13 minutes 57 seconds
```

If the kernel build fails, check the log file `/var/adm/smlogs/setld.log` for information to diagnose the problem. Refer to the `setld(8)` reference page for more information.

## 11.6 Building an Asian Kernel After the Installation

If you installed support software subsets for Japan, China, Hong Kong, Korea, Taiwan, or Thailand, the worldwide installation process builds a kernel with all the installed Asian or Thai terminal supports. Afterwards, you reboot the system with the new kernel to enable Asian or Thai terminal support in the kernel.

If you want to enable or disable some of the Asian or Thai terminal supports from the kernel, Section 11.6.1 describes the procedure to rebuild an Asian kernel.

### 11.6.1 Reconfiguring the Kernel to Support the Asian Terminal Driver and Daemons

To reconfigure the kernel to support the Asian terminal driver and daemons, invoke the `wwconfig` script with the `-a` option:

```
/usr/sbin/wwconfig -a
```

Refer to the `wwconfig(8)` reference page for more information.

If you installed `IOSWWBIN440` and installed at least one of the following subsets: `IOSWWUDCOS440` (`odld`), `IOSWWPHRASE440` (`simd`), or `IOSJPBASE440` (`kkcd`), a UTX configuration selection table similar to the following displays. UTX is the mechanism to support communication between the Asian terminal driver and daemons.

```
/usr/sbin/wwconfig -a
```

```
*** UTX CONFIGURATION SELECTION ***
```

```
 Selection Asian service Daemon

 1 On Demand Font Loading (odld)
 2 Software Input Method (simd)
 3 Kana-Kanji Conversion (kkcd)
 4 All of the above
 5 None of the above

```

Enter the selection number for each daemon you want.  
For example, 1 2 :

After you make your selection, the daemons are displayed for your confirmation. If you choose 4 (All of the above), the following confirmation message is displayed:

```
You specified the following daemons:
```

```
On Demand Font Loading (odld)
Software Input Method (simd)
Kana-Kanji Conversion (kkcd)
```

Is this correct? (y/n) [n]:

Enter **y** if the list includes the daemons you want to set up.

The installation procedure then asks how many UTX devices you want to create.

How many UTX devices do you want to create? [default: 32] :

The number you enter is saved in the `/var/i18n/sys/stanza.loadable` file. The actual creation of the UTX devices is done when you reboot your system.

There is one `utxd` master daemon that uses one UTX device. Each invocation of one of the `odld`, `simd`, and `kkcd` daemons uses one UTX device. Each user who turns on `odld` on a database not already served by another `odld` starts a new `odld` process. Refer to the `stty(1)` and `cedit(1)` reference pages for more information. Each user session that has the Software Phrase Input Method turned on requires one `simd`. Each user who turns on Kana-Kanji Conversion on a database (refer to `stty(1)` for more information) not already served by another `kkcd` starts a new `kkcd` process. Assuming that 10 users use all three functions, it requires 31 UTX devices to support 10 users.

If you installed the `IOSZHBIG5440`, `IOSZHTELEX440`, and `IOSZHCONV440` software subsets, the following selection menu is displayed:

```
*** ADDITIONAL TERMINAL CODESETS SELECTION ***
```

| Selection | Terminal Codeset                            |
|-----------|---------------------------------------------|
| 1         | BIG-5                                       |
| 2         | Telecode                                    |
| 3         | Traditional & Simplified Chinese Conversion |
| 4         | All of the above                            |
| 5         | None of the above                           |

Enter the selection number for each codeset you want.  
For example, 1 2 :

Selecting a terminal codeset at this prompt means that you want to build support for that terminal codeset into the terminal driver. When codeset support is built into the terminal driver, users can select that codeset as their terminal code by using the `/usr/i18n/bin/stty` command.

Choose 3 if you want to support the proper codeset conversion when the terminal code is set to a Simplified Chinese codeset and the application code is set to a Traditional Chinese codeset or vice versa.

If only two out of the three software subsets are installed, the selection menu still appears but the uninstalled component is missing from the list.

If you installed just one of the software subsets, a question is asked instead. As shown in the following example, if you installed the IOSTHBIN440 software subset, the procedure asks if you want to add the Thai terminal driver to the kernel:

```
Do you want to install the Thai tty driver? (y/n) [y] :
```

The Thai terminal driver supports Thai terminal input/output (I/O). The other Asian languages are supported by the Asian terminal driver. If you have installed only the IOSTHBIN440 software subset and not the IOSWWBIN440 software subset, the previous question is the only question asked.

The installation procedure then asks if you want to rebuild the kernel.

If you wish, you may use an automated kernel build procedure by answering 'y' to the next question.

You will need about 10 Mb available in the /sys file system for the kernel build. If you do not have this much space, do not choose an automated build.

You have the following amount of free disk space available:

```
df -k /sys
Filesystem kbytes used avail capacity Mounted on
/dev/rz3g 825507 670890 72066 90% /ufs/rz3g
```

```
Do you want this procedure to rebuild your kernel? (y/n):
```

If you enter y, the kernel build starts, and the display is similar to the following:

```
Starting kernel rebuild...

*** KERNEL CONFIGURATION AND BUILD PROCEDURE ***

Saving /sys/conf/ARUBA as /sys/conf/ARUBA.bck
Do you want to edit the configuration file? (y/n) [n]: n

*** PERFORMING KERNEL BUILD ***
Working...Fri Dec 17 16:05:35 EDT 1999
Working...Fri Dec 17 16:07:35 EDT 1999
Working...Fri Dec 17 16:09:36 EDT 1999

The new kernel is /sys/ARUBA/vmunix
```

```
Saving /vmunix as /vmunix.IOS440.3
Copying /sys/ARUBA/vmunix to /vmunix
```

Reboot your system using the new kernel.

In the previous example, ARUBA is the system name. If you want to enable or disable some of the terminal options, you must enter the following command to reconfigure and rebuild the kernel:

```
/usr/sbin/wwconfig -a
```

Reboot your system after a kernel rebuild to include the newly selected features.

## 11.7 Setting up wnn

If you installed the IOSJPWNN440 software subset, invoke `/usr/sbin/wwsetup` to set up wnn. The following message may be displayed:

```
=====
Worldwide setup for wnn
=====
```

If you have never installed the Wnn software subset before, the following message is displayed:

You can create the following symbolic links:

```
/usr/local/bin/Wnn4 -> /usr/i18n/bin/Wnn4
/usr/local/lib/wnn -> /usr/i18n/lib/wnn
```

Do you want to create these links? (y/n) [y]:

If you enter `y`, symbolic links are created under the `/usr/local` directory to link to the corresponding Wnn directories under `/usr/i18n`. These links may be necessary if some of your existing applications assume that the Wnn binaries are located under `/usr/local`.

The installation procedure for the IOSJPWNN440 software subset also asks you to enter the password for creating dictionaries as shown in the following example:

Please input the dictionary password.

```
Enter Password :
Verify:
```

```
Dictionary set up
done.
```

The following message is displayed:

You should start the wnn jserver daemon using the command

```

/sbin/init.d/jserver start

Do you want to start the wnn jserver daemon now? (y/n) [y]: y

Nihongo Multi Client Server (4.10)
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/kihon.dic Fid = 1
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/setsuji.dic Fid = 2
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/koyuu.dic Fid = 3
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/chimei.dic Fid = 4
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/jinmei.dic Fid = 5
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/special.dic Fid = 6
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/computer.dic Fid = 7
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/symbol.dic Fid = 8
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/tankan.dic Fid = 9
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/bio.dic Fid = 10
Reading /usr/i18n/lib/wnn/ja_JP/dic/pubdic/full.fzk Fid = 11
Finished Reading Files
/sbin/init.d/jserver: jserver daemon started
done.

```

## 11.8 Backup Files Created by the Installation

During the installation of the WLS software subsets, backup files are created to save the contents of the original files that are replaced by the installation procedure. Table 11–1 lists the files replaced by the installation procedure.

The backup files have either the extension `.IOS440_sav.N` where *N* is an integer, or have the extension `.IOS440_sav` (without the integer).

**Table 11–1: Backup Files Created by Worldwide Installations**

| Files Saved with Extension:    | File Name                           |
|--------------------------------|-------------------------------------|
| <code>file.IOS440_sav.N</code> | <code>/vmunix</code>                |
| <code>file.IOS440_sav</code>   | <code>/usr/bin/X11/dxkeycaps</code> |

Backup files with extension `IOS440_sav` are data or binary files that are not likely to be modified by the system manager. They are restored to the original files when WLS software subsets are removed. **DO NOT** delete files with the extension `IOS440_sav`. If you delete these files, the corresponding data and binary files cannot be restored during the removal of worldwide support software.

Data files that might be modified by the system managers, depending on the system configuration, have the extension `.IOS440_sav.N` for their backup. You can delete files with the extension `.IOS440_sav.N` to save space. These files are not restored to the originals during removal. Instead, the removal procedure creates new `.IOS440_sav.N` files from files that are currently used.



## 11.9 Working in a Worldwide Environment

To enable input and display in any language other than English, you must always set the locale in which your processes run. You set the locale by defining the `LANG` or `LC_ALL` environment variables. To set the Common Desktop Environment (CDE) language from the CDE login window, click on Options and then click on Language.

Refer to the `locale(1)`, `i18n_intro(5)`, `l10n_intro(5)`, and to the reference pages for individual languages (such as `spanish(5)`, `italian(5)`, `japanese(5)`, `hebrew(5)` and so on) for more information about working in an internationalized environment.



# 12

---

## Performing a Worldwide Update Installation

This chapter describes how to update a system running Worldwide Language Support (WLS) software to the latest version of the WLS software.

Refer to Chapter 2 for information about performing an update installation of the base operating system.

### 12.1 What Is an Update Installation of Worldwide Support Software?

An update installation means you are updating a system that is running the previous version of the operating system with WLS software to the current version of the operating system. An update installation preserves disk partitions, file systems, file customizations, your print and network configuration, user accounts, user files, and any other system setup you may have done on a system already running the the operating system.

An update installation of worldwide support does the following:

1. Checks the current system status and saves system files.
2. Deletes the WLS subsets for the previous version of the operating system.
3. Invokes the base system update installation command, `/sbin/installupdate` to update the base system from the previous version of the operating system to the new version of the operating system.
4. Installs worldwide support subsets and merges the saved system files.

### 12.2 Preparing for the Worldwide Update Installation

Before you begin a worldwide update installation, make sure you have the following:

- If you are performing the worldwide update installation from CD-ROM, make sure you have the *Operating System Volume 1* CD-ROM. During the worldwide update installation, you will be prompted to insert this CD-ROM into the drive. Also make sure you have the *Associated Products Volume 1* CD-ROM, which contains the WLS software subsets for the new version of the operating system.
- If you are performing the worldwide update installation from a remote installation services (RIS) server or network file system (NFS) server, make sure you have the base operating system kit available on the RIS or NFS server.

## 12.3 System Files Affected in an Update Installation of Worldwide Support

System files that are saved by an update installation of worldwide support subsets have the extension `.IOSUPD_sav`. Some of these files are merged back to the new system files automatically by the update installation procedure. User intervention is not needed for these merges. However, some system files cannot be merged automatically and must be merged back into the system manually.

The following system files are saved and merged automatically:

- `/etc/utxd.conf`
- `/sys/conf/SYSTEM_NAME`
- `/var/il8n/sys/config.file`
- `/var/il8n/sys/stanza.loadable`

The following system files are saved, but must be merged manually:

- Application default files of X11/DECwindows applications

## 12.4 System Backup

You should back up your operating system before beginning an update installation of worldwide support. If there are any interruptions (including pressing `Ctrl/C`) after the update installation has started, it is unlikely that the update will complete successfully. Should this happen, restore the original version of the base operating system and the worldwide support that previously was installed on your system before you attempt another update installation.

## 12.5 If You Encounter Problems During the Update Installation of the Base System

If you encounter problems during the update installation of the base system such as file type conflicts or the existence of certain layered products that are not compatible with the new version of the operating system, the update installation of the base system is halted. In this case, fix any file conflicts and then invoke the `installupdate` script manually again to continue the update install of the base system.

Do not reboot the machine or switch it to multiuser mode or delete files in `/tmp` and the `/usr/tmp` directories. This corrupts the system and the update installation cannot be continued.

## 12.6 Required Disk Space

Your system needs about 100 MB of free disk space to perform an update installation of worldwide support software. Warning messages are displayed if there is less than 100 MB of free disk space in the `/usr/i18n` directory. Use the `df` command to check your current disk usage. If the update installation fails due to insufficient disk space, your system is in an indeterminate state. You must restore the original versions of the operating system software to your system before attempting another update installation.

## 12.7 Running `winstallupdate` from CD-ROM Media

Read this section if you are using CD-ROM media to perform an update installation of the worldwide support subsets:

1. Make sure that you backed up your system and that your system has sufficient disk space to perform an update installation.
2. Boot to single-user mode or shut down your system as follows:

```
shutdown +30 Please log out
```

In this example, `+30` shuts down the system in thirty minutes and sends the message `Please log out` to all users. Refer to the `shutdown(8)` reference page for more information about the `shutdown` command.

3. Mount the local file systems:

```
/sbin/bcheckrc
```

4. Load the *Associated Products Volume 1* CD-ROM into the CD-ROM drive. Refer to Appendix B if necessary.

5. If you do not know the system device name of your CD-ROM drive, log in as `root` or use the `su` command to gain `root` privileges, and enter the following command:

```
file /dev/rrz*c | grep RRD
/dev/rrz4c: character special (8/4098) SCSI #0 RRD44 disk #32 (SCSI ID #4)
```

In this example, the CD-ROM device is `RRD44` on device `/dev/rz4c`. If you have more than one `RRD` device connected to your system, determine the device where you will mount the CD-ROM.

---

**Note**

---

You must have `root` privileges to get this information with the `file` command.

---

Standard device names begin with `rz` for the block special file and `rrz` for the raw (character) special file. The result of the `file` command displays the *raw* device name, but you must specify the block special file when mounting the CD-ROM device. In this example, the displayed device name is `/dev/rrz4c`, but you will use `/dev/rz4c`.

6. Mount the CD-ROM device. For example, if your CD-ROM device is device number 4 and you are mounting the CD-ROM on `/mnt`, enter a command similar to the following:

```
mkdir /mnt
mount -rd /dev/rz4c /mnt
```

7. Invoke the `wwinstallupdate` script to perform an update installation of worldwide support software:

```
/mnt/ALPHA/WORLDWIDE/wwinstallupdate /mnt
```

8. Insert the *Operating System Volume 1* CD-ROM into your CD-ROM drive as instructed by the following prompt:

```
Please insert the CD-ROM labeled DIGITAL UNIX
Operating System Volume 1 into the CD-ROM drive.
Press <Return> to continue...
```

If you do not have the CD-ROM, just press the Return key to continue and you will be prompted to enter a RIS or NFS server name as shown in the last step in Section 12.8.

Go to Section 12.9 to continue the worldwide update installation.

## 12.8 Running `wwinstallupdate` from an NFS Server System

Read this section if you are using NFS mounted media to perform an update installation of the worldwide support subsets.

The following steps assume that there is a CD-ROM mounted on an NFS server system `nfs_server` with mount point `/oskits`. The `/oskits` entry is added to the `/etc/exports` file of the NFS server system for other client systems to mount it for normal or update installations.

1. Ensure that you backed up your system and that your system has sufficient disk space for an update installation.
2. Ensure that the network is configured and that your system can communicate with the NFS server. Use the following command to test the network connection to the server:

```
ping -c2 nfs_server
```

Substitute `nfs_server` with the host name of your NFS server system.

3. Boot to single-user mode or shut down your system as shown in the following:

```
shutdown +30 preparing to update the system
```

In this example, `+30` shuts down the system in 30 minutes and sends the message `preparing to update the system` to all users. Refer to the `shutdown(8)` reference page for more information about the `shutdown` command.

4. Mount the local file systems:

```
/sbin/bcheckrc
```

5. Start the network and NFS services:

```
/sbin/init.d/inet start
/sbin/init.d/route start
/sbin/init.d/gateway start
/sbin/init.d/nis start
/sbin/init.d/named start
/sbin/init.d/nfs start
```

6. Mount the NFS server's mount point:

```
mount nfs_server:/oskit /mnt
```

7. Enter the following command to invoke the `wwinstallupdate` script:

```
/mnt/ALPHA/WORLDWIDE/wwinstallupdate /mnt
```

8. At the following prompt, enter the mount point of the base operating system kit or the RIS server name:

```
Please input local or remote mount point, device name or
RIS server name for the base kit of DIGITAL UNIX
Operating System or press <return> to retry :
```

If you enter a RIS server name in response to the previous prompt, the RIS server name must be appended with a colon (`:`).

Go to Section 12.9 to continue the worldwide update installation.

## 12.9 What Happens During the Worldwide Update Installation

After you invoke the `wwinstallupdate` program, a screen similar to the following is displayed:

```
Update installation of Worldwide Language Support from
Version 4,0 or later of DIGITAL UNIX

Digital Equipment Corporation recommends that you perform complete
system software backups before proceeding.

Messages of Update Installation of Worldwide Language Support are
recorded in /var/adm/smlogs/wwupdate.log and /var/adm/smlogs/it.log
```

```

Make sure that you have the base kit of DIGITAL UNIX Operating
System which is either in
- CD-ROM labeled DIGITAL UNIX Operating System Volume 1, or
- Network file system (NFS) server, or
- Remote installation service (RIS) server

```

```
Press <RETURN> to review message again.
Do you want to continue the update installation? (y/n) []:
```

One of the following takes place, depending upon your response:

- If you enter `n`, the worldwide update installation procedure stops, and your system is in single-user mode at the `root` system prompt (`#`).
- If you enter `y`, system files are saved and worldwide support subsets are deleted. Then, the update installation procedure of the base operating system begins. Software subset configuration and the kernel build begin after all base operating system software subsets are updated. Refer to Chapter 2 for more information about the base operating system update installation.

If you invoked the worldwide update installation from CD-ROM, when the update installation of the base system is complete, the following message appears to prompt you to insert the CD-ROM of the worldwide kit into the CD-ROM drive:

```
Please insert the CD-ROM labeled DIGITAL UNIX Associated
Products Volume 1 into the CD-ROM drive.
Press <Return> to continue.
```

If the base operating system kit for this version of the operating system is in a network file system (NFS) server or remote installation service (RIS) server, the following message displays:



Base kit not found or read error.  
Please input local or remote mount point, device name or  
RIS server name for the base kit of DIGITAL UNIX Operating  
System or press <return> to retry :

**Enter the mount point of the base kit or the name of the RIS server  
appended with a colon (:).**

**Messages from the update installation for worldwide support are recorded  
in the files /var/adm/smlslogs/wwupdate.log and  
/var/adm/smlslogs/it.log.**

## **12.10 Installing Worldwide Subsets and Building the Asian Kernel**

The last step in the update installation process is the kernel build. After the kernel build, the worldwide support subsets are installed. Finally, the Asian kernel is built, if necessary, and the system reboots.



# A

---

## Preinstallation Tasks for Systems Running LSM, LVM, Prestoserve, and AdvFS

Perform the preinstallation tasks described in this appendix if you are planning to install the new version of the operating system and your system is using one or more of the following software products:

- Logical Storage Manager (LSM)
- Logical Volume Manager (LVM)
- Prestoserve
- Advanced File System (AdvFS)

### A.1 Preparing for a Full Installation if Using LSM

Read this section only if your system is installed with and using the Logical Storage Manager (LSM) and you are performing a full installation.

The following steps should be performed to preserve the LSM configuration currently in use on a system. Steps 2 and 4 are not necessary when performing an update installation because the update preserves the LSM `volboot` file in the `root` file system.

1. Check the `/etc/vol/volboot` file to ensure that it contains valid LSM disks. Enter the following command to list the current disks in `/etc/vol/volboot`:

```
voldctl list
```

2. Create a backup copy of the `/etc/vol/volboot` file. The backup copy of `/etc/vol/volboot` must be restored after the installation is complete. The backup copy should be created on a separate file system that is not located in either the `root`, `/usr`, or `/var` file systems because a full installation destroys (overwrites) those three file systems. In the following example, `/backup` is a separate file system:

```
mkdir /backup/lsm
cp /etc/vol/volboot /backup/lsm/volboot
```

3. If the `root` file system and primary swap device were encapsulated to use LSM volumes `rootvol` and `swapvol` respectively, the volumes `rootvol` and `swapvol` should be removed before a full installation. If the `/usr` and `/var` file systems were encapsulated to LSM volumes, they also should be removed from the LSM configuration before a full installation. Unencapsulating volumes used for `root`, `swap`, `/usr` and `/var` is not necessary for update installations.

Consider the following LSM configuration with mirrored `rootvol` and `swapvol`. The `/usr` file system is also encapsulated to use the LSM volume `volrz10g`:

```
v rootvol root ENABLED ACTIVE 131072 ROUND -
pl rootvol-01 rootvol ENABLED ACTIVE 131072 CONCAT - RW
sd rz10-01 rootvol-01 0 131056 16 rz10 rz10
sd rz10-02 rootvol-01 16 0 131056 rz10 rz10
pl rootvol-02 rootvol ENABLED ACTIVE 131072 CONCAT - RW
sd rz14-01 rootvol-02 0 131056 16 rz14 rz14
sd rz14-02 rootvol-02 16 0 131056 rz14 rz14

v swapvol swap ENABLED ACTIVE 400880 ROUND
pl swapvol-01 swapvol ENABLED ACTIVE 400880 CONCAT - RW
sd rz10b-01 swapvol-01 0 400880 rz10b rz10b
pl swapvol-02 swapvol ENABLED ACTIVE 400880 CONCAT - RW
sd rz14b-01 swapvol-02 0 400880 rz14b rz14b

v volusr fsgen ENABLED ACTIVE 1787904 SELECT -
pl volusr-01 volusr ENABLED ACTIVE 1787904 CONCAT - RW
sd advfs_rz10g-01 volrz10g-01 0 0 1787904 advfs_rz10g rz10g
pl volusr-02 volusr ENABLED ACTIVE 1787904 CONCAT - RW
sd advfs_rz14g-01 volrz10g-02 0 0 1787904 advfs_rz14g rz14g
```

Perform the following steps to remove the use of the LSM volumes for `root`, `swap`, and `/usr`:

- a. Disassociate the second plex in `rootvol` and `swapvol` and remove them from the LSM configuration. In this example, the full installation will later be done on `rz10`:
 

```
volplex dis rootvol-02
volplex dis swapvol-02
voledit -rf rm rootvol-02 swapvol-02
voldg rmdisk rz14 rz14b
voldisk rm rz14 rz14b
```
- b. Execute the `/usr/sbin/volunroot` command to unencapsulate `rootvol` and `swapvol`. This requires a system reboot for the changes to take effect:
 

```
/usr/sbin/volunroot
```

Reboot the system at the next available opportunity.
- c. To remove the volumes used for `/usr` and `/var`, shut down the system to single-user mode and ensure that the `/usr` and `/var` file systems are unmounted. In the previous example, volume

volrz10g was used for the /usr file system in the AdvFS domain usr\_domain.

Remove the LSM volume volusr from the LSM configuration:

```
voledit -rf rm volusr
voldg rmdisk advfs_rz10g advfs_rz14g
voldisk rm rz10g rz14g
```

Change the /etc/fdmns/usr\_domain directory to use /dev/rz10g instead of the LSM volume:

```
cd /etc/fdmns/usr_domain
rm volusr
ln -s /dev/rz10g rz10g
```

If UNIX file systems (UFS) were used instead of Advanced File Systems (AdvFS), the /etc/fstab file should be modified to use /dev/rz10g for the /usr file system.

Similar steps for the /var file system are required if LSM volumes were used.

4. Save the current LSM configuration information for added safety. Create a backup copy of the current LSM configuration. The backup copy should be created on a separate file system that is not located in either the root, /usr, or /var file systems because a full installation destroys (overwrites) those three file systems. In the following example, /backup is a separate file system:

- a. Save information regarding the disks currently being used with LSM:

```
voldisk list > /backup/lsm/voldisk.out
```

- b. Save the LSM diskgroup configuration. For example, enter the following command for each LSM diskgroup in the configuration. The backslashes (\) in the following two command lines indicate line continuation and should not be included in the actual command line:

```
volprint -g rootdg -mvps > \
/backup/lsm/volprint.rootdg.out
```

```
volprint -g diskgroup -mvps > \
/backup/lsm/volprint.diskgroup.out
```

The backup files created in the previous steps should also be copied to a backup media (such as magnetic tape) before the installation is started for added safety. These configuration files do not need to be restored under normal circumstances; restoring the

`/etc/vol/volboot` file from backup has sufficient information for the LSM configuration.

5. Perform the installation process as documented in this guide.
6. After the full installation is complete, restore the backed up copies of the LSM `volboot` file before starting LSM. For example, while in multiuser mode, enter commands similar to the following:

```
cp /backup/lsm/volboot /etc/vol/volboot
volinstall
rm -f /etc/vol/reconfig.d/state.d/install-db
vol-startup
```

After the full installation, the `/usr` and `/var` file systems reside on disk partitions. Separate steps are required to encapsulate the disk partitions to LSM volumes. Before the current `/usr` and `/var` file systems can be encapsulated to LSM volumes, a cleanup of the LSM configuration that existed before the full installation has to be done. If either the `/usr` or `/var` file systems resided on LSM volumes before the full installation, you will have to clean up these LSM volumes because the LSM volumes will no longer be in use.

Refer to *Logical Storage Manager* for more information about LSM.

## A.2 Preparing for a Full Installation if Using LVM

Read this section only if your system is installed with and using the Logical Volume Manager (LVM) and you are performing a full installation.

---

### Note

---

The LVM product has been retired and replaced with the Logical Storage Manager (LSM).

---

The following steps should be performed to preserve the LVM configuration currently in use on a system:

1. Create a backup copy of the LVM configuration. The backup copy should be created on a separate file system that is not located in either the root `/usr` or `/var` file systems because a full installation destroys (overwrites) those three file systems. In the following example, `/backup` is a separate file system:

```
mkdir /backup/lvm
cp /etc/lvmtab /backup/lvm/lvmtab
```

2. Save the special device files associated with LVM volumes by creating a tar file of the special device files. For each LVM volume group on the system, create a tar file of all the special device files in `/dev/volume_group`. In the following example, `vg1`, `vg2`, and `vg3` are the volume groups:

```
tar cf /backup/lvm/lvm.devfiles.tar /dev/vg1 /dev/vg2 /dev/vg3
```

3. Save the current LVM configuration for added safety as shown in the following steps:

- a. For each LVM volume group in the configuration, enter the following command to back up the volume group information. In this example, `vg1` is the volume group:

```
vdisplay -v /dev/vg1 > /backup/lvm/vg1.out
```

- b. For each logical volume in a volume group, execute the following command to back up the configuration information. In this example, `lv011` is the logical volume and `vg1` is the volume group:

```
lvdisplay -v /dev/vg1/lv011 > /backup/lvm/vg1.lv011.out
```

- c. For each physical volume in a volume group, execute the following command to back up the configuration information for each physical volume in the volume group. In this example, `/dev/rz8c` is the physical volume:

```
pvdisplay -v /dev/rz8c > /backup/lvm/vg1.rz8c.out
```

4. Perform a full installation of the operating system as described in this guide.
5. After the full installation is complete, restore the copy of `/etc/lvmtab` from the backup media as shown in this example:

```
cp /backup/lvm/lvmtab /etc/lvmtab
```

Then, recreate the LVM special device files from the tar file stored in the `/backup` directory:

```
tar xf /backup/lvm/lvm.devfiles.tar
```

Restoring the `/etc/lvmtab` file has sufficient information for a complete LVM configuration. The LVM configuration files that were backed up in Step 3 were backed for added safety and do not have to be restored.

Refer to the *Logical Storage Manager* document for information about encapsulating existing LVM volumes to LSM volumes.

## A.3 Preparing for a Full Installation if Using Prestoserve

Read this section only if your system is using Prestoserve and you are performing a full installation.

You must save your current Prestoserve configuration before beginning a full installation because the `root` file system is overwritten during a full installation. To save and restore the Prestoserve configuration, follow these steps:

1. Create a backup copy of the `/etc/prestotab` file. The backup copy should be created on a separate file system that is not located in either the `root`, `/usr`, or `/var` file systems because a full installation destroys (overwrites) those three file systems. In the following example, `/backup` is a separate file system:

```
mkdir /backup/presto
cp /etc/prestotab /backup/presto/prestotab
```

2. Perform the full installation of the operating system as described in this guide.
3. Restore the copy of `/etc/prestotab` from the backup after the full installation is complete, as shown in the following example:

```
cp /backup/presto/prestotab /etc/prestotab
```

To configure the Prestoserve software, refer to the `prestosetup(8)` or `setup(8)` reference pages for more information.

## A.4 Preparing for a Full Installation if Using AdvFS

If your system is configured with AdvFS, a full installation overwrites the `/etc/fdmns` directory resulting in the loss of critical configuration data. If the file system layout of all of your AdvFS file systems will remain the same after the full installation, then save a copy of the `/etc/fdmns` directory and all files under the directory before beginning the installation. After the installation is complete, restore the directory. If you plan to change your file system layout during the full installation process (for example, `/usr` is currently on `rz0g` and you plan to change `/usr` to `rz1g` during the installation process), then you will need to selectively copy files before beginning the installation. After the installation is complete, selectively restore the files.



# B

---

## Compact Disk Overview

The software for this version of the operating system is distributed on read-only compact disks (CD-ROM). These CD-ROMs are identified as follows:

- *Operating System Volume 1* contains the operating system software subsets. The software subsets included on this CD-ROM are documented in Appendix D.
- *Associated Products Volume 1* contains additional software that is shipped with the operating system, including software for Worldwide Language Support (WLS). The software subsets included on this CD-ROM are documented in Appendix E.
- *Associated Products Volume 2* contains more additional software. The software subsets included on this CD-ROM are also documented in Appendix E.
- *Documentation Volume 1* contains the operating system documentation set in HTML and PDF formats. The online documentation included on this CD-ROM are documented in Chapter 8.

This appendix describes how to perform the following tasks:

- Load a CD-ROM in a caddy
- Insert and remove a CD-ROM
- Mount a CD-ROM
- Unmount a CD-ROM

Before you insert a CD-ROM in its drive, make sure you know how to operate the disk drive. The *Optical Disk Drive Owner's Manual* contains instructions for using the CD-ROM drive.

### B.1 Loading a CD-ROM in a Caddy

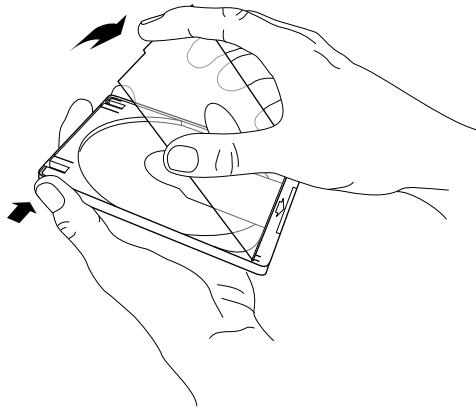
A CD-ROM must be placed in a caddy before it can be inserted in an RRD42 or RRD44 disk drive. Caddies are not required for RRD43 or RRD45 disk drives. Follow these steps to load a CD-ROM in a caddy:

1. If a protective cellophane wrapper is on the caddy, remove the wrapper before using the caddy.

2. Press the tabs on both sides of the caddy and lift the lid.
3. Remove the CD-ROM from its packaging. Hold the CD-ROM by its edge.
4. Place the CD-ROM in the caddy, making sure that the labeled side faces up.
5. Close the lid of the caddy by pressing both corners down firmly.

Figure B-1 shows how to press the tabs of the caddy and lift the lid:

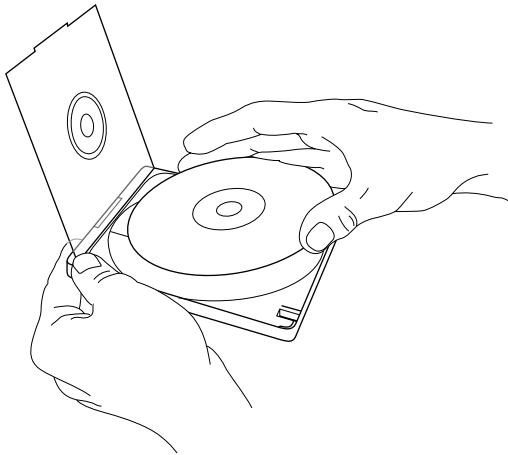
**Figure B-1: Pressing Tabs and Lifting Lid of a CD-ROM Caddy**



ZS-0443-MH

Figure B-2 shows how to place the disk in the caddy:

**Figure B-2: Placing a Disk in a CD-ROM Caddy**



ZS-0444-MH

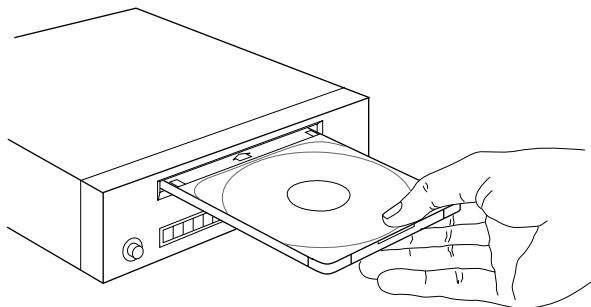
## **B.2 Inserting and Removing a CD-ROM**

After placing the CD-ROM in a caddy, follow these steps to insert the disk caddy in to a disk drive:

1. Insert the caddy in to the slot in the disk drive. The disk label should be facing up.
2. Push the caddy in until it stops.

Figure B-3 shows a CD-ROM (in its caddy) being inserted in to a disk drive:

**Figure B-3: Inserting a CD-ROM in to a Disk Drive**



ZS-0445-MH

## B.3 Mounting a CD-ROM

Before you can access the files and directories on a CD-ROM, it must be mounted on a mount point. Follow these steps to mount a CD-ROM:

1. Log in as root or become superuser.
2. If you do not know the system device name of your CD-ROM drive, log in as root or use the `su` command to gain root privileges, and enter the following command:

```
file /dev/rrz*c | grep RRD
/dev/rrz4c: character special (8/4098) SCSI #0 RRD44 disk #32 (SCSI ID #4)
```

In this example, the CD-ROM device is RRD44 on device `/dev/rz4c`. If you have more than one RRD device connected to your system, determine the device where you will mount the CD-ROM.

---

### Note

---

You must have root privileges to get this information with the `file` command.

---

Standard device names begin with `rz` for the block special file and `rrz` for the raw (character) special file. The result of the `file` command displays the *raw* device name, but you must specify the block special file when mounting the CD-ROM device. In this example, the displayed device name is `/dev/rrz4c`, but you will use `/dev/rz4c`.

3. Make a directory that will be the mount point for the CD-ROM, using the `mkdir` command. Then mount the CD-ROM using the `mount` command with the following syntax, substituting the unit number of your CD-ROM drive for the *unit\_number*.

```
mount -r /dev/rz unit_numberc /mount-point
```

For example, to mount the CD-ROM in drive `/dev/rz4c` on the directory `/cdrom`, enter the following commands:

```
mkdir /cdrom
mount -r /dev/rz4c /cdrom
```

4. To ensure that the CD-ROM is remounted in the event that your system crashes or is rebooted, you can use the text editor of your choice and open the `/etc/fstab` file. Add a line similar to the following:

```
/dev/rz4c /cdrom ufs ro 0 0
```

When you have ensured that your edits are correct, write and quit the file. The system will now mount the CD-ROM on the `/cdrom` mount point on every reboot.

## B.4 Unmounting a CD-ROM

You must unmount a CD-ROM by using the `umount` command before you can eject it from the disk drive. To unmount a CD-ROM, you must be superuser or `root` and you must be one directory above the mount point of the CD-ROM. Use a command similar to the following to unmount a CD-ROM:

```
umount /dev/rz4c
```

If you do not unmount the CD-ROM before trying to remove it, the CD-ROM will not eject from the drive when you press the eject button. If you are not one directory above the mount point of the CD-ROM when you execute the `umount` command, you will see the message `device busy`.

To remove the disk from the disk drive after it is unmounted, press the eject button on the disk drive.

If the eject button is disabled by software or if the drive does not eject the caddy after you press the eject button, refer to your *Optical Disk Drive Owner's Manual* for instructions.



# C

---

## User-Supplied Files and Installation Cloning

This appendix describes the use of user-supplied files in the full installation process (default or custom) and the installation cloning process. Table C-1 summarizes these features.

**Table C-1: Feature Summary**

| Feature                                                                                                                                                                                                                                     | Applies To:                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| The installation process searches for and invokes user-supplied files to enable customizations on the system to be installed. The files can be on diskette, a RIS server, the <code>/var/tmp</code> directory on your system, or on CD-ROM. | Full installations and installation cloning |
| Administrators can modify the configuration description file (CDF) to enable an unattended installation cloning process.                                                                                                                    | Installation cloning                        |

The following information is included in this appendix:

- Overview of the installation cloning process and support of user-supplied files
- Role of the administrator
- Theory of operation for invoking user-supplied files and CDFs
- Description of the CDF
- Relationship between the user-supplied files and the CDF
- Acceptable differences between the CDF and the systems to be cloned
- Modifying the CDF to enable unattended installation cloning of client systems
- Creating files for execution during a full installation or installation cloning
- Moving the CDF and files to the appropriate distribution media (diskette, RIS server, or CD-ROM)

## C.1 Installation Cloning Overview

Installation cloning allows you to replicate the installation configuration from a model system that is already installed with this release of the operating system onto one or more target systems with the same or similar hardware configurations.

When a system is installed with this release of the operating system, a configuration description file (CDF) is generated that contains the results of the questions answered during the installation. This file is located on the installed system in the `/var/adm/smlogs` directory under the file name `install.cdf`. The CDF contains all the configuration information required to perform an initial system installation on a client system.

---

### Caution

---

CDFs used in previous versions of the operating system may not be compatible with this version of the operating system.

---

### C.1.1 Prerequisites for Installation Cloning

The only prerequisite for installation cloning is that the target system has the same disk configuration as the system where the CDF was generated. This means that the disks used for the `/` (`root`), `usr`, and `var` file systems and `swap` areas on both systems must have the same disk type and the same device name.

It is possible, however, to support slight differences in configuration. Section C.7.1 describes these acceptable differences.

### C.1.2 Benefits of Installation Cloning

The benefits to using installation cloning to mass-install systems are:

- Installation cloning produces identical installations.
- You can set up the installation cloning process to run with very little user intervention.
- Installation cloning is ideal for environments in which there are many of the same or similar systems that need to be installed with this release of the operating system because it eliminates the need to perform duplicate installations on all systems.



- Once a suitable CDF has been located and optionally modified, the administrator has minimal involvement in the installation cloning process at the client systems.

### C.1.3 Installation Cloning Features

The files necessary for the installation cloning process can be placed on a diskette, the `/var/adm/ris/clients/sets/profile_set` directory on a RIS server or in the `/isl` directory on a CD-ROM or extracted RIS area. A CD-ROM is a read-only device and data cannot be written to it. However, if you have a special license agreement to copy and repackage the operating system, files can be written to the `/isl` directory of the image, which will be written to the CD-ROM. Refer to Section C.11.4 for more information about burning (writing to) CD-ROMs.

In older versions of the operating system, installation cloning could be done only from a network connection to a remote installation services (RIS) server and required user intervention. In this version of the operating system, however, installation cloning can be done from either a network connection or CD-ROM. In addition, installation cloning can be set up so that it automatically bypasses the following actions that previously required user intervention:

- Confirming use of the CDF to start an installation cloning
- Building a tailored kernel automatically

## C.2 Overview of Support for User-Supplied Files

The full installation and installation cloning processes can invoke user-supplied files that contain scripts, programs, or executables to perform user-defined customizations. This ability provides administrators with the opportunity to customize the installation procedure. The files can be provided on diskette, a RIS server, or in the `/isl` directory of the distribution media (either CD-ROM or an extracted RIS area). Refer to Section C.11.2 for things to consider when moving files to an extracted RIS area.

The first invocation of user-supplied files occurs before the actual installation process begins, that is, before any file systems are created and software is installed. At that point, for example, an administrator may want to write a new disk label onto a specific disk to customize disk partitions. This file must be named `preinstall`.

The second invocation is allowed after software is installed. At that point, for example, an administrator may want to install a customized software

application after the installation of the base operating system software subsets. This file must be named `postload`.

Refer to Section C.9 and Section C.10 for more information about creating `preinstall` and `postload` files for execution during a full installation or installation cloning process.

### C.3 Relationship Between CDFs and User-Supplied Files

CDFs are used only for an installation cloning process. User-supplied files are invoked and executed during both types of full installations (default and custom) and the installation cloning processes.

CDFs and user-supplied files can be used independently or in any combination. The CDFs and user-supplied files can be located on different sources. For example, the `install.cdf` file may be on a diskette, the `preinstall` file might come from the RIS server, and the `postload` file might come from the `/isl` directory of the distribution media.

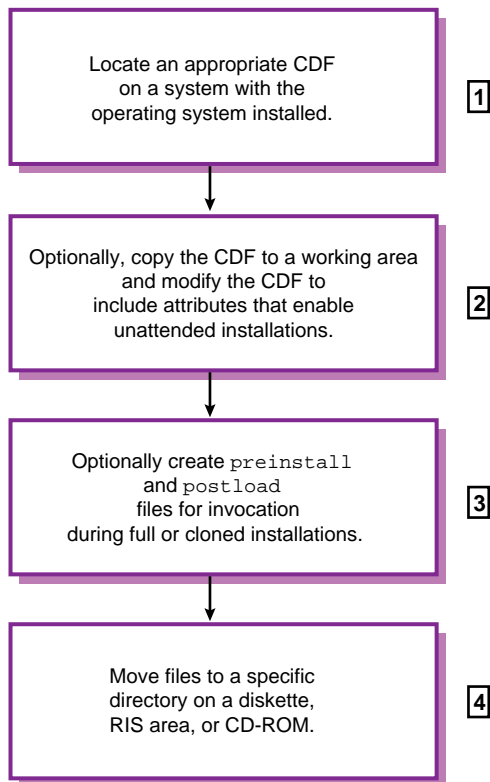
The installation process searches for the `install.cdf`, `preinstall`, and `postload` files in the following order of priority:

1. The `/` (root) directory of diskette drive `fd0` or `fd1`. If a diskette is used, it requires a standard UNIX File System (UFS).
2. The `/var/adm/ris/clients/sets/profile_set` directory on a RIS server where `profile_set` is a user-created directory name.
3. The `/var/tmp` directory on the system to be installed. Keep in mind that CDFs or user-supplied files cannot be delivered in the `/var/tmp` directory. They can, however, be copied into this directory by executing the `preinstall` file, which previously has been customized to manipulate a CDF or other user-supplied file.
4. In the `/isl` directory of the distribution media (for CD-ROM or RIS installations) or the `/isl` directory of an extracted RIS area (for RIS installations only).

### C.4 Role of the Administrator

To set up a system for installation cloning, an administrator performs the tasks described in Figure C-1. To execute user-supplied files during a full installation, the administrator performs Tasks 3 and 4 only. The numbered list after the task summary describes the tasks in more detail and provides pointers to more information.

**Figure C-1: Summary of Administrator Tasks**



- 1** An administrator locates a CDF that is suitable to use for installation cloning. On systems that are installed with this version of the operating system, the CDF is located in the `/var/adm/smlogs` directory as the file named `install.cdf`. There is one CDF generated per system installation. Refer to Section C.6 for a description of the contents of the CDF. Refer to Section C.7 for information about what makes a CDF suitable for installation cloning and for information about acceptable differences between the CDF and the target systems.
- 2** The administrator copies and moves the CDF to a working area where it optionally can be modified for installation cloning. The administrator should make a copy of the `/var/adm/smlogs/install.cdf` file and move and modify the copy. The original CDF should be retained in the `/var/adm/smlogs` directory because it contains information about the initial system installation that could be valuable for future troubleshooting. The administrator has the option to modify the CDF so that the installation bypasses all user responses usually required during an installation cloning process. Refer to Section C.8 for

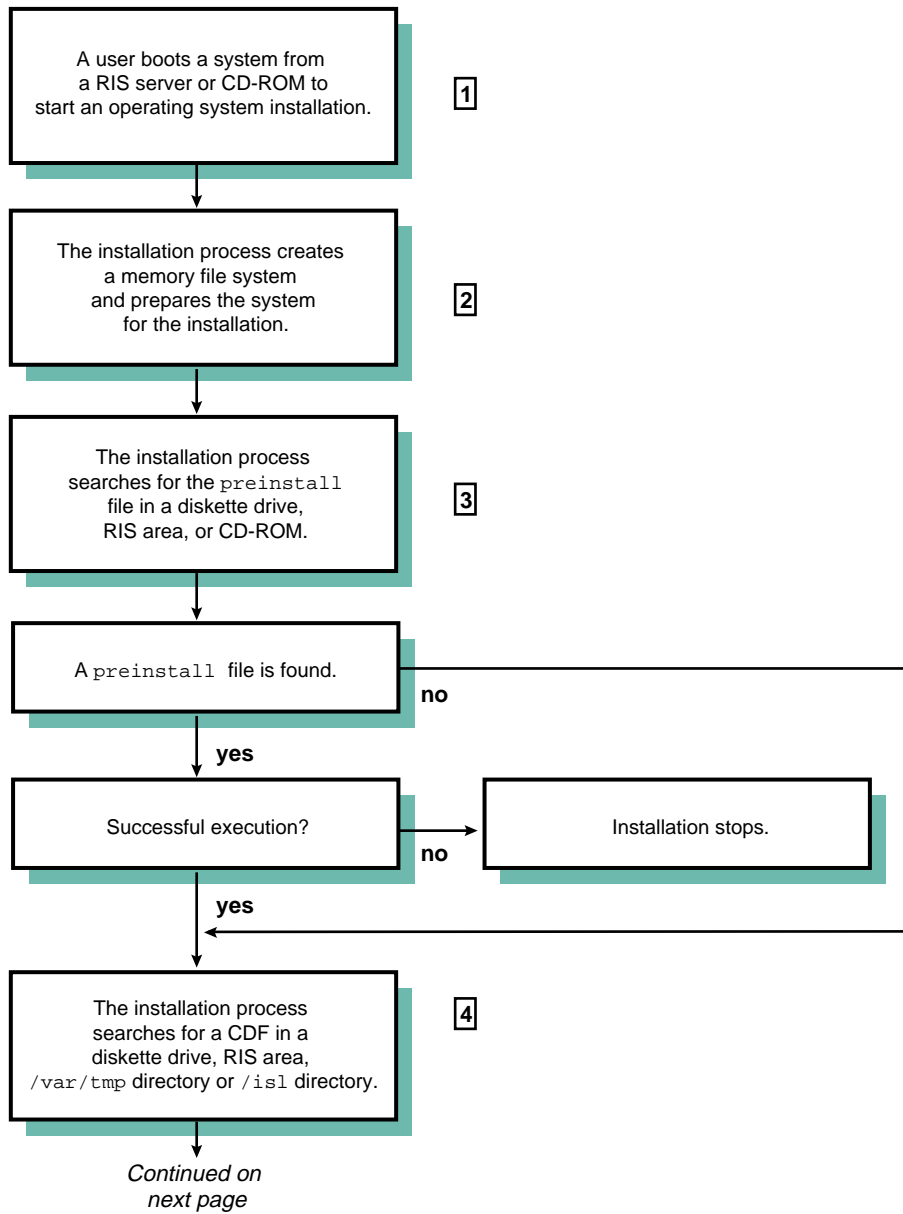
information about the attributes in the CDF that can be modified to attain unattended installation cloning.

- 3 The administrator optionally creates scripts or programs to be executed at two predefined points in the full installation and installation cloning processes. The actions performed by these user-supplied files are determined by the administrator. Refer to Section C.9 and Section C.10 for more information about creating `preinstall` and `postload` files for execution during an installation.
- 4 The administrator moves the modified CDF and any user-supplied files either to the `/` (root) directory on a diskette, to the `/var/adm/ris/clients/sets/profile_set` directory on a RIS server, or to the `/isl` directory on a CD-ROM if the operating system distribution media is being repackaged. The files also can be copied to the `/isl` directory within an extracted RIS area. Refer to Section C.11 for information about copying the CDF to the appropriate place and the guidelines surrounding each type of distribution media.

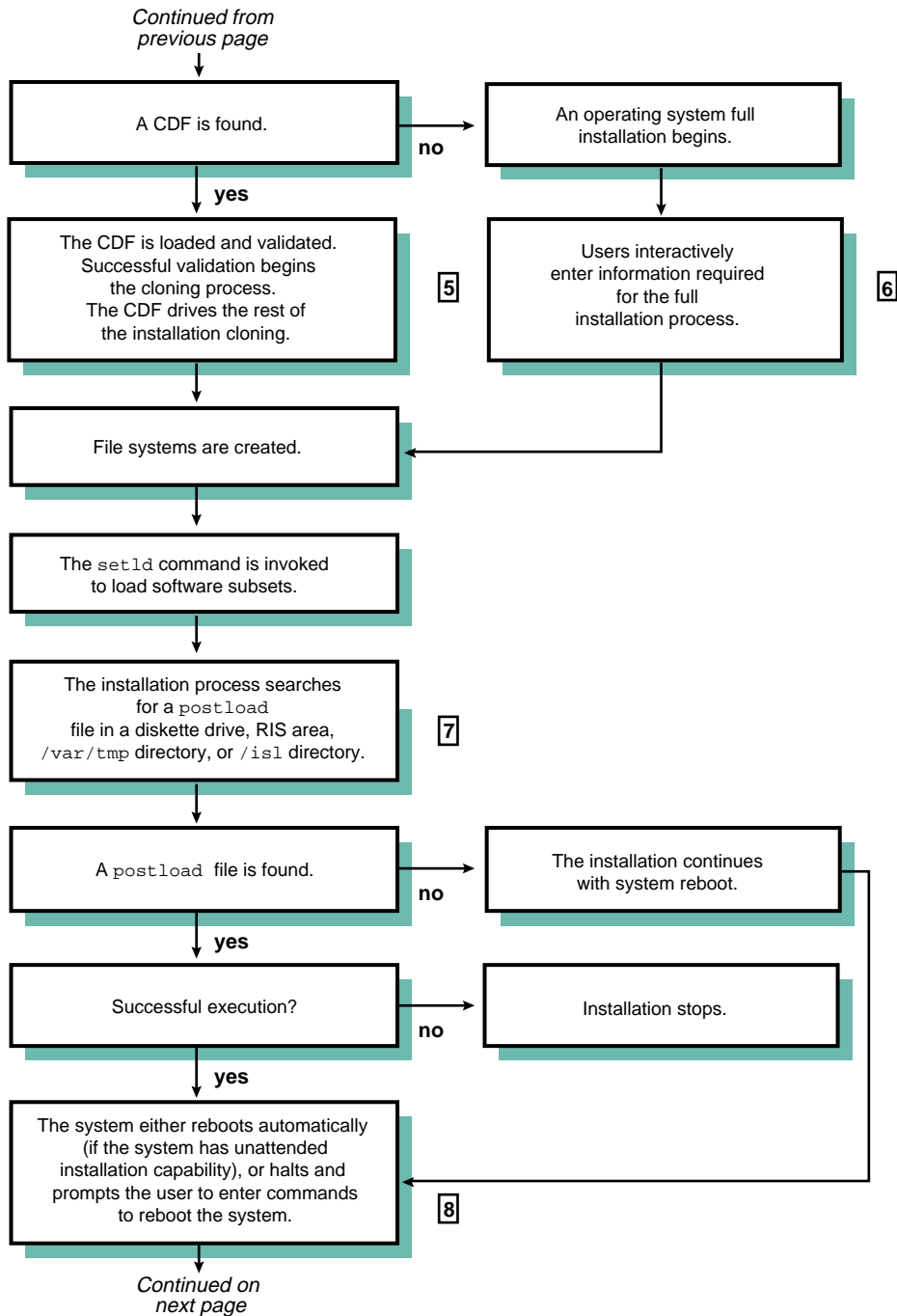
## C.5 Theory of Operation

This section contains a synopsis of how the installation process uses the user-supplied files and CDFs during full and cloned installations. Detailed information is provided in subsequent sections. The work flow shown in Figure C-2 assumes that the administrator has completed the tasks shown in Section C.4.

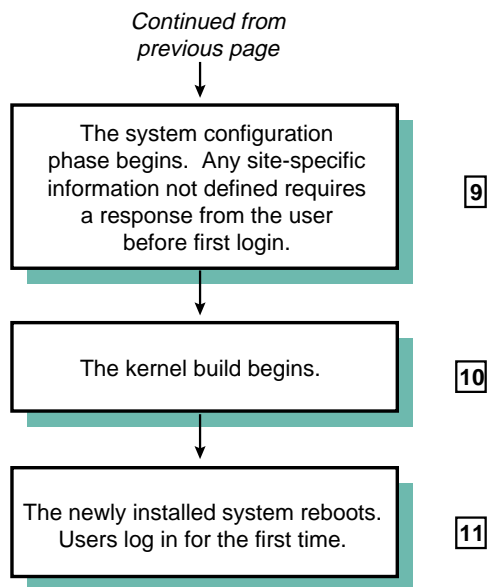
**Figure C-2: Theory of Operation**



**Figure C-3: Theory of Operation (cont'd)**



**Figure C-4: Theory of Operation (cont'd)**



- 1 To start an installation process, users boot the system from the operating system CD-ROM or over a network connection to a RIS server.
- 2 The Memory File System (MFS) provides writable space required by the installation process.
- 3 The installation process searches for a file named `preinstall`, which is a user-supplied script, program, or executable containing specific actions to be carried out before the installation process begins. If this file is found, it is executed. If execution is successful, the installation process begins. If execution is not successful, the installation process stops. If a `preinstall` file is not found, the installation process begins the search for a CDF. Refer to Section C.9 for more information about creating a `preinstall` file.
- 4 The installation process searches for a CDF that, if found, drives the rest of the installation and begins an installation cloning process. This file, named `install.cdf`, is searched for in the same order as the `preinstall` file. If an `install.cdf` file is not found, the full installation process continues. Section C.6 provides more information about the CDF.
- 5 The installation process validates the CDF before beginning an installation cloning process. Validation includes ensuring that the disk name and disk type specified in the CDF exists on the system to be cloned. A CDF validation failure causes the process to stop. Validation

includes comparing the versions of the software subsets included in the CDF with the software subset versions that are installed in the RIS environment. Diagnostic messages display the reason for validation failures. Upon successful CDF validation, an installation cloning process continues.

- 6 The user responses required during a full installation depend upon the type of full installation being performed (default or custom) and the user interface being used (text-based or graphical). Chapter 5 describes the responses required during a full installation process.
- 7 Upon completion of the software subset load phase, the installation process searches for a file named `postload`, which is a user-supplied script, program, or executable containing specific actions to be carried out after software subsets are loaded. If this file is found, it is executed. If execution fails, the installation process stops. Refer to Section C.10 for information about creating a `postload` file.
- 8 If your system has unattended installation capability, the system automatically reboots after the software subsets are loaded. If your system does not have unattended installation capability, the installation process halts and prompts you to enter commands to reboot the system from the newly installed disks. The screen displays the boot commands that must be entered to reboot the system.
- 9 The configuration phase begins automatically after the system reboots. Configuration refers to the process of tailoring the software subsets; setting the host name, `root` password, date, time, geographic location, and time zone; system tuning; and building a kernel. For installation cloning processes, refer to Section C.8.4 about setting these site-specific attributes in the CDF. If values are not defined for these attributes or if the user did not enter a response during the full installation, the installation process becomes interactive to request it.
- 10 For installation cloning, the type of kernel build is defined in the CDF by the `kernel_options=` attribute. Refer to Section C.8.3 for the options that are available.

For full installations, the type of kernel build depends on whether a default or custom installation was performed. Default installations have noninteractive kernel builds that select mandatory kernel options. Custom installations have interactive kernel builds to give users the opportunity to choose the options to build into the kernel.

- 11 Refer to Table C-6 for information about setting site-specific information if it was not defined in the CDF nor entered during a full installation. If any of these attributes is null, the installation process becomes interactive to request a response from the user.



## C.6 Description of the Configuration Description File

When this version of the operating system is installed on a system, the installation process creates a configuration description file (CDF). As described previously, the information stored in the CDF can be used to mass-install machines with the same or similar hardware configurations.

The CDF contains the following information about an installation:

- File systems that were created: / (root), /usr, and var
- Swap space that was created
- Disk types and disk names where file systems reside
- File system layout (the specific partitions where file systems reside)
- File system types (UNIX File System or Advanced File System)
- System-specific information such as host name and root password and site-specific information such as geographic location, time zone, and date and time
- Type of distribution media (CD-ROM or RIS) from which the installation took place
- Software subsets that were installed

The CDF, `install.cdf`, is located on a newly installed system in the `/var/adm/smlogs` directory.

---

### Caution

---

CDFs used in previous versions of the operating system may not be compatible with the current version of the operating system.

---

The CDF is in stanza file format, and is organized logically as groupings of **attribute-value** pairs. Each attribute-value pair is separated with an equal sign (=). Each logical grouping of attribute-value pairs is defined as an **item**. Refer to the `stanza(4)` reference page for more information about stanza file format.

Four items are defined in the installation CDF:

- `Inst_islinfo` contains initial system load information that conveys the state of the system before the start of the installation process
- `Inst_filesystem` contains file system information such as the number and type of file systems that were created on the installed

system. There is one `Inst_filesystem` item for every file system and swap area that was created. At a minimum, there are four `Inst_filesystem` items in the CDF to describe the `/` (`root`), `/usr`, and `/var` file systems and the swap device.

- `Inst_subsets` contains a list of the installed base operating system software subsets.
- `Inst_cinstall` conveys client system configuration information to the installation process. All of the attributes specified in the `Inst_cinstall` item are optional. If values are not provided for these attributes, the installation process becomes interactive to request this information during the installation configuration phase.

### C.6.1 Sample Configuration Description File

In the sample CDF shown in Example C-1, attributes marked with an asterisk (\*) must be included manually into the CDF when it is retrieved from an installed system because the installation interfaces do not provide the ability to set these values. Section C.8 defines these attributes and shows you how to include them in the CDF.

Section C.6.2 provides definitions of all attribute-value pairs in the CDF.

#### Example C-1: Sample Configuration Description File (CDF)

---

```
install:
 _item=Inst_islinfo
 prompt=no *
 media_type=REMOTE
 server_timezone=Eastern
 timeset=1
 server_locality=US
 server=daria
 risdir=/
 _action=create
 srcloc=daria:
 client=kramer
```

```
install:
 _item=Inst_filesystem
 maj_min_num=8388608
 disk_number=0
 disk_name=rz0
 controller_type=SCSI
 name=root
 partition=a
 controller_number=0
 disk_type=RZ26L
 _action=create
 file_system_type=UFS
```

```
install:
 _item=Inst_filesystem
 maj_min_num=8388608
```

## Example C-1: Sample Configuration Description File (CDF) (cont.)

---

```
disk_number=0
disk_name=rz0
controller_type=SCSI
name=usr
partition=g
controller_number=0
disk_type=RZ26L
_action=create
file_system_type=UFS

install:
_item=Inst_filesystem
maj_min_num=8388608
disk_number=0
disk_name="in /usr"
controller_type=SCSI
name=var
partition=g
controller_number=0
disk_type=RZ26L
_action=create
file_system_type=UFS

install:
_item=Inst_filesystem
maj_min_num=8388608
disk_number=0
disk_name=rz0
controller_type=SCSI
name=swap1
partition=b
controller_number=0
disk_type=RZ26L
_action=create
file_system_type=swap

install:
_item=Inst_subsets
names=OSFBASE440,OSFBIN440,OSFBINCOM440,OSFCDEDT440,OSFCDEMAIL440,
OSF CDEMIN440,OSFCLINET440,OSFCMLRS440,OSFDPSFONT440,OSFFONT15440,OSFHWA
ASE440,OSFHWIN440,OSFHWINCOM440,OSFKBDLK401440,OSFMITFONT440,OSFNETCON
F440,OSFNETSCAPE440,OSFNFS440,OSFNFSCONF440,OSFOLDX11440,OSFPRINT440,OSF
SER440,OSFSERTC440,OSFSYSMAN440,OSFTCLBASE440,OSFTKBASE440,OSFX11440,OSF
XADMIN440,OSFXPRINT440,OSFXSYSMAN440
_action=create
advflag=1

install:
_item=Inst_cinstall
kernel_option=all *
password=C36V.nMSW0j/o
timeset=yes
timezone=Eastern
locality=US
_action=create
hostname=kramer
```

---

## C.6.2 Attribute-Value Pair Definitions

This section provides definitions for all attribute-value pairs in the CDF.

The attribute-value pairs within individual items differ as a result of the distribution method (CD-ROM or RIS) that was used to perform the initial installation of the model system.

---

### Caution

---

Only experienced system administrators should modify the attributes-value pairs in the CDF. **Do not** edit the CDF other than for those attribute-value pairs in the `Inst_cinstall` item and those marked with an asterisk in the sample CDF shown in Example C-1. Typographical errors and inserting attribute-value pairs into the incorrect item may result in serious corruption on the cloned systems and may render the systems unusable.

In addition, attribute-value pairs cannot contain blank spaces. Blank spaces cause data validation errors. Be very careful to remove all blank spaces especially at the end of a line. When you want to give an attribute a null value, make sure there is nothing (null) after the equal sign (=).

Do not modify or remove attributes that are prefixed with an underscore (`_`). These attributes, for example `_action=create`, are internal variables required by the full installation and installation cloning processes.

---

### C.6.2.1 Attributes in the `Inst_disklabel` Item

Table C-2 defines the attributes in the `Inst_disklabel` CDF item. The `Inst_disklabel` item is used to support the default disk partition tables.

**Table C-2: Attribute Definitions in the Default Disk Partitions (`Inst_disklabel`) Item**

| Attribute           | Definition                                                                                                                                        |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>name</code>   | A required attribute specifying the software name of the disk to which the recommended partition will be applied (for example: <code>rz0</code> ) |
| <code>a_size</code> | The size of the <code>a</code> partition in 512-byte blocks                                                                                       |

**Table C-2: Attribute Definitions in the Default Disk Partitions (Inst\_disklabel) Item (cont.)**

| Attribute | Definition                                                    |
|-----------|---------------------------------------------------------------|
| a_offset  | The offset of the a partition from block 0 in 512-byte blocks |
| b_size    | The size of the b partition in 512-byte blocks                |
| b_offset  | The offset of the b partition from block 0 in 512-byte blocks |
| c_size    | The size of the c partition in 512-byte blocks                |
| c_offset  | The offset of the c partition from block 0 in 512-byte blocks |
| d_size    | The size of the d partition in 512-byte blocks                |
| d_offset  | The offset of the d partition from block 0 in 512-byte blocks |
| e_size    | The size of the e partition in 512-byte blocks                |
| e_offset  | The offset of the e partition from block 0 in 512-byte blocks |
| f_size    | The size of the f partition in 512-byte blocks                |
| f_offset  | The offset of the f partition from block 0 in 512-byte blocks |
| g_size    | The size of the g partition in 512-byte blocks                |
| g_offset  | The offset of the g partition from block 0 in 512-byte blocks |
| h_size    | The size of the h partition in 512-byte blocks                |
| h_offset  | The offset of the h partition from block 0 in 512-byte blocks |

You can specify multiple `Inst_disklabel` items so that several disks can be repartitioned automatically during the cloning process, based on the values contained within the individual items.

The following example shows a sample `Inst_disklabel` item in a CDF:

```
install:
 _item=Inst_disklabel
 name=rz1
 a_size=262144
 a_offset=0
 b_size=262144
 b_offset=0
 g_size=1090979
```

```
g_offset=524288
h_size=435593
h_offset=1615276
_action=create
```

### C.6.2.2 Attributes in the Inst\_islinfo Item

Table C-3 defines the attributes in the `Inst_islinfo` item in the CDF. The `Inst_islinfo` item is used to convey the system state before the start of the installation process.

**Table C-3: Attribute Definitions in the Initial Subset Load (Inst\_islinfo) Item**

| Attribute                | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>client=</code>     | This attribute is valid only for RIS full installations (not installation cloning) and specifies the client name of the system that was cloned. The client name is determined automatically as a result of the <code>bootp</code> request to the server. Do not modify this attribute for installation cloning because the value in this attribute does not have to match the client systems to be cloned.                                                   |
| <code>clone=</code>      | This attribute is inserted automatically into the CDF as a result of an installation cloning process and is only valid during the installation cloning process. This attribute-value pair should not be set manually.                                                                                                                                                                                                                                        |
| <code>media_type=</code> | This attribute is used by the full installation and installation cloning processes to indicate the type of distribution media for the current installation. This is the only required entry in the <code>Inst_islinfo</code> item. Valid values are <code>REMOTE</code> and <code>CDROM</code> . Edit this attribute when the type of distribution media used for the initial installation is different from the installation cloning that is to take place. |

**Table C-3: Attribute Definitions in the Initial Subset Load (Inst\_islinfo) Item (cont.)**

| Attribute        | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| prompt=          | <p>This attribute is used by the installation cloning process to indicate whether the start of an installation cloning process requires a confirmation response from the user.</p> <p>This attribute must be entered manually into the CDF for an installation cloning process because the installation interfaces do not provide the ability to insert this attribute into the CDF.</p> <p>A value of <code>yes</code> indicates that the process should prompt for confirmation to use the CDF. A value of <code>no</code> indicates that the installation cloning process should use this CDF and bypass the confirmation question.</p> <p>If this attribute is not included in the CDF, the default is <code>prompt=yes</code>. Setting the attribute to <code>no</code> should be used with caution because the installation cloning begins as soon as the installation process detects a CDF. If you wanted to boot the system from the distribution media and perform system management or disk maintenance tasks, for example, you would not want the installation cloning to begin immediately.</p> |
| risdir=          | <p>This attribute is specific to RIS full installations and is set automatically to the base RIS directory of the product environment to which the client system is registered. Do not modify this attribute for installation cloning.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| server=          | <p>This attribute is specific to RIS full and cloning installations and identifies the RIS server to which the client system is currently registered. Do not modify this attribute for installation cloning.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| server_locality= | <p>This attribute is specific to RIS full installations and specifies to the installation interfaces the current geographic location. Do not modify this attribute for installation cloning.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| server_timezone= | <p>This attribute is specific to RIS full installations and specifies to the installation interfaces the current geographic time zone. This value is set automatically during a RIS full installation. Do not modify this attribute for installation cloning.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table C-3: Attribute Definitions in the Initial Subset Load (Inst\_islinfo) Item (cont.)**

| Attribute | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| srcloc=   | This attribute is not used by either the full installation or installation cloning processes; it is used by the operating system for internal purposes. This attribute identifies the location of the software to load. For RIS installations, this value specifies the server name (appended with a colon). For CD-ROM installations, this value is the directory path /ALPHA/BASE. Do not modify this attribute unless the <code>media_type</code> attribute is changed because this value must be consistent with the value of <code>media_type</code> .       |
| timeset=  | <p>This attribute applies to full installations and indicates to the installation interfaces whether the date and time on the client system have been successfully set and whether the date and time can be displayed during the installation. Valid values are:</p> <p>0- Date and time have not been set and will not be displayed during the installation process</p> <p>1- Date and time have been successfully set and will be displayed where appropriate during the installation process</p> <p>Do not modify this attribute for installation cloning.</p> |

### C.6.2.3 Attributes in the Inst\_filesystem Item

Table C-4 defines the attributes in the `Inst_filesystem` item in the CDF. The `Inst_filesystem` item is used to convey information about the number and type of file systems that are to be created on the cloned system. At a minimum, there must be at least four file system items to describe the / (root), /usr, and /var file systems and one swap area. Except where noted, you optionally can modify all attribute-value pairs in this item, although it is not recommended.



**Table C-4: Attribute Definitions in the File System (Inst\_filesystem) Item**

| Attribute         | Definition                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| name=             | This attribute is a required attribute that specifies the name of the file system to be made. Valid values are: <code>root</code> , <code>usr</code> , <code>var</code> , <code>swap1</code> , and <code>swap2</code> . There only can be one item each for <code>root</code> , <code>usr</code> , <code>var</code> , <code>swap1</code> , and <code>swap2</code> . |
| file_system_type= | This attribute is a required attribute that specifies the file system type to be created for the named file system. Valid values are: <code>ufs</code> , <code>advfs</code> , and <code>swap</code> . If the value of the <code>name=</code> attribute is <code>swap1</code> or <code>swap2</code> , the value of this attribute must be <code>swap</code> .        |

**Caution**

Be aware that changing this value from `ufs` to `advfs` may cause errors on the cloned system because the software subsets necessary to support an Advanced File System (AdvFS) may not be defined in the CDF and will not be installed on the cloned system. Therefore, the file system will be unreadable.

Do not change this value to `advfs` unless other file systems have been set by the installation process to `advfs` or the required AdvFS software subsets are present in the `names=` attribute in the `Inst_subsets` item.

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| disk_name= | This attribute is a required attribute that specifies the disk name for the named file system as it is known to the operating system (for example, <code>rz0</code> ). The value in this attribute must be consistent with (or match) the value in the <code>disk_type=</code> attribute. If you change this attribute, you must validate the change with respect to the <code>disk_type=</code> attribute. For example, if you change this value to <code>disk_name=rz1</code> , you must determine the type of disk at <code>rz1</code> . If it is an <code>RZ58</code> type of disk, make sure the value of the <code>disk_type=</code> attribute is <code>RZ58</code> . |
| disk_type= | This attribute is a required attribute that indicates the type of disk for the specified <code>disk_name</code> (for example <code>RZ26</code> ). The value in this attribute must be consistent with the <code>disk_name=</code> attribute. Refer to the <code>disk_name=</code> attribute for more information.                                                                                                                                                                                                                                                                                                                                                           |

**Table C–4: Attribute Definitions in the File System (Inst\_filesystem) Item (cont.)**

| Attribute          | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| partition=         | This attribute is a required attribute that specifies the disk partition on which the named file system will be created. Valid values are the letters a through h inclusive. The <code>root</code> file system must always be located on partition a. If you change the value in this attribute for any file system other than <code>root</code> , make sure the partition you choose does not overlap another partition.                                                                                                                                 |
| controller_type=   | This attribute identifies the controller type to which the specified disk for the named file system is connected. During a full installation, this value is provided automatically for informational purposes. During an installation cloning process this attribute is not used, and can be omitted from the CDF.                                                                                                                                                                                                                                        |
| controller_number= | This attribute identifies the controller number to which the specified disk for the named file system is connected. During a full installation, this value is provided automatically for informational purposes. During an installation cloning process this attribute is not used, and can be omitted from the CDF.                                                                                                                                                                                                                                      |
| maj_min_num=       | This value is calculated automatically for full and cloned installations so there is no need to modify it. This attribute is required for the <code>root</code> file system item and specifies the major and minor number of the specified disk for the named file system. The major and minor number is used to map the software device name (as known to the operating system) to the firmware device name (as known to the SRM console) so that the proper boot commands are displayed on the screen during the manual boot phase of the installation. |

#### C.6.2.4 Attributes in the Inst\_subsets Item

Table C–5 defines the attributes in the `Inst_subsets` item in the CDF. The `Inst_subsets` item is used to convey information to the installation cloning process about the base operating system software subsets that are to be installed on the system to be cloned.

**Table C–5: Attribute Definitions in the Software Subsets Load (Inst\_subsets) Item**

| Attribute | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| advflag=  | <p>You should not modify this attribute. This attribute is a required attribute that specifies the type of installation (custom or default) that is to occur. Valid values are:</p> <ul style="list-style-type: none"> <li>0- Default installation</li> <li>1- Custom installation</li> </ul> <p style="text-align: center;"><b>Caution</b></p> <p style="text-align: center;">Be aware that changing the value of this attribute may cause the <code>setld</code> command to fail during software subset loading because the software subsets defined in the CDF may not be compatible with the type of installation defined by this attribute.</p> <p>Setting this attribute to 0 nullifies the <code>kernel_option=</code> attribute in the <code>Inst_cinstall</code> item because default installations provide noninteractive kernel builds with mandatory kernel options.</p> |
| names=    | <p>This attribute is a required attribute that specifies the list of base operating system software subsets to be installed. Each software subset name is separated by a comma (,) and must be on one continuous line (let the line wrap). If you add software subset names to this attribute, you must consider available disk space and dependencies upon other software subsets. Refer to Appendix D for software subset dependency information and disk space requirements.</p>                                                                                                                                                                                                                                                                                                                                                                                                  |

### C.6.2.5 Attributes in the Inst\_cinstall Item

Table C–6 defines the attributes in the `Inst_cinstall` item in the CDF. The `Inst_cinstall` item is used to convey client system configuration information to the installation cloning process. All of the attributes specified in the installation configuration item are optional. If values are not provided for these attributes, the installation process becomes interactive to request this information during the installation configuration phase.

To use a single CDF to clone many systems, consider leaving the system-specific attributes such as host name and password null, but provide attributes for site-specific attributes such as kernel option, time zone, geographic location, and date and time.

**Table C–6: Attribute Definitions in the Installation Configuration (Inst\_cinstall) Item**

| Attribute      | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| hostname=      | <p>This attribute specifies the client system's host name to the installation process. Host names for client systems that exist on the same network must be unique. Refer to the Installation Guide for guidelines on choosing a proper host name. During a RIS installation cloning process, this value is set automatically to the host name of the client system. For CD-ROM installations, make sure this value is set correctly or is null. A null value means that the installation process becomes interactive during the installation configuration phase to request a host name.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| kernel_option= | <p>This attribute specifies to the installation process whether the tailored kernel build should be interactive or noninteractive.</p> <p>This attribute must be entered manually in the CDF for an installation cloning process because the installation interfaces do not provide the ability to insert this attribute in the CDF.</p> <p>In an interactive kernel build session, a kernel options menu is presented allowing selection of any or all optional kernel options. To specify an interactive tailored kernel build, use the following value:</p> <pre>kernel_option=interactive</pre> <p>For noninteractive kernel builds, two options are provided:</p> <pre>kernel_option=mandatory</pre> <pre>kernel_option=all</pre> <p>The <code>mandatory</code> value builds a tailored kernel with only mandatory kernel options. The <code>all</code> value builds a tailored kernel with all mandatory and optional kernel options.</p> <p>The default behavior of a full, custom installation is the <code>interactive</code> type of kernel build. Full, default installations have <code>mandatory</code> type kernel builds.</p> <p>If the value of the <code>advflag</code> attribute in the <code>Inst_subsets</code> item is zero (0), the value given to the <code>kernel_option</code> attribute value is ignored.</p> |

**Table C–6: Attribute Definitions in the Installation Configuration (Inst\_cinstall) Item (cont.)**

| Attribute | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| locality= | <p>This attribute specifies the geographic location of the client system. Valid values for this attribute are located on an installed system in the <code>/etc/zoneinfo</code> directory, which contains an entry (a file or a directory) for each geographic location. During a RIS installation cloning process, this value is set automatically to the geographic location of the RIS server. A null value means that the installation process becomes interactive during the installation configuration phase to request a geographic location.</p>                                                                                                               |
| password= | <p>This attribute specifies to the installation process the encrypted <code>root</code> password for the client system. The presence of a value here means that all cloned systems share the same <code>root</code> password. A null value means that the installation process becomes interactive during the installation configuration phase to request a password.</p> <p>Because the value of <code>password=</code> must be encrypted, you cannot enter manually a new value for this attribute.</p>                                                                                                                                                             |
| timeset=  | <p>This attribute specifies to the installation process that the system date and time have already been set on the client system. In the case of a RIS full installation or RIS installation cloning, this value is always set to <code>yes</code>. Valid values are:</p> <p><code>no</code>- System date and time have not been set. The installation process becomes interactive to request the date and time.</p> <p><code>yes</code>- System date and time have been set. For CD-ROM installations, users should verify the accuracy of the date and time after logging in for the first time because the installation process may not have set it correctly.</p> |

**Table C–6: Attribute Definitions in the Installation Configuration (Inst\_cinstall) Item (cont.)**

| Attribute | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| timezone= | <p>This attribute specifies the time zone within a specific geographic location (if applicable). Valid values for this attribute are located in the subdirectories of the <code>/etc/zoneinfo</code> directory. During a RIS installation cloning process, this value is set automatically to the time zone of the RIS server. The value of <code>timezone</code> must be a valid time zone for the geographic location defined in the <code>locality=</code> attribute. For example, if <code>locality=US</code>, only time zones in the United States are valid. If the geographic location does not have a time zone, leave this value null. The installation process recognizes geographic locations that do not have time zones, and will not request a time zone during the configuration phase.</p> <p>If the geographic location has valid time zones, a null value means that the installation process becomes interactive during the installation configuration phase to request a time zone.</p> |

## C.7 Generating or Selecting an Appropriate CDF

When generating a CDF through the installation of a system or selecting which CDF to use to clone other similar systems, you must consider the disk configuration, graphics adapter, font sizes and keyboard types of the systems to be cloned. Ideally, however, you should clone systems with identical hardware configurations.

To reduce the disk space required when the operating system is installed, the software required to support the different graphics adapters, font sizes, and keyboard types has been packaged so that only the software subsets required to support options present on the system are mandatory and installed automatically. All other software subsets are considered optional and are not installed unless you specifically select them. Determining the mandatory software subsets for a system is done automatically by the installation process and guarantees that only appropriate software subsets are installed.

However, when a system is installed using installation cloning, the software subsets installed on to the system are defined in the CDF. Therefore, if the system to be cloned has a different graphics adapter, font size, or keyboard type than the system on which the CDF was created, the appropriate software subsets will not be installed and the cloned system may not be usable.

To generate a CDF that is versatile enough for use across differing systems, you may want to consider installing a system to use as a model. That is, perform a custom installation on a model system so that the CDF generated from that installation is usable by systems with different graphics adapters, font sizes, and keyboards. You do this by installing the software subsets to support all graphics adapters, font sizes, and keyboard types required by the systems to be cloned even though they are not required by the model system.

Acceptable differences in disk configuration, graphics adapter, font sizes, and keyboard type are explained in the following sections.

### C.7.1 Acceptable Differences in Disk Configurations

The system to be installed by the installation cloning process should have the same hardware configuration as the system where the CDF was generated. However, it is possible to support slight differences in configuration.

The system to be cloned must have the same disk configuration for the disks on which `root`, `usr`, `swap1`, `var` (if it is not a directory under `/usr`) and `swap2` (if allocated) are to be installed as the system on which the CDF was generated. The same disk configuration means that the disk type (for example RZ26) and the device name (for example `rz0`) must match. If the partition tables for these disks are not identical on both systems, the software defined in the CDF may not fit on to the system to be cloned or would overlap the disk partitions.

---

#### Note

---

You may want to consider writing a `preinstall` script to install a common disk label on all systems to be cloned. Example C-2 contains a sample script that installs a common disk label.

---

It does not matter if disks other than those used for the file systems and swap areas created during an installation are different on the system to be cloned.

Table C-7 illustrates acceptable differences in disk configuration between a CDF generated from a model system and a system to be cloned.

**Table C–7: Acceptable Differences in Disk Configuration Between a Model System and a System to be Cloned**

| System              | Disk Type | Device Name      |
|---------------------|-----------|------------------|
| model system        | RZ26      | rz0 <sup>a</sup> |
|                     | RZ25      | rz1              |
| system to be cloned | RZ26      | rz0              |
|                     | RZ26      | rz1              |

<sup>a</sup>The / (root), and /usr file systems and swap1 space are located on the rz0 device on the model system.

Assuming there are no other differences in disk configuration, the system to be cloned can use the CDF generated from the model system. The difference in disk type at device name rz1 is acceptable because the file systems and swap space were not placed on it. If the disk device at rz0 were different, however, an installation cloning could not be performed.

## C.7.2 Considering Differences in Graphics Adapters

When you install a model system from which you will use the CDF to clone other systems, you must consider the graphics options of the systems that will be cloned. If any of the systems to be cloned have different graphics options, the software subsets required to support the graphics options needed by those systems must be installed on the model system.

When selecting software subsets, look in the Windowing Environment category for software subsets starting with the words *X Servers for name*. Replace *name* with the name that describes the graphics options supported by the software subset. In this version of the operating system, the following graphics software subsets are available:

- *X Servers Base* — Device independent X Server support (always installed)
- *X Servers for Open3D* — Supports the ZLXp-L graphics adapter
- *X Servers for PCbus* — Supports EISA bus and PCI bus graphics adapters
- *X Servers for TurboChannel* — Supports TurboChannel bus graphics adapters

### Note

*X Servers for PCbus* adapters supported by the operating system are specified in the *Software Product Description (SPD)*.

Table C–8 displays the graphics adapters on a model system and a system to be cloned. The hardware configuration of the model system and the



system to be cloned are determined to be similar enough to allow the CDF from the model system to be used for the installation cloning.

**Table C–8: Acceptable Differences in Graphics Adapters Between a Model System and a System to be Cloned**

| System              | Graphics Adapter |
|---------------------|------------------|
| model system        | Open3D           |
| system to be cloned | QVision (PCbus)  |

During the installation of the model system, the X Servers for Open3D software subset is considered mandatory for the model system and is installed automatically. The X Servers for PCbus software subset is considered optional for the model system. Installing this optional software subset on the model system ensures that the appropriate software is available for the system to be cloned. If you do not install the X Servers for PCbus onto the model system, the graphics capabilities of the system to be cloned are likely to be disabled.

#### Caution

Do not use the CDF from a system that does not have graphics capabilities to clone systems that have the hardware to support graphics. There are several software subsets, most notably those associated with the common desktop environment (CDE), that will not be loaded on systems without graphics capabilities that are mandatory for systems with graphics capabilities. If you use a CDF from a system without graphics capabilities to clone a system with graphics capabilities, the desktop environment on the cloned system will be corrupted.

If you are unsure of which graphics options are available on the systems you want to clone, install all of the graphics software subsets that are available. However, installing all of the software subsets requires more disk space than loading only selected graphics software subsets.

### C.7.3 Considering Differences in Font Size

To reduce the disk space required when the operating system is installed, the software required to support the 75dpi (dots per inch) and 100dpi font sizes are contained in separate software subsets.

During an installation cloning, the font software subsets to be installed are defined in the CDF. If the system to be cloned requires a different size font

than those defined by the software subsets in the CDF, the system to be cloned will not have the appropriate fonts loaded.

When generating the CDF through the full installation of a model system, you must consider the font sizes required by the systems to be cloned from the CDF. If the systems to be cloned require different size fonts, load the appropriate font software subset when installing the model system.

The need for `DECwindows 75dpi Fonts` or `DECwindows 100dpi Fonts` depends on the resolution of the graphics adapter being used. On a system with the operating system already installed, this value can be determined by entering the following command:

```
sizer -gr
```

When the resolution is `1024x768` or less, the `DECwindows 75dpi Fonts` are required. When the resolution is greater, the `DECwindows 100dpi Fonts` are required. If you are unsure of the resolution available on the systems to be cloned, select both font software subsets to ensure that the correct font is available.

Systems with multiple graphics adapters may require both the `DECwindows 75dpi Fonts` and `DECwindows 100dpi Fonts` if the adapters include those with `1024x768` or less resolution and those with greater resolution.

While there are other software subsets that contain fonts, only the `DECwindows` fonts are packaged separately by size.

Table C-9 displays the different font sizes required on a model system and a system to be cloned. The hardware configuration of the model system and the system to be cloned are determined to be similar enough to allow the CDF from the model system to be used for the installation cloning.

**Table C-9: Acceptable Differences in Font Sizes Between a Model System and a System to be Cloned**

| System              | Graphics Resolution | Required Font Size                   |
|---------------------|---------------------|--------------------------------------|
| model system        | 1024x680            | <code>DECwindows 75dpi Fonts</code>  |
| system to be cloned | 1280x1024           | <code>DECwindows 100dpi Fonts</code> |

During the installation of the model system, the `DECwindows 75dpi Fonts` software subset is mandatory and is installed automatically; the `DECwindows 100dpi Fonts` software subset is optional. You should install the optional software subset to provide the necessary fonts for the installation cloning of the client system.

If you are unsure of the fonts available on the systems you want to clone, you can ensure that you provide the appropriate fonts by installing all of

the font software subsets on to the model system. Installing all of the font software subsets will require more space than loading selected fonts.

#### C.7.4 Considering Differences in Keyboard Type

To reduce the disk space required when the operating system is installed, the software subsets required to support the different keyboard types is contained in separate software subsets.

During an installation cloning, the keyboard support software subset to be installed is defined in the CDF. If the system to be cloned has a different keyboard type than the model system, the cloned system will not have the appropriate keyboard software installed.

When generating the CDF through the installation of a model system, you must consider the keyboard type of the systems that will be cloned using the CDF. If the systems that will be cloned have different keyboard types, load the appropriate keyboard support software subset when installing the model system. The keyboard type can be determined from the `sizer -wk` command. Refer to the `sizer(8)` reference page for more information.

Table C–10 displays the keyboard types on a model system and a system to be cloned. The hardware configuration of the model system and the system to be cloned are determined to be similar enough to allow the CDF from the model system to be used for the installation cloning.

**Table C–10: Acceptable Differences in Keyboard Types Between a Model System and a System to be Cloned**

| System              | Keyboard Type |
|---------------------|---------------|
| model system        | PXCAL         |
| system to be cloned | LK444         |

During the installation of the model system, the software subset `PXCAL Keyboard Support` is mandatory and is installed automatically. The software subset for `LK444 Keyboard Support` is optional. Selecting this optional software subset results in some unnecessary software being loaded on the model system but allows the CDF to be appropriate to clone the client system.

If you are unsure of the keyboard types available on the systems you want to clone, you can ensure that you provide the appropriate keyboard type by installing all of the keyboard software subsets. However, loading all keyboard software subsets will require more disk space than loading selected keyboard software subsets.

## C.8 Modifying Attributes in the CDF to Achieve Unattended Installations

Only experienced system administrators modify the attributes-value pairs in the CDF. Before modifying the CDF, make sure you read the information in the Caution in Section C.6.2.

Do not modify the original CDF located in the `/var/adm/smlogs` directory of an installed system. Instead, make a copy of `install.cdf` and modify the copy. The original `install.cdf` file contains information related to the system installation that could be valuable for future use. You should retain the `install.cdf` file in the `/var/adm/smlogs` directory.

Some attribute-value pairs must be added manually to the CDF for an installation cloning process because the installation interfaces do not currently provide the ability to set these values. The following sections describe the attribute-values pairs that can be added manually to the CDF to attain unattended installations.

### C.8.1 Errors in the CDF

While modifying a CDF, a common error is to include a trailing blank space after an attribute-value pair. If the validation process detects a trailing blank space in the CDF, a message similar to the following will be displayed:

```

Some errors occurred:
SetItemAttr: invalid attribute value kernel_option=all

```

This error causes the installation process to stop. In the previous example, the validation process found a trailing blank space after the word `all` in the `kernel_option=all` attribute-value pair. The corrective action is to edit the CDF and remove the blank space. Then, restart the installation process at the client system.

### C.8.2 Modifying the CDF Confirmation Attribute

Previous versions of the installation cloning process required the user to confirm that the CDF was to be used to start an installation cloning rather than a full installation. The purpose of this confirmation was to protect a system from an inadvertent installation cloning if the system was mistakenly still registered to a RIS environment and CDF.

The CDF confirmation prompt is configurable through the `prompt=` attribute-value pair in the `Inst_islinfo` item in the CDF. The value of the `prompt=` attribute determines whether confirmation is required before the CDF is used to start an installation cloning process. Valid values are:

- `prompt=yes` — means that the user will be asked to confirm that the CDF should drive the installation cloning process.
- `prompt=no` — means that the installation cloning process will bypass the CDF use confirmation question and begin an installation cloning process automatically.

If this attribute-value pair is not defined or is null, the installation cloning process defaults to `prompt=yes`.

A portion of a CDF in the following example shows you where to include the `prompt=` attribute-value pair in the `Inst_islinfo` item:

```
install:

_item=Inst_islinfo
prompt=no
media_type=CDROM
server=cosmo
_action=create
srcloc=/ALPHA/BASE
```

### C.8.3 Modifying the Tailored Kernel Build Attribute

A default installation provides a noninteractive kernel build with mandatory kernel options enabled. A custom installation provides an interactive kernel build and allows you to tailor the kernel by allowing you to select mandatory and optional kernel options.

The `kernel_option` attribute in the `Inst_cinstall` item allows a noninteractive tailored kernel build with all kernel options (mandatory and optional) or mandatory kernel options only. In addition, the `interactive` value can be specified to allow you to tailor the kernel. The values for the `kernel_option` attribute are defined as follows:

- `kernel_option=interactive` — Provides an interactive kernel build. This is the default setting for this attribute.
- `kernel_option=mandatory` — Provides a noninteractive kernel build that selects mandatory kernel options only.
- `kernel_option=all` — Provides a noninteractive kernel build that selects all (mandatory and optional) kernel options.

A portion of a CDF in the following example shows you where to include the attribute-value pair into the `Inst_cinstall` item:

```
install:

_item=Inst_cinstall
kernel_option=all
password=SdDt78fuPrMkE
timeset=yes
timezone=Eastern
locality=US
_action=create
hostname=kramer
```

Kernel build failures that occur during a noninteractive kernel build cause the kernel build process to become interactive and provides the user with options for proceeding.

#### C.8.4 Modifying Site- and System-Specific Attributes

You must read this section if you plan to perform installation cloning from CD-ROM.

Setting site- and system-specific information such as host name, geographic location, time zone, date, and time are trivial in the case of a RIS installation because these values are obtained automatically from the RIS server during the installation. This statement is true for full installations from RIS or from a RIS installation cloning process.

In the case of a standalone system installed by a CD-ROM installation cloning process, however, setting these values must be determined from the CDF that drives the installation cloning. If the CDF does not define these attributes, the values must be entered interactively during the software configuration phase of the installation cloning process that occurs after software has been loaded.

The system-specific attributes to be considered are:

- Host Name

A system's host name is contained in the `hostname= attribute-value` pair in the `Inst_cinstall` item. Refer to Section 5.4 if you need guidelines for choosing a proper host name. Host names for client systems that exist on the same network must be unique. If the `hostname= attribute` does not exist in the CDF, or if the value associated with this attribute is null, the installation process becomes interactive during the software configuration phase of the installation cloning process to request this information.

- Password

Be aware that an encrypted value in the `password= attribute` means that all cloned systems share the same `root` password. You may want to

consider leaving this value null so that the installation process becomes interactive to request a root password. For security reasons, sharing passwords among systems is not recommended. If you choose to retain the encrypted password in the CDF, remember that the password came from the model system and you should change the password on that model system to protect it from unauthorized users. Because the value of the password= attribute must be encrypted, this value cannot be set manually. If you need to change the password on the model system, Section 5.5 contains guidelines for choosing appropriate passwords.

The site-specific attributes to be considered are:

- **Geographic Location and Time Zone**

A system's geographic location and time zone are contained in the locality= and timezone= attribute-value pairs in the Inst\_cinstall item. On a system with this version of the operating system already installed, valid values for these attributes are located in the /etc/zoneinfo directory. Section 5.7 defines the acronyms shown in the /etc/zoneinfo directory. Geographic locations that are divided into time zones are shown as directories in /etc/zoneinfo. The contents of the /etc/zoneinfo directory is similar to the following. Geographic locations directories are identified by a slash (/):

|            |        |        |       |           |         |            |
|------------|--------|--------|-------|-----------|---------|------------|
| Australia/ | GMT    | GMT+7  | GMT-6 | GMT4      | Japan   | Singapore  |
| Belfast    | GMT+0  | GMT+8  | GMT-7 | GMT5      | Libya   | SystemV/   |
| Brazil/    | GMT+1  | GMT+9  | GMT-8 | GMT6      | London  | Turkey     |
| CET        | GMT+10 | GMT-0  | GMT-9 | GMT7      | MET     | UCT        |
| Canada/    | GMT+11 | GMT-1  | GMT0  | GMT8      | Mexico/ | US/        |
| Chile/     | GMT+12 | GMT-10 | GMT1  | GMT9      | NZ      | UTC        |
| Cuba       | GMT+13 | GMT-11 | GMT10 | Greenwich | NZ-CHAT | Universal  |
| Dublin     | GMT+2  | GMT-12 | GMT11 | Hongkong  | Navajo  | W-SU       |
| EET        | GMT+3  | GMT-2  | GMT12 | Iceland   | PRC     | WET        |
| Egypt      | GMT+4  | GMT-3  | GMT13 | Iran      | Poland  | Zulu       |
| Factory    | GMT+5  | GMT-4  | GMT2  | Israel    | ROC     | localtime@ |
| GB-Eire    | GMT+6  | GMT-5  | GMT3  | Jamaica   | ROK     | sources/   |

The geographic location directories contain the time zones within that specific geographic location. When you specify a value for locality=, you must choose a valid time zone for that geographic location.

When the geographic location (and when relevant, time zone) are specified in the CDF, these values are used to configure the system accordingly.

If the locality= and timezone= attributes do not exist in the CDF, or if the value associated with these attributes is null, the installation process becomes interactive during the software configuration phase to request this information. A locality= attribute can be present without a timezone= attribute because not all geographic locations are divided into multiple time zones. For example, the geographic location Japan does not have multiple time zones. In that situation, the

installation process recognizes the fact that Japan does not have multiple time zones and bypasses the request for a time zone.

- **Date and Time**

It is not possible to specify dynamic values such as date and time in a CDF and still retain accuracy at the cloned system. The ability does exist, however, for the CDF to indicate that the date and time have been set previously either by invocation of one of the installation interfaces, or through a RIS installation cloning invocation. The method used is the `timeset=` attribute-value pair in the `Inst_cinstall` item:

- `timeset=no` — Means that the system date and time have not been set previously. The installation cloning process becomes interactive to acquire this information.
- `timeset=yes` — Means that the system date and time have been set previously. It is possible through the use of the `timeset=` attribute set to `yes` to continue the installation in an unattended fashion, even if the system time actually had not been set. The value of date and time is undetermined until the first user logs in and sets the date and time to the proper value using the `date` command.

## C.9 Creating preinstall Files

The installation process tests for the existence of user-supplied files at predefined invocation points. The first invocation point is between the creation of the memory file systems (MFS) and the search for a CDF. At this point, the installation process searches for a file named `preinstall`, which is a user-supplied script, program, or executable containing specific actions to be carried out before the file system creation and software subset load phases of the installation process.

Actions to be carried out before file systems are created and software subsets are loaded might include writing a customized disk label to one or more disks.

You would not want the `preinstall` file to execute any function that requires the installed file systems and software to be available because these phases of the installation have not yet been completed.

The user-supplied file must be named `preinstall`, and the `preinstall` file and any files that it calls require execute permission.

It is not necessary that this file be contained in the same location in which the CDF and `postload` files are found.

If execution of the `preinstall` file fails, the `preinstall` file is responsible for supplying its own status or error messages. There is no



guarantee of the results after script or program execution but if it completes successfully, the installation process proceeds.

The installation process queries the return status from the execution of the `preinstall` file and terminates the installation process if a non-zero return status is received.

The installation process searches for the `preinstall` file in the following order of priority:

1. The `/` (`root`) directory of diskette drive `fd0` or `fd1`. If a diskette is used, it requires a standard UNIX File System (UFS).
2. The `/var/adm/ris/clients/sets/profile_set` directory on the RIS server. Profile set directories are created by the RIS or system administrator. Refer to Section C.11.2 for more information about profile set directories on RIS servers.
3. In the `/isl` directory of the distribution media or to the `/isl` directory of an extracted RIS area.

The sample `preinstall` script shown in the following example applies a customized disk label to an RZ26 disk.

### Example C-2: Sample preinstall Script

---

```
#!/sbin/sh

#
Write a custom disk label to the
system disk before starting the installation.
#

NOTE: THIS FILE ASSUMES A DISK NAME OF rz0 AND DISK TYPE OF RZ26

#
Make the device special file for rz0
#
(cd /dev; ./MAKEDEV rz0)

#
First, zero the label
#
2>/dev/null disklabel -z rz0

#
Next, restore the label
#
disklabel -Rr rz0 ./DLSAVE RZ26 || 1
{
 echo "\nError restoring disklabel on rz0\n"
 exit 1
}

echo "\nThe disklabel that has been applied is:\n"
disklabel -r rz0 | tail -10
```

## Example C-2: Sample preinstall Script (cont.)

---

```
exit 0
```

---

- 1 The DLSAVE file called by the preinstall script must reside in the same directory as the preinstall script.

The sample DLSAVE file required by the preinstall script is shown in Example C-3. The DLSAVE file contains a disk label that was created by reading the disk label of the disk at `rz0` and redirecting the output into a file. To create this file, you would enter commands similar to the following:

```
disklabel -r rz0 > DLSAVE
```

## Example C-3: DLSAVE File Required By the Sample preinstall Script

---

```
/dev/rrz8a:
type: SCSI
disk: rz26
label:
flags:
bytes/sector: 512
sectors/track: 57
tracks/cylinder: 14
sectors/cylinder: 798
cylinders: 2570
sectors/unit: 2050860
rpm: 3600
interleave: 1
trackskew: 0
cylinderskew: 0
headswitch: 0 # milliseconds
track-to-track seek: 0 # milliseconds
drivedata: 0

8 partitions:
size offset fstype [fsize bsize cpg]
a: 131072 0 4.2BSD 1024 8192 16 # (Cyl. 0 - 164*)
b: 262144 131072 unused 1024 8192 # (Cyl. 164*- 492*)
c: 2050860 0 unused 1024 8192 # (Cyl. 0 - 2569)
d: 552548 393216 unused 1024 8192 # (Cyl. 492*- 1185*)
e: 552548 945764 unused 1024 8192 # (Cyl. 1185*- 1877*)
f: 552548 1498312 unused 1024 8192 # (Cyl. 1877*- 2569*)
g: 1210000 393216 4.2BSD 1024 8192 16 # (Cyl. 492*- 2009*)
h: 447644 1603216 4.2BSD 1024 8192 16 # (Cyl. 2009*- 2569*)
```

---

## C.10 Creating postload Files

Upon completion of the file system creation and software subset load phases and the preparation of the configuration environment for the

pending configuration phase, the installation process searches for a file named `postload`, which contains specific actions to be carried out.

Actions to be carried out after software subsets are loaded might include creating additional file systems or installing additional software that was not installed as part of the base operating system.

The `postload` file and any files that `postload` calls require execute permission. The installation process searches for the `postload` file in the following order of priority:

1. The `/` (root) directory of diskette drive `fd0` or `fd1`. If a diskette is used, it requires a standard UNIX File System (UFS).
2. The `/var/adm/ris/clients/sets/profile_set` directory on the RIS server. Profile set directories are created by the RIS or system administrator. Refer to Section C.11.2 for more information about profile set directories on RIS servers.
3. In the `/var/tmp` directory on the system to be installed.
4. In the `/isl` directory of the distribution media or to the `/isl` directory of an extracted RIS area.

It is not necessary that the `postload` file be contained on the same media on which the `CDF` and `preinstall` files are found.

The installation process queries the results of the execution of the `postload` file and terminates the installation process upon a non-zero return status.

It is important to know that at this invocation point, the newly created `root`, `/usr`, and `/var` file systems on the magnetic media are mount-relative with respect to the directory `/mnt` until the system is rebooted from the default boot device. That is, the root file system is `/mnt`, the `usr` file system is `/mnt/usr`, and so on.

The sample `postload` script shown in Example C-4 is creating a new file system called `users` and is then adding the entry into the `/etc/fstab` file to mount the new file system upon every reboot.

#### Example C-4: Sample `postload` Script

---

```
#!/sbin/sh
#
postload - script which is invoked after the subset load of a full
installation. The script creates a new file system and
adds an entry in the fstab file. Doing this will make the
file system available as soon as the installation completes.
#
Create a new file system on rz2c which is to be mounted at /usr/users
```

### Example C-4: Sample postload Script (cont.)

---

```
#
echo "postload: creating new file system on rz2c\n"
First, make sure that all device special files exist
(cd /dev; ./MAKEDEV rz2)
Next, create the UFS file system on rz2c, an RZ26L disk.
/usr/sbin/newfs -F /dev/rz2c RZ26L ||
{
 echo "postload: failed to create a new file system on rz2c\n"
 # We consider this a nonfatal error and allow the install to
 # continue. This is done by returning 0. Otherwise, exit with a
 # non-zero value.
 exit 0
}
Next, add an entry to fstab so that this new file system is
automatically mounted when the system boots.
NOTE: the actual installed file systems are mounted at /mnt.
Therefore, we want to add the entry to /mnt/etc/fstab and
not /etc/fstab.
echo "/dev/rz2c /usr/users ufs rw 1 2" >> /mnt/etc/fstab
Finally, make sure the mount point is created. Once again, create it
relative to /mnt.
/bin/mkdir /mnt/usr/users
Process complete!
exit 0
```

---

## C.11 Moving the CDF and User-Supplied Files to the Appropriate Location

It is the administrator's responsibility to place the `install.cdf` file, the `preinstall` and `postload` files and all files required by `preinstall` and `postload` into the appropriate directories so the installation process can find them. Depending upon how you want to deliver the CDF and all related files, you can copy them to the following destinations:

- The `/` (root) directory of diskette drive `fd0` or `fd1`. Refer to Section C.11.1 for more information about formatting the diskette and copying the CDF and files there.

- The `/var/adm/ris/clients/sets/profile_set` directory on the RIS server to which the client system is registered. Refer to Section C.11.2 for more information about moving the CDF and files to a profile set on the RIS server.
- The `/var/tmp` directory. Refer to Section C.11.3 for more information about moving the CDF and files there.
- The `/isl` directory of a CD-ROM image. Refer to Section C.11.4 for information about burning data onto a CD-ROM. You also can move the files to the `/isl` directory of an extracted RIS area.

During an installation cloning, the cloning process searches for the CDF and user-supplied files in the following order of priority:

1. Diskette drive `fd0` or `fd1`.
2. The `/var/adm/ris/clients/sets/profile_set` subdirectory on the RIS server.
3. The `/var/tmp` directory on the system to be installed.
4. The `/isl` directory on the distribution media (local CD-ROM or extracted RIS area). Refer to Section C.11.2 for things to consider when moving files to an extracted RIS area.

### C.11.1 Moving the CDF and Files to a Diskette

Before you can copy the CDF and user-supplied files to the diskette, you must first format the diskette, write a new disk label, and then create a new file system using the following command syntax:

```
fddisk -fmt raw_diskette_device
```

```
disklabel -wr diskette_drive disk_type
```

```
newfs raw_diskette_device_partition
```

Use commands similar to the following to format the diskette in diskette drive `fd0`, write a new disk label specifying the `rx23` type of diskette, and creating a new file system on the entire diskette (partition `c`):

1. Enter commands similar to the following to format a diskette drive `fd0`:
 

```
fddisk -fmt /dev/rfd0
```
2. Enter commands similar to the following to write a new disk label to an `rx23` type of diskette. The diskette type is printed on the diskette.
 

```
disklabel -wr fd0 rx23
```

3. Use commands similar to the following to create a new file system on the entire diskette, the `c` partition:

```
newfs /dev/rfd0c
```

If either the `preinstall` or `postload` files are located on the diskette, all files called by the `preinstall` or `postload` files must be located on the diskette.

Use commands similar to the following to mount the diskette drive and copy the CDF and all related files to the diskette:

1. Mount the diskette drive on the `/mnt` mount point:

```
mount /dev/fd0c /mnt
```

2. Enter the `chmod` command to ensure all files have execute permissions:

```
chmod 777 *
```

The asterisk (\*) is a wildcard character that represents all files in the directory.

3. Assuming that you are in the directory in which the files are located, enter the following copy commands to copy the files to the diskette:

```
cp ./install.cdf /mnt/install.cdf
cp ./preinstall /mnt/preinstall
cp ./postload /mnt/postload
cp ./file_name /mnt/file_name
```

4. Unmount the diskette drive:

```
umount /mnt
```

### C.11.2 Moving the CDF and Files to a RIS Server

The information contained in this section applies to RIS servers running a previous version or the current version of the operating system. For information about moving the CDF and user-supplied files to a RIS server running an older version of the operating system, see the appropriate documentation supplied with that version of the operating system.

The Remote Installation Services (RIS) utility has been modified to support client registration to both RIS environments and profile set directories. RIS maintains the CDFs and user-supplied files in logically organized subdirectories that are created by the RIS administrator. These subdirectories, known as **profile sets** must be located within the `/var/adm/ris/clients/sets` directory. The administrator uses the `mkdir` command to make profile set directories.

A profile set is a directory that contains the files used during an installation process. The `sets` directory can contain many profile sets. Each of the profile set directories may contain a CDF (`install.cdf`), a preinstallation file (`preinstall`), a postinstallation file (`postload`), and all files called by the `preinstall` and `postload` files. All files are optional; they can be used independently or in any combination. It is the RIS administrator's responsibility to place the appropriate files into the correct profile set directory.

The `profile_set` directories you create depend upon your working environment and how you want to logically organize the functions of the CDFs and files. If, for example, your site or facility requires engineering workstations to be installed and configured differently from the workstations in the accounting department, you might want to create two profile set directories; one named `engineering` and one named `accounting`. Those profile sets would contain the CDFs and files that were created to suit the configuration needs of both departments.

Another hypothetical situation for defining profile sets is one in which separate CDFs and files are maintained for server type systems and workstation type systems. Profile set directories named `server` and `workstation` might be set up under that scenario.

Use procedures similar to the following to copy the CDF, `preinstall` and `postload` files, and related files to a profile set directory:

1. Change to the `/var/adm/ris/clients/sets` directory, and using the naming scheme of your choice, create a profile set directory with an appropriate name:

```
cd /var/adm/ris/clients/sets
mkdir engineering
```

2. Change to the new profile set directory to ensure files are copied to the correct directory:

```
cd engineering
```

3. Copy the modified CDF and optionally the `preinstall`, `postload`, and all other related files from your working area to the new `engineering` profile set directory, using the copy tool you usually use (for example, `ftp`, `dcp`, or `rcp`).
4. Enter the `chmod` command to ensure all files have execute permissions:

```
chmod 755 *
```

The asterisk (\*) is a wildcard character that represents all files in the directory.

After you copy the appropriate CDF and other files to the profile sets directory, you can register RIS clients for installation cloning or for user-defined file invocation during a full RIS installation. You do this by registering new clients to a RIS environment as well as to a profile set. If a RIS client is registered to a profile set and boots across the network to start an installation, the order of priority in which a search for a CDF and other optional files is done is shown in Section C.11. If a CDF is found, it is retrieved and used by the installation process to provide the answers to all installation configuration questions.

- If an `install.cdf`, `preinstall`, or `postload` file is moved to the `/isl` area of an extracted RIS area, the files will be used by all client systems installing from that RIS area.

If this action is not appropriate, the administrator should create profile set directories to supply these files on a client-by-client basis.

- Follow the general procedures in *Sharing Software on a Local Area Network* to register a client system to a RIS environment and a profile set.
- To determine if a RIS client is registered to a profile set, examine the RIS database file, `/var/adm/ris/clients/risdb`, on the RIS server. The name of the profile set is specified in the fourth field; fields are separated by a colon. In the following sample entry in the `risdb` file, the client system `kramer` is registered to the `engineering` profile set:

```
kramer:08-00-2b-58-89-1c:ris2.alpha,product_1:engineering
```

- You can remove a client from profile set registration by using the `Modify` option from the RIS Utility Main Menu. When you are prompted to specify a profile set for the client, enter `n` or press Return to register the client without specifying a profile set.
- If a profile set is no longer needed, you can delete it by removing the appropriate `profile_set` directory from the directory `/var/adm/ris/clients/sets`.

Examine the RIS database file on the RIS server, `/var/adm/ris/clients/risdb`, before deleting a profile set to ensure that no clients are registered to it. The name of the profile set is specified in the fourth field; fields are separated by a colon (:). In the following sample entry in the `risdb` file, the client `newman` is registered to the `accounting` profile set:

```
newman:08-00-2b-58-89-1c:ris2.alpha,product_1:accounting
```



### C.11.3 Moving the CDF and User-Supplied Files to the `/var/tmp` Directory

The `/var/tmp` directory is a writable directory created during the installation process and, therefore, cannot be used to ship the CDF and user-supplied files. However, if a `preinstall` script is used, it can copy dynamically the CDF, `postload`, and any files needed by `postload` into `/var/tmp` during the installation process. The `preinstall` file itself cannot be invoked from `/var/tmp` as it is the only mechanism available to move files into `/var/tmp`.

This feature is valuable for users repackaging the operating system and who are providing the CDF and user-supplied files on the CD-ROM. When there is a need to modify or select a CDF or `postload` file as part of the installation process, a writable location is needed because the CD-ROM cannot be written to. For example, assume that several CDFs are shipped on the CD-ROM for the purpose of supporting different hardware or configurations from one distribution media. In this case, you can create a `preinstall` file that examines the system on which the installation is being executed, and based on the examination, select the appropriate CDF file from among those shipped. The `preinstall` file can then copy this CDF to `/var/tmp/install.cdf` where it will later be read by the installation process. Similarly, the `preinstall` file could choose from among several `postload` files and copy the one you want to `/var/tmp/postload`.

The `preinstall` script should assure that files copied to `/var/tmp` have the appropriate permission codes (`chmod 777 *` is the safest way to ensure appropriate permissions).

### C.11.4 Burning the CDF and Files on to a CD-ROM

You can repackage the operating system CD-ROM to include CDFs and user-supplied files in the `/isl` directory.

---

**Note**

---

Copying software may be done only for the purpose of licensed use of the operating system . A valid license agreement must be present for all instances of use of the copied operating system.

---

Use the method you usually use to burn (write onto) a CD-ROM if you plan to provide the `install.cdf`, `preinstall`, and `postload` files on a CD-ROM. The method you use depends upon the type of CD-ROM burner you have.

The basic steps to create an image and burn a CD-ROM are:

1. Mount the operating system CD-ROM to determine how much disk space is required on the magnetic disk to which you will be copying the contents of the CD-ROM. For example, to mount the CD-ROM in drive `/dev/rz4c` on the directory `/mnt`, enter commands similar to the following:

```
mkdir /mnt
mount -r /dev/rz4c /mnt
cd /mnt
```

2. Enter the following command to determine disk space in kilobytes:

```
df -k
```

Remember this figure and make sure you have a disk large enough to meet the space requirement.

3. Unmount the CD-ROM using commands similar to the following:

```
umount /mnt
```

4. Create an image of the operating system by copying the contents of an operating system CD-ROM on to a disk that is at least as large as the figure obtained in Step 2. Use commands similar to the following to copy the contents of the CD-ROM to disk. In the example, the input file is the CD-ROM device, (`/dev/rz4c`), the output file is the magnetic disk (`/dev/rz2c`), and the input and output block size is 32 kilobytes (32k).

```
dd if=/dev/rz4c of=/dev/rz2c bs=32k
```

---

**Caution**

---

The output file (`of=`) must specify a disk partition that starts at block zero (usually `a` or `c`). Specifying a partition that does not start at zero (`0`) results in an operating system image that is not bootable.

---

5. Mount the disk to which you just copied the contents of the operating system CD-ROM, and use the `cp` command to copy the `install.cdf`, `preinstall`, `postload` files and any files called by the files into the `/isl` directory of the image:

```
mount /dev/rz2c /mnt
cp ./preinstall /mnt/isl/preinstall
cp ./install.cdf /mnt/isl/install.cdf
cp ./postload /mnt/isl/postload
```

```
cp ./file_name /mnt/isl/file_name
```

6. Depending upon the type of CD-ROM burner you have, use the recommended method to burn a CD-ROM from the modified image on the disk.

---

**Note**

---

To ensure that you have a valid, bootable operating system image, you should verify the ability to boot from the image on the disk before burning the CD-ROM.

---



# D

---

## Base Operating System Software Subset Descriptions

The software subsets described in this appendix are located on the *Operating System Volume 1* CD-ROM.

Operating system software subsets are divided into the following categories: optional, mandatory, and conditionally mandatory.

- Optional software subsets can be selected during custom installations. These software subsets represent a variety of applications that can be installed to enhance your operating system. Optional software subsets are not offered during the default installation. Refer to Chapter 10 for information about using the `setld` command to install optional subsets after the installation.
- Mandatory software subsets are installed automatically for default and custom installations. These software subsets represent the minimum software needed to install and run the operating system.
- Conditionally mandatory software subsets are considered mandatory only when certain hardware or software is detected during the installation procedure. Table D-1 lists the software subsets that are conditionally mandatory. In Table D-1, a group of software subsets that contains the word `or` means that at least one of the software subsets is mandatory when the condition is met; a group of software subsets that contains the word `and` means that all software subsets are mandatory if the condition is met.

**Table D-1: Conditionally Mandatory Software Subsets**

| Software Subset Description                                                                 | What Makes It Mandatory?                                  |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| DECwindows 75dpi Fonts <code>or</code><br>DECwindows 100dpi Fonts                           | Resolution of the graphics adapter attached to the system |
| X Servers for Open3D,<br>X Servers for PCbus, <code>or</code><br>X Servers for TurboChannel | Type of graphics adapter attached to the system           |

**Table D-1: Conditionally Mandatory Software Subsets (cont.)**

| <b>Software Subset Description</b>                                                                                                                                                                                                                                                                         | <b>What Makes It Mandatory?</b>                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Graphical Base System Management Utilities,<br>Graphical Print Configuration Application,<br>Graphical System Administration Utilities,<br>Netscape Communicator V4.5,<br>CDE Desktop Environment,<br>Basic X Environment,<br>X Servers,<br>X Fonts,<br>Adobe Font Metric Files, and<br>CDE Mail Interface | A graphics adapter is attached to the system                                                            |
| LK201 Keyboard Support,<br>LK401 Keyboard Support,<br>LK411 Keyboard Support,<br>LK421 Keyboard Support,<br>LK444 Keyboard Support, or<br>PCXAL Keyboard Support                                                                                                                                           | Type of keyboard attached to the system                                                                 |
| POLYCTR AdvFS and<br>POLYCTR AdvFS Kernel Modules                                                                                                                                                                                                                                                          | Choosing AdvFS as the file system type for the root, /usr, or /var file systems during the installation |
| ATM Kernel Header and Common Files, ATM Kernel Modules, and ATM Commands                                                                                                                                                                                                                                   | ATM hardware is detected by the installation procedure                                                  |

In this appendix, the conditionally mandatory software subsets are described in the software category in which they would appear during an installation if they were not mandatory for your system.

## D.1 Mandatory Software Subsets

The mandatory subsets shown in Table D-2 always are installed automatically for the default and custom installations.

The Base System and the Base System-Hardware Support subsets cannot be deleted once they are installed.

The Standard Kernel Modules, the Kernel Header and Common Files, the Hardware Kernel Modules, the Hardware Kernel Header and Common Files, and the Compiler Back End subsets contain all the files needed to build a standard kernel. You can delete these subsets after the installation by using the `setld -d` command to reclaim disk space after the kernel is built. However, you will not be able to rebuild your kernel. If you need to

rebuild your kernel for any reason, you must reinstall those subsets with the `setld` command.

Table D-2 describes the mandatory subsets.

**Table D-2: Description of the Mandatory Software Subsets**

| <b>Title and Contents</b>                                                                                                                                                                          | <b>Subset Name</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Base System                                                                                                                                                                                        | OSFBASE440         |
| This software subset includes fundamental utilities and data files for the base operating system. The base operating system includes the editors and many of the general-purpose programs.         |                    |
| Base System — Hardware Support                                                                                                                                                                     | OSFHWBASE440       |
| This software subset provides the hardware dependent portion of the OSFBASE subset.                                                                                                                |                    |
| This software subset also contains the Monitoring Performance History (MPH) utility that gathers information on the reliability and availability of the operating system and associated platforms. |                    |
| Base System Management Applications and Utilities                                                                                                                                                  | OSFSYSMAN440       |
| This software subset contains all files related to the base system management applications and utilities such as <code>diskconfig</code> and <code>mailconfig</code> .                             |                    |
| Basic Network Configuration Applications                                                                                                                                                           | OSFNETCONF440      |
| This software subset contains all files related to the basic network configuration applications <code>bindconfig</code> and <code>netconfig</code> .                                               |                    |

**Table D-2: Description of the Mandatory Software Subsets (cont.)**

| <b>Title and Contents</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Subset Name</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Basic Networking Services                                                                                                                                                                                                                                                                                                                                                                                                                                            | OSFCLINET440       |
| <p>This software subset contains the software required to provide services over the network using the TCP/IP protocols. These services include remote login (<code>rlogin</code>) and Network Time Protocol (<code>xntp</code>).</p>                                                                                                                                                                                                                                 |                    |
| Compiler Back End                                                                                                                                                                                                                                                                                                                                                                                                                                                    | OSFCMPLRS440       |
| <p>C Language Compiler. This software subset provides the minimum level of C language support required to build operating system kernels. The subset also contains the DEC C compiler executables. This software subset must be used in conjunction with the Software Development Tools and Utilities subset. This software subset is mandatory during the initial system installation, but can be removed if you do not intend to build kernels on your system.</p> |                    |
| Hardware Kernel Header and Common Files                                                                                                                                                                                                                                                                                                                                                                                                                              | OSFHWBINCOM440     |
| <p>This software subset provides the hardware dependent kernel header and data files that together with the Standard Kernel Modules and Hardware Kernel Modules let you configure and build the kernel. If you do not plan to build kernels on your system, this subset can be removed. This software subset supports uniprocessor, symmetric multiprocessing (SMP), and realtime configurations.</p>                                                                |                    |
| Hardware Kernel Modules                                                                                                                                                                                                                                                                                                                                                                                                                                              | OSFHWBIN440        |
| <p>This software subset provides hardware dependent kernel modules that together with the Standard Kernel Modules let you configure and build the kernel. This software subset is mandatory during the initial system installation, but can be removed if you do not intend to build kernels on your system.</p>                                                                                                                                                     |                    |



**Table D–2: Description of the Mandatory Software Subsets (cont.)**

| <b>Title and Contents</b>                                                                                                                                                                                                                                                                                                                   | <b>Subset Name</b> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Insight Manager                                                                                                                                                                                                                                                                                                                             | OSFIMXE440         |
| This software subset contains agents that allow the system to be managed remotely by the Insight Manager system administration tool.                                                                                                                                                                                                        |                    |
| Java V1.1.6–2 Environment                                                                                                                                                                                                                                                                                                                   | OSFJAVA440         |
| This software subset contains the class libraries, tools, and run-time libraries necessary for Java environment development.                                                                                                                                                                                                                |                    |
| Kernel Header and Common Files                                                                                                                                                                                                                                                                                                              | OSFBINCOM440       |
| This software subset provides the common kernel header and data files that together with the Standard Kernel Modules and Hardware Kernel Modules let you configure and build the kernel. This software subset is mandatory during the initial system installation, but can be removed if you do not intend to build kernels on your system. |                    |
| Local Printer Support                                                                                                                                                                                                                                                                                                                       | OSFPRINT440        |
| This software subset provides printer commands such as <code>lpr</code> , <code>lpg</code> , and <code>lpd</code> ; utilities; configuration files; filters; and PostScript printer support.                                                                                                                                                |                    |
| NFS Configuration Application                                                                                                                                                                                                                                                                                                               | OSFNFSCONF440      |
| This software subset contains the files related to the network file system configuration application, <code>nfsconfig</code> .                                                                                                                                                                                                              |                    |
| NFS Utilities                                                                                                                                                                                                                                                                                                                               | OSFNFS440          |
| This software subset provides the software required to mount remote file systems using the Network File System (NFS).                                                                                                                                                                                                                       |                    |

**Table D–2: Description of the Mandatory Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                                                                              | Subset Name   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <p>Standard Kernel Modules</p> <p>This software subset provides common kernel modules that together with the Hardware Kernel Modules let you configure and build the kernel. This software subset is mandatory during the initial system installation, but can be removed if you do not intend to build kernels on your system.</p>                                             | OSFBIN440     |
| <p>Tcl Commands</p> <p>This software subset contains the binary distribution of Tool Command Language (TCL) and the TCLX extension package without graphical components. TCL is a scripting language. The package consists of TCL/TCLX shared libraries, the TCL/TCLSH shells, and script libraries. Install this software subset if you want to write or run TCL programs.</p> | OSFTCLBASE440 |

## D.2 Optional Software Subsets

The optional software subsets contain software that supports a variety of applications. If you choose the default installation procedure, these software subsets are not available during the installation, but can be installed after the installation completes by using the `setld` command. If you choose the custom installation, these software subsets are available for selection during the installation procedure.

The optional software subsets can be deleted after they are installed, although some are dependent upon others.

The following is a list of the optional software subset categories. Locate the category you are interested in and refer to the corresponding table for subset descriptions.

- General Applications – Table D–3
- Kernel Build Environment – Table D–4
- Kernel Software Development – Table D–5
- Mail Applications – Table D–6
- Network-Server/Communications – Table D–7
- Printing Environment – Table D–8

- Reference Pages – Table D-9
- Software Development – Table D-10
- Supplemental Documentation – Table D-11
- System Administration – Table D-12
- Text Processing – Table D-13
- Windowing Environment – Table D-14
- Windows Applications – Table D-15

## D.2.1 General Applications Software Subsets

Table D-3 describes the software subsets in this category.

**Table D-3: Description of the General Applications Software Subsets**

| Title and Contents                                                                                                                                                                                                                                                                                                                                                                                                    | Subset Name |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Additional Terminfo Databases                                                                                                                                                                                                                                                                                                                                                                                         | OSFTERM440  |
| This software subset contains the additional terminal information databases to support additional terminals.                                                                                                                                                                                                                                                                                                          |             |
| Computer Aided System Tutorial                                                                                                                                                                                                                                                                                                                                                                                        | OSFLEARN440 |
| This software subset provides a simple, interactive online tutorial about subjects such as basic UNIX file handling, the <code>vi</code> text editor, the capabilities of the <code>ls</code> command, <code>ms</code> macros, editors in general, <code>eqn</code> (a language for typesetting mathematics), and the C Programming Language. Refer to the <code>learn(1)</code> reference page for more information. |             |

**Table D-3: Description of the General Applications Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Subset Name    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| DOS tools                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | OSFDOSTOOLS440 |
| <p>This software subset provides a collection of tools for manipulating MS-DOS files. The mtools commands are a public domain collection of programs that let you read, write, and manipulate files on an MS-DOS file system (typically a floppy disk) from a UNIX system. Each command attempts to emulate the MS-DOS equivalent command as closely as possible. The following commands are available: <code>mattrib</code>, <code>mcd</code>, <code>mcopy</code>, <code>mdel</code>, <code>mdir</code>, <code>mformat</code>, <code>mlabel</code>, <code>mmd</code>, <code>mrd</code>, <code>mread</code>, <code>mtype</code>, and <code>mwrite</code>.</p> |                |
| GNU Emacs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | OSFEMACS440    |
| <p>This software subset contains the GNU Emacs editor.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                |
| Local Area Transport (LAT)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | OSFLAT440      |
| <p>Local Area Transport (LAT) is a protocol that provides a means of logically connecting terminal servers to one or more nodes on the same local area network (LAN).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |
| <p>LAT software has the features required for a host to function as a service node, so requests for connections can be made by server users.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |
| Tk Toolkit Commands                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | OSFTKBASE440   |
| <p>This software subset contains the Tool Command Language (TCL) graphical extensions package Version TK4.04b4 and TKX.04b5.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |

**Table D–3: Description of the General Applications Software Subsets (cont.)**

| <b>Title and Contents</b>                                                                                                                                                                                                                                  | <b>Subset Name</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| UNIX SVID2 Compatibility                                                                                                                                                                                                                                   | OSFSVID2440        |
| <p>This software subset brings the system into compliance with the Base System and Kernel Extensions of the System V Interface Definition Issue 2 (SVID2). It also adds a higher degree of compatibility with the Basic Utilities Extensions of SVID2.</p> |                    |
| UNIX to UNIX Copy Facility                                                                                                                                                                                                                                 | OSFUUCP440         |
| <p>This software subset provides programs and data files needed for a system to participate in a network of machines using the UUCP facility. This facility transmits files over serial communications lines.</p>                                          |                    |

## D.2.2 Kernel Build Environment Software Subsets

Table D–4 describes the software subsets in this category.

**Table D–4: Description of the Kernel Build Environment Software Subsets**

| <b>Title and Contents</b>                                                                                                                                                                                                                                                                                | <b>Subset Name</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| ATM Kernel Header and Common Files                                                                                                                                                                                                                                                                       | OSFATMBINCOM440    |
| <p>This software subset provides the ATM kernel header and data files and together with the ATM Kernel Modules subset lets you configure and build a kernel that supports the ATM hardware.</p>                                                                                                          |                    |
| ATM Kernel Modules                                                                                                                                                                                                                                                                                       | OSFATMBIN440       |
| <p>This software subset contains the ATM kernel modules. This software subset is mandatory if ATM hardware is detected during the installation process. ATM technology is a connection-oriented wide area/local area technology based on the high-speed switching of 53-byte cells across a network.</p> |                    |

**Table D–4: Description of the Kernel Build Environment Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                  | Subset Name     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Logical Storage Manager Kernel Header and Common Files                                                                                                                                              | OSFLSMBINCOM440 |
| <p>This software subset contains the LSM kernel include files to build LSM with the kernel. This software subset supports uniprocessor, SMP, and realtime configurations.</p>                       |                 |
| Logical Storage Manager Kernel Modules                                                                                                                                                              | OSFLSMBIN440    |
| <p>This software subset provides the kernel modules to build the kernel with LSM drivers. This software subset supports uniprocessor, SMP, and realtime configurations.</p>                         |                 |
| POLYCTR AdvFS Kernel Modules                                                                                                                                                                        | OSFADVFSBIN440  |
| <p>This software subset contains the POLYCENTER Advanced File System (AdvFS) kernel modules. AdvFS is a log based file system that allows for faster system restarts in case of system crashes.</p> |                 |

### D.2.3 Kernel Software Development Software Subsets

Table D–5 describes the software subsets in this category. These software subsets are optional after the installation. They will not appear on the optional software subset list during a custom installation. Use the `setld` command if you want to install these software subsets.

**Table D–5: Description of the Kernel Software Development Software Subsets**

| <b>Title and Contents</b>                                                                                                                                                                        | <b>Subset Name</b>   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| ATM Kernel Objects<br><br>This software subset contains the Asynchronous Transfer Mode (ATM) Kernel Objects needed for software development of code that is to be built into the kernel.         | OSFATMBINOBJECT440   |
| Hardware Kernel Objects<br><br>This software subset contains the Hardware Kernel Objects needed for software development of code that is to be built into the kernel.                            | OSFHWINOBJECT440     |
| Logical Storage Manager Kernel Objects<br><br>This software subset contains the Logical Storage Manager Kernel Objects needed for software development code that is to be built into the kernel. | OSFLSMBINOBJECT440   |
| POLYCENTER AdvFS Kernel Objects<br><br>This software subset contains the POLYCENTER AdvFS Kernel Objects needed for software development of code that is to be built into the kernel.            | OSFADVFSBINOBJECT440 |
| Standard Kernel Objects<br><br>This software subset contains the Standard Kernel Objects needed for the software development of code that is to be built into the kernel.                        | OSFBINOBJECT440      |

## D.2.4 Mail Applications

Table D–6 describes the software subsets in this category.

**Table D–6: Description of the Mail Applications Software Subsets**

| <b>Title and Contents</b>                                                                                                                           | <b>Subset Name</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| CDE Mail Interface                                                                                                                                  | OSFCDEMAIL440      |
| This software subset contains the Common Desktop Environment mail system. This software subset is mandatory on a system with graphics capabilities. |                    |
| DECwindows Mail Interface                                                                                                                           | OSFXMAIL440        |
| This software subset provides the DECwindows mail application for <code>dxmail</code> .                                                             |                    |
| RAND Corp. Mail Handler (MH)                                                                                                                        | OSFMH440           |
| This software subset provides programs that constitute the RAND Corporation MH mail reader interface.                                               |                    |

## D.2.5 Network-Server/Communications Software Subsets

Table D–7 describes the software subsets in this category.

**Table D–7: Description of the Network-Server/Communications Software Subsets**

| <b>Title and Contents</b>                                                                                                                                                                              | <b>Subset Name</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| ATM Commands                                                                                                                                                                                           | OSFATMBASE440      |
| This software subset contains the software that provides the Asynchronous Transfer (ATM) mode commands. This software subset is mandatory if ATM hardware is detected during the installation process. |                    |
| Additional Networking Services                                                                                                                                                                         | OSFINET440         |
| This software subset contains the software that provides the networking services; Berkeley Internet Name Domain (BIND) and Network Information Services (NIS).                                         |                    |



**Table D–7: Description of the Network-Server/Communications Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                                                                                                    | Subset Name |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <p>Dataless Management Service</p> <p>This software subset provides the software needed to run Dataless Management Services (DMS). In a DMS environment, a server maintains the root, /usr, and /var file systems for client systems. Paging, swapping, and dumping is done on the clients local disks. The UNIX-SERVER product authorization key (PAK) must be loaded and registered to use DMS.</p> | OSFDMS440   |
| <p>Remote Installation Services</p> <p>This software subset provides the ability to perform installations of the operating system and applications over a network. The UNIX-SERVER product authorization key (PAK), must be loaded and registered to use RIS.</p>                                                                                                                                     | OSFRIS440   |

## D.2.6 Printing Environment Software Subsets

Table D–8 describes the software subsets in this category.

**Table D–8: Description of the Printing Environment Software Subsets**

| Title and Contents                                                                                                                                                                                                                                                                                           | Subset Name |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <p>Adobe Font Metric Files</p> <p>This software subset contains font metrics (character bounding box, width, name, ligature, kerning, and font properties) for PostScript outline fonts used by text formatting applications on PostScript output devices. This software subset is needed to view files.</p> | OSFAFM440   |

## D.2.7 Reference Pages Software Subsets

Table D–9 describes the software subsets in this category.

**Table D–9: Description of the Reference Pages Software Subsets**

| <b>Title and Contents</b>                                                                                                                                                                                                                           | <b>Subset Name</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Ref Pages: Admin/User<br><br>This software subset provides the online reference pages for system administrators and general users.                                                                                                                  | OSFMANOS440        |
| Ref Pages: CDE Admin/User<br><br>This software subset contains the reference pages for Common Desktop Environment general users and system administrators.                                                                                          | OSFCDEMANOS440     |
| Ref Pages: CDE Development<br><br>This software subset contains the Common Desktop Environment development reference pages.                                                                                                                         | OSFCDEMANOP440     |
| Ref Pages: Programming<br><br>This software subset provides the online reference pages for programmers. It also contains the online reference pages for the Realtime kernel.                                                                        | OSFMANOP440        |
| Ref Pages: Windows Admin/User<br><br>This software subset provides the online reference pages for windows administrators and users. This software subset also contains the reference pages for the SysMan graphical system management applications. | OSFMANWOS440       |
| Ref Pages: Windows Programming<br><br>This software subset provides the online reference pages for windows programmers.                                                                                                                             | OSFMANWOP440       |

## D.2.8 Software Development Software Subsets

Table D–10 describes the software subsets in this category.

**Table D–10: Description of the Software Development Software Subsets**

| <b>Title and Contents</b>                                                                                                                                                                                                                   | <b>Subset Name</b> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| CDA Software Development                                                                                                                                                                                                                    | OSFCDAPGMR440      |
| The CDA Software Development environment provides C header files that enable programmer access to the CDA Base Services run-time libraries.                                                                                                 |                    |
| CDA for X/Motif Development                                                                                                                                                                                                                 | OSFXCDADEV440      |
| This software subset provides a developer's environment for X11/DECwindows CDA architecture.                                                                                                                                                |                    |
| CDE Software Development and Programming Examples                                                                                                                                                                                           | OSFCDEDEV440       |
| This software subset contains the header files, static libraries, and tools needed for Common Desktop Environment (CDE) development.                                                                                                        |                    |
| GNU Revision Control System                                                                                                                                                                                                                 | OSFRCS440          |
| This software subset contains programs that make up the UNIX Revision Control System (RCS), which provides a regulation mechanism for large software projects.                                                                              |                    |
| Ladebug Debugger                                                                                                                                                                                                                            | OSFLDBBASE440      |
| This software subset contains the command line interface for the operating system's Ladebug Debugger. The Ladebug Debugger is a symbolic source-level debugger that supports debugging of ADA, C/C++, Fortran, and Fortran 90 applications. |                    |
| Ladebug Debugger Release Notes                                                                                                                                                                                                              | OSFLDBDOC440       |
| This software subset contains the Ladebug Debugger Release Notes, placed in <code>ladebug-relnotes.txt</code> in the <code>/usr/doc/ladebug</code> directory when this subset is installed.                                                 |                    |
| Ladebug Debugger Window Interface                                                                                                                                                                                                           | OSFLDBGUI440       |
| This software subset contains all the files needed to install the graphical user interface to the Ladebug Debugger.                                                                                                                         |                    |

**Table D–10: Description of the Software Development Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                                                                                                         | Subset Name    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <p>Ladebug Debugger Remote Server</p> <p>This software subset contains all the files needed to install the Ladebug Debugger server. The server is used to do remote debugging.</p>                                                                                                                                                                                                                         | OSFLDBSRV440   |
| <p>Java Development Environment</p> <p>This software subset contains contains Java development tools.</p>                                                                                                                                                                                                                                                                                                  | OSFJAVADEV440  |
| <p>Programming Examples</p> <p>This software subset contains programming examples.</p>                                                                                                                                                                                                                                                                                                                     | OSFEXAMPLES440 |
| <p>Software Development Desktop Environment</p> <p>This software subset contains the Common Desktop Environment (CDE) files necessary to start the Ladebug Debugger and the Porting Assistant from the CDE desktop.</p>                                                                                                                                                                                    | OSFSDECDE440   |
| <p>Software Development Tools and Utilities</p> <p>This software subset provides additional software development environment extensions. This software subset includes the ATOM tools <code>hiprof</code>, <code>pixie</code>, and <code>third</code>. The software subset, OSF-DEV-USER Product Authorization Key (PAK), is required to use the tools and utilities included in this software subset.</p> | OSFSDE440      |
| <p>Source Code Control System</p> <p>This software subset contains programs that make up the UNIX Source Code Control System (SCCS), which provides a regulation mechanism for large software projects.</p>                                                                                                                                                                                                | OSFSCCS440     |

**Table D–10: Description of the Software Development Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                                                        | Subset Name     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Standard Header Files                                                                                                                                                                                                                                                                                                                                     | OSFINCLUDE440   |
| <p>This software subset contains the standard header files for C programming.</p>                                                                                                                                                                                                                                                                         |                 |
| Standard Programmer Commands                                                                                                                                                                                                                                                                                                                              | OSFPGMR440      |
| <p>This software subset contains libraries and utilities useful for software development. It includes the libraries for linking programs to be analyzed with the <code>dbx</code> debugger and <code>lex</code> and <code>yacc</code> parser packages. Also included in this software subset is the ATOM performance analysis and debugging tool kit.</p> |                 |
| Static Libraries                                                                                                                                                                                                                                                                                                                                          | OSFLIBA440      |
| <p>This software subset contains the static libraries for linking programs that do not use shared libraries. Some software development tools work only with static linked programs.</p>                                                                                                                                                                   |                 |
| X Windows and X/Motif Header Files                                                                                                                                                                                                                                                                                                                        | OSFXINCLUDE440  |
| <p>This software subset contains the X Windows header files needed for X11 and Motif software development.</p>                                                                                                                                                                                                                                            |                 |
| X Windows and X/Motif Programming Examples                                                                                                                                                                                                                                                                                                                | OSFXEXAMPLES440 |
| <p>This software subset contains examples of X and Motif programs.</p>                                                                                                                                                                                                                                                                                    |                 |

**Table D–10: Description of the Software Development Software Subsets (cont.)**

| <b>Title and Contents</b>                                                                                                                                                                                          | <b>Subset Name</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| X Windows and X/Motif Software Development                                                                                                                                                                         | OSFXDEV440         |
| <p>This software subset provides the library and data files needed to produce X/Motif Window System client applications. This software subset also includes example programs demonstrating how to get started.</p> |                    |
| X Windows and X/Motif Static Libraries                                                                                                                                                                             | OSFXLIBA440        |
| <p>This software subset contains the X Windows static libraries for linking programs that do not use shared libraries. Some software development tools only work with static linked programs.</p>                  |                    |

## D.2.9 Supplemental Documentation Software Subset

Table D–11 describes the software subset in this category.

**Table D–11: Description of the Supplemental Documentation Software Subset**

| <b>Title and Contents</b>                                                                                                                          | <b>Subset Name</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Java Online Documentation                                                                                                                          | OSFJAVADOC440      |
| <p>This subset contains online documentation for the Java development tools.</p>                                                                   |                    |
| XIE Version 5 Online Documentation                                                                                                                 | OSFXIEDOC440       |
| <p>This software subset provides compressed PostScript files of documents for the X Windows System Image Extension (XIE) Version 5.0 software.</p> |                    |

## D.2.10 System Administration Software Subsets

Table D–12 describes the software subsets in this category.

**Table D–12: Description of the System Administration Software Subsets**

| Title and Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Subset Name   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| C2 Security                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | OSFC2SEC440   |
| This software subset provides additional configurable system security features such as identification, authentication and audit.                                                                                                                                                                                                                                                                                                                                                                  |               |
| C2 Security GUI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | OSFXC2SEC440  |
| This software subset provides the graphical user interface for the C2 Security subset.                                                                                                                                                                                                                                                                                                                                                                                                            |               |
| Environmental Monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OSFENVMON440  |
| This software subset provides a means of detecting the thermal state, fan status, and redundant power supply status in enough time to prevent damage to the system itself. This subset contains the components needed to implement Environmental Monitoring in Alpha systems that support this feature.                                                                                                                                                                                           |               |
| Graphical Base System Management Utilities                                                                                                                                                                                                                                                                                                                                                                                                                                                        | OSFXSYSMAN440 |
| This software subset contains the graphical system management Tool Command Language (TCL/TK) shell, some utility libraries, the configuration checklist application (for postinstallation use), and the Common Desktop Environment (CDE) application manager rules files for the creation of system management applications within the application manager. It also contains all the system management application icons. This software subset is mandatory on system with graphics capabilities. |               |

**Table D–12: Description of the System Administration Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                         | Subset Name   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Graphical Print Configuration Application                                                                                                                                                                                                                                                                                  | OSFXPRINT440  |
| <p>This software subset contains all files relating to the graphical print configuration application, <code>printconfig</code>. This software subset is mandatory on systems with graphics capabilities.</p>                                                                                                               |               |
| Graphical System Administration Utilities                                                                                                                                                                                                                                                                                  | OSFXADMIN440  |
| <p>This software subset contains all files relating to the following graphical system administration utilities: account manager, archiver, file share, host manager, system info, kernel tuner, license manager, process tuner, and shutdown. This software subset is mandatory on systems with graphics capabilities.</p> |               |
| Kernel Debugging Tools                                                                                                                                                                                                                                                                                                     | OSFKTOOLS440  |
| <p>This software subset provides tools for analyzing and debugging kernels.</p>                                                                                                                                                                                                                                            |               |
| Logical Storage Manager                                                                                                                                                                                                                                                                                                    | OSFLSMBASE440 |
| <p>This software subset contains the LSM administrative commands and tools required to manage an LSM configuration.</p>                                                                                                                                                                                                    |               |
| Logical Storage Manager Graphical User Interface                                                                                                                                                                                                                                                                           | OSFLSMX11440  |
| <p>This software subset contains the LSM Motif-based graphical user interface (GUI) management tool and related utilities.</p>                                                                                                                                                                                             |               |



**Table D–12: Description of the System Administration Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                               | Subset Name    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Logical Volume Manager                                                                                                                                                                                                                                                           | OSFLVM440      |
| <p>The Logical Volume Manager (LVM) is a subset that is composed of physical devices and logical (virtual) entities to offer you a mechanism for transparently and dynamically storing and retrieving files and file systems across multiple devices and in multiple copies.</p> |                |
| Obsolete Commands and Utilities                                                                                                                                                                                                                                                  | OSFOBSOLETE440 |
| <p>This software subset contains the commands and utilities that are no longer supported for this version of the operating system.</p>                                                                                                                                           |                |
| Obsolete Locale Databases                                                                                                                                                                                                                                                        | OSFCTABLOC440  |
| <p>This software subset contains obsolete locale databases and should be installed only if you are running applications that require internationalization support and were built on DEC OSF/1 V1.2 or DEC OSF/1 V1.3 systems.</p>                                                |                |
| POLYCTR AdvFS                                                                                                                                                                                                                                                                    | OSFADVFS440    |
| <p>The subset contains the system administration commands required for creating and managing the Advanced File System (AdvFS).</p>                                                                                                                                               |                |
| Single-Byte European Locales                                                                                                                                                                                                                                                     | OSFEURLOC440   |
| <p>This software subset provides basic internationalization and localization information for 21 Western European locales.</p>                                                                                                                                                    |                |

**Table D–12: Description of the System Administration Software Subsets (cont.)**

| <b>Title and Contents</b>                                                                                                                                   | <b>Subset Name</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| System Accounting Utilities                                                                                                                                 | OSFACCT440         |
| This software subset provides programs and data files needed to perform system accounting. This software subset contains log files that grow automatically. |                    |
| System Exercisers                                                                                                                                           | OSFEXER440         |
| This software subset provides programs that help to diagnose problems with hardware and peripheral devices.                                                 |                    |

### D.2.11 Text-Processing Software Subsets

Table D–13 describes the software subsets in this category.

**Table D–13: Description of the Text Processing Software Subsets**

| <b>Title and Contents</b>                                                                                                                           | <b>Subset Name</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Doc. Preparation Tools                                                                                                                              | OSFDCMT440         |
| This software subset provides tools to format, manage, and display reference pages, including the <code>nroff</code> formatter and required macros. |                    |
| Doc. Preparation Tools Extensions                                                                                                                   | OSFDCMTEXT440      |
| This software subset contains additional <code>nroff</code> macro packages, bibliography tools, and <code>roff</code> tools.                        |                    |

## D.2.12 Windowing Environment Software Subsets

Table D–14 describes the software subsets in this category.

**Table D–14: Description of the Windowing Environment Software Subsets**

| Title and Contents                                                                                                                                                                                                                                                                                                        | Subset Name  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Basic X Environment                                                                                                                                                                                                                                                                                                       | OSFX11440    |
| <p>This software subset provides programs required for X11/DECwindows. This environment includes the following X Windows applications: <code>dxconsole</code>, <code>dxkeycaps</code>, and <code>dxterm</code>. This software becomes mandatory and is installed automatically on systems with graphics capabilities.</p> |              |
| CDE Desktop Environment                                                                                                                                                                                                                                                                                                   | OSFCDEDT440  |
| <p>This software subset contains the user interface (that is, the front panel, colors, and so forth) to the Common Desktop Environment (CDE). This subset is mandatory if graphics capabilities are detected on the system.</p>                                                                                           |              |
| CDE Minimum Run-time Environment                                                                                                                                                                                                                                                                                          | OSFCDEMIN440 |
| <p>This software subset contains the Common Desktop Environment minimum run-time environment which includes shared libraries and executables for new client development. This subset is mandatory if graphics capabilities are detected on the system.</p>                                                                |              |
| DECwindows 75dpi Fonts                                                                                                                                                                                                                                                                                                    | OSFFONT440   |
| <p>This software subset provides fonts for X11/DECwindows and is needed for specific layered products and low resolution (1024 x 768) monitors. This software subset becomes mandatory (instead of OSFFONT150440) when low resolution graphics are detected during the installation.</p>                                  |              |

**Table D–14: Description of the Windowing Environment Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                            | Subset Name    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <p>DECwindows 100dpi Fonts</p> <p>This software subset provides workstation font files for systems using either the VR160 15-inch monitor or higher resolution graphics (1280 x 1024). This software subset is mandatory when high resolution graphics are detected during the installation.</p>              | OSFFONT15440   |
| <p>LK201 Keyboard Support</p> <p>This software subset provides keyboard support for the Model LK201 keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard. This software subset becomes mandatory if this keyboard type is detected during the installation.</p> | OSFKBDLK201440 |
| <p>LK401 Keyboard Support</p> <p>This software subset provides support for the Model LK401 keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard. This software subset becomes mandatory if this keyboard type is detected during the installation.</p>          | OSFKBDLK401440 |
| <p>LK411 Keyboard Support</p> <p>This software subset provides support for the Model LK411 keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard. This software subset becomes mandatory if this keyboard type is detected during the installation.</p>          | OSFKBDLK411440 |
| <p>LK421 Keyboard Support</p> <p>This software subset provides support for the Model LK421 keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard. This software subset becomes mandatory if this keyboard type is detected during the installation.</p>          | OSFKBDLK421440 |

**Table D–14: Description of the Windowing Environment Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                                                             | Subset Name    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <p>LK444 Keyboard Support</p> <p>This software subset provides support for the Model LK444 keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard. This software subset becomes mandatory if this keyboard type is detected during the installation.</p>                                                           | OSFKBDLK444440 |
| <p>PCXAL Keyboard Support</p> <p>This software subset provides support for the Model PCXAL keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard. This software subset becomes mandatory if this keyboard type is detected during the installation.</p>                                                           | OSFKBDPCXAL440 |
| <p>Old X Environment</p> <p>This software subset contains the following X Windows environment applications: <code>dxpause</code> and <code>dxsession</code>. This software subset is mandatory on systems with graphics capabilities.</p>                                                                                                                      | OSFOLDX11440   |
| <p>X Customizations for OEM</p> <p>This software subset contains X Windows customizations and special logo information for use by specific original equipment manufacturers (OEMs) when they install the operating system on their equipment. This software subset is not intended for general use and should not be installed if your site is not an OEM.</p> | OSFXOEM440     |
| <p>X Fonts</p> <p>This software subset provides X11 fonts from the X Consortium compiled for the DEC X server. This software subset becomes mandatory and is installed automatically on systems with graphics capabilities.</p>                                                                                                                                | OSFMITFONT440  |

**Table D–14: Description of the Windowing Environment Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                                                                                                                     | Subset Name |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <p>X Servers</p> <p>This software subset provides X11/DECwindows server support. A DECwindows server is the software that provides windowing on a workstation. This software subset becomes mandatory and is installed automatically on systems with graphics capabilities.</p>                                                                                                                                        | OSFSER440   |
| <p>X Servers for Open3D</p> <p>This software subset provides the X server device-dependent support for the operating system-supported 3D graphics cards. This software subset is mandatory and is installed automatically if 3D graphics cards are detected during the installation.</p>                                                                                                                               | OSFSER3D440 |
| <p>X Servers for PCbus</p> <p>This software subset provides graphics support for systems using the PCI bus. This software subset is loaded automatically when the installation procedure detects a PCI bus. This software subset also provides graphics support for EISA and PCI based systems that support QVision. This software subset is loaded automatically when the installation procedure detects QVision.</p> | OSFSERPC440 |

**Table D–14: Description of the Windowing Environment Software Subsets (cont.)**

| <b>Title and Contents</b>                                                                                                                                                                                                                           | <b>Subset Name</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| X Servers for TurboChannel<br><br>This software subset provides graphics support for systems with Turbochannel cards. This software subset is mandatory and is installed automatically when the installation procedure detects a Turbochannel card. | OSFSERTC440        |
| X/Motif 1.1<br><br>This software subset contains the Motif Version 1.1 shared libraries for compatibility with programs that may not work with the Version 1.2 shared libraries.                                                                    | OSFMOTIF11440      |

### **D.2.13 Windows Applications Software Subsets**

Table D–15 describes the software subsets in this category.

**Table D–15: Description of the Windows Applications Software Subsets**

| <b>Title and Contents</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Subset Name</b>   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>Additional DECwindows Applications</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>OSFDECW440</b>    |
| <p>This software subset provides additional X11/DECwindows client applications such as <code>dxdiff</code> (a visual differences program), <code>dypaint</code> (a bitmap editor), <code>dxpresto</code> (a graphical display of Prestoserve state and statistics), and <code>dxprint</code> (captures and prints screen images).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |
| <b>Additional X Applications</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>OSFXMIT440</b>    |
| <p>This software subset contains the additional X Consortium X11 R5 client applications such as: <code>appres</code>, <code>bitmap</code>, <code>bmtoa</code>, <code>atobm</code>, <code>bdfpcfc</code>, <code>dypaint</code>, <code>editres</code>, <code>ico</code>, <code>iconv</code>, <code>listres</code>, <code>lndir</code>, <code>maze</code>, <code>mkdirhier</code>, <code>oclock</code>, <code>puzzle</code>, <code>resize</code>, <code>showfont</code>, <code>showrgb</code>, <code>viewres</code>, <code>x1lperf</code>, <code>x1lperfcomp</code>, <code>x1lperfcomp</code>, <code>xauth</code>, <code>xbiff</code>, <code>dxcalc</code>, <code>xcalc</code>, <code>xclipboard</code>, <code>dxclock</code>, <code>xclock</code>, <code>xcmsdb</code>, <code>xcmstest</code>, <code>xcutsel</code>, <code>xdpr</code>, <code>xdpyinfo</code>, <code>xedit</code>, <code>xev</code>, <code>xeyes</code>, <code>xfd</code>, <code>xfontsel</code>, <code>xgc</code>, <code>xkill</code>, <code>xload</code>, <code>xlogo</code>, <code>xlsatoms</code>, <code>xlsclients</code>, <code>xlsfonts</code>, <code>xmag</code>, <code>xman</code>, <code>xmh</code>, <code>xmkmf</code>, <code>xon</code>, <code>dxpresto</code>, <code>dxprint</code>, <code>xpr</code>, <code>xprop</code>, <code>xrefresh</code>, <code>xstdcmap</code>, <code>xwd</code>, <code>xwininfo</code>, and <code>xwud</code>. Refer to the reference page for each of these applications for more information.</p> |                      |
| <b>CDE Additional Applications</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>OSFCDEAPPS440</b> |
| <p>This software subset contains the Common Desktop Environment additional applications such as: <code>dxkeyboard</code>, <code>dxprint</code>, <code>dxkeycaps</code>, and <code>dxdiff</code>. This subset also provides access to the following binaries: <code>dximageview</code>, <code>dtcm</code>, <code>dticon</code>, <code>dtimsstart</code>, and <code>dxkeyboard</code>. This software subset is mandatory on systems with graphics capabilities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |



**Table D–15: Description of the Windows Applications Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Subset Name    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Demo X Applications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | OSFXDEMOS440   |
| <p>This software subset contains X Windows demonstration applications to provide examples of the capabilities of the X windowing software that can be developed for the operating system.</p>                                                                                                                                                                                                                                                                                                                                                                           |                |
| Nested X Server                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OSFXNEST440    |
| <p>This software subset provides the Xnest server and contains the following: the Xnest server binary<br/> <code>/usr/bin/X11/Xnest</code>, the Xnest shared library<br/> <code>/usr/shlib/libxnest.so</code>, and the Xnest configuration file<br/> <code>/var/X11/Xnest.conf</code>. Xnest is a client and a server. Xnest is a client of the real Xserver and appears in a window no more than 3/4 the size of the real server. Xnest is also a server. Clients specify the Xnest server display; Xnest then manages graphics requests on behalf of the clients.</p> |                |
| Netscape Communicator V4.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | OSFNETSCAPE440 |
| <p>This software subset contains the Netscape Navigator World Wide Web viewer that is used to view the operating system online documentation set. This software subset is mandatory on systems with graphics capabilities.</p>                                                                                                                                                                                                                                                                                                                                          |                |

**Table D–15: Description of the Windows Applications Software Subsets (cont.)**

| Title and Contents                                                                                                                                                                                                                                                                                                                                                                                                 | Subset Name   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Old Additional DECwindows Applications                                                                                                                                                                                                                                                                                                                                                                             | OSFOLDDECW440 |
| <p>This software subset provides additional X11/DECwindows client applications such as <code>dxcalc</code> (a calculator), <code>dxcalendar</code>, <code>dxcardfiler</code>, <code>dxclock</code>, and <code>dypaint</code> (a bitmap editor). These applications will be retired in a future release.</p>                                                                                                        |               |
| Virtual X Frame Buffer                                                                                                                                                                                                                                                                                                                                                                                             | OSFXVFB440    |
| <p>This software subset provides the Xvfb server and contains the following: Xvfb server binary <code>/usr/bin/X11/Xvfb</code>, the Xvfb shared library <code>/usr/shlib/libxvfb.so</code>, and the Xvfb configuration file <code>/var/X11/Xvfb.conf</code>. The Xvfb server can run on machines with no display hardware and no physical input devices. It emulates a dumb frame buffer using virtual memory.</p> |               |

# E

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## Associated Product Descriptions

This appendix describes the associated products and software subsets that are shipped in addition to the base operating system.

Table E-1 describes the products contained on the *Associated Products Volume 1* CD-ROM. Table E-2 describes the products contained on the *Associated Products Volume 2* CD-ROM.

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### Note

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The term **RTL** is an acronym for Run-Time Library.

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**Table E-1: Associated Products Volume 1**

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| Product Directories<br>in /ALPHA | Product Description                                                                       |
|----------------------------------|-------------------------------------------------------------------------------------------|
| Alternative_Compiler             | Development Enhancements for Software Development                                         |
| DEC_Ada_RTL                      | Ada Run-Time Support Library for Alpha Systems                                            |
| DEC_C++_RTL                      | C++ Run-Time Support Library for Alpha Systems (shared libraries)                         |
| DEC_Cobol_RTL                    | COBOL Run-Time Support Library for Alpha Systems and DEC Decimal Run-Time Support Library |
| DEC_EVENT                        | Event Management Utility                                                                  |
| DEC_Fortran_RTL                  | Fortran Run-Time Support Library for Alpha Systems                                        |
| DEC_Pascal_RTL                   | Pascal Run-Time Support Library for Alpha Systems                                         |
| DEC_Sort_RTL                     | Sort Run-Time Library                                                                     |
| Data_Direct                      | INTERSOLV® DataDirect ODBC connectivity software                                          |
| GNUSRC                           | Free Software Foundation GNU Source for the operating system                              |

**Table E-1: Associated Products Volume 1 (cont.)**

| <b>Product Directories<br/>in /ALPHA</b> | <b>Product Description</b>                                                                 |
|------------------------------------------|--------------------------------------------------------------------------------------------|
| Multimedia_Services                      | Multimedia Services                                                                        |
| Netscape_FastTrack_Server                | Netscape FastTrack Server V3.01                                                            |
| PanoramiX_ADK                            | Xserver Extensions Advanced Developer's Kit                                                |
| Porting_Assistant                        | Porting Assistant                                                                          |
| Program_Analyzers                        | Graphical Program Analysis Tools                                                           |
| Worldwide_Language_Support               | Worldwide Language Support. Appendix F<br>contains worldwide software subset descriptions. |

**Table E-2: Associated Products Volume 2**

| <b>Product Directories</b>  | <b>Product Description</b>                           |
|-----------------------------|------------------------------------------------------|
| AdvFS_Advanced_Utilities    | AdvFS Advanced File System Utilities                 |
| Advanced_Printing           | Advanced Printing Software                           |
| Advanced_Server             | Advanced Server Administration Tools                 |
| NetWorker                   | NetWorker™ SingleServer Save and<br>Restore          |
| Open3D                      | Open3D graphics applications software<br>environment |
| Performance_Manager         | Performance Manager                                  |
| SCSI_CAM_Layered_Components | SCSI Common Access Method Layered<br>Components      |
| System_V_Environment        | System V Environment                                 |
| TruCluster                  | TruCluster                                           |
| Visual_Threads              | Visual Threads Diagnostic Tool                       |

## E.1 General Instructions for Installing Associated Products

Associated products are installed after the initial full installation by using the `setld` command. The installation can be invoked from CD-ROM or RIS. Refer to Chapter 10 for more information about the `setld` command.

Follow these steps if you are installing an associated product from either the *Associated Products Volume 1* or *Associated Products Volume 2* CD-ROM:

1. Mount the CD-ROM. Refer to Section B.3 if you do not know how to mount a CD-ROM.
2. Log in as `root` or use the `su` command to gain root privileges.
3. Do one of the following, depending on whether the associated product you are loading is on Volume 1 or Volume 2:

- If you are installing an associated product from the *Associated Products Volume 1* CD-ROM, do the following:

```
/usr/sbin/setld -l /mnt/ALPHA/product_directory
```

The previous example assumes the CD-ROM is mounted under `/mnt`. Replace `product_directory` with the name of the directory where the product is located. Table E-1 and Table E-2 list the directory names for each associated product.

The `setld` command displays a list of software subsets available to install. Choose the appropriate software subsets from the list.

- If you are installing an associated product from the *Associated Products Volume 2* CD-ROM:

```
/usr/sbin/setld -l /mnt/product_directory
```

The previous example assumes the CD-ROM is mounted under `/mnt`. Replace `product_directory` with the name of the directory where the product is located. Table E-1 and Table E-2 list the directory names for each associated product.

The `setld` command displays a list of software subsets available to install. Choose the appropriate software subsets from the list.

Follow these steps if you are performing a RIS installation of an associated product:

1. Ask your RIS server administrator to ensure that your system is a client of the RIS server and is registered to the appropriate software environment.
2. Ensure that your system can communicate with the RIS server by executing the `/sbin/ping` command to verify the network connection. Enter the command in the following format and replace `ris_server_name` with the name of your local RIS server:

```
/sbin/ping -c2 ris_server_name
```

Successful output of the `/sbin/ping` command is similar to the following:

```
ping -c2 system9
PING system9 (16.59.124.96): 56 data bytes
64 bytes from 16.59.124.96: icmp_seq=0 ttl=255 time=1 ms
64 bytes from 16.59.124.96: icmp_seq=1 ttl=255 time=0 ms

----system9 PING Statistics----
2 packets transmitted, 2 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/0/1 ms
```

In the previous example, `system9` is the name of the RIS server.

3. Enter the following command to begin the RIS installation:

```
/usr/sbin/setld -l ris_server_name:
```

Replace `ris_server_name:` with the name of your RIS server appended with a colon (:). The `setld` command displays a list of software subsets available to install. Choose the appropriate software subsets from the list.

## E.2 Updating Reference Pages After Installing Associated Products

The `apropos` and `whatis` commands access reference page entries in the `whatis` database. The `whatis` database that is created in `/usr/share/man` when you initially install operating system reference pages includes entries only for those reference pages.

The `whatis` database provided as part of the operating system product is not automatically updated when associated product, layered product, third party, or site-specific reference pages are installed after the initial operating system installation. If the `whatis` database exists on your system, you should update the database by executing the `catman -w` command if you install product-specific reference pages. For information about using the `catman -w` command to rebuild the `whatis` database, see the `catman(8)` reference page.

## E.3 Development Enhancements for Alpha Systems (Alternative Compiler)

The `Alternative_Compiler` directory contains the following software subsets: `CMPDEVENH440` and `CMPDEVALT440`. Follow the instructions in Section E.1 to install this product.

The following describes the two software subsets in this directory:

- `CMPDEVENH440` – There are static and shared libraries which contain the `malloc()` system call as it was implemented in older

versions of the operating system. The libraries are shipped to ensure backwards compatibility with previous versions of the operating system. The file `mmap_32.c` is a C source file that provides a jacket for the `mmap()` system call. This is provided to support the Truncated Address Support Option (TASO) in older versions of the operating system. Refer to the TASO documentation for more information if your TASO code contains `mmap()` calls.

- **CMPDEVALT440** – This software subset provides an alternative application compiler suite in the `/usr/lib/cmplrs/cc.alt` directory. This suite is accessed through the `/usr/bin/cc.alt` command and differs from the default `/usr/lib/cmplrs/cc` compiler suite by providing components that may deliver faster run-time performance. Performance improvements provided by the components in this suite will be delivered in the default compiler suite in future releases of the operating system. In this version of the software subset, the DEC C compiler is the only component in the `cc.alt` directory that is different from the default compiler suite. The features supported by this suite are the same as those documented for the default compiler suite in this release of the operating system. However, the compiler included in this suite does not contain the features necessary to build kernel objects. Do not copy the compiler provided in this suite to the default compiler directory, `/usr/lib/cmplrs/cc`, or you lose the ability to rebuild kernels on your system. The `cc.alt` suite is intended to provide more recent versions of the compiler components than those in the operating system. Because the `cc.alt` components will change more frequently than the base operating system components, any problems reported against `cc.alt` will be addressed in a later release of `cc.alt`.

## E.4 Ada Run-Time Library Support for Alpha Systems

The `DEC_Ada_RTL` directory contains the `ADALIB404` software subset. Follow the instructions in Section E.1 to install this product.

The Ada Run-Time Library subset is included on the operating system CD-ROM to facilitate deployment of applications built using DEC Ada.

The following table describes the contents of the DEC Ada Run-Time Library kit:

| File Name | Description                               |
|-----------|-------------------------------------------|
| libada.so | DEC Ada Run-Time Library, shared object   |
| libada.a  | DEC Ada Run-Time Library, archive library |

Inclusion of the DEC Ada Run-Time Library in the base system allows users to run applications that were linked with the DEC Ada (run-time) libraries without requiring the user to purchase DEC Ada.

## E.5 C++ Class Library for Alpha Systems

The `DEC_C++_RTL` directory contains the following software subsets: `CXLSHRDA440` and `CXLLIBA440`. Follow the instructions in Section E.1 to install this product.

The DEC C++ Version 5.0 compiler kits no longer provide the Class Library archive libraries when installed on this version of the operating system.

The `CXLSHRDA440` software subset contains the shared libraries required for the C++ Complex and Task Packages. The `CXLLIBA440` software subset contains the corresponding archive libraries.

The mandatory base operating system software subset, `OSFBASE440` contains the shared library for the remaining packages, including `IOStream`, as well as the run-time support. The optional base operating system subset, `OSFLIBA440` contains the corresponding archive library.

If you run C++ applications on your system, install the `CXLSHRDA440` software subset. If you develop C++ applications on your system, install both C++ subsets, `CXLSHRDA440` and `CXLLIBA440` as well as the base operating system software subset `OSFLIBA440`.

There is no need to remove the `CXXSHRDA` subset that was included in previous versions of the operating system before you upgrade to this version of the operating system. However, you must remove the old `CXXSHRDA` subset before you can install `CXLSHRDA440`.

The `CXLLIBA440` subset will not install if your system has the DEC C++ Version 1. *n* compiler installed. Before you install the `CXLLIBA440` subset you should upgrade the DEC C++ compiler to Version 5.0 or later.

## E.6 COBOL Run-Time Support Library for Alpha Systems

The `DEC_Cobol_RTL` directory contains the following software subsets: `DCARTL250` and `02ABASE250`. Follow the instructions in Section E.1 to install this product.



DEC COBOL Run-Time Support Library for Alpha Systems is a software library that provides compiled code support for file processing, format processing, I/O processing and other capabilities to the DEC COBOL programming language implementation. The DEC Fortran for Alpha Run-Time Support subsets must be installed at the same time as the DEC COBOL Run-Time Support subsets.

The software subsets contain:

- DCARTL - DEC COBOL Run-Time Support Library
- O2ABASE - DEC Decimal Run-Time Support Library

Both subsets must be installed together. The following table lists the contents of the DCARTL230 subset:

| File Name      | Description                                |
|----------------|--------------------------------------------|
| libcob.a       | DEC COBOL Run-time (archive) library       |
| libcob.so      | DEC COBOL Run-time (shared) library        |
| libisam_stub.a | DEC COBOL ISAM stub (archive) library      |
| cob_msg.cat    | DEC COBOL Run-time library message catalog |

The following table lists the contents of the O2ABASE230 subset:

| File Name  | Description                                    |
|------------|------------------------------------------------|
| libots2.a  | DEC Decimal Support Run-time (archive) Library |
| libots2.so | DEC Decimal Support Run-time (shared) Library  |

## E.7 DECEvent Management Utility

The `DEC_EVENT` directory contains the `DIABASE290` software subset. Follow the instructions in Section E.1 to install this product.

The DECEvent utility is an event management utility for this operating system that provides the interface between a system user and the system's event log files. This lets system users produce ASCII reports derived from system event entries. The format of the ASCII reports depends on the command entered on the command line or on the command entered from the graphical user interface (GUI). Command line commands are restricted to 255 characters. Event report information can be filtered by event types, date, time, and event entry numbers. Event report formats can be selected from full disclosure to very brief information messages. The `-i` (include) and `-x` (exclude) flags provide a wide range of selection criteria to narrow down the focus of event searches.

The DECEvent utility also offers an interactive command shell interface, accessible with the command `--int`, that recognizes the same commands used at the command line. From the interactive command shell users can customize, change, or save system settings.

DECEvent uses the system event log file `/usr/adm/binary.errlog` as the default input file for event reporting, unless another file is specified. To produce a translated report using the built-in defaults, type the following command at the command line:

```
dia
```

To produce a translated event report using the GUI, click on the translate/auto icon in the DECEvent GUI menu bar.

Users need super user privileges to use the translation and reporting features of DECEvent, unless the event log file privileges have been changed to let all users read the event log file.

## E.8 Fortran Alpha Run-Time Support

The `DEC_Fortran_RTL` directory contains the `DFARTL369` software subset. Follow the instructions in Section E.1 to install this product.

The DEC Fortran Alpha Run-Time Support is a software library that provides compiled code support for file processing, format processing, I/O processing and other capabilities to the DEC Fortran programming language implementation. The following table lists the contents of the DEC Fortran Alpha Run-Time Support kit:

| File Name                | Description                     |
|--------------------------|---------------------------------|
| <code>libFutil.a</code>  | DEC Convert RTL                 |
| <code>libUfor.a</code>   | DEC Fortran Unsupported RTL     |
| <code>libfor.a</code>    | DEC Fortran RTL                 |
| <code>libFutil.so</code> | DEC Convert RTL                 |
| <code>libUfor.so</code>  | DEC Fortran Unsupported RTL     |
| <code>libfor.so</code>   | DEC Fortran RTL                 |
| <code>for_msg.cat</code> | DEC Fortran RTL Message Catalog |

## E.9 Pascal Alpha Run-Time Support

The `DEC_Pascal_RTL` directory contains the `DPORTL541` software subset. Follow the instructions in Section E.1 to install this product.

The DEC Pascal Alpha Run-Time Support is a software library that provides compiled code support for file processing, format processing, I/O processing and other capabilities to the DEC Pascal programming language implementation. The DEC Fortran Alpha Run-Time Support subsets must be installed at the same time as the DEC Pascal Alpha Run-Time Support Library subset.

| File Name      | Description                    |
|----------------|--------------------------------|
| libpas.a       | DEC Pascal RTL                 |
| libpas.so      | DEC Pascal shared RTL          |
| libpas_msg.cat | DEC Pascal RTL message catalog |

## E.10 Sort Run-Time Library

The `DEC_Sort_RTL` directory contains the `SORLIB300` software subset. Follow the instructions in Section E.1 to install this product.

The Sort subset provides a run-time library of sort routines that provide applications programming interface compatibility with a subset of the OpenVMS sort/merge utility. This functionality is provided to assist in the migration to this operating system of several OpenVMS products that depend on OpenVMS SORT. It also provides a high performance sort package that takes advantage of the Alpha architecture for better performance.

The following table lists the contents of the `SORLIB440` subset.

| File Name   | Description                           |
|-------------|---------------------------------------|
| libsort.so  | Shareable object of Sort RTL routines |
| libsort.a   | Library of Sort RTL routines          |
| libsort.cat | Sort message catalog                  |

## E.11 INTERSOLV DataDirect

The `Data_Direct` directory contains the following software subsets:

- `DAUDOC100` — DataDirect Online Help
- `DAUJDBCODBC100` — DataDirect JDBC-ODBC Bridge
- `DAUODBCCON100` — DataDirect Connect ODBC Drivers
- `DAUSQLNKJAVA100` — DataDirect SequeLink JAVA Edition
- `DAUSQLNKODBC100` — DataDirect SequeLink ODBC Edition

- DAUSQLNKSVR10 — DataDirect SequeLink Server

Follow the instructions in Section E.1 to install this product.

The INTERSOLV DataDirect family of software products enables ODBC connectivity and Windows NT integration for operating system applications.

The SequeLink ODBC Edition is a universal ODBC client component that provides transparent connectivity to multiple clients, network, servers, and databases. SequeLink can give you access to any database server with a simple programming interface and flexibility in choosing platforms and databases applications evolve.

You can use the DataDirect Connect ODBC Drivers if you already have a database client installed. You only need to install the Connect ODBC Driver for that specific database client.

## E.12 Free Software Foundation GNU Source for Alpha Systems

The GNUSRC directory contains the following software subsets from the GNU Free Software Foundation: FSFGAWKSRC440, FSFINDENTSRC440, FSFEMACSSRC440, FSFRCSSRC440 and FSFGZIPSRC440. Follow the instructions in Section E.1 to install this product.

The GNU awk Source subset, FSFGAWKSRC440, contains source files for the GNU awk (gawk) programming language. Gawk is the GNU Project's implementation of the awk programming language. Refer to the `gawk(1)` reference page for more information.

The GNU Emacs Source subset, FSFEMACSSRC440, contains the source files for the GNU Emacs editor. The GNU Emacs editor is a new version of Emacs, written by the author of the original (PDP-10) Emacs. The documentation for GNU Emacs is available on line and can be viewed using `Info`, a subsystem of the Emacs facility. Refer to the `emacs(1)` reference page for more information.

The GNU Revision Control System Source subset, FSFRCSSRC440, contains source files for the GNU Revision Control System (RCS). Refer to the `rsc(1)` reference page for more information.

The GNU ident Source subset, FSFINDENTSRC440, contains the source files for the `ident` utility which searches for all occurrences of a pattern in the named files or, if no file name is specified, the standard input. Refer to the `ident(1)` reference page for more information.

The GNU gzip source subset, FSFGZIPSRC440, contains the source files for the `gzip` utility which compresses or expands files. Refer to the `gzip(1)` reference page for more information.

The GNU Mkisofs source subset, FSFMKISOFSSRC440, contains the source files for the `mkisofs` utility which creates an ISO9660 file system with optional Rock Ridge attributes. Refer to the `mkisofs(1)` reference page for more information.

## E.13 Multimedia Services for Alpha Systems

The `Multimedia_Services` directory contains the following software subsets: `MMERELNOTES244`, `MMEMANRT244`, `MMERT244`, `MMECDE244`, `MMERTSMPLDAT244`, `MMEDRVAV201244`, `MMEDRVAV3X1244`, `MMEDRVMSB244`, `MMEDRMMSESS244`, `MMEDRVA300244`, and `MMEDRVBBA244`. Follow the instructions in Section E.1 to install this product.

Multimedia Services Version 2.0A for this operating system brings audio and video capabilities to supported workstations and provides a full programming library for use by developers of new applications. The developer kit is available on the *Software Product Library* CD-ROM and is not distributed with the operating system.

Installing the reference pages for Multimedia Services (`MMEMANRT244`) automatically updates the `whatis` database.

Ready-to-use applications included in Multimedia Services are:

- `DECsound` - an audio record, playback, and edit utility.
- `AlphaVCR` - a video and audio playback and record utility. `AlphaVCR` can play back AVI files with JPEG, Intel's Indeo(tm), or YUV data and MPEG-1 audio/video files.
- `Video Odyssey` - a video screen saver that displays motion JPEG files.
- `Audio Control` - a utility to control volume and port selection for all audio devices.

Multimedia Services supports standard Microsoft® Resource Interchange File Format (RIFF) file I/O in AVI and WAVE file formats in the utilities. This allows sharing of many audio and some video files between PCs and Alpha systems.

Users can play back video and audio clips from the Common Desktop Environment (CDE), from MIME enabled mailers, and from the Netscape browser. Users may record audio messages to send and if their systems contain a supported video capture device, they may record full audio and video messages. Multimedia Services also enables such tools as presentation authoring and teleconferencing.

No additional video hardware is needed to play back video clips. If your system is configured with an audio card, you can play back full video and audio clips as well as record audio messages.

Multimedia Services consists of the following subsets:

- **MMERELNOTES244 - Multimedia Services Release Notes.** Contains product release notes, Software Product Description (SPD) and a cover letter. Files are installed in `/usr/opt/MMERELNOTES244`.
- **Run-Time Kit:**
  - **MMEMANRT244 - Multimedia Services Run-time Reference Pages.** This subset contains the reference pages for run-time applications and commands. Requirements: OSFDCMT440 Doc. Preparation Tools
  - **MMERT244 - Multimedia Services Run-time.** This subset contains the static and shared versions of the run-time libraries, the multimedia server, mmeserver, the server device libraries for the software video and audio CODECs, and audio and video capture and playback utilities. This subset is required for all other subsets listed below.
  - **MMERTCDE244 - Multimedia Services CDE Integration.** This subset contains the icons and action files to enable multimedia integration with the Common Desktop Environment (CDE). Requirements: MMERT244 and OSFCDEEDT440.
  - **MMERTSMPLDAT244 - Multimedia Services Sample Data.** This subset contains sample audio and video clips. Requirements: MMERT244 and OSFCDEEDT244.
- **Hardware Option Support for PCI/EISA/ISA Bus Machines:**
  - **MMEDRVAV201244 - FullVideo Basic (AV201) Device Support.** This subset contains the device support files for the FullVideo Basic option module. Requirements: MMERT244, PCI bus machine. Installation requires a kernel rebuild.
  - **MMEDRVAV3X1244 - FullVideo Supreme (AV321/AV301) Device Support.** This subset contains the device support files for the FullVideo Supreme option modules. Requirements: MMERT244, PCI bus machine. Installation requires a kernel rebuild.
  - **MMEDRVMSB244 - Microsoft Sound Board Device Support.** This subset contains the device support files for the Microsoft Sound Board option module. Requirements: MMERT244, ISA or EISA bus machine. Installation requires a kernel rebuild.
  - **MMEDRMMSESS244 - Personal Workstation Audio (ES1888/7) Device Support.** This subset contains the support files for Personal Workstation audio devices. Installation requires a kernel rebuild.
- **Hardware Option Support for TURBOchannel Bus Machines:**

- MMEDRVA300244 - Sound and Motion (J300) Device Support. This subset contains the device support files for the Sound and Motion option module. Requirements: MMERT244, TURBOchannel bus machine. Installation requires a kernel rebuild.
- MMEDRVBBA244 - Base Board Audio Device Support. This subset contains the device support files for the Base Board Audio module. Requirements: MMERT244, TURBOchannel bus machine. Installation does not require a kernel rebuild.

## E.14 Netscape FastTrack Server

This version of the operating system includes Version 3.01 of the Netscape FastTrack Server, an easy-to-use entry-level Web server designed to let you create and manage a Web site. The Netscape FastTrack Server is provided in the WEBNETSCAPEFASTTRACK301 subset on the *Associated Products Volume 1* CD-ROM. To install FastTrack on your system, perform the following steps:

1. Log in to the root account on your system.
2. Use the `/usr/sbin/setld` software subset management utility to install the WEBNETSCAPEFASTTRACK301 subset. This will install the FastTrack server in the `/usr/opt/netscape/suitespot` directory.
3. Change your directory to the FastTrack kit directory:

```
cd /usr/opt/netscape/suitespot
```

4. Read the `readme.txt` file:

```
more readme.txt
```

This file contains information from Netscape about the FastTrack kit. Because you have installed FastTrack from the OSFNETSCAPEFASTTRACK301 subset and not from a CD-ROM that Netscape ships, you can ignore steps 1-5 of the installation instructions, which pertain to installing from the Netscape CD-ROM.

5. Begin the configuration by running the `ns-setup` program and following the instructions in the `readme.txt` file:

```
./ns-setup
```

The installation program will query you for several pieces of information and then configure the FastTrack server.

The installation of FastTrack Version 3.01 will not update FastTrack Version 2.01 servers installed on your system. If you have an existing

FastTrack 2.01 server installed on your system and want to upgrade it to Version 3.01, use the following process:

1. Install FastTrack 3.01 as described in the previous steps.
2. Access the FastTrack 3.01 administration server as directed by the installation program.
3. Click on the Migrate option from the initial administration server screen. This option will allow you to migrate existing FastTrack 2.01 server instances to FastTrack 3.01.

## E.15 Panoramix Xserver Extension Advanced Developer's Kit

The Panoramix directory contains the PRXADK200 software subset. Follow the instructions in Section E.1 to install this product.

This section discusses the operating system-based solution for a multiheaded single root window. The implementation removes graphics drawing screen size constraints and creates a screen equal to the combined width and height of all screens connected to the system.

The Panoramix Extensions is provided in this advanced development kit (ADK). The following table lists the contents of the Panoramix ADK:

| File Name            | Description                                                                                    |
|----------------------|------------------------------------------------------------------------------------------------|
| libpanoramix.so      | Panoramix extension shared library                                                             |
| libos.so             | Modified version of core server library                                                        |
| libmi.os             | Modified version of core server library                                                        |
| libdix.so            | Modified version of core server library                                                        |
| libextshape.so       | Modified version of shape extension library                                                    |
| Panoramix            | Modified version of Xdec                                                                       |
| Xserver.conf         | Modified version of server config file                                                         |
| README_PANORAMIX.TXT | Contains information about Panoramix extension. Read this file before enabling the extensions. |

## E.16 Porting Assistant

The Porting\_Assistant directory contains the following software subsets: PRTBASE300 and PRTMAN300. Follow the instructions in Section E.1 to install this product.



Porting Assistant is a Motif-based tool to help you port your C, C++, and FORTRAN source code to this operating system from other UNIX and proprietary platforms including OpenVMS. Porting Assistant does the following:

- Uncovers 32-bit dependencies
- Checks your makefile commands and options
- Helps find functions that your application needs
- Helps develop operating system-specific code segments
- Provides information on porting your application

The Porting Assistant is licensed and provided to you with the operating system Developers' Toolkit, but it requires separate installation.

For detailed information about the Porting Assistant, refer to its extensive online HyperHelp system. You can also refer to the `port` reference page for command options and details.

After installation, invoke the Porting Assistant from the Common Desktop Environment (CDE) or from the command line:

- From CDE: If you install the Software Development Tools and Utilities for CDE (OSFSDECDE440), you can invoke the Porting Assistant from an icon on the desktop.
- From the command line, enter the following:

```
port
```

## E.17 Graphical Program Analysis (GPA) Tools

The `Program_Analyzers` directory contains the following software subsets:

- GPABASE205 — Graphical Program Analysis Base
- GPAMVIEW205 — Graphical Program Analysis Memory Profiler gathers and displays information about how your application uses memory inefficiently (such as by fragmented memory allocations)
- GPAPROFHEAP205 — Graphical Program Analysis Profiler and Heap Analyzer finds and displays memory errors and memory leaks in your application
- GPAPVIEW205 — The Graphical Program Analysis Process Viewer gathers and displays performance information about a remote Tru64 UNIX application and all the child processes it runs

Follow the instructions in Section E.1 to install this product.

The Graphical Program Analysis Tools can help you check out your application in a more efficient manner. Because of the tools' knowledge about the operating system and the Alpha architecture, you can use them to spot parts of your application that could cause poor performance. The Graphical Program Analysis Tools function as a readily accessible base of knowledge on testing, debugging, and tuning code.

The Graphical Program Analysis Tools can locate problems in your code, explain the problems using diagnostic messages, and even suggest necessary changes through reports. For example, using these tools you can:

- Get information about all processes, including child processes, running on a remote system
- Invoke utilities and commands to monitor and manage the remote system
- Record all the process information to a file for later review
- Instrument an application, run the application, and look at the memory usage data in one step or separate steps
- Find poorly tested areas in your code
- Locate and correct performance bottlenecks
- Find and fix problems with writing past the ends of memory blocks

## E.18 Worldwide Language Support

The `Worldwide_Language_Support` directory contains Worldwide Language Support (WLS) subsets, described in Appendix F. You have the option to install WLS software during a full installation or an update installation. These procedures are documented in Chapter 11 and Chapter 12.

## E.19 POLYCENTER Advanced File System Utilities

The `AdvFS_Advanced_Uilities` directory contains the following software subsets: `AFAADVANCED440`, `AFAADVDAEMON440`, `AFAADVGUI440`, `AFAADVMAN440`, `AFAJPADVGUI440`, and `AFAJPADVMAN440`. Follow the instructions in Section E.1 to install this product.

The POLYCENTER Advanced File System Utilities consist of several management utilities that extend the capabilities of the POLYCENTER Advanced File System (AdvFS). The AdvFS Utilities let you:

- Spend less time managing file systems
- Improve performance

- Keep your data on line during routine maintenance
- Extend the capacity of files and file systems

The software subsets contain:

- AFAADVANCED440 - POLYCENTER Advanced File System Advanced Utilities
- AFAADVDAEMON440 - POLYCENTER Advanced File System Daemon
- AFAADVGUI440 - POLYCENTER Advanced File System Graphical User Interface
- AFAADVMAN440 - POLYCENTER Advanced File System Advanced Utilities Reference Pages
- AFAJPADVGUI440 - POLYCENTER Advanced File System Japanese Advanced Utilities
- AFAJPADVMAN440 - POLYCENTER Advanced File System Japanese Advanced Utilities Reference Pages

## E.20 Advanced Printing

The `Advanced_Printing` directory contains the following software subsets:

- APXADMIN100 — Advanced Printing Software Administrator Utilities
- APXBASE100 — Advanced Printing Software BASE and Client Commands
- APXGUI100 — Advanced Printing Software Graphical User Interface
- APXGW100 — Advanced Printing Software lpr/lpd Gateways
- APXSVR100 — Advanced Printing Software Spooler and Supervisor

Follow the instructions in Section E.1 to install this product.

Advanced Printing Software is a flexible, distributed, client/server print system for the UNIX operating system. This print system includes the following features:

- A set of client and server programs that work together to manage and perform print-related functions.
- It provides administrators and operators a set of tools to manage printing in a network environment.
- It provides end users with utility programs for printing documents and monitoring their print jobs.

The print system is based on the following industry printing standards:

- ISO/IEC 10175 - Document Printing Application (DPA)

- POSIX 1387.4 - System Administration – Part 4: Printing Interfaces

The DPA standard defines a set of abstract print objects, their states, syntax, protocol, and a comprehensive set of standard attributes. The POSIX document specifies a set of command operations and arguments relating to printing and management of a print system.

In addition to a command line interface, the Advanced Printing Software contains a graphical user interface that can be used to submit print jobs and monitor print jobs.

The `pdprint` program is the GUI program used to submit print jobs, and the `pdprintinfo` program is the GUI program used to obtain job and printer status. These GUIs are accessible from the command line or from the Print Manager icon of the CDE desktop.

The `Advanced_Printing` directory on the *DIGITAL UNIX V5.0 Associated Products Volume 1* contains a `doc` directory which has HTML and PDF formats of the documents associated with this product.

## E.21 Advanced Server

The `Advanced_Server` directory contains the following software subsets:

- ASUADM401 — Client-based Server Administration (Nexus) Tools
- ASUADMJP40 — Client-based Server Administration (Nexus) Tools (Japanese)
- ASUBASE401 — Base Server
- ASUMANJP401 — Reference Pages (Japanese)
- ASUMANPAGE401 — ASDU Reference Pages
- ASUTRAN401 — Transports

Advanced Server (ASDU) is an industry-standard network operating system (NOS) that is fully compatible with Microsoft networking technology. As a server for workstations on a local area network (LAN), Advanced Server provides file and print services that enable the efficient sharing of computing resources among a community of desktop users. ASDU incorporates the latest Microsoft technology to deliver powerful new network administration and enhanced security features. Advanced Server interoperates seamlessly with systems running Windows NT Server, Windows NT Workstation, Windows 95, and older Windows clients.

ASDU system requirements are based on Windows NT Server, Version 4.0. As a result, Advanced Server takes advantage of the UNIX system's native ability to function simultaneously as a file, print, and applications server,

while ensuring compatibility with Microsoft networking features and desktop environments. Advanced Server provides networking capabilities that are functionally equivalent to those offered by Windows NT Server.

Advanced Server represents the next generation of LAN Manager for UNIX Systems technology and enhances it with significant new features based on a distributed enterprise-wide networking model. Advanced Server maintains full down-level compatibility with LAN Manager for UNIX Systems. LAN Manager users can add Advanced Server to their existing network and migrate to the new technology at their own pace.

The `Advanced_Server/doc` directory on the *DIGITAL UNIX V5.0 Associated Products Volume 2* contains the documentation library for ASCU documentation. To access the ASDU documentation, insert and mount the CD-ROM and use your Web browser to open the ASDU Documentation Library file. For example, if you mount the CD-ROM on `/mnt`, open this file: `/mnt/Advanced_Server/doc/html/LIBRARY.HTM`.

## E.22 NetWorker SingleServer Save and Restore

The `NetWorker_SingleServer` directory contains the following software subsets: BRXSOAKIT520, BRXCKIT520, BRXMAN520, BRXRNOTES520, BRXCLNT520, BRXNODE520, and BRXSERV520. Follow the instructions in Section E.1 to install this product.

NetWorker SingleServer Save and Restore, also known as NetWorker SingleServer, is a graphical utility that backs up and restores local files on a single local system to a local tape or loader. Unlike standard UNIX backup utilities such as `tar`, `cpio`, `dump/restore`, or `vdumd/vrestore`, NetWorker SingleServer provides easy to use user interfaces for saving and restoring data and for performing system administration tasks.

NetWorker SingleServer is a subset of the POLYCENTER NetWorker Save and Restore product and is licensed free of charge with the base operating system.

The OSF-BASE, UNIX-SERVER, or UNIX-WORKSTATION Product Authorization Key (PAK) gives you a license to install and use SingleServer; you do not need to load and register a special PAK.

Following is a description of the four NetWorker SingleServer software subsets:

- BRXSOAKIT520 contains the NetWorker SingleServer graphical user interface and utilities.
- BRXCKIT520 contains the client software for the operating system client and the Windows NT client. This software subset is not required for NetWorker SingleServer.

- BRXRNOTES520 contains the NetWorker Save and Restore and NetWorker SingleServer documentation and Release Notes.
- BRXMAN520 contains the NetWorker Save and Restore reference pages.
- BRXCLNT520 contains the NetWorker Save and Restore Basic Client.
- BRXNODE520 contains the NetWorker Save and Restore Driver and Storage Node.
- BRXSERV520 contains the NetWorker Save and Restore Basic Server.

After you install the NetWorker SingleServer subset BRXRNOTES520, postscript files containing the NetWorker documents are loaded into /usr/opt/BRX520/usr/doc.

During the installation, you are asked if you want to start the NetWorker daemons. If you enter no, the daemons will be started when the system is rebooted. To start the daemons manually without rebooting, refer to nsrd(8).

## E.23 Open3D Graphics Environment

The Open3d directory contains the following software subsets:

- O3DDWSBASE493 — DWS Open3D Base V4.9A-1
- O3DDWSCMT493 — DWS Open3D PowerStorm 4D10T V4.9A-1
- O3DDWSCOMMON493 — Open3D Common V4.9A-1
- O3DDWSCONFIG493 — Open3D Config V4.9A-1
- O3DDWSGLBASE493 — DWS Open3D OpenGL Base V4.9A-1
- O3DDWSGLEXAM493 — DWS Open3D OpenGL examples V4.9A-1
- O3DDWSGLMAN493 — DWS Open3D OpenGL reference pages V4.9A-1
- O3DDWSMITPEX493 — DWS Open3D MIT PEX Programming V4.9A-1
- O3DDWSMITPEXEXAM493 — DWS Open3D MIT PEX Programming examples V4.9A-1
- O3DDWSMITPEXMAN493 — DWS Open3D MIT PEX Programming Reference pages V4.9A-1
- O3DDWSPCM493 — DWS Open3D PCM Server and Library V4.9A-1
- O3DDWSPEX493 — DWS Open3D PEX Programming V4.9A-1
- O3DDWSPHRJP493 — Digital PHIGS Japanese Run-Time Files V4.9A-1
- O3DDWSPHRMAN493 — Digital PHIGS Manual Pages V4.9A-1
- O3DDWSPHRTO493 — Digital PHIGS Run-Time-Only Kit V4.9A-1

- O3DDWSSTEREO493 — DWS Open3D Stereo Extension V4.9A-1
- O3DDWSSTEREOMAN493 — DWS Open3D Stereo Extension Reference pages V4.9A-1
- O3DDWSZE3493 — DWS Open3D PowerStorm 4D40T/4D50T/4D51T/4D60T V4.9A-1
- O3DDWSZLXE493 — DWS Open3D PowerStorm 3D30 and PowerStorm 4D20 V4.9A-1
- O3DDWSZLXL493 — DWS Open3D ZLXp-L V4.9A-1

Open3D Version 4.6 lets you run the following Peripheral Component Interconnect (PCI) graphics accelerators on Alpha systems:

- ZLXp-L family: ZLXp-L1 and ZLXp-L2
- PowerStorm family: PowerStorm 3D30, PowerStorm 4D20, PowerStorm 4D40T, PowerStorm 4D50T, PowerStorm 4D60T

Open3D provides a complete development and run-time environment for 2D and 3D applications, supporting the X Window System client/server model for network-transparent graphics and windowing. Included graphics servers can display output from 2D client applications supporting Release 6 of the X Window System, Version 11 (X11R6), and 3D client applications supporting the OpenGL 3D extensions to the X Window System.

The included ZLXp-L and PowerStorm 3D30/4D20 graphics servers can also display output from 3D client applications supporting PEX 3D extensions to the X Window System. Open3D also includes an implementation of the PEXlib API in two programming libraries. X-compliant and OpenGL-compliant servers are provided for supported graphics accelerators, as well as an implementation of the OpenGL application programming interface (API) in a set of programming libraries.

## E.24 Performance Manager for Alpha Systems

The `Performance_Manager` directory contains the following software subsets: `PMGRBASE435`, `PMGRGUI435`, `PMGRUTIL435`, `PMGRMAN435`, `PMGRAPP435`, and `PMGRCLUSTER435`. Follow the instructions in Section E.1 to install this product.

Performance Manager Version 2.0 (PM V2) is a realtime performance monitoring, analysis, and management application. A single-system version of PM V2 is included with this version of the operating system. A separate license is available to enable the distributed Performance Manager.

While providing many of the features of previous versions of the Polycenter Performance Solution, PM V2 is a complete reimplementaion with a new

GUI, application-accessible metrics, user extensibility and performance analysis capability.

The following Performance Manager software subsets are located in the `Performance_Manager` directory:

- `PMGRBASE435`- Performance Manager Data Collector and Base
- `PMGRGUI435`- Performance Manager Graphical User Interface
- `PMGRMAN435`- Performance Manager Reference Pages
- `PMGRUTIL435`- Performance Manager Additional Utilities
- `PMGRAPP435`- Performance Manager Additional Application Support
- `PMGRCLUSTER435`- Performance Manager TruCluster Support

Features of the Performance Manager are:

- **Monitoring** - Monitoring capabilities include user-selectable graphs and charts showing hundreds of different system values, including CPU performance, memory usage, disk transfers, file system capacity, network efficiency, AdvFS, and cluster-specific metrics.
- **Performance Analysis** - Provides a range of analyses that can be run individually to target specific problems or together as a general system health check. The conclusions of the analyses are presented in clear text with suggestions for remedial action if appropriate.
- **System and Script Management** - Provides a script management capability, which lets users incorporate their own system management and other scripts into PM.
- **Open Metrics Access** - You can access PM V2 metrics through most SNMP-enabled management stations including Netview. A high level interface is also provided so that metrics can be accessed from user applications and from the command line.
- **AdvFS** - Provides extensive AdvFS monitoring, analysis and tuning advice in a customizable and extensible framework. AdvFS monitoring requires installation of the AdvFS Utilities `AFAADVDAEMON440` software subset and appropriate license.

## E.25 SCSI CAM Layered Components

SCSI CAM Layered Components provide device support components for the SCSI Common Access Method (CAM) Driver environment. This includes the SCSI CAM Optical Device Driver and the SCSI CAM Medium Changer Device Driver.

The following software subsets are located in the `SCSI-CAM_Layered_Components` directory:



- CLCMC314 — SCSI CAM Medium Changer Driver V3.1D for SCSI devices identified as a SCSI-2 medium changer device
- CLCOP314 — SCSI CAM Optical Disk Driver V3.1D for SCSI devices identified as a SCSI-2 optical or WORM device

To use an element of the SCSI CAM Layered Components products, a kernel rebuild is required to add the desired driver. These products provide device access capabilities for other corporate products (Consumer Applications) that require support of specific types of devices. The SCSI CAM Layered Components products are licensed by the Consumer Applications products.

For detailed information about this product, look in the the `SCSI_CAM_Layered_Components/doc` directory on the *DIGITAL UNIX V5.0 Associated Products Volume 1*.

## E.26 System V Environment

The `SVE` directory contains the following software subsets: `SVEENV425`, `SVEADM425`, `SVEBCP425`, `SVEDEV425`, `SVEMAN425`, and `SVEPRINT425`. Follow the instructions in Section E.1 to install this product.

The System V Environment product combines the features of both this operating system and SVR4 to provide a truly unified UNIX product on the ALPHA AXP platform. The System V Environment functionality includes SVID3-compliant commands, utilities, system calls and libraries, and many SVR4 features.

The software subsets contain:

- `SVEENV425` - System V Environment Setup Files Package
- `SVEADM425` - System V Environment System Management Package
- `SVEBCP425` - System V Environment Base Compatibility Package
- `SVEDEV425` - System V Environment API and Development Tools Package
- `SVEMAN425` - System V Environment Reference Pages Package
- `SVEPRINT425` - System V Environment Print Package

## E.27 TruCluster

The `TCR` directory contains the following software subsets: `TCRASE160`, `TCRCMS160`, `TCRCOMMON160`, `TCRCONF160`, `TCRDSVC160`, and `TCRMCA160`. Follow the instructions in Section E.1 to install this product.

TCR consists of the following products:

- **TruCluster Available Server Software** — This product lets you create an integrated organization of systems and disks located on a shared SCSI bus that together provide highly available software and data to client systems. Available Server provides multihost access to shared storage and a generic failover mechanism for network-based applications and system services.
- **TruCluster Production Server Software** — This product lets you create a cluster of two or more systems with clusterwide, multihost access to shared storage. Production Server supports highly parallelized database applications, such as Oracle Parallel Server™, which provide high performance and high availability. The distinguishing feature of Production Server is its support of the PCI-based MEMORY CHANNEL™ as a cluster interconnect, bringing leadership performance to intracluster communication.
- **TruCluster MEMORY CHANNEL Software** — This product lets programmers write distributed applications requiring direct access to the MEMORY CHANNEL for high performance. MEMORY CHANNEL consists of a device driver and a routine library.

The license (PAK) that is registered determines which group of the TCR subsets will be displayed when the user runs `setld -l`. The Production Server license gives the customer complete access to the full kit. The Available Server and MEMORY CHANNEL Software licenses allow access to only certain portions of the kit. See the appropriate TCR documentation for more information.

The software subsets contain:

- TCRASE160 - Available Server Software
- TCRCMS160 - Cluster Monitor
- TCRCOMMON160 - Common Components
- TCRCONF160 - Configuration Software
- TCRDSVC160 - Production Server Software
- TCRMAN160 - Reference Pages
- TCRMCA160 - MEMORY CHANNEL Software

## E.28 Visual Threads

The `Visual_Threads` directory contains the `DVTBASE100` software subset. Follow the instructions in Section E.1 to install this product.

Visual Threads can be used with any application for this operating system that uses POSIX threads (Pthreads) or is written in Java. It is designed for multithreaded applications with two threads to hundreds of threads.

Visual Threads includes the following features:

- Collects detailed information about significant thread-related state changes (events)
- Automatic analysis of common threading problems based on predefined rules applied to the event stream
- Rule customization for application-specific parameters and actions
- Automatic statistics gathering by sampling the event stream
- Multiple categories of analysis, including data protection errors (race conditions), deadlocks, programming errors, and performance



# F

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## Worldwide Software Subset Descriptions

This appendix describes the Worldwide Language Support (WLS) software subsets. WLS software subsets are located on the *Associated Products Volume 1* CD-ROM in the /ALPHA/Worldwide\_Language\_Support directory. The worldwide installation script is located at /ALPHA/Worldwide\_Language\_Support/kit/wwinstall. Refer to Chapter 11 for information about performing a worldwide installation. There is no special license registration required to install the WLS software subsets.

Most of the common Worldwide Language Support (WLS) software subsets have a prefix of IOSWW, although the IOSULUCSBASE440 subset is also included. The following languages are supported by WLS:

**Table F-1: Supported Languages and Subset Prefixes**

| Language  | Prefix | Language   | Prefix |
|-----------|--------|------------|--------|
| Catalan   | IOSCA  | Korean     | IOSKO  |
| Chinese   | IOSZH  | Lithuanian | IOSLT  |
| Czech     | IOSCS  | Polish     | IOSPL  |
| French    | IOSFR  | Russian    | IOSRU  |
| German    | IOSDE  | Slovak     | IOSSK  |
| Greek     | IOSEL  | Slovene    | IOSSL  |
| Hebrew    | IOSIW  | Spanish    | IOSES  |
| Hungarian | IOSHU  | Swedish    | IOSSV  |
| Italian   | IOSIT  | Thai       | IOSTH  |
| Japanese  | IOSJP  | Turkish    | IOSTR  |

## F.1 Worldwide Support Software Descriptions

Worldwide support provides the following software subsets:

- **IOSULUCSBASE440 Universal Locale Unicode Support (Operating System)** – This software subset contains the locales, method libraries and codeset converters of Universal Locale Unicode UTF8. It is mandatory.
- **IOSWWBASE440 Worldwide Base System (Operating System)** – This software subset is mandatory for all languages. It requires the presence of the OSFBASE440 software subset of the base operating system.
- **IOSWWBIN440 Worldwide Standard Kernel Modules (Kernel Build Environment)** – This software subset contains the standard kernel modules for the Asian terminal drivers and services. This software subset is mandatory for Asian languages. This software subset requires the IOSWWBINCOM440 and OSFBIN440 software subsets.
- **IOSWWBINCOM440 Worldwide Kernel Headers and Common Files (Operating System)** – This software subset is mandatory for Asian languages. It contains kernel header and other common files for building standard kernel or extended kernel which contains Asian/Thai terminal drivers and services. This software subset requires the OSFBINCOM440 software subset.
- **IOSWWCDEDT440 Worldwide CDE Desktop Environment (Windowing Environment)** – This software subset contains font alias files for Greek, Hungarian, Russian, Lithuanian, Slovene, and Turkish language supports in CDE environment. This software subset requires the OSFCDEDT440 software subset. It is a mandatory subset if the OSFCDEDT440 software subset is installed.
- **IOSWWFGC440 Worldwide Composite Unicode Fonts (Windowing Environment)** – This software subset contains the composite Unicode renderer that provides composite Unicode fonts needed for the UTF-8 locales. This subset is mandatory if Euro currency sign support is selected at installation; otherwise it is optional.
- **IOSWWFONTM440 Worldwide DECwindows Mandatory Fonts (Windowing Environment)** – This software subset contains the workstation font files.
- **IOSWWFONTP440 Worldwide DECwindows Additional Fonts (Windowing Environment)** – This optional software subset contains a selection of public domain Unicode fonts.
- **IOSWWLAT2FONT100M440 Worldwide ISO-LATIN2 DECwindows 100dpi Mandatory Fonts (Windowing Environment)** – This software subset contains workstation ISO-LATIN2 100dpi mandatory font files.

This software subset is mandatory for systems using either a VR160 15-inch monitor or a higher resolution graphics monitor. This software subset is optional for systems using a low resolution graphics monitor.

- IOSWWLAT2FONT100P440 Worldwide ISO-LATIN2 DECwindows 100dpi Optional Fonts (Windowing Environment) – This optional software subset contains Workstation ISO-LATIN2 100dpi optional font files.
- IOSWWLAT2FONT75M440 Worldwide ISO-LATIN2 DECwindows 75dpi Mandatory Fonts (Windowing Environment) – This software subset contains Workstation ISO-LATIN2 75dpi mandatory font files. This software subset is mandatory for systems using low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- IOSWWLAT2FONT75P440 Worldwide ISO-LATIN2 DECwindows 75dpi Optional Fonts (Windowing Environment) – This optional software subset contains Workstation ISO-LATIN2 75dpi optional font files.
- IOSWWLAT4FONT100M440 Worldwide ISO-LATIN4 DECwindows 100dpi Mandatory Fonts (Windowing Environment) – This software subset contains workstation ISO-LATIN4 100dpi mandatory font files. This software subset is mandatory for systems using either a VR160 15-inch monitor or a higher resolution graphics monitor. This software subset is optional for systems using a low resolution graphics monitor.
- IOSWWLAT4FONT100P440 Worldwide ISO-LATIN4 DECwindows 100dpi Optional Fonts (Windowing Environment) – This optional software subset contains Workstation ISO-LATIN4 100dpi optional font files.
- IOSWWLAT4FONT75M440 Worldwide ISO-LATIN4 DECwindows 75dpi Mandatory Fonts (Windowing Environment) – This software subset contains Workstation ISO-LATIN4 75dpi mandatory font files. This software subset is mandatory for systems using low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- IOSWWLAT4FONT75P440 Worldwide ISO-LATIN4 DECwindows 75dpi Optional Fonts (Windowing Environment) – This optional software subset contains Workstation ISO-LATIN2 75dpi optional font files.
- IOSWWLATCFONT100M440 Worldwide ISO-LATIN Cyrillic DECwindows 100dpi Mandatory Fonts (Windowing Environment) – This software subset contains Workstation ISO-LATIN Cyrillic 100dpi mandatory font files. It is mandatory for systems using either a VR160 15-inch monitor or a higher resolution graphics monitor. This software subset is optional for systems using a low resolution graphics monitor.

- IOSWWLATCFONT100P440 Worldwide ISO-LATIN Cyrillic DECwindows 100dpi Optional Fonts (Windowing Environment) – This optional software subset contains Workstation ISO-LATIN Cyrillic 100dpi optional font files.
- IOSWWLATCFONT75M440 Worldwide ISO-LATIN Cyrillic DECwindows 75dpi Mandatory Fonts (Windowing Environment) – This software subset contains Workstation ISO-LATIN Cyrillic 75dpi mandatory font files. This software subset is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- IOSWWLATCFONT75P440 Worldwide ISO-LATIN Cyrillic DECwindows 75dpi Optional Fonts (Windowing Environment) – This optional software subset contains Workstation ISO-LATIN Cyrillic 75dpi optional font files.
- IOSWWLAT2OLFONT440 Worldwide ISO-LATIN2 Outline Fonts (Windowing Environment) – This optional software subset contains ISO-LATIN2 outline font files. This software subset requires the OSFAFM440 software subset.
- IOSWWLATCOLFONT440 Worldwide ISO-LATIN Cyrillic Outline Fonts (Windowing Environment) – This optional software subset contains ISO-LATIN Cyrillic outline font files. This software subset requires the OSFAFM440 software subset.
- IOSWWLAT9FONT100M440 Worldwide ISO-LATIN9 DECwindows 100dpi Fonts (Windowing Environment) – This software subset contains ISO\_LATIN9 100dpi font files required to support the Euro currency symbol on high-resolution graphics monitors. This subset is mandatory for systems with high-resolution monitors if you enable Euro currency sign support during installation.
- IOSWWLAT9FONT75M440 Worldwide ISO-LATIN9 DECwindows 75dpi Fonts (Windowing Environment) – This software subset contains ISO\_LATIN9 75dpi font files required to support the Euro currency symbol on low-resolution graphics monitors. This subset is mandatory for systems with low-resolution monitors if you enable Euro currency sign support during installation.
- IOSWWMOTIF11440 Worldwide Motif 1.1 (Windowing Environment) – This software subset contains Worldwide Motif 1.1.3 libraries. They are used by dxnotepad software and for backward compatibility. This software subset requires the OSFMOTIF11440 software subset. It is a mandatory subset if the OSFMOTIF11440 software subset is installed.
- IOSWWMULE440 Worldwide MULE (General Applications) – This software subset contains MULE (Multilingual Emacs) software.



MULE is a multilingual enhancement of GNU Emacs. Mule Version 1 was based on GNU Emacs Version 18 and Mule Version 2 is based on GNU Emacs Version 19. Mule Version 1 is no longer supported. This software subset is optional.

- **IOSWWPGMR440 Worldwide Software Development (Software Development)** – This software subset contains header files and examples for Worldwide software development. This software subset is optional and requires the IOSWWBASE440 software subset.
- **IOSWWPHRASE440 Worldwide Phrase Input Support (Operating System)** – This software subset contains binary files for the phrase input methods and daemons. This software subset is optional and requires the IOSWWBASE440 software subset.
- **IOSWWPRINT440 Worldwide Printer Support (Operating System)** – This software subset contains the `lp*` commands for Chinese, Greek, Japanese, Korean, Thai, and Turkish languages. It also contains common print filters for all Asian language variants. This software subset is requires the OSFPRINT440 and IOSWWBASE440 software subsets. This software subset is mandatory if the OSFPRINT440 software subset is installed.
- **IOSWWSVEDEV440 Worldwide SVE MNLS Migration Tools (Software Development)** – This software subset contains the migration tools of SVE MNLS, System V Environment Multinational Languages Support. This software subset is optional.
- **IOSWWSYSMAN440 Worldwide Configuration Tool (System Configuration)** – This software subset contains the Worldwide configuration tool. This software subset requires the IOSWWBASE440, OSFSYSMAN440 and OSFXSYSMAN440 software subsets. This software subset is optional.
- **IOSWWUCSBASE440 Worldwide Unicode UCS-4 Locales Support (Operation System)** – This software subset contains codeset converters for Unicode UCS4 locales and method library of Unicode UCS4 locales. This software subset is mandatory.
- **IOSWWUDCOS440 Worldwide User Defined Character Support (Operating System)** – This software subset contains tools to create user-defined characters in OS level. It also contains kernel objects for on demand font loading for terminal drivers. This software subset is optional and the requires IOSWWBASE440 software subset.
- **IOSWWUDCWOS440 Worldwide User Defined Character Workstation Service (Windowing Environment)** – This software subset contains a tool to create user-defined character fonts for X11/DECwindows. It is optional and requires the IOSWWX11440 software subset.

- **IOSWWX11440 Worldwide Basic X Environment (Windowing Environment)** – This software subset contains the X11/DECwindows required programs. This software subset is mandatory and requires the OSFX11440 and IOSWWBASE440 software subsets.
- **IOSWWXDEV440 Worldwide X Window Software Development (Windowing Environment)** – This software subset contains libraries and data files needed to produce X/Motif Window system client applications. It also includes example programs demonstrating how to get started using the client applications. This software subset is optional and requires the IOSWWX11440 and OSFXDEV440 software subsets.
- **IOSWWXFR440 Worldwide Two-Byte Outline Font Renderer (Windowing Environment)** – This software subset contain the outline font renderer for two-byte outline font. This software subset is optional requires the IOSWWX11440 software subset.
- **IOSWWMULESRC440 Worldwide MULE Source Files (Public Domain Source)** – This software subset contains the source files for MULE. This software subset is optional.

## F.2 Catalan Support

Catalan Support provides the following software subsets:

- **IOSCACDEAPPS440 Catalan CDE Additional Applications (Windowing Applications)** – This software subset contains Catalan resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSCACDEDT440 software subsets, and it is mandatory if the OSFCDEAPPS440 software subset is installed.
- **IOSCACDEDEV440 Catalan CDE Software Development (Software Development)** – This software subset contains the Catalan Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSCACDEDT440 software subsets, and it is mandatory if the OSFCDEDEV440 software subset is installed.
- **IOSCACDEDT440 Catalan CDE Desktop Environment (Windowing Environment)** – This software subset contains Catalan resource files and message catalogs for the Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOSCACDEMIN440 software subsets, and it is mandatory if the OSFCDEDT440 software subset is installed.
- **IOSCACDEMAIL440 Catalan CDE Mail Interface (Mail Applications)** – This software subset contains Catalan resource files and message catalogs for the Common Desktop Environment mail system. This

software subset requires the OSFCDEMAIL440 and IOSCACDEDT440 software subsets, and it is mandatory if the OSFCDEMAIL440 software subset is installed.

- IOSCACDEMIN440 Catalan CDE Minimum Run-time Environment (Windowing Environment) – This software subset contains Catalan resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSCAX11440 software subsets, and it is mandatory if the OSFCDEMIN440 software subset is installed.
- IOSCADECW440 Catalan Additional DECwindows Applications (Windowing Applications) – This software subset contains Catalan resource files and UID files for the X11/DECwindows client application `dxprint`. This software subset requires the OSFDECW440 and IOSCAX11440 software subsets, and it is mandatory if the OSFDECW440 software subset is installed.
- IOSCAOLDDECW440 Catalan Old Additional DECwindows Applications (Windows Applications) – This software subset contains Catalan resource files and UID files for the X11/DECwindows client application `dxdiff`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSCAX11440 software subsets, and it is mandatory if the OSFOLDDECW440 software subset is installed.
- IOSCAX11440 Catalan Basic X Environment (Windowing Environment) – This software subset contains Catalan X11/DECwindows required programs and shared libraries. It is mandatory and requires the OSFX11440 and IOSWWBASE440 software subsets.
- IOSCAXDEV440 Catalan X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Catalan X/Motif window system client applications.. This software subset is optional and requires the IOSWWXDEV440 and IOSCAX11440 software subsets.

### F.3 Chinese Support

Chinese Support provides the following software subsets:

- IOSZHBASE440 Chinese Base System (Operating System) – This software subset contains the `asort` (Asian sort) binary which is used for sorting Traditional Chinese and Simplified Chinese data. It is mandatory and requires the IOSWWBASE440 software subset.
- IOSZHBIG5440 Big-5 Character Set Support (Operating System) – This software subset contains all the BIG5 related libraries, charmaps,

methods and terminal drivers. This software subset is optional and requires the IOSZHBASE440 software subset.

- IOSZHCNBASE440 Chinese Base System for China (Operating System) – This software subset contains the China specific locales and methods shared libraries. This software subset is mandatory and requires the IOSZHBASE440 software subset.
- IOSZHCNCDEAPPS440 Simplified Chinese CDE Additional Applications (Windowing Applications) – This software subset contains Simplified Chinese resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSZHCNCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- IOSZHCNCDEDEV440 Simplified Chinese CDE Software Development (Software Development) – This software subset contains Simplified Chinese Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSZHCNCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- IOSZHCNCDEDT440 Simplified Chinese CDE Desktop Environment (Windowing Environment) – This software subset contains Simplified Chinese resource files and message catalogs for the Common Desktop Environment user interface. This software subset requires the OSFCDEDT440 and IOSZHCNCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSZHCNCDEHLP440 Simplified Chinese CDE Online Help (Windowing Environment) – This software subset contains Simplified Chinese online help files of Common Desktop Environment. This software subset is optional and requires the IOSZHCNCDEDT440 software subset.
- IOSZHCNCDEMAIL440 Simplified Chinese CDE Mail Interface (Mail Applications) – This software subset contains Simplified Chinese resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSZHCNCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSZHCNCDEMIN440 Simplified Chinese CDE Minimum Run-time Environment (Windowing Environment) – This software subset contains Simplified Chinese resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This

software subset requires the OSFCDEMIN440 and IOSZHSX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.

- IOSZHCNLOC440 Additional Chinese Locales for China (Operating System) – This software subset contains the @ variant locales that have different collating rules. This software subset is optional and requires the IOSZHCNBASE440 software subset.
- IOSZHCNUCSBASE440 Chinese Unicode Support for China (Operating System) – This software subset contains the Chinese Unicode locale for China. This software subset is mandatory and requires the IOSZHUCSBASE440 software subset.
- IOSZHCONV440 Traditional and Simplified Chinese Conversion (Operating System) – This software subset contains the terminal drivers, kernel objects and services for Traditional and Simplified Chinese conversion. This software subset is mandatory and requires the IOSZHBASE440 software subset.
- IOSZHEUCTW440 Taiwanese EUC Character Set Support (Operating System) – This software subset contains methods, shared libraries and services for the Taiwanese EUC character set. It is optional and requires the IOSZHTWBASE440 software subset.
- IOSZHHANYU440 DEC Hanyu Character Set Support (Operating System) – This software subset contains methods, shared libraries and services for the DEC Hanyu character set. It is optional and requires the IOSZHTWBASE440 software subset.
- IOSZHHANZI440 DEC Hanzi Character Set Support (Operating System) – This software subset contains methods and shared libraries for the DEC Hanzi character set. This software subset is optional and requires the IOSZHBASE440 software subset.
- IOSZHHKBASE440 Chinese Base System for Hong Kong (Operating System) – This software subset contains specific locales, methods, shared libraries, messages catalogs and services for Hong Kong. This software subset is mandatory and requires the IOSZHBASE440 software subset.
- IOSZHHKUCSBASE440 Chinese Unicode Support for Hong Kong (Operating System) – This software subset contains the Chinese Unicode locale for Hong Kong. This software subset is mandatory and requires the IOSZHUCSBASE440 software subset.
- IOSZHPGMR440 Chinese Software Development (Software Development) – This software subset contains the header files and libraries for the Chinese software development. This software subset is optional and requires the IOSZHBASE440 software subset.

- **IOSZHSDECW440 Simplified Chinese Additional DECwindows Applications (Windowing Applications)** – This software subset contains Simplified Chinese resource files and UID files for the X11/DECwindows client applications `dxpaint` and `dxprint`. This software subset requires the `OSFDECW440` and `IOSZHSX11440` software subsets. This software subset is mandatory if the `OSFDECW440` software subset is installed.
- **IOSZHSFONTM440 Simplified Chinese DECwindows Mandatory Fonts (Windowing Environment)** – This software subset contains workstation Simplified Chinese mandatory font files for 75dpi and 100dpi displays. This software subset is mandatory.
- **IOSZHSFONTP440 Simplified Chinese DECwindows Optional Fonts (Windowing Environment)** – This optional software subset contains workstation Simplified Chinese screen optional font files for 75dpi and 100dpi displays.
- **IOSZHSOLDDECW440 Simplified Chinese Old Additional DECwindows Applications (Windows Applications)** – This software subset contains Simplified Chinese resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the `OSFOLDDECW440` and `IOSZHSX11440` software subsets. This software subset is mandatory if the `OSFOLDDECW440` software subset is installed.
- **IOSZHSOLDX11440 Simplified Chinese Old X Environment (Windowing Environment)** – This software subset contains Simplified Chinese resource files and UID files for the X window applications `dxpause` and `dxsession`. This software subset requires the `OSFOLDX11440` and `IOSZHSX11440` software subsets. This software subset is mandatory if the `OSFOLDX11440` software subset is installed.
- **IOSZHSX11440 Simplified Chinese Basic X Environment (Windowing Environment)** – This software subset contains Simplified Chinese X11/DECwindows required programs and shared libraries. It also provides Simplified Chinese resource files and UID files. This software subset is mandatory and requires the `IOSZHX11440` software subset.
- **IOSZHSXDEV440 Simplified Chinese X Window Software Development (Windowing Environment)** – This software subset contains libraries and data files needed to produce Simplified Chinese X/Motif window system client applications. This software subset is optional and requires the `IOSWWXDEV440` and `IOSZHSX11440` software subsets.
- **IOSZHTDECW440 Traditional Chinese Additional DECwindows Applications (Windowing Applications)** – This software subset contains Traditional Chinese resource files and UID files for the

X11/DECwindows client applications `dxpaint` and `dxprint`. This software subset requires the OSFDECW440 and IOSZHTX11440 subset. This software subset is mandatory if the OSFDECW440 software subset is installed.

- IOSZHTOLDDECW440 Traditional Chinese Old Additional DECwindows Applications (Windows Applications) – This software subset contains Traditional Chinese resource files and UID files for the X11/DECwindows client application `dxnotepad` which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSZHTX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- IOSZHTOLDX11440 Traditional Chinese Old X Environment (Windowing Environment) – This software subset contains Traditional Chinese resource files and UID files for the X window applications `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSZHTX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- IOSZHTELEX440 Telecode Character Set Support (Operating System) – This software subset contains all Telecode related methods and terminal drivers. This software subset is optional and requires the IOSZHTWBASE440 software subset.
- IOSZHTFONTM440 Traditional Chinese DECwindows Fonts – This software subset contains workstation Traditional Chinese mandatory font files for 75dpi and 100dpi displays. This software subset is mandatory.
- IOSZHTFONTP440 Traditional Chinese DECwindows Fonts – This optional software subset contains workstation Traditional Chinese optional font files for 75dpi and 100dpi displays.
- IOSZHTWBASE440 Chinese Base System for Taiwan (Operating System) – This software subset contains the Taiwan specific locales, methods libraries, messages catalogs and collating tables for Asian sorting. This software subset is mandatory and requires OSFBASE440.
- IOSZHTWCDEAPPS440 Traditional Chinese CDE Additional Applications (Windowing Applications) – This software subset contains Traditional Chinese resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSZHTWCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- IOSZHTWCDEDEV440 Traditional Chinese CDE Software Development (Software Development) – This software subset contains

Traditional Chinese Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSZHTWCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.

- IOSZHTWCDEHLP440 Traditional Chinese CDE Online Help (Windowing Environment) – This software subset contains Traditional Chinese online help files for the Common Desktop Environment. This software subset is optional and requires the IOSZHTWCDEDT440 software subset.
- IOSZHTWCDEDT440 Traditional Chinese CDE Desktop Environment (Windowing Environment) – This software subset contains Traditional Chinese resource files and message catalogs for the Common Desktop Environment user interface. This software subset requires the OSFCDEDT440 and IOSZHTWCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSZHTWCDEMAIL440 Traditional Chinese CDE Mail Interface (Mail Applications) – This software subset contains Traditional Chinese resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSZHTWCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSZHTWCDEMIN440 Traditional Chinese CDE Minimum Run-time Environment (Windowing Environment) – This software subset contains Traditional Chinese resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSZHTX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- IOSZHTWLOC440 Additional Chinese Locales for Taiwan (Operating System) – This software subset contains the @ variant locales which have different collating rules. This software subset is optional and requires the IOSZHTWBASE440 software subset.
- IOSZHTWUCSBASE440 Chinese Unicode Support for Taiwan (Operating System) – This software subset contains Chinese Unicode locale for Taiwan. This software subset is mandatory and requires the IOSZHUCSBASE440 software subset.
- IOSZHTX11440 Traditional Chinese Basic X Environment (Windowing Environment) – This software subset contains Traditional Chinese X11/DECwindows required programs and shared libraries. It also



provides Hanyu resource files and UID files. This software subset is mandatory and requires the IOSZHX11440 software subset.

- **IOSZHTXDEV440 Traditional Chinese X Window Software Development (Windowing Environment)** – This software subset contains libraries and data files needed to produce Traditional Chinese X/Motif window client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSZHTX11440 software subsets.
- **IOSZHUCSBASE440 Common Chinese Unicode Support (Operating System)** – This software subset contains method libraries which are common for all Chinese Unicode locales. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.
- **IOSZHX11440 Base Chinese X Environment (Windowing Environment)** – This software subset contains required programs that are common to both Traditional Chinese/DECwindows and Simplified Chinese/DECwindows. It also provides Chinese input methods. This software subset is mandatory and requires the IOSWWX11440 and IOSZHBASE440 software subsets.
- **IOSZHSOLFON440 Simplified Chinese Outline Fonts (Outline Fonts)** – This optional software subset contains the Simplified Chinese outline font files. This software subset requires the OSFAFM440 software subset.
- **IOSZHTOLFON440 Traditional Chinese Outline Fonts (Outline Fonts)** – This software subset contains the Traditional Chinese outline font files. This software subset is optional. This software subset requires the OSFAFM440 software subset.

## F.4 Czech Support

Czech Support contains the following software subsets:

- **IOSCSCDEAPPS440 Czech CDE Additional Applications (Windowing Applications)** – This software subset contains Czech resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSCSCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- **IOSCSDECW440 Czech Additional DECwindows Applications (Windowing Applications)** – This software subset contains Czech resource files and UID files for the X11/DECwindows client applications `dxpaint` and `dxprint`. This software subset requires the OSFDECW440 and IOSCSX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.

- **IOSCSCDEDEV440 Czech CDE Software Development (Software Development)** – This software subset contains Czech Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSCSCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- **IOSCSCDEDT440 Czech CDE Desktop Environment (Windowing Environment)** – This software subset contains Czech resource files and message catalogs for the Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOSCSCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- **IOSCSCDEMAIL440 Czech CDE Mail Interface (Mail Applications)** – This software subset contains Czech resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSCSCDEDT440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.
- **IOSCSCDEMIN440 Czech CDE Minimum Run-time Environment (Windowing Environment)** – This software subset contains Czech resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and OSCSX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- **IOSCSOLDDECW440 Czech Old Additional DECwindows Applications (Windows Applications)** – This software subset contains Czech resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSCSX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- **IOSCSOLDX11440 Czech Old X Environment (Windowing Environment)** – This software subset contains Czech resource files and UID files for the X window applications `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSCSX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- **IOSCSUCSBASE440 Czech Unicode Support (Operating System)** – This software subset contains the Czech Unicode locale. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.

- IOSCSX11440 Czech Basic X Environment (Windowing Environment) – This mandatory software subset contains Czech X11/DEC windows required programs and shared libraries and provides Czech resource and UID files. This software subset requires the OSFX11440 and IOSWWBASE440 software subsets.
- IOSCSXDEV440 Czech X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Czech X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSCSX11440 software subsets.

## F.5 French Support

French Support contains the following software subsets:

- IOSFRBEX11440 French (Belgian) Basic X Environment (Windowing Environment) – This software subset contains files needed for French localization support in the French (Belgian) locale `fr_CH.ISO8859-1`. This software subset requires the IOSFRX11440 software subset. This software subset is mandatory when you select the country `Belgium - French` at the beginning of the installation procedure.
- IOSFRCAX11440 French (Canadian) Basic X Environment (Windowing Environment) – This software subset contains files needed for French localization support in the French (Canadian) locale `fr_CA.ISO8859-1`. This software subset requires the IOSFRX11440 software subset. This software subset is mandatory when you select the country `Canada - French` at the beginning of the installation procedure.
- IOSFRCHX11440 French (Swiss) Basic X Environment (Windowing Environment) – This software subset contains files needed for French localization support in the French (Swiss) locale `fr_CH.ISO8859-1`. This software subset requires the IOSFRX11440 software subset. This software subset is mandatory when you select the country `Switzerland - French` at the beginning of the installation procedure.
- IOSFRCDEAPPS440 French CDE Additional Applications (Windowing Applications) – This software subset contains French resource files and message catalogs of the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSFRCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- IOSFRCDEDEV440 French CDE Software Development (Software Development) – This software subset contains the French Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSFRCDEDT440 software

subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.

- **IOSFRCDEDT440 French CDE Desktop Environment (Windowing Environment)** – This software subset contains French resource files and message catalogs for the Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOSFRCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- **IOSFRCDEHLP440 French CDE Online Help (Windowing Environment)** – This software subset contains French online help files of Common Desktop Environment. This software subset is optional and requires the IOSFRCDEDT440 software subset.
- **IOSFRCDEMAIL440 French CDE Mail Interface (Mail Applications)** – This software subset contains French resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSFRCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.
- **IOSFRCDEMIN440 French CDE Minimum Run-time Environment (Windowing Environment)** – This software subset contains French resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSFRX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- **IOSFRDECW440 French Additional DECwindows Applications (Windowing Applications)** – This software subset contains French resource files and UID files for the X11/DECwindows client applications `dypaint` and `dyprint`. This software subset requires the OSFDECW440 and IOSFRX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.
- **IOSFROLDDECW440 French Old Additional DECwindows Applications (Windows Applications)** – This software subset contains French resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in the future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSFRX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- **IOSFROLDX11440 French Old X Environment (Windowing Environment)** – This software subset contains French resource files and UID files for the X window applications `dxpauise` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSFRX11440

software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.

- IOSFRX11440 French Basic X Environment (Windowing Environment) – This software subset contains French X11/DECwindows required programs and shared libraries. It also provides French resource files and UID files. It is mandatory and requires the OSFX11440 and OSFEURLOC440 software subsets.
- IOSFRXDEV440 French X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce French X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSFRX11440 software subsets.

## F.6 German Support

German Support contains the following software subsets:

- IOSDECDEAPPS440 German CDE Additional Applications (Windowing Applications) – This software subset contains German resource files and message catalogs of the Common Desktop Environment (CDE) additional applications. This software subset requires the OSFCDEAPPS440 and IOSDECDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 subset is installed.
- IOSDECDEDEV440 German CDE Software Development (Software Development) – This software subset contains the German Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSCDEDT440 software subsets. It is mandatory if the OSFCDEDEV440 software subset is installed.
- IOSDECDEDT440 German CDE Desktop Environment (Windowing Environment) – This software subset contains German resource files and message catalogs of the user interface for the Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOSDECDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSDECDEHLP440 German CDE Online Help (Windowing Environment) – This software subset contains German online help files for the Common Desktop Environment. This software subset is optional and requires the IOSDECDEDT440 software subset.
- IOSDECDEMAIL440 German CDE Mail Interface (Mail Applications) – This software subset contains German resource files and message catalogs of the Common Desktop Environment mail system. This

software subset requires the OSFCDEMAIL440 and IOSDECDEDT440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.

- IOSDECDEMIN440 German CDE Minimum Run-time Environment (Windowing Environment) – This software subset contains German resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSDEX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 subset is installed.
- IOSDECHX11440 German (Swiss) Basic X environment (Windowing Environment) – This software subset contains files needed for German localization support in the German (Swiss) locale `de_CH.ISO8859-1`. This software subset requires the IOSDEX11440 software subset. This software subset is mandatory when you select the country Switzerland - German at the beginning of the installation procedure.
- IOSDEDECW440 German Additional DECwindows Applications (Windowing Applications) – This software subset contains German resource files and UID files for the X11/DECwindows client application `dxpaint` and `dxprint`. This software subset requires the OSFDECW440 and IOSDEX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.
- IOSDEOLDDECW440 German Old Additional DECwindows Applications (Windows Applications) – This software subset contains German resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in the future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSDEX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- IOSDEOLDX11440 German Old X Environment (Windowing Environment) – This software subset contains German resource files and UID files for the X window applications: `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSDEX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- IOSDEX11440 German Basic X Environment (Windowing Environment) – This mandatory software subset contains German X11/DECwindows required programs and shared libraries. It also provides German resource files and UID files. This software subset requires OSFX11440 and OSFEURLOC440.
- IOSDEXDEV440 German X Window Software Development (Windowing Environment) – This software subset contains libraries and

data files needed to produce German X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSDEX11440 software subsets.

## F.7 Greek Support

Greek Support provides the following software subsets:

- IOSELFONT100M440 Greek DECwindows 100dpi Mandatory Fonts (Windowing Environment) – This software subset contains workstation Greek 100dpi mandatory font files. This software subset is mandatory for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor. This software subset is optional for systems using a low resolution graphics monitor.
- IOSELFONT100P440 Greek DECwindows 100dpi Optional Fonts (Windowing Environment) – This optional software subset contains workstation Greek 100dpi optional font files.
- IOSELFONT75M440 Greek DECwindows 75dpi Mandatory Fonts (Windowing Environment) – This software subset contains workstation Greek 75dpi mandatory font files. This software subset is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15- inch monitor or a higher resolution graphics monitor.
- IOSELFONT75P440 Greek DECwindows 75dpi Optional Fonts (Windowing Environment) – This optional software subset contains workstation Greek 75dpi optional font files.
- IOSELOLDDECW440 Greek Old Additional DECwindows Applications (Windows Applications) – This software subset contains Greek resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in the future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSELX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- IOSELUCSBASE440 Greek Unicode Support (Operating System) – This software subset contains Greek Unicode locale. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.
- IOSELX11440 Greek Basic X Environment (Windowing Environment) – This software subset contains Greek X11/DECwindows required programs and shared libraries. It also provides Greek resource files and UID files. It is mandatory and requires the OSFX11440 and OSFEURLOC440 software subsets.

- IOSELOLFONT440 Greek Outline Fonts (Outline Fonts) – This software subset contains Greek outline font files and it is optional. This software subset requires the OSFAFM440 software subset.

## F.8 Hebrew Support

Hebrew Support contains the following software subsets:

- IOSIWBASE440 Hebrew Base System (Operating System) – This software subset contains the Hebrew locale `iw_IL.ISO8859-8`. This software subset is mandatory and requires the IOSWWBASE440 software subset.
- IOSIWCDEDT440 Hebrew CDE Desktop Environment (Windowing Environment) – This software subset contains Hebrew resource files and message catalogs for the user interface of the Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOSIWCDEMIN440 software subset. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSIWCDEMIN440 Hebrew CDE Minimum Run-time Environment (Windowing Environment) – This software subset contains Hebrew resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSIWX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- IOSIWFONT100M440 Hebrew DECwindows 100dpi Mandatory Fonts (Windowing Environment) – This software subset contains workstation Hebrew 100dpi mandatory font files. This software subset is mandatory for systems using either a VR160 15-inch monitor or higher resolution graphics monitor. This software subset is optional for systems using low resolution graphics monitors.
- IOSIWFONT100P440 Hebrew DECwindows 100dpi Optional Fonts (Windowing Environment) – This optional software subset contains workstation Hebrew 100dpi font files.
- IOSIWFONT75M440 Hebrew DECwindows 75dpi Mandatory Fonts (Windowing Environment) – This software subset contains workstation Hebrew 75dpi mandatory font files. This software subset is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- IOSIWFONT75P440 Hebrew DECwindows 75dpi Optional Fonts – This software subset contains workstation Hebrew 75dpi optional font files.



- IOSIWOLDX11440 Hebrew Old X Environment (Windowing Environment) – This software subset contains Hebrew resource files and UID files for the X window applications `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSIWX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- IOSIWUCSBASE440 Hebrew Unicode Support (Operating System) – This software subset contains the Hebrew Unicode locale. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.
- IOSIWX11440 Hebrew Basic X Environment (Windowing Environment) – This software subset contains Hebrew X11/DECwindows required programs and shared libraries. It also provides Hebrew resource files and UID files. It is mandatory and requires the OSFX11440 and IOSIWBASE440 software subsets.
- IOSIWXDEV440 Hebrew X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Hebrew X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSIWX11440 software subsets.
- IOSIWOLFONTS440 Hebrew Outline Fonts (Outline Fonts) – This optional software subset contains Hebrew outline font files. This software subset requires the OSFAFM440 software subset.

## F.9 Hungarian Support

Hungarian Support contains the following software subsets:

- IOSHUCDEAPPS440 Hungarian CDE Additional Applications (Windowing Applications) – This software subset contains Hungarian resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSHUCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- IOSHUCDEDEV440 Hungarian CDE Software Development (Software Development) – This software subset contains Hungarian Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSHUCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- IOSHUCDEDT440 Hungarian CDE Desktop Environment (Windowing Environment) – This software subset contains Hungarian resource files

and message catalogs for the Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOSHUCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.

- **IOSHUCDEMAIL440 Hungarian CDE Mail Interface (Mail Applications)** – This software subset contains Hungarian resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSHUCDEDT440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.
- **IOSHUCDEMIN440 Hungarian CDE Minimum Run-time Environment (Windowing Environment)** – This software subset contains Hungarian resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSHUX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- **IOSHUDECW440 Hungarian Additional DECwindows Applications (Windowing Environment)** – This software subset contains Hungarian resource files and UID files for the X11/DECwindows client applications. This software subset requires the OSFDECW440 and IOSHUX11440 software subsets. This software subset is mandatory if the OSFDECW440 subset is installed.
- **IOSHUOLDDECW440 Hungarian Old Additional DECwindows Applications (Windows Applications)** – This software subset contains Hungarian resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSHUX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- **IOSHUOLDX11440 Hungarian Old X Environment (Windowing Environment)** – This software subset contains Hungarian resource files and UID files for the X window applications: `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSHUX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- **IOSHUUCSBASE440 Hungarian Unicode Support (Operating System)** – This software subset contains the Hungarian Unicode locale. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.
- **IOSHUX11440 Hungarian Basic X Environment (Windowing Environment)** – This software subset contains Hungarian

X11/DECwindows required programs and shared libraries. It also provides Hungarian resource files and UID files. This software subset is mandatory and requires the OSFX11440 and IOSWWBASE440 software subsets.

- IOSHUXDEV440 Hungarian X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Hungarian X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSHUX11440 software subsets.

## F.10 Italian Support

Italian Support contains the following software subsets:

- IOSITCDEAPPS440 Italian CDE Additional Applications (Windowing Applications) – This software subset contains Italian resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSITCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- IOSITCDEDEV440 Italian CDE Software Development (Software Development) – This software subset contains the Italian Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSITCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- IOSITCDEDT440 Italian CDE Desktop Environment (Windowing Environment) – This software subset contains Italian resource files and message catalogs for the Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOSITCDEMIN440 software subset. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSITCDEHLP440 Italian CDE Online Help (Windowing Environment) – This software subset contains Italian online help files for the Common Desktop Environment. This software subset is optional and requires the IOSITCDEDT440 software subset.
- IOSITCDEMAIL440 Italian CDE Mail Interface (Mail Applications) – This software subset contains Italian resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSITCDEDT440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.

- **IOSITCDEMIN440 Italian CDE Minimum Run-time Environment (Windowing Environment)** – This software subset contains Italian resource files and message catalogs for Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSITX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- **IOSITDECW440 Italian Additional DECwindows Applications (Windowing Applications)** – This software subset contains Italian resource files and UID files for the X11/DECwindows client applications `dypaint` and `dxprint`. This software subset requires the OSFDECW440 and IOSITX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.
- **IOSITOLDDECW440 Italian Old Additional DECwindows Applications (Windows Applications)** – This software subset contains Italian resource files and UID files for X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSITX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- **IOSITOLDX11440 Italian Old X Environment (Windowing Environment)** – This software subset contains Italian resource files and UID files for the X window applications `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSITX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- **IOSITX11440 Italian Basic X Environment (Windowing Environment)** – This software subset contains Italian X11/DECwindows required programs and shared libraries. It also provides Italian resource files and UID files. It is mandatory and requires the OSFX11440 and OSFEURLOC440 software subsets.
- **IOSITXDEV440 Italian X Window Software Development (Windowing Environment)** – This software subset contains libraries and data files needed to produce Italian X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSITX11440 software subsets.

## F.11 Japanese Support

Japanese Support provides the following software subsets:

- **IOSJPBASE440 Additional Japanese Software (Operating System)** – This software subset contains the `jvi` binaries. This software subset is optional and requires the IOSJPBASE440 software subset.

- IOSJPAMANOS440 Japanese Reference Pages for Additional Software (Operating System) – This software subset contains the reference pages for the Japanese software in IOSJPABASE440. This software subset is optional and requires the OSFDCMT440 software subset.
- IOSJPBASE440 Japanese Base System (Operating System) – This software subset contains the Japanese-specific locales, methods, shared libraries, and services. This software subset is mandatory and requires the IOSWWBASE440 software subset.
- IOSJPCDEAPPS440 Japanese CDE Additional Applications (Windowing Applications) – This software subset contains Japanese resource files and message catalogs of the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSJPCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- IOSJPCDEDEV440 Japanese CDE Software Development (Software Development) – This software subset contains the Japanese Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSJPCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- IOSJPCDEDT440 Japanese CDE Desktop Environment (Windowing Environment) – This software subset contains Japanese resource files and message catalogs for the Common Desktop Environment user interface. This software subset requires the OSFCDEDT440 and IOSJPCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSJPCDEHLP440 Japanese CDE Online Help (Windowing Environment) – This software subset contains Japanese online help files of the Common Desktop Environment. This software subset is optional and requires the IOSJPCDEDT440 software subset.
- IOSJPCDEHLPSJIS440 Japanese CDE Online Help (Windowing Environment) – This software subset contains Japanese online help files of the Common Desktop Environment in Shift JIS. This software subset is optional and requires the IOSJPCDEDT440 software subset.
- IOSJPCDEMAIL440 Japanese CDE Mail Interface (Mail Applications) – This software subset contains Japanese resource files and message catalogs of the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSJPCDEDT440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.

- **IOSJPCDEMIN440 Japanese CDE Minimum Run-time Environment (Windowing Environment)** – This software subset contains Japanese resource files and message catalogs for Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSJPX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- **IOSJPDECW440 Japanese Additional DECwindows Applications (Windowing Applications)** – This software subset contains Japanese resource files and UID files for the X11/DECwindows client applications `dxpaint` and `dxprint`. This software subset requires the OSFDECW440 and IOSJPX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.
- **IOSJPFONT100M440 Japanese DECwindows 100dpi Mandatory Fonts (Windowing Environment)** – This software subset contains workstation Japanese 100dpi mandatory font files. This software subset is mandatory for systems using either a VR160 15-inch monitor or higher resolution graphics monitor. This software subset is optional for systems using a low resolution graphics monitor.
- **IOSJPFONT100P440 Japanese DECwindows 100dpi Optional Fonts (Windowing Environment)** – This optional software subset contains workstation Japanese 100dpi font files.
- **IOSJPFONTM440 Japanese DECwindows 75dpi Mandatory Fonts (Windowing Environment)** – This software subset contains workstation Japanese mandatory font files for 75dpi and 100dpi displays.
- **IOSJPFONT75M440 Japanese DECwindows 75dpi Mandatory Fonts (Windowing Environment)** – This software subset contains workstation Japanese 75dpi font files. This software subset is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- **IOSJPNETSCAPE440 Japanese Netscape Communicator V4.5 (Windowing Environment)** – This software subset contains resource files needed for a Japanese user interface to Netscape Communicator V4.5. This optional software subset requires the OSFNETSCAPE440 software subset.
- **IOSJOLDDECW440 Japanese Old Additional DECwindows Applications (Windows Applications)** – This software subset contains Japanese resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSJPX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.

- **IOSJPOLDDECW440 Japanese Old Additional DECwindows Applications (Windows Applications)** – This software subset contains Japanese resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the **OSFOLDDECW440** and **IOSJPX11440** software subsets. This software subset is mandatory if the **OSFOLDDECW440** software subset is installed.
- **IOSJPOLDX11440 Japanese Old X Environment (Windowing Environment)** – This software subset contains Japanese resource files and UID files for the X window applications: `dxpause` and `dxsession`. This software subset requires the **OSFOLDX11440** and **IOSJPX11440** software subset. This software subset is mandatory if the **OSFOLDX11440** software subset is installed.
- **IOSJPLDBBASE440 Japanese Ladebug Debugger (Software Development)** – This software subset contains the Japanese message catalogs for the internationalized Ladebug Debugger. This software subset is optional. This software subset requires the **OSFLDBBASE440** and **IOSJPBASE440** software subsets.
- **IOSJPLDBGUI440 Japanese Ladebug Debugger Window Interface (Software Development)** – This software subset contains the Japanese resource files and UID files for window interface of Internationalized Ladebug Debugger. This software subset is optional. This software subset requires the **OSFLDBGUI440** and **IOSJPX11440** software subsets.
- **IOSJPMANOS440 Japanese Reference Pages (Operating System)** – This software subset contains the Japanese reference pages. This software subset is optional and requires the **OSFDCMT440** software subset.
- **IOSJPMANWOS440 Japanese Windows Reference Pages (Windowing Environment)** – This software subset contains Japanese Windows reference pages. This software subset is optional and requires the **OSFDCMT440** subset.
- **IOSJPMSG440 Japanese Message Catalogs (Operating System)** – This software subset contains the Japanese message catalogs for Japanese commands. This software subset is optional and requires the **IOSJPBASE440** software subset.
- **IOSJPMSGSJIS440 Formatted SJIS Japanese Message Catalogs (Operating System)** – This software subset contains the same message catalogs as **IOSJPMSG440**, but in SJIS format. This software subset is optional and requires the **IOSJPBASE440** software subset.
- **IOSJPNEMACS440 Japanese Nemacs (Operating System)** – This software subset supports the Nemacs editor. It is optional and requires the **IOSJPBASE440** software subset.

- **IOSJPPGMR440 Japanese Software Development (Software Development)** – This software subset contains the header files and libraries for the Japanese software in the IOSJPABASE440 software subset. This software subset is optional and requires the IOSJPBASE440 software subset.
- **IOSJPUCSBASE440 Japanese Unicode Support (Operating System)** – This software subset contains the Japanese Unicode locale. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.
- **IOSJPWNN440 Wnn Input Method (Operating System)** – This software subset supports the Wnn input method. It is optional and requires the IOSJPBASE440 software subset.
- **IOSJPWNNPGMR440 Wnn Software Development (Software Development)** – This software subset contains the header files and libraries for the Wnn input method development. It is optional and requires the IOSJPBASE440 software subset.
- **IOSJPX11440 Japanese Basic X Environment (Windowing Environment)** – This software subset contains Japanese X11/DECwindows required programs and shared libraries. It also provides Japanese resource files and UID files. This software subset is mandatory and requires the IOSWWX11440 and IOSJPBASE440 software subsets.
- **IOSJPXDEV440 Japanese X Window Software Development (Windowing Environment)** – This software subset contains libraries and data files needed to produce Japanese X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSJPX11440 software subsets.
- **IOSJPNEMACSSRCS440 Japanese Nemacs Source Files (Public Domain Source)** – This optional software subset contains the source files for Japanese Nemacs.
- **IOSJPWNNSRC440 Wnn Source Files (Public Domain Source)** – This software subset contains the source file for the Wnn input method. This software subset is optional and has no other software subset dependencies.

## F.12 Korean Support

Korean Support provides the following software subsets:

- **IOSKOBASE440 Korean Base System (Operating System)** – This software subset contains the Korean specific locales, methods, shared libraries, and services. This software subset is mandatory and requires the IOSWWBASE440 software subset.



- **IOSKOCDEAPPS440 Korean CDE Additional Applications (Windowing Applications)** – This software subset contains Korean resource files and message catalogs of the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSKOCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- **IOSKOCDEDEV440 Korean CDE Software Development (Software Development)** – This software subset contains the Korean Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSKOCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- **IOSKOCDEDT440 Korean CDE Desktop Environment (Windowing Environment)** – This software subset contains Korean resource files and message catalogs of user interface of Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOSKOCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- **IOSKOCDEHLP440 Korean CDE Online Help (Windowing Environment)** – This software subset contains Korean online help files for the Common Desktop Environment. This software subset is optional and requires the IOSKOCDEDT440 software subset.
- **IOSKOCDEMAIL440 Korean CDE Mail Interface (Mail Applications)** – This software subset contains Korean resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSKOCDEDT440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.
- **IOSKOCDEMIN440 Korean CDE Minimum Run-time Environment (Windowing Environment)** – This software subset contains Korean resource files and message catalogs for Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSKOX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- **IOSKODECW440 Korean Additional DECwindows Applications (Windowing Applications)** – This software subset contains Korean resource files and UID files for the X11/DECwindows client application `dxpaint` and `dxprint`. This software subset requires the OSFDECW440 and IOSKOX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.
- **IOSKOOLDDECW440 Korean Old Additional DECwindows Applications (Windows Applications)** – This software subset contains

Korean resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the `OSFOLDDECW440` and `IOSKOX11440` software subsets. This software subset is mandatory if the `OSFOLDDECW440` software subset is installed.

- `IOSKOOLDX11440` Korean Old X Environment (Windowing Environment) – This software subset contains Korean resource files and UID files for the X window applications: `dxpause` and `dxsession`. This software subset requires the `OSFOLDX11440` and `IOSKOX11440` software subsets. This software subset is mandatory if the `OSFOLDX11440` software subset is installed.
- `IOSKOFONTM440` Korean DECwindows Mandatory Fonts (Windowing Environment) – This software subset contains workstation Korean mandatory font files for 75dpi and 100dpi displays.
- `IOSKOFONTP440` Korean DECwindows Optional Fonts (Windowing Environment) – This optional software subset contains workstation Korean optional font files for 75dpi and 100dpi displays.
- `IOSKOPGMR440` Korean Software Development (Software Development) – This software subset contains the header files and libraries for Korean software development. This software subset is optional and requires the `IOSKOBASE440` software subset.
- `IOSKOUCSBASE440` Korean Unicode Support (Operating System) – This mandatory software subset contains the Korean Unicode locale and requires the `IOSWWUCSBASE440` software subset.
- `IOSKOX11440` Korean Basic X Environment (Windowing Environment) – This software subset contains programs and shared libraries required for Korean X/11 DECwindows. It also provides Korean resource files and UID files. This software subset is mandatory and requires the `IOSWWX11440` and `IOSKOBASE440` software subset.
- `IOSKOXDEV440` Korean X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Korean X/Motif window system client applications. This software subset is optional and requires the `IOSWWXDEV440` and `IOSKOX11440` software subsets.
- `IOSKOOLFONT440` Korean Outline Fonts (Outline Fonts) – This software subset contains the Korean outline font files. This software subset is optional. This software subset requires the `OSFAFM440` software subset.

## F.13 Lithuanian Support

Lithuanian Support provides the following software subsets:

- IOSLTX11440 Lithuanian Basic X Environment (Windowing Environment) – This software subset contains Lithuanian X11/DECwindows required keymaps, programs, and shared libraries. This software subset is mandatory and requires the OSFX11440 and IOSWWBASE440 software subsets.

## F.14 Polish Support

Polish Support provides the following software subsets:

- IOSPLCDEAPPS440 Polish CDE Additional Applications (Windowing Applications) – This software subset contains Polish resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSPLCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- IOSPLCDEDEV440 Polish CDE Software Development (Software Development) – This software subset contains Polish Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSPLCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- IOSPLCDEDT440 Polish CDE Desktop Environment (Windowing Environment) – This software subset contains Polish resource files and message catalogs for the Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOSPLCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSPLCDEMAIL440 Polish CDE Mail Interface (Mail Applications) – This software subset contains Polish resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSPLCDEDT440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.
- IOSPLCDEMIN440 Polish CDE Minimum Run-time Environment (Windowing Environment) – This software subset contains Polish resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSPLX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- IOSPLDECW440 Polish Additional DECwindows Applications (Windowing Applications) – This software subset contains Polish

resource files and UID files for the X11/DECwindows client applications `dypaint` and `dyprint`. This software subset requires the OSFDECW440 and IOSPLX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.

- IOSPLOLDDECW440 Polish Old Additional DECwindows Applications (Windows Applications) – This software subset contains Polish resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSPLX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- IOSPLOLDX11440 Polish Old X Environment (Windowing Environment) – This software subset contains Polish resource files and UID files for the X window applications `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSPLX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- IOSPLUCSBASE440 Polish Unicode Support (Operating System) – This software subset contains the Polish Unicode locale. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.
- IOSPLX11440 Polish Basic X Environment (Windowing Environment) – This software subset contains Polish X11/DECwindows required programs and shared libraries. It also provides Polish resource files and UID files. It is mandatory and requires the OSFX11440 and IOSWWBASE440 software subsets.
- IOSPLXDEV440 Polish X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Polish X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSPLX11440 software subsets.

## F.15 Russian Support

Russian Support provides the following software subsets:

- IOSRUDECW440 Russian Additional DECwindows Applications (Windowing Applications) – This software subset contains Russian resource files and UID files for the X11/DECwindows client applications `dypaint` and `dyprint`. This software subset requires the OSFDECW440 and IOSRUX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.
- IOSRUOLDDECW440 Russian Old Additional DECwindows Applications (Windows Applications) – This software subset contains

Russian resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the `OSFOLDDECW440` and `IOSRUX11440` software subsets. This software subset is mandatory if the `OSFOLDDECW440` software subset is installed.

- `IOSRUOLDX11440` Russian Old X Environment (Windowing Environment) – This software subset contains Russian resource files and UID files for the X window applications `dxpause` and `dxsession`. This software subset requires the `OSFOLDX11440` and `IOSRUX11440` software subsets. This software subset is mandatory if the `OSFOLDX11440` software subset is installed.
- `IOSRUUCSBASE440` Russian Unicode Support (Operating System) – This software subset contains the Russian Unicode locale. This software subset is mandatory and requires the `IOSWWUCSBASE440` software subset.
- `IOSRUX11440` Russian Basic X Environment (Windowing Environment) – This software subset contains Russian X11/DECwindows required programs and shared libraries. It also provides Russian resource files and UID files. It is mandatory and requires the `OSFX11440` and `IOSWWBASE440` software subsets.
- `IOSRUXDEV440` Russian X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Russian X/Motif window system client applications. This software subset is optional and requires the `IOSWWXDEV440` and `IOSRUX11440` software subsets.

## F.16 Slovak Support

Slovak Support provides the following software subsets:

- `IOSSKCDEAPPS440` Slovak CDE Additional Applications (Windowing Applications) – This software subset contains Slovak resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the `OSFCDEAPPS440` and `IOSSKCDEDT440` software subsets. This software subset is mandatory if the `OSFCDEAPPS440` software subset is installed.
- `IOSSKCDEDEV440` Slovak CDE Software Development (Software Development) – This software subset contains the Slovak Common Desktop Environment software development examples. This software subset requires the `OSFCDEDEV440` and `IOSSKCDEDT440` software subsets. This software subset is mandatory if the `OSFCDEDEV440` software subset is installed.

- **IOSSKCDEDT440 Slovak CDE Desktop Environment (Windowing Environment)** – This software subset contains Slovak resource files and message catalogs for the Common Desktop Environment user interface. This software subset requires the OSFCDEDT440 and IOSSKCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- **IOSSKCDEMAIL440 Slovak CDE Mail Interface (Mail Applications)** – This software subset contains Slovak resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSSKCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- **IOSSKCDEMIN440 Slovak CDE Minimum Run-time Environment (Windowing Environment)** – This software subsets contains Slovak resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSSKX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- **IOSSKDECW440 Slovak Additional DECwindows Applications (Windowing Applications)** – This software subset contains Slovak resource files and UID files for the X11/DECwindows client applications `dxpaint` and `dxprint`. This software subset requires the OSFDECW440 and IOSSKX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.
- **IOSSKOLDDECW440 Slovak Old Additional DECwindows Applications (Windows Applications)** – This software subset contains Slovak resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSSKX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- **IOSSKOLDX11440 Slovak Old X Environment (Windowing Environment)** – This software subset contains Slovak resource files and UID files for the X window applications: `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSSKX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- **IOSSKUCSBASE440 Slovak Unicode Support (Operating System)** – This software subset contains the Slovak Unicode locale. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.

- IOSSKX11440 Slovak Basic X Environment (Windowing Environment) – This software subset contains Slovak X11/DECwindows required programs and shared libraries. It also provides Slovak resource files and UID files. It is mandatory and requires the OSFX11440 and IOSWWBASE440 software subsets.
- IOSSKXDEV440 Slovak X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Slovak X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSSKX11440 software subsets.

## F.17 Slovene Support

Slovene Support provides the following software subsets:

- IOSSLX11440 Slovene Basic X Environment (Windowing Environment) – This software subset contains Slovene X11/DECwindows required keymaps, programs, and shared libraries. This software subset is mandatory and requires the OSFX11440 and IOSWWBASE440 software subsets.

## F.18 Spanish Support

Spanish Support contains the following software subsets:

- IOESCDEAPPS440 Spanish CDE Additional Applications (Windowing Applications) – This software subset contains Spanish resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOESCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- IOESCDEDEV440 Spanish CDE Software Development (Software Development) – This software subset contains Spanish Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOESCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- IOESCDEDT440 Spanish CDE Desktop Environment (Windowing Environment) – This software subset contains Spanish resource files and message catalogs for the Common Desktop Environment. This software subset requires the OSFCDEDT440 and IOESCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOESCDEHLP440 Spanish CDE Online Help (Windowing Environment) – This software subset contains Spanish online help files

of Common Desktop Environment. This software subset is optional and requires the IOESCEDT440 software subset.

- IOESCDEMAIL440 Spanish CDE Mail Interface (Mail Applications) – This software subset contains Spanish resource files and message catalogs of the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOESCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEMAIN440 software subset is installed.
- IOESCDEMIN440 Spanish CDE Minimum Run-time Environment (Windowing Environment) – This software subset contains Spanish resource files and message catalogs for Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOESX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- IOESDECW440 Spanish Additional DECwindows Applications (Windowing Applications) – This software subset contains Spanish resource files and UID files for the X11/DECwindows client applications `dxpaint` and `dxprint`. This software subset requires the OSFDECW440 and IOESX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.
- IOESOLDDECW440 Spanish Old Additional DECwindows Applications (Windows Applications) – This software subset contains Spanish resource files and UID files for X11/DECwindows client application `dxnotepad`, which will be retired in the future release of the operating system. This software subset requires the OSFOLDDECW440 and IOESX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- IOESOLDX11440 Spanish Old X Environment (Windowing Environment) – This software subset contains Spanish resource files and UID files for the X window applications: `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOESX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- IOESX11440 Spanish Basic X Environment (Windowing Environment) – This software subset contains Spanish X11/DECwindows required programs and shared libraries. It also provides Spanish resource files and UID files. This software subset is mandatory and requires the OSFX11440 and OSFEURLOC440 software subsets.
- IOESXDEV440 Spanish X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Spanish X/Motif window system client applications.



This software subset is optional and requires the IOSWWXDEV440 and IOSESX11440 software subsets.

## F.19 Swedish Support

Swedish Support provides the following software subsets:

- IOSSVCDEAPPS440 Swedish CDE Additional Applications (Windowing Applications) – This software subset contains Swedish resource files and message catalogs of Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS440 and IOSSVCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.
- IOSSVCDEDEV440 Swedish CDE Software Development (Software Development) – This software subset contains the Swedish Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSSVCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- IOSSVCDEDT440 Swedish CDE Desktop Environment (Windowing Environment) – This software subset contains Swedish resource files and message catalogs for the Common Desktop Environment user interface. This software subset requires the OSFCDEDT440 and IOSSVCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSSVCDEHLP440 Swedish CDE Online Help (Windowing Environment) – This software subset contains Swedish online help files for the Common Desktop Environment. This software subset is optional and requires the IOSSVCDEDT440 software subset.
- IOSSVCDEMAIL440 Swedish CDE Mail Interface (Mail Applications) – This software subset contains Swedish resource files and message catalogs of Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSSVCDEDT440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.
- IOSSVCDEMIN440 Swedish CDE Minimum Run-time Environment (Windowing Environment) – This software subset contains Swedish resource files and message catalogs for Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSSVX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- IOSSVDECW440 Swedish Additional DECwindows Applications (Windowing Applications) – This software subset contains Swedish

resource files and UID files for the X11/DECwindows client applications `dypaint` and `dxprint`. This software subset requires the OSFDECW440 and IOSSVX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.

- IOSSVOLDDECW440 Swedish Old Additional DECwindows Applications (Windows Applications) – This software subset contains Swedish resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and IOSSVX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.
- IOSSVOLDX11440 Swedish Old X Environment (Windowing Environment) – This software subset contains Swedish resource files and UID files for the X window applications `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSSVX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- IOSSVX11440 Swedish Basic X Environment (Windowing Environment) – This software subset contains Swedish X11/DECwindows required programs and shared libraries. It also provides Swedish resource files and UID files. It is mandatory and requires the OSFX11440 and OSFEURLOC440 software subsets.
- IOSSVXDEV440 Swedish X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Swedish X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSSVX11440 software subsets.

## F.20 Thai Support

Thai Support provides the following software subsets:

- IOSTHBASE440 Thai Base System (Operating System) – This software subset contains the Thai specific locales, methods, shared libraries, and services. This software subset is mandatory and requires the IOSWWBASE440 software subset.
- IOSTHBIN440 Standard Kernel Modules (Kernel Build Environment) – This software subset contains the kernel modules for the Thai terminal driver. This software subset is mandatory. This software subset requires the IOSWWBINCOM440 and OSFBIN440 software subsets.
- IOSTHCDEAPPS440 Thai CDE Additional Applications (Windowing Applications) – This software subset contains Thai resource files and message catalogs for the Common Desktop Environment additional

applications. This software subset requires the OSFCDEAPPS440 and IOSTHCDEDT440 software subsets. This software subset is mandatory if the OSFCDEAPPS440 software subset is installed.

- IOSTHCDEDEV440 Thai CDE Software Development (Software Development) – This software subset contains the Thai Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV440 and IOSTHCDEDT440 software subsets. This software subset is mandatory if the OSFCDEDEV440 software subset is installed.
- IOSTHCDEDT440 Thai CDE Desktop Environment (Windowing Environment) – This software subset contains Thai resource files and message catalogs for the Common Desktop Environment user interface. This software subset requires the OSFCDEDT440 and IOSTHCDEMIN440 software subsets. This software subset is mandatory if the OSFCDEDT440 software subset is installed.
- IOSTHCDEMAIL440 Thai CDE Mail Interface (Mail Applications) – This software subset contains Thai resource files and message catalogs for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL440 and IOSTHCDEDT440 software subsets. This software subset is mandatory if the OSFCDEMAIL440 software subset is installed.
- IOSTHCDEMIN440 Thai CDE Minimum Run-time Environment (Windowing Environment) – This software subset contains Thai resource files and message catalogs for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN440 and IOSTHX11440 software subsets. This software subset is mandatory if the OSFCDEMIN440 software subset is installed.
- IOSTHDECW440 Thai Additional DECwindows Applications (Windowing Applications) – This software subset contains the Thai resource files and UID files for the X11/DECwindows client applications `dypaint` and `dxprint`. This software subset requires the OSFDECW440 and IOSTHX11440 software subsets. This software subset is mandatory if the OSFDECW440 software subset is installed.
- IOSTHFONTM440 Thai DECwindows Mandatory Fonts (Windowing Environment) – This software subset contains workstation Thai mandatory font files for 75dpi and 100dpi displays.
- IOSTHOLDDECW440 Thai Old Additional DECwindows Applications (Windows Applications) – This software subset contains Thai resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440 and

IOSTHX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.

- IOSTHOLDX11440 Thai Old X Environment (Windowing Environment) – This software subset contains Thai resource files and UID files for the X window applications `dxpause` and `dxsession`. This software subset requires the OSFOLDX11440 and IOSTHX11440 software subsets. This software subset is mandatory if the OSFOLDX11440 software subset is installed.
- IOSTHPGMR440 Thai Software Development (Software Development) – This software subset contains the header files and libraries for Thai software development. This software subset is optional and requires the IOSTHBASE440 software subset.
- IOSTHPRINT440 Thai Printer Support Environment (Operating System) – This software subset contains the printer filters for Thai printers. This software subset is optional and requires the IOSWWPRINT440 and IOSTHBASE440 software subsets.
- IOSTHUCSBASE440 Thai Unicode Support (Operating System) – This software subset contains the Thai Unicode locale. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.
- IOSTHX11440 Thai Basic X Environment (Windowing Environment) – This software subset contains Thai X11/DECwindows required programs and shared libraries. It also provides Thai resource files and UID files. It is mandatory and requires the IOSWWX11440 and IOSTHBASE440 software subsets.
- IOSTHXDEV440 Thai X Window Software Development (Windowing Environment) – This software subset contains libraries and data files needed to produce Thai X/Motif window client applications. This software subset is optional and requires the IOSWWXDEV440 and IOSTHX11440 software subsets.
- IOSTHOLFONTS440 Thai Outline Fonts (Outline Fonts) – This software subset contains the optional Thai outline font files. This software subset requires the OSFAFM440 software subset.

## F.21 Turkish Support

Turkish Support provides the following software subsets:

- IOSTROLDDECW440 Turkish Old Additional DECwindows Applications (Windows Applications) – This software subset contains Turkish resource files and UID files for the X11/DECwindows client application `dxnotepad`, which will be retired in a future release of the operating system. This software subset requires the OSFOLDDECW440

and IOSTRX11440 software subsets. This software subset is mandatory if the OSFOLDDECW440 software subset is installed.

- IOSTRFONT100M440 Turkish DECwindows 100dpi Mandatory Fonts (Windowing Environment) – This software subset contains workstation Turkish 100dpi mandatory font files. This software subset is mandatory for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor. This software subset is optional for systems using a low resolution graphics monitor.
- IOSTRFONT100P440 Turkish DECwindows 100dpi Optional Fonts (Windowing Environment) – This software subset contains workstation Turkish 100dpi optional font files. This software subset is optional.
- IOSTRFONT75M440 Turkish DECwindows 75dpi Mandatory Fonts (Windowing Environment) – This software subset contains workstation Turkish mandatory 75dpi font files. This software subset is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15- inch monitor or a higher resolution graphics monitor.
- IOSTRFONT75P440 Turkish DECwindows 75dpi Optional Fonts (Windowing Environment) – This software subset contains workstation Turkish 75dpi optional font files.
- IOSTRUCSBASE440 Turkish Unicode Support (Operating System) – This software subset contains the Turkish Unicode locale. This software subset is mandatory and requires the IOSWWUCSBASE440 software subset.
- IOSTRX11440 Turkish Basic X Environment (Windowing Environment) – This software subset contains Turkish X11/DECwindows required programs and shared libraries. It also provides Turkish resource files and UID files. It is mandatory and requires the OSFX11440 and OSFEURLOC440 software subsets.
- IOSTROLFONT440 Turkish Outline Fonts (Outline Fonts) – This software subset contains the optional Turkish outline font files. This software subset requires the OSFAFM440 software subset.



# G

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## Installation Error Messages

This appendix explains the error messages you might see if there is a problem during an installation. The messages are sorted in alphabetical order.

**<dev>: unknown device**

The installation procedure detected that the distribution media to install from is not a supported installation device. Installation devices include Remote Installation Services (RIS) servers or rz\* (SCSI) disks and CD-ROMs.

**<string>: unknown machine type**

The program used to determine the type of machine being installed has not found the expected Alpha architecture. The value of *string* is the value returned from the program. The system installation cannot continue and you must contact your field service representative.

**A previous installation has left the system in a state that will not allow a restart.**

**Please halt and then reboot to install this system.**

This message may be displayed when `restart` is entered from the UNIX Shell. This message means that the installation has determined that a restart is not possible due to the current state of the system. You must first halt the system by entering the `halt` command and then reboot the system from the distribution media to start the installation procedure again.

**Cannot find <CLIENT> in risdb file. Check with the system manager of your RIS server.**

This message displays during a RIS installation. The name assigned to this system (`CLIENT`) during the installation does not have an entry in the `risdb` file on the RIS server. When this occurs, the problem is usually related to the use of a fully qualified hostname versus a non-fully qualified hostname, for example, `abcxyz.com` instead of `abcxyz`. This error is often caused by the particular name

service configured on the network and can usually be resolved by modifying the entry in the `risdb` file so that it matches `CLIENT`.

**Cannot find the name for \$CLIENT using bin/getname. Check with the system manager of your RIS server.**

During a RIS installation, the RIS server was unable to inform the client of its host name. The system being installed requests that the RIS server send its host name based on the IP address. The RIS server does this by executing the `~ris/bin/getname` command. The error occurs when the `getname` command could not return the host name. Generally, this is due to a problem with the particular name service configured on the network. This can often be resolved by adding an entry to the `/etc/hosts` file (on the RIS server) for the system being installed.

**Could not successfully write 'showboot' file.  
When the system halts, please enter your default boot disk as follows:**

**>>> set BOOTDEF\_DEV <boot\_default>**

This message indicates that the installation process could not successfully ascertain the default boot information from the console firmware and suggests that the console firmware variable `BOOTDEF_DEV` be set to the name of the disk that contains the newly-installed `root` file system. After setting this variable, reboot the system by issuing the `boot` command.

**Error copying MAKEDEV to /mnt.**

This message is displayed when the installation process fails to copy the `MAKEDEV` script from the memory file system (`/dev`) to the `dev` directory on the newly created `root` file system which is currently mounted on `/mnt (/mnt/dev)`. This is a fatal error for the installation. Invoke the installation again. If it fails, contact your field service representative.

**If the X server was started as part of the installation and repeated attempts to restart the installation fail, enter: restart nogui**

This message may be seen if the graphical user interface encountered an error or if you intentionally selected the `UNIX Shell` option. If an error occurred before the installation graphical user interface was started, there may be a problem starting the X environment for the installation. In this case, you can invoke the installation procedure with the text-based interface by entering the `restart nogui` command.



**No valid device is found. Contact a DIGITAL field service representative.**

There are no disks on the system that are supported for the purpose of storing the `root` file system.

Consult the Software Product Description (SPD) for a list of supported disks.

If you have disks that are listed as supported for use as system disks connected to your system, use the following steps to check the cables:

1. Turn off the system and all connected expansion cabinets.
2. Check the cabling to all disks and expansion cabinets.
3. Turn on all expansion cabinets.
4. Turn on the system.
5. Start the installation again by booting from the distribution media.

**Please change directory to / before restarting.**

This message displays if you have exited the installation setup process, accessed the UNIX Shell option and then entered `restart` to start the installation process again. This message appears only if you have changed (`cd`) out of the `root (/)` directory. You must change directory to `/` by using the `cd` command before entering `restart`.

**Please inspect the file `/var/tmp/install.FS.log` to identify the source of the failure.**

This message displays when the installation procedure encounters a file system error. Use the `cat /var/tmp/install.FS.log` command to view the contents of the `/var/tmp/install.FS.log` file to identify the source of the failure. The `/var/tmp/install.FS.log` file is written in the memory file system and will exist only until the system is booted.

The operating system provides the ability to view (or inspect) files by using various commands and utilities such as: `vi(ew)`, `ed`, `cat`, `head`, and `tail`. Each of these commands and utilities is available to you at the UNIX shell prompt.

**restart: not found**

This message may display if you have exited the installation setup procedure, accessed the UNIX Shell option, started another shell, and then entered `restart` to start the installation procedure again. You must exit the second shell before you can enter `restart` at the UNIX Shell to start the installation setup procedure again.

**Tape devices are not supported for installation.**

The installation procedure detected that the distribution media selected to install from is a tape device. Tape devices are not supported. The installation cannot continue. Select another device.

**The disk name "rz8" was not found on this system when attempting to validate the following filesystem(s): root usr**

---

**Note**

---

The disk name `rz8` in this message is only an example, and is replaced by the actual disk name not found on your system.

---

This error is the result of a disk name validation error that occurred during a cloned installation. The disk name `rz8` specified in the configuration description file (CDF) for the `root` and `usr` file systems was not found on your system. If you want to continue the cloned installation, ask the RIS server administrator to register your system for a different CDF. Then, restart the installation procedure.

**The installation procedure cannot prepare the system disk for new boot blocks.**

<Text of disklabel diagnostic>

This message is displayed when the installation procedure fails while writing a default disk label (with new boot blocks) to the disk selected for the `root` file system.

The corrective action depends on the error message from the `disklabel` command. In general, you should confirm that the system disk is properly connected, powered up, and so on. If it is not, fix it and restart the installation. If the disk is properly set up, restart the installation and select a different disk for the `root` file system. Contact your field service representative to determine the problem with the original disk. See the `disklabel(8)` reference page for additional information.

**The installation procedure cannot restore the system disk label and cannot update boot blocks.**

<Text of disklabel diagnostic>

This message is displayed when the installation procedure fails to restore the saved `disklabel` while updating the boot blocks on the disk selected for the `root` file system.

The corrective action depends on the error message from the `disklabel` command. In general, you should confirm that the system

disk is properly connected, powered up, and so on. If it is not, fix it and restart the installation. If the disk is properly set up, restart the installation and select a different disk for the `root` file system. Contact your field service representative to determine the problem with original disk. See the `disklabel(8)` reference page for additional information.

**The installation procedure failed attempting to write a default disklabel to device <disk>.**

This message is displayed when the installation procedure tries to write a default disk label to the disk specified. An attempt to apply the default label results in the installation procedure not being able to read a valid label on the specified disk. This failure most likely indicates a corrupt disk. Contact your field service representative.

**The installation procedure failed or was intentionally exited. To restart the installation, halt and reboot the system or enter: restart**

This message is seen if the installation interface (text-based or graphical) encountered an error or if you intentionally selected the `UNIX Shell` option. Enter the `restart` command or reboot your system from the distribution media to begin the installation procedure again.

**The installation procedure successfully installed the mandatory software subsets. Some optional subsets did not install correctly.**

**Would you like to try again to install these subsets? (y/n)[]:**

This message indicates that the `setld` command successfully installed the mandatory software subsets required for your system. However, it encountered a failure during the loading of one or more optional software subsets. Possible reasons could include a corrupt distribution media (CD-ROM or RIS), network errors (RIS), or a failing target disk device. You have the opportunity to reattempt the installation of the optional software subsets.

**The installation procedure was not able to correctly install the mandatory software subsets.**

This message indicates that the `setld` command was not able to install one or more of the mandatory software subsets required for your system. Possible reasons could include a corrupt distribution media (CD-ROM or RIS), network errors (RIS), or a failing target disk device. When this message is displayed, the installation procedure attempts to load software subsets again.

**The installation process has failed to determine the configured disk devices for this system.**

This message indicates that the utility used to identify configured disk devices on the target (client) system exited due to an error. Possible reasons include no devices found on the system, or the inability to write the list of devices found.

**The installation process has failed when attempting to open the file (/tmp/finder.data) containing the configured disk devices.**

This message indicates that the file containing the list of configured device on the target (client) could not be opened. This failure may indicate a memory failure because the /tmp/finder.data file exists in the memory file system. Restart the installation. If the installation fails again, contact your field service representative.

**The MAKEDEV command could not make the special files on device <device name> This error causes the installation procedure to stop. One possible cause for the error is a corrupt system disk. You may want to replace or use another system disk, and begin the installation again. If this error message appears a second time, contact a DIGITAL representative.**

The system is unable to create the device special file for the load device. The in-memory file system might not be mounted read-write. The MAKEDEV command might not understand how to create special files for the device. Verify that the file system is read-write by using the mount command. Restart the installation by pressing Ctrl/d. If the problem persists, contact your field service representative.

**The "rz25" disk type specified in the Configuration Description File does not match the name/type found on this system for the following device(s): "rz3/rz26"**

---

**Note**

---

The disk names `rz25` and `rz3/rz26` in this message are only examples, and are replaced by the actual nonmatching disk names on your system.

---

This error is the result of a disk type validation error that occurred during a cloned installation. The disk type in the configuration description file does not match the disk type on your system. In the example, the configuration description file (CDF) contains a disk type of `rz25` for the device name `rz3`. However, on your system, device `rz3` has a disk type `rz26`. If you want to continue the cloned

installation, ask the RIS server administrator to register your system for a different CDF. Then, restart the installation procedure.

**This error causes the installation procedure to stop. One possible cause for the error is a corrupt system disk. You may want to replace the current disk or use another system disk, and begin the installation again. If this error message appears a second time, contact a Compaq representative.**

This message is displayed when a fatal error has been detected during either a full or cloned installation. During a full installation, this message indicates a disk or file system error during file system creation. During a cloned installation, this error may indicate a Configuration Description File (CDF) validation error. A more descriptive message relating to the actual cause of the failure will precede this message.

#### **X Timed Out! Switching to Char Cell mode**

An attempt to start the X environment in order to run the graphical user interface to the installation timed out. The installation automatically switches to the text-based interface to the installation.

**vm\_swap\_init: warning /sbin/swapdefault swap device not found  
vm\_swap\_init: in swap over commitment mode**

These messages are displayed during a reboot and can be ignored.



# H

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## Sample Text-Based Installations

This appendix contains samples of the text-based default and custom installations.

### H.1 Sample Text-Based Default Installation

This section shows a sample text-based default installation from a CD-ROM on the drive with console device name dkb100 to a system disk with console device name dka100. Use this sample to follow the progress of your own default installation.

```
>>> boot dkb100

INIT-S-CPU...
INIT-S-RESET_TC...
INIT-S-ASIC...
INIT-S-MEM...
INIT-S-NVR...
INIT-S-SCC...
INIT-S-NI...
INIT-S-SCSI...
INIT-S-ISDN...
INIT-S-TC0...
AUDIT_BOOT_STARTS ...
AUDIT_CHECKSUM_GOOD
AUDIT_LOAD_BEGINS
AUDIT_LOAD_DONE

Digital UNIX boot - Thu Jan 14 15:03:19 EST 1999

Loading vmunix ...
Loading at 0xffffffff00000000
Current PAL Revision <0x10538>
Switching to OSF PALcode Succeeded
New PAL Revision <0x2012d>
Mapping Image Address Space
Mapping complete

Sizes:
text = 5808144
data = 1769136
bss = 3424400
Starting at 0xffffffff00210890

Alpha boot: available memory from 0xel4000 to 0x4000000
Digital UNIX X4.0F-4 (Rev. 1180); Thu Jan 14 16:04:52 EST 1999
physical memory = 64.00 megabytes.
available memory = 50.71 megabytes.
using 79 buffers containing 0.61 megabytes of memory
emx: dynamic addressing enabled
tc0 at nexus
```

```
scc0 at tc0 slot 7
tcds0 at tc0 slot 6
scsi0 at tcds0 slot 0
rz1 at scsi0 target 1 lun 0 (LID=0) (DEC RZ26 (C) DEC T392)
rz3 at scsi0 target 3 lun 0 (LID=1) (DEC RZ26 (C) DEC T386)
rz4 at scsi0 target 4 lun 0 (LID=2) (DEC RRD42 (C) DEC 4.5d)
scsil at tcds0 slot 1
rz9 at scsil target 1 lun 0 (LID=3) (DEC RZ26 (C) DEC 392A)
tzl3 at scsil target 5 lun 0 (LID=4) (DEC TLZ06 (C)DEC 0374)
ln0: DEC LANCE Module Name: PMAD-BA
ln0 at tc0 slot 7
ln0: DEC LANCE Ethernet Interface, hardware address: 08-00-2B-39-CA-C0
fb0 at tc0 slot 0
 1280X1024
DEC 3000 - M400 system
Firmware revision: 7.0
PALcode: Digital UNIX version 1.45
vm_swap_init: warning /sbin/swapdefault swap device not found
vm_swap_init: swap is set to lazy (over commitment) mode
```

INIT: SINGLE-USER MODE

Initializing system for Digital UNIX installation. Please wait...

\*\*\* Performing CDROM Installation

Loading installation process and scanning system hardware.

Welcome to the DIGITAL UNIX Installation Procedure

This procedure installs DIGITAL UNIX onto your system. You will be asked a series of system configuration questions. Until you answer all questions, your system is not changed in any way.

During the question and answer session, you can go back to any previous question and change your answer by entering: history  
You can get more information about a question by entering: help

There are two types of installations:

- o The Default Installation installs a mandatory set of software subsets on a predetermined file system layout.
- o The Custom Installation installs a mandatory set of software subsets plus optional software subsets that you select. You can customize the file system layout.

The UNIX Shell option puts your system in single-user mode with superuser privileges. This option is provided for experienced UNIX system administrators who want to perform file system or <Press RETURN for more>: Return  
disk maintenance tasks before the installation.

The Installation Guide contains more information about installing DIGITAL UNIX.

- 1) Default Installation
- 2) Custom Installation
- 3) UNIX Shell

Enter your choice: 1

Choose a hostname for this system. The hostname identifies the



system on the network. The hostname must start with a letter, and may include letters, numbers, periods and hyphens.

Enter the hostname for this system: mysystem

Enter a password to use as the root (superuser) password. Be sure to remember this password, because it is needed to log in as the user "root" following installation.

Enter root password:

Retype root password:

Select the location that best describes your site. This is to determine what time zone your site is in. If your location includes multiple time zones (e.g., Canada), the next question will ask you which of those you want.

- |              |               |               |               |
|--------------|---------------|---------------|---------------|
| 1) Australia | 12) GB-Eire   | 23) MET       | 34) Turkey    |
| 2) Belfast   | 13) GMT       | 24) Mexico    | 35) UCT       |
| 3) Brazil    | 14) Greenwich | 25) NZ        | 36) US        |
| 4) CET       | 15) Hongkong  | 26) NZ-CHAT   | 37) UTC       |
| 5) Canada    | 16) Iceland   | 27) Navajo    | 38) Universal |
| 6) Chile     | 17) Iran      | 28) PRC       | 39) W-SU      |
| 7) Cuba      | 18) Israel    | 29) Poland    | 40) WET       |
| 8) Dublin    | 19) Jamaica   | 30) ROC       | 41) Zulu      |
| 9) EET       | 20) Japan     | 31) ROK       |               |
| 10) Egypt    | 21) Libya     | 32) Singapore |               |
| 11) Factory  | 22) London    | 33) SystemV   |               |

Enter your choice: 36

Select one of these "US" time zones.

- |             |                   |              |
|-------------|-------------------|--------------|
| 1) Alaska   | 5) East-Indiana   | 9) Michigan  |
| 2) Aleutian | 6) Eastern        | 10) Mountain |
| 3) Arizona  | 7) Hawaii         | 11) Pacific  |
| 4) Central  | 8) Indiana-Starke | 12) Samoa    |

Enter your choice: 6

Enter the current date (as mm-dd-[cc]yy): 01-26-1999

Enter the current time in 24-hour format (as hh:mm): 14:37

Choose a disk to be the system disk where the DIGITAL UNIX software will be installed using the default layout:

- \* root file system on the "a" partition, type UFS
- \* /usr file system on the "g" partition, type UFS
- \* /var as part of /usr
- \* first swapping area (swap1) on the "b" partition
- \* no second swapping area (swap2)

This table lists the disks connected to your system.

|    | Disk Type | Device Name | Device Number | Controller Name | Controller Number |
|----|-----------|-------------|---------------|-----------------|-------------------|
| 1) | RZ26      | rz1         | 1             | SCSI            | 0                 |
| 2) | RZ26      | rz3         | 3             | SCSI            | 0                 |
| 3) | RZ26      | rz9         | 9             | SCSI            | 1                 |

Enter your choice: 1

root will use file system type UFS.

/usr will be on partition g of disk rz1

/usr will use file system type UFS.

swap1 will be on partition b of disk rz1

Because this is the default disk layout, no secondary swap area (swap2) will be created.

Because this is the default disk layout, /var will be on /usr.

\*\* Reviewing available software subsets. Please wait ...

Because this is a Default installation, only the mandatory software subsets will be loaded. These are:

- \* Base System
- \* Base System - Hardware Support
- \* Base System Management Applications and Utilities

<Press RETURN for more>: **Return**

- \* Basic Networking Configuration Applications
- \* Basic Networking Services
- \* Basic X Environment
- \* CDE Desktop Environment
- \* CDE Mail Interface
- \* CDE Minimum Runtime Environment
- \* Compiler Back End
- \* DECwindows 100dpi Fonts
- \* Graphical Base System Management Utilities
- \* Graphical Print Configuration Application
- \* Graphical System Administration Utilities
- \* Hardware Kernel Header and Common Files
- \* Hardware Kernel Modules
- \* Insight Manager
- \* Java 1.1.7B-2 Environment
- \* Kernel Header and Common Files
- \* LK401 Keyboard Support
- \* Local Printer Support
- \* Logical Storage Manager Kernel Header and Common Files
- \* Logical Storage Manager Kernel Modules
- \* NFS(tm) Configuration Application
- \* NFS(tm) Utilities
- \* Netscape Communicator V4.5

<Press RETURN for more>: **Return**

- \* Old X Environment
- \* POLYCTR advfs Kernel Modules
- \* Standard Kernel Modules
- \* Tcl Commands
- \* Tk Toolkit Commands
- \* X Fonts
- \* X Servers Base
- \* X Servers for TurboChannel

You have now answered all questions needed to install DIGITAL UNIX on this system. Press CTRL/C to cancel the installation; or type "history" to modify your earlier answers; or press RETURN to proceed with installation: **Return**

Continuing installation...

\*\*\* Creating the root file system on device rzla \*\*\*  
\*\*\* Creating the usr file system on device rzlg \*\*\*  
\*\*\* Creating the swap1 file system on device rzlb \*\*\*  
\*\*\* Loading the operating system software subsets \*\*\*

The installation procedure will now load the software on your disk partitions. This process will take from 45 to 120 minutes to complete depending on your distribution media and processor type.

Checking file system space required to install specified subsets:  
Working...Tue Jan 26 14:39:18 EST 1999

File system space checked OK.

34 subset(s) will be installed.

Loading 1 of 34 subset(s)....

Base System  
Copying from /ALPHA/BASE (disk)  
Working...Tue Jan 26 14:39:40 EST 1999  
Verifying  
Working...Tue Jan 26 14:41:45 EST 1999

Loading 2 of 34 subset(s)....

Base System - Hardware Support  
Copying from /ALPHA/BASE (disk)  
Working...Tue Jan 26 14:42:26 EST 1999  
Verifying

Loading 3 of 34 subset(s)....

Compiler Back End  
Copying from /ALPHA/BASE (disk)  
Verifying

Loading 4 of 34 subset(s)....

Kernel Header and Common Files  
Copying from /ALPHA/BASE (disk)  
Working...Tue Jan 26 14:43:05 EST 1999  
Verifying  
Working...Tue Jan 26 14:44:22 EST 1999

Loading 5 of 34 subset(s)....

Standard Kernel Modules  
Copying from /ALPHA/BASE (disk)  
Working...Tue Jan 26 14:44:41 EST 1999  
Verifying

Loading 6 of 34 subset(s)....

Hardware Kernel Header and Common Files  
Copying from /ALPHA/BASE (disk)  
Verifying

```
Loading 7 of 34 subset(s)....

Hardware Kernel Modules
 Copying from /ALPHA/BASE (disk)
 Working....Tue Jan 26 14:45:11 EST 1999
 Verifying

Loading 8 of 34 subset(s)....

Logical Storage Manager Kernel Header and Common Files
 Copying from /ALPHA/BASE (disk)
 Verifying

Loading 9 of 34 subset(s)....

Logical Storage Manager Kernel Modules
 Copying from /ALPHA/BASE (disk)
 Verifying

Loading 10 of 34 subset(s)....

POLYCTR advfs Kernel Modules
 Copying from /ALPHA/BASE (disk)
 Verifying

Loading 11 of 34 subset(s)....

Tcl Commands
 Copying from /ALPHA/BASE (disk)
 Working....Tue Jan 26 14:46:05 EST 1999
 Verifying

Loading 12 of 34 subset(s)....

Basic Networking Services
 Copying from /ALPHA/BASE (disk)
 Working....Tue Jan 26 14:46:21 EST 1999
 Verifying

Loading 13 of 34 subset(s)....

NFS(tm) Utilities
 Copying from /ALPHA/BASE (disk)
 Verifying

Loading 14 of 34 subset(s)....

Local Printer Support
 Copying from /ALPHA/BASE (disk)
 Verifying

Loading 15 of 34 subset(s)....

Basic X Environment
 Copying from /ALPHA/BASE (disk)
 Working....Tue Jan 26 14:47:02 EST 1999
 Verifying
 Working....Tue Jan 26 14:47:43 EST 1999

Loading 16 of 34 subset(s)....

CDE Minimum Runtime Environment
 Copying from /ALPHA/BASE (disk)
 Verifying
```

Loading 17 of 34 subset(s)....

CDE Desktop Environment  
Copying from /ALPHA/BASE (disk)  
Working...Tue Jan 26 14:48:16 EST 1999  
Verifying  
Working...Tue Jan 26 14:50:17 EST 1999

Loading 18 of 34 subset(s)....

X Servers Base  
Copying from /ALPHA/BASE (disk)  
Verifying

Loading 19 of 34 subset(s)....

X Servers for TurboChannel  
Copying from /ALPHA/BASE (disk)  
Verifying

Loading 20 of 34 subset(s)....

X Fonts  
Copying from /ALPHA/BASE (disk)  
Working...Tue Jan 26 14:51:02 EST 1999  
Verifying

Loading 21 of 34 subset(s)....

DECwindows 100dpi Fonts  
Copying from /ALPHA/BASE (disk)  
Verifying

Loading 22 of 34 subset(s)....

LK401 Keyboard Support  
Copying from /ALPHA/BASE (disk)  
Verifying

Loading 23 of 34 subset(s)....

Old X Environment  
Copying from /ALPHA/BASE (disk)  
Verifying

Loading 24 of 34 subset(s)....

CDE Mail Interface  
Copying from /ALPHA/BASE (disk)  
Verifying

Loading 25 of 34 subset(s)....

Tk Toolkit Commands  
Copying from /ALPHA/BASE (disk)  
Verifying

Loading 26 of 34 subset(s)....

Java 1.1.7B-2 Environment  
Copying from /ALPHA/BASE (disk)  
Verifying

Loading 27 of 34 subset(s)....  
Netscape Communicator V4.5  
  Copying from /ALPHA/BASE (disk)  
  Working....Tue Jan 26 14:52:36 EST 1999  
  Verifying

Loading 28 of 34 subset(s)....  
Base System Management Applications and Utilities  
  Copying from /ALPHA/BASE (disk)  
  Working....Tue Jan 26 14:53:12 EST 1999  
  Verifying

Loading 29 of 34 subset(s)....  
Basic Networking Configuration Applications  
  Copying from /ALPHA/BASE (disk)  
  Verifying

Loading 30 of 34 subset(s)....  
NFS(tm) Configuration Application  
  Copying from /ALPHA/BASE (disk)  
  Verifying

Loading 31 of 34 subset(s)....  
Graphical Base System Management Utilities  
  Copying from /ALPHA/BASE (disk)  
  Working....Tue Jan 26 14:53:52 EST 1999  
  Verifying

Loading 32 of 34 subset(s)....  
Graphical System Administration Utilities  
  Copying from /ALPHA/BASE (disk)  
  Verifying

Loading 33 of 34 subset(s)....  
Graphical Print Configuration Application  
  Copying from /ALPHA/BASE (disk)  
  Verifying

Loading 34 of 34 subset(s)....  
Insight Manager  
  Copying from /ALPHA/BASE (disk)  
  Working....Tue Jan 26 14:54:34 EST 1999  
  Verifying

34 of 34 subset(s) installed successfully.

The installation software has successfully installed your system.

There are logfiles that contain a record of your installation.  
These are:

|                                |                                  |
|--------------------------------|----------------------------------|
| /var/adm/smlogs/install.cdf    | - configuration description file |
| /var/adm/smlogs/install.log    | - general log file               |
| /var/adm/smlogs/install.FS.log | - file system creation logs      |
| /var/adm/smlogs/setld.log      | - log for the setld(8) utility   |

```
/var/adm/smlogs/fverify.log - verification log file
```

The above message is also recorded in /etc/motd for your future reference.

Issue the following console commands to set your default bootpath variable and to boot your system disk to multiuser:

```
>>> set boot_osflags A
>>> set bootdef_dev DKA100
>>> boot
```

```
syncing disks... done
CPU 0: Halting... (transferring to monitor)
```

```
?05 HLT INSTR
PC= FFFFFFFF.00212520 PSL= 00000000.00000005
```

```
>>> set boot_osflags A
```

```
BOOT_OSFLAGS = A
```

```
>>> set bootdef_dev DKA100
```

```
BOOTDEF_DEV = DKA100
```

```
>>> boot
```

**System initialization messages display as the system boots from the newly-installed system. Software configuration begins next:**

```
*** SYSTEM CONFIGURATION ***
```

```
Configuring "Base System " (OSFBASE440)
```

```
Configuring "Base System - Hardware Support " (OSFHWBASE440)
```

```
Configuring "Compiler Back End " (OSFCMPLRS440)
```

```
Configuring "Kernel Header and Common Files " (OSFBINCOM440)
```

```
Configuring "Standard Kernel Modules " (OSFBIN440)
```

```
Configuring "Hardware Kernel Header and Common Files" (OSFHWBINCOM440)
```

```
Configuring "Hardware Kernel Modules " (OSFHWBIN440)
```

```
Configuring "Logical Storage Manager Kernel Header and Common Files"
(OSFLSMBINCOM440)
```

```
Configuring "Logical Storage Manager Kernel Modules" (OSFLSMBIN440)
```

```
Configuring "POLYCTR advfs Kernel Modules " (OSFADVFSBIN440)
```

```
Configuring "Tcl Commands " (OSFTCLBASE440)
```

```
Configuring "Basic Networking Services " (OSFCLINET440)
```

```
Configuring "NFS(tm) Utilities " (OSFNFS440)
```

Configuring "Local Printer Support " (OSFPRINT440)  
Configuring "Basic X Environment " (OSFXL1440)  
Configuring "CDE Minimum Runtime Environment " (OSFCDEMIN440)  
Configuring "CDE Desktop Environment " (OSFCDEDT440)  
Configuring "X Servers Base " (OSFSER440)  
Configuring "X Servers for TurboChannel " (OSFSERTC440)  
Configuring "X Fonts " (OSFMITFONT440)  
Configuring "DECwindows 100dpi Fonts " (OSFFONT15440)  
Configuring "LK401 Keyboard Support " (OSFKBDLK401440)  
Configuring "Old X Environment " (OSFOLDX11440)  
Configuring "CDE Mail Interface " (OSFCDEMAIL440)  
Configuring "Tk Toolkit Commands " (OSFTKBASE440)  
Configuring "Java 1.1.7B-2 Environment " (OSFJAVA440)  
Configuring "Netscape Communicator V4.5 " (OSFNETSCAPE440)  
Configuring "Base System Management Applications and Utilities" (OSFSYSMAN440)  
Configuring "Basic Networking Configuration Applications" (OSFNETCONF440)  
Configuring "NFS(tm) Configuration Application " (OSFNFSCONF440)  
Configuring "Graphical Base System Management Utilities" (OSFXSYSMAN440)  
Configuring "Graphical System Administration Utilities" (OSFXADMIN440)  
Configuring "Graphical Print Configuration Application" (OSFXPRINT440)  
Configuring "Insight Manager " (OSFIMXE440)

The system name assigned to your machine is 'mysystem'.

The system will now automatically build a kernel and then reboot. This will take approximately 15 minutes, depending on the processor type.

When the login prompt appears after the system has rebooted, use 'root' as the login name and the SUPERUSER password that was entered during this procedure, to log into the system.

\*\*\* PERFORMING KERNEL BUILD \*\*\*

Working...Tue Jan 26 15:06:06 EST 1999  
Working...Tue Jan 26 15:08:07 EST 1999

syncing disks... done  
rebooting... (transferring to monitor)



## H.2 Sample Text-Based Custom Installation

This section shows a sample text-based custom installation from a remote installation services (RIS) server named `serveris` using a network interface with console device name `ez0`. Use this sample to follow the progress of your own custom installation.

```
>>> boot ez0

INIT-S-CPU...
INIT-S-RESET_TC...
INIT-S-ASIC...
INIT-S-MEM...
INIT-S-NVR...
INIT-S-SCC...
INIT-S-NI...
INIT-S-SCSI...
INIT-S-ISDN...
INIT-S-TC0...
AUDIT_BOOT_STARTS ...
AUDIT_BOOT_REQ
Host server IP address is 16.69.224.75
AUDIT_BSERVER_FOUND
AUDIT_LOAD_BEGINS
.....
AUDIT_LOAD_DONE

Secondary boot program - Thu Jan 14 15:58:08 EST 1999

Loading vmunix ...
Loading at 0xffffffff00000000
Current PAL Revision <0x10538>
Switching to OSF PALcode Succeeded
New PAL Revision <0x2012d>
Mapping Image Address Space
Mapping complete

Sizes:
text = 5808144
data = 1769136
bss = 3424400
Starting at 0xffffffff00210890

Broadcasting BOOTP Request
Alpha boot: available memory from 0xe08000 to 0x4000000
Digital UNIX X4.0F-4 (Rev. 1180); Thu Jan 14 16:04:52 EST 1999
physical memory = 64.00 megabytes.
available memory = 50.67 megabytes.
using 79 buffers containing 0.61 megabytes of memory
emx: dynamic addressing enabled
tc0 at nexus
scc0 at tc0 slot 7
tcds0 at tc0 slot 6
scsi0 at tcds0 slot 0
rz1 at scsi0 target 1 lun 0 (LID=0) (DEC RZ26 (C) DEC T392)
rz3 at scsi0 target 3 lun 0 (LID=1) (DEC RZ26 (C) DEC T386)
rz4 at scsi0 target 4 lun 0 (LID=2) (DEC RRD42 (C) DEC 4.5d)
scsil at tcds0 slot 1
rz9 at scsil target 1 lun 0 (LID=3) (DEC RZ26 (C) DEC 392A)
```

```
tzl3 at scsil target 5 lun 0 (LID=4) (DEC TLZ06 (C)DEC 0374)
ln0: DEC LANCE Module Name: PMAD-BA
ln0 at tc0 slot 7
ln0: DEC LANCE Ethernet Interface, hardware address: 08-00-2B-39-CA-C0
fb0 at tc0 slot 0
 1280X1024
DEC 3000 - M400 system
Firmware revision: 7.0
PALcode: Digital UNIX version 1.45
Booted from Network Interface (BOOTP 0 7 0 0 0 2 CORE-IO 08-00-2B-39-CA-C0 1)
netblk.cliipadr 1045e0c5
hostname: mysystem
vm_swap_init: warning /sbin/swapdefault swap device not found
vm_swap_init: swap is set to lazy (over commitment) mode
```

INIT: SINGLE-USER MODE

Initializing system for Digital UNIX installation. Please wait...

\*\*\* Performing RIS Installation from serveris

Loading installation process and scanning system hardware.

Welcome to the DIGITAL UNIX Installation Procedure

This procedure installs DIGITAL UNIX onto your system. You will be asked a series of system configuration questions. Until you answer all questions, your system is not changed in any way.

During the question and answer session, you can go back to any previous question and change your answer by entering: history  
You can get more information about a question by entering: help

There are two types of installations:

- o The Default Installation installs a mandatory set of software subsets on a predetermined file system layout.
- o The Custom Installation installs a mandatory set of software subsets plus optional software subsets that you select. You can customize the file system layout.

The UNIX Shell option puts your system in single-user mode with superuser privileges. This option is provided for experienced UNIX system administrators who want to perform file system or <Press RETURN for more>:  
disk maintenance tasks before the installation.

The Installation Guide contains more information about installing DIGITAL UNIX.

- 1) Default Installation
- 2) Custom Installation
- 3) UNIX Shell

Enter your choice: 2

Hostname "mysystem" has been assigned to this system.

Enter a password to use as the root (superuser) password.  
Be sure to remember this password, because it is needed to log in as the user "root" following installation.

Enter root password: *password*

Retype root password: *password*

Location and time zone have been set from server: US/Eastern

System clock has been set via network: Tue Jan 26 15:55:04 EST 1999

Select a disk for DIGITAL UNIX installation. The root file system will be placed on the "a" partition of this disk.

|    | Disk Type | Device Name | Device Number | Controller Name | Controller Number |
|----|-----------|-------------|---------------|-----------------|-------------------|
| 1) | RZ26      | rz1         | 1             | SCSI            | 0                 |
| 2) | RZ26      | rz3         | 3             | SCSI            | 0                 |
| 3) | RZ26      | rz9         | 9             | SCSI            | 1                 |

Enter your choice: 1

The rz1 disk has a partition table that is not recommended.

|             | Partition | Start   | Size    | End     | Overlaps      |
|-------------|-----------|---------|---------|---------|---------------|
| Recommended | a         | 0       | 262144  | 262143  | c             |
|             | b         | 262144  | 262144  | 524287  | c             |
|             | c         | 0       | 2050860 | 2050859 | a b d e f g   |
|             | d         | 524288  | 508857  | 1033144 | c g           |
|             | e         | 1033145 | 508857  | 1542001 | c g           |
|             | f         | 1542002 | 508858  | 2050859 | c g           |
|             | g         | 524288  | 1526572 | 2050859 | c d e f       |
|             | h         | 0       | 0       | -1      |               |
| Existing    | a         | 0       | 131072  | 131071  | c             |
|             | b         | 131072  | 262144  | 393215  | c             |
|             | c         | 0       | 2050860 | 2050859 | a b d e f g h |
|             | d         | 393216  | 552548  | 945763  | c g           |
|             | e         | 945764  | 552548  | 1498311 | c g h         |
|             | f         | 1498312 | 552548  | 2050859 | c h           |
|             | g         | 393216  | 819200  | 1212415 | c d e         |
|             | h         | 1212416 | 838444  | 2050859 | c e f         |

Choose which partition table to use.

- 1) Recommended table
- 2) Existing table

Enter your choice: 1

The default disk layout is:

- \* root file system on the "a" partition, type UFS
- \* /usr file system on the "g" partition, type UFS
- \* /var as part of /usr
- \* first swapping area (swap1) on the "b" partition
- \* no second swapping area (swap2)

Use this default disk layout (y/n) ? y

root will use file system type UFS.

/usr will be on partition g of disk rz1

/usr will use file system type UFS.

swap1 will be on partition b of disk rz1

Because this is the default disk layout, no secondary

swap area (swap2) will be created.

Because this is the default disk layout, /var will be on /usr.

\*\* Reviewing available software subsets. Please wait ...

The following subsets are mandatory and will be installed automatically unless you choose to exit without installing any subsets:

- \* Base System
- \* Base System - Hardware Support
- \* Base System Management Applications and Utilities

<Press RETURN for more>:

- \* Basic Networking Configuration Applications
- \* Basic Networking Services
- \* Basic X Environment
- \* CDE Desktop Environment
- \* CDE Mail Interface
- \* CDE Minimum Runtime Environment
- \* Compiler Back End
- \* DECwindows 100dpi Fonts
- \* Graphical Base System Management Utilities
- \* Graphical Print Configuration Application
- \* Graphical System Administration Utilities
- \* Hardware Kernel Header and Common Files
- \* Hardware Kernel Modules
- \* Insight Manager
- \* Java 1.1.7B-2 Environment
- \* Kernel Header and Common Files
- \* LK401 Keyboard Support
- \* Local Printer Support
- \* Logical Storage Manager Kernel Header and Common Files
- \* Logical Storage Manager Kernel Modules
- \* NFS(tm) Configuration Application
- \* NFS(tm) Utilities
- \* Netscape Communicator V4.5

<Press RETURN for more>:

- \* Old X Environment
- \* POLYCTR advfs Kernel Modules
- \* Standard Kernel Modules
- \* Tcl Commands
- \* Tk Toolkit Commands
- \* X Fonts
- \* X Servers Base
- \* X Servers for TurboChannel

Free space remaining after mandatory subsets (root/usr): 67.8 MB/491 MB

## H.2.1 Optional Software Subsets for a Custom Installation

This section lists the optional software subsets that are available for a custom installation regardless of the interface (text-based or graphical) you are using.

Optional subsets are listed below. There may be more optional subsets than can be presented on a single screen. If this is the case, you can choose subsets screen by screen, or all at once on the last screen. All of the choices you make will be collected for your confirmation before any subsets are installed.

- General Applications:
- 1) Additional Terminfo databases
  - 2) Computer Aided System Tutor

Add to your choices, or press RETURN for next page.  
Free space remaining (root/usr): 67.8 MB/491 MB  
Choices (for example, 1 2 4-6): **history**

Select the question you wish to re-visit.

- 1) Installation type ( 1 )
- 2) Set root password ( encryption )
- 3) Confirm root password ( encryption )
- 4) Select root disk ( rz1 )
- 5) Select partition table for root disk ( recommended )
- 6) Use default disk layout? ( 1 )
- 7) DISMISS history menu

Enter your choice: **6**

The default disk layout is:

- \* root file system on the "a" partition, type UFS
- \* /usr file system on the "g" partition, type UFS
- \* /var as part of /usr
- \* first swapping area (swap1) on the "b" partition
- \* no second swapping area (swap2)

Use this default disk layout (y/n) ? **n**

Select the file system type for the root file system.

- 1) UFS -- UNIX file system
- 2) AdvFS -- advanced file system

Enter your choice: **2**

Select the disk where the /usr file system will reside.

|    | Disk Type | Device Name | Device Number | Controller Name | Controller Number |
|----|-----------|-------------|---------------|-----------------|-------------------|
| 1) | RZ26      | rz1         | 1             | SCSI            | 0                 |
| 2) | RZ26      | rz3         | 3             | SCSI            | 0                 |
| 3) | RZ26      | rz9         | 9             | SCSI            | 1                 |

Enter your choice: **1**

Select the rz1 partition where the /usr file system will reside.

|    | Partition | Start   | Size    | End     | Overlaps |
|----|-----------|---------|---------|---------|----------|
| 1) | b         | 262144  | 262144  | 524287  | c        |
| 2) | d         | 524288  | 508857  | 1033144 | c g      |
| 3) | e         | 1033145 | 508857  | 1542001 | c g      |
| 4) | f         | 1542002 | 508858  | 2050859 | c g      |
| 5) | g         | 524288  | 1526572 | 2050859 | c d e f  |

Enter your choice: **g**

Select the file system type for the /usr file system.

- 1) UFS -- UNIX file system
- 2) AdvFS -- advanced file system

Enter your choice: **2**

Select the disk where the first swapping area (swap1) will reside.

|    | Disk Type | Device Name | Device Number | Controller Name | Controller Number |
|----|-----------|-------------|---------------|-----------------|-------------------|
| 1) | RZ26      | rz1         | 1             | SCSI            | 0                 |
| 2) | RZ26      | rz3         | 3             | SCSI            | 0                 |
| 3) | RZ26      | rz9         | 9             | SCSI            | 1                 |

Enter your choice: **1**

swap1 will be on the "b" partition of disk rz1 because all of its other partitions are already in use.

You may choose to have a second swapping area (swap2).  
Do you want a second swapping area (y/n) ? **y**

Select the disk where the second swapping area (swap2) will reside.

|    | Disk Type | Device Name | Device Number | Controller Name | Controller Number |
|----|-----------|-------------|---------------|-----------------|-------------------|
| 1) | RZ26      | rz3         | 3             | SCSI            | 0                 |
| 2) | RZ26      | rz9         | 9             | SCSI            | 1                 |

Enter your choice: **1**

Select the rz3 partition where the second swapping area (swap2) will reside.

|    | Partition | Start   | Size    | End     | Overlaps    |
|----|-----------|---------|---------|---------|-------------|
| 1) | a         | 0       | 262144  | 262143  | c           |
| 2) | b         | 262144  | 262144  | 524287  | c           |
| 3) | c         | 0       | 2050860 | 2050859 | a b d e f g |
| 4) | d         | 524288  | 508857  | 1033144 | c g         |
| 5) | e         | 1033145 | 508857  | 1542001 | c g         |
| 6) | f         | 1542002 | 508858  | 2050859 | c g         |
| 7) | g         | 524288  | 1526572 | 2050859 | c d e f     |

Enter your choice: **b**

You can make /var a separate file system, or you can have it share space on the /usr file system.  
Should /var be a separate file system (y/n) ? **n**

You have requested this file system layout:

- \* root file system on rz1a, type AdvFS
- \* /usr file system on rz1g, type AdvFS
- \* /var will be on /usr
- \* first swapping area (swap1) will be on rz1b
- \* second swapping area (swap2) will be on rz3b

Is this the correct file system layout (y/n) ? **y**

\*\* Reviewing available software subsets. Please wait ...

The following subsets are mandatory and will be installed automatically unless you choose to exit without installing any subsets:

- \* Base System
  - \* Base System - Hardware Support
  - \* Base System Management Applications and Utilities
  - \* Basic Networking Configuration Applications
  - \* Basic Networking Services
  - \* Basic X Environment
  - \* CDE Desktop Environment
  - \* CDE Mail Interface
  - \* CDE Minimum Runtime Environment
  - \* Compiler Back End
  - \* DECwindows 100dpi Fonts
  - \* Graphical Base System Management Utilities
  - \* Graphical Print Configuration Application
  - \* Graphical System Administration Utilities
  - \* Hardware Kernel Header and Common Files
  - \* Hardware Kernel Modules
- <Press RETURN for more>: **Return**
- \* Insight Manager
  - \* Java 1.1.7B-2 Environment
  - \* Kernel Header and Common Files
  - \* LK401 Keyboard Support
  - \* Local Printer Support
  - \* Logical Storage Manager Kernel Header and Common Files
  - \* Logical Storage Manager Kernel Modules
  - \* NFS(tm) Configuration Application
  - \* NFS(tm) Utilities
  - \* Netscape Communicator V4.5
  - \* Old X Environment
  - \* POLYCTR advfs
  - \* POLYCTR advfs Kernel Modules
  - \* Standard Kernel Modules
  - \* Tcl Commands
  - \* Tk Toolkit Commands
  - \* X Fonts
  - \* X Servers Base
  - \* X Servers for TurboChannel

Free space remaining after mandatory subsets (root/usr): 65.2 MB/488 MB

Optional subsets are listed below. There may be more optional

<Press RETURN for more>: **Return**  
subsets than can be presented on a single screen. If this is the case, you can choose subsets screen by screen, or all at once on the last screen. All of the choices you make will be collected for your confirmation before any subsets are installed.

- General Applications:
  - 1) Additional Terminfo databases
  - 2) Computer Aided System Tutor
  - 3) DOS tools
  - 4) GNU Emacs
  - 5) Local Area Transport (LAT)
  - 6) UNIX(tm) SVID2 Compatibility
  - 7) UNIX(tm) to UNIX(tm) Copy Facility
- Kernel Build Environment:
  - 8) ATM Kernel Header and Common Files

9) ATM Kernel Modules

- Mail Applications:

10) DECwindows Mail Interface

Add to your choices, or press RETURN for next page.

Free space remaining (root/usr): 65.2 MB/488 MB

Choices (for example, 1 2 4-6): Return

11) RAND Corp. Mail Handler (MH)

- Network-Server/Communications:

12) ATM Commands

13) Additional Networking Services

14) Dataless Management Services

15) Remote Installation Service

- Printing Environment:

16) Adobe Font Metric Files

- Reference Pages:

17) Ref Pages: Admin/User

18) Ref Pages: CDE Admin/User

19) Ref Pages: CDE Development

20) Ref Pages: Programming

21) Ref Pages: Windows Admin/User

22) Ref Pages: Windows Programming

- Software Development:

Add to your choices, or press RETURN for next page.

Free space remaining (root/usr): 65.2 MB/488 MB

Choices (for example, 1 2 4-6): Return

23) CDA(tm) Software Development

24) CDA(tm) for X/Motif Development

25) CDE Software Development and Programming Examples

26) GNU Revision Control System

27) Ladebug Debugger Version 4.0-49

28) Ladebug Debugger Version 4.0-49 Release Notes

29) Ladebug Debugger graphical user interface

30) Ladebug Debugger remote server

31) Programming Examples

32) Software Development Desktop Environment

33) Software Development Tools and Utilities

34) Source Code Control System

35) Standard Header Files

36) Standard Programmer Commands

37) Static Libraries

38) X Window and X/Motif Header Files

39) X Window and X/Motif Programming Examples

40) X Window and X/Motif Software Development

41) X Window and X/Motif Static Libraries

Add to your choices, or press RETURN for next page.

Free space remaining (root/usr): 65.2 MB/488 MB

Choices (for example, 1 2 4-6): Return

- Supplemental Documentation:

42) XIE Version 5 Online Documentation

- System Administration:

43) C2-Security

44) C2-Security GUI

45) Environmental Monitoring

46) Kernel Debugging Tools



- 47) Logical Storage Manager
- 48) Logical Storage Manager GUI
- 49) Logical Volume Manager
- 50) Obsolete Commands and Utilities
- 51) Obsolete Locale databases
- 52) Single-Byte European Locales
- 53) System Accounting Utilities
- 54) System Exercisers

- Text Processing:
- 55) Doc. Preparation Tools
  - 56) Doc. Preparation Tools Extensions

Add to your choices, or press RETURN for next page.

Free space remaining (root/usr): 65.2 MB/488 MB

Choices (for example, 1 2 4-6):

- Windowing Environment:
- 57) DECwindows 75dpi Fonts
  - 58) LK201 Keyboard Support
  - 59) LK411 Keyboard Support
  - 60) LK421 Keyboard Support
  - 61) LK444 Keyboard Support
  - 62) PCXAL Keyboard Support
  - 63) X Customizations for OEM
  - 64) X Servers for Open3D
  - 65) X Servers for PCbus
  - 66) X/Motif 1.1

- Windows Applications:
- 67) Additional DECwindows Applications
  - 68) Additional X Applications
  - 69) CDE Additional Applications
  - 70) Demo X Applications
  - 71) Nested X Server
  - 72) Old Additional DECwindows Applications

Add to your choices, or press RETURN for next page.

Free space remaining (root/usr): 65.2 MB/488 MB

Choices (for example, 1 2 4-6):

- 73) Virtual X Frame Buffer

The following choices override your previous selections:

- 74) ALL mandatory and all optional subsets
- 75) MANDATORY subsets only
- 76) CANCEL selections and redisplay menus

Add to your choices, or press RETURN to confirm previous choices.

Free space remaining (root/usr): 65.2 MB/488 MB

Choices (for example, 1 2 4-6): **74**

The following subsets will be loaded:

- \* System Accounting Utilities
- \* POLYCTR advfs
- \* POLYCTR advfs Kernel Modules
- \* Adobe Font Metric Files
- \* ATM Commands
- \* ATM Kernel Modules
- \* ATM Kernel Header and Common Files
- \* Base System
- \* Standard Kernel Modules
- \* Kernel Header and Common Files

```

* C2-Security
* CDA(tm) Software Development
* CDE Additional Applications
* CDE Software Development and Programming Examples
* CDE Desktop Environment
* CDE Mail Interface
* Ref Pages: CDE Development
* Ref Pages: CDE Admin/User
* CDE Minimum Runtime Environment
<Press RETURN for more>: Return
* Basic Networking Services
* Compiler Back End
* Obsolete Locale databases
* Doc. Preparation Tools
* Doc. Preparation Tools Extensions
* Additional DECwindows Applications
* Dataless Management Services
* DOS tools
* GNU Emacs
* Environmental Monitoring
* Single-Byte European Locales
* Programming Examples
* System Exercisers
* DECwindows 100dpi Fonts
* DECwindows 75dpi Fonts
* Base System - Hardware Support
* Hardware Kernel Modules
* Hardware Kernel Header and Common Files
* Insight Manager
* Standard Header Files
* Additional Networking Services
* Java 1.1.7B-2 Environment
* LK201 Keyboard Support
<Press RETURN for more>: Return
* LK401 Keyboard Support
* LK411 Keyboard Support
* LK421 Keyboard Support
* LK444 Keyboard Support
* PCXAL Keyboard Support
* Kernel Debugging Tools
* Local Area Transport (LAT)
* Ladebug Debugger Version 4.0-49
* Ladebug Debugger Version 4.0-49 Release Notes
* Ladebug Debugger graphical user interface
* Ladebug Debugger remote server
* Computer Aided System Tutor
* Static Libraries
* Logical Storage Manager
* Logical Storage Manager Kernel Modules
* Logical Storage Manager Kernel Header and Common Files
* Logical Storage Manager GUI
* Logical Volume Manager
* Ref Pages: Programming
* Ref Pages: Admin/User
* Ref Pages: Windows Programming
* Ref Pages: Windows Admin/User
* RAND Corp. Mail Handler (MH)
<Press RETURN for more>: Return
* X Fonts
* X/Motif 1.1
* Basic Networking Configuration Applications
* Netscape Communicator V4.5
* NFS(tm) Utilities
* NFS(tm) Configuration Application

```

```

* Obsolete Commands and Utilities
* Old Additional DECwindows Applications
* Old X Environment
* Standard Programmer Commands
* Local Printer Support
* GNU Revision Control System
* Remote Installation Service
* Source Code Control System
* Software Development Tools and Utilities
* Software Development Desktop Environment
* X Servers for Open3D
* X Servers Base
* X Servers for PCbus
* X Servers for TurboChannel
* UNIX(tm) SVID2 Compatibility
* Base System Management Applications and Utilities
* Tcl Commands
<Press RETURN for more>: Return
* Additional Terminfo databases
* Tk Toolkit Commands
* UNIX(tm) to UNIX(tm) Copy Facility
* Basic X Environment
* Graphical System Administration Utilities
* C2-Security GUI
* CDA(tm) for X/Motif Development
* Demo X Applications
* X Window and X/Motif Software Development
* X Window and X/Motif Programming Examples
* XIE Version 5 Online Documentation
* X Window and X/Motif Header Files
* X Window and X/Motif Static Libraries
* DECwindows Mail Interface
* Additional X Applications
* Nested X Server
* X Customizations for OEM
* Graphical Print Configuration Application
* Graphical Base System Management Utilities
* Virtual X Frame Buffer

Are these the subsets that should be loaded (y/n) ? y

```

## H.2.2 File System Creation and Software Subset Load

This section shows file system creation and software subset loading.

You have now answered all questions needed to install DIGITAL UNIX on this system. Press CTRL/C to cancel the installation; or type "history" to modify your earlier answers; or press RETURN to proceed with installation: Return

Continuing installation...

```

*** Creating the root file system on device rz1a ***
ADVFS: using 566 buffers containing 4.42 megabytes of memory

*** Creating the usr file system on device rz1g ***

*** Creating the swap1 file system on device rz1b ***

```

\*\*\* Creating the swap2 file system on device rz3b \*\*\*

\*\*\* Loading the operating system software subsets \*\*\*

The installation procedure will now load the software on your disk partitions. This process will take from 45 to 120 minutes to complete depending on your distribution media and processor type.

Checking file system space required to install specified subsets:  
Working...Tue Jan 26 16:03:04 EST 1999

File system space checked OK.

108 subset(s) will be installed.

Loading 1 of 108 subset(s)....

Base System

Copying from serveris (inet)  
Working...Tue Jan 26 16:04:18 EST 1999

Verifying  
Working...Tue Jan 26 16:06:00 EST 1999

Loading 2 of 108 subset(s)....

Base System - Hardware Support

Copying from serveris (inet)  
Working...Tue Jan 26 16:06:32 EST 1999

Verifying

Loading 3 of 108 subset(s)....

Compiler Back End

Copying from serveris (inet)  
Working...Tue Jan 26 16:07:11 EST 1999

Verifying

Loading 4 of 108 subset(s)....

Kernel Header and Common Files

Copying from serveris (inet)  
Working...Tue Jan 26 16:07:44 EST 1999

Verifying  
Working...Tue Jan 26 16:08:33 EST 1999

Loading 5 of 108 subset(s)....

Standard Kernel Modules

Copying from serveris (inet)  
Working...Tue Jan 26 16:08:47 EST 1999

Broken pipe  
Verifying

Loading 6 of 108 subset(s)....

Hardware Kernel Header and Common Files

Copying from serveris (inet)  
Broken pipe  
Verifying

Loading 7 of 108 subset(s)....

Hardware Kernel Modules

```
Copying from serveris (inet)
Working...Tue Jan 26 16:09:24 EST 1999
Verifying

Loading 8 of 108 subset(s)....

ATM Kernel Header and Common Files
Copying from serveris (inet)
Verifying

Loading 9 of 108 subset(s)....

ATM Kernel Modules
Copying from serveris (inet)
Verifying

Loading 10 of 108 subset(s)....

Logical Storage Manager Kernel Header and Common Files
Copying from serveris (inet)
Verifying

Loading 11 of 108 subset(s)....

Logical Storage Manager Kernel Modules
Copying from serveris (inet)
Broken pipe
Verifying

Loading 12 of 108 subset(s)....

POLYCTR advfs Kernel Modules
Copying from serveris (inet)
Verifying

Loading 13 of 108 subset(s)....

Tcl Commands
Copying from serveris (inet)
Broken pipe
Verifying

Loading 14 of 108 subset(s)....

Basic Networking Services
Copying from serveris (inet)
Working...Tue Jan 26 16:11:14 EST 1999
Verifying

Loading 15 of 108 subset(s)....

Additional Networking Services
Copying from serveris (inet)
Working...Tue Jan 26 16:11:43 EST 1999
Verifying

Loading 16 of 108 subset(s)....

ATM Commands
Copying from serveris (inet)
Verifying

Loading 17 of 108 subset(s)....
```

Logical Storage Manager  
Copying from serveris (inet)  
Working...Tue Jan 26 16:12:15 EST 1999  
Verifying

Loading 18 of 108 subset(s)....

POLYCTR advfs  
Copying from serveris (inet)  
Working...Tue Jan 26 16:12:31 EST 1999  
Broken pipe  
Verifying

Loading 19 of 108 subset(s)....

NFS(tm) Utilities  
Copying from serveris (inet)  
Broken pipe  
Verifying

Loading 20 of 108 subset(s)....

Remote Installation Service  
Copying from serveris (inet)  
Broken pipe  
Verifying

Loading 21 of 108 subset(s)....

Dataless Management Services  
Copying from serveris (inet)  
Verifying

Loading 22 of 108 subset(s)....

Local Printer Support  
Copying from serveris (inet)  
Verifying

Loading 23 of 108 subset(s)....

Adobe Font Metric Files  
Copying from serveris (inet)  
Broken pipe  
Verifying

Loading 24 of 108 subset(s)....

Doc. Preparation Tools  
Copying from serveris (inet)  
Broken pipe  
Verifying

Loading 25 of 108 subset(s)....

Doc. Preparation Tools Extensions  
Copying from serveris (inet)  
Verifying

Loading 26 of 108 subset(s)....

Basic X Environment  
Copying from serveris (inet)  
Working...Tue Jan 26 16:13:54 EST 1999

```
Verifying
 Working...Tue Jan 26 16:14:44 EST 1999

Loading 27 of 108 subset(s)....

CDE Minimum Runtime Environment
 Copying from serveris (inet)
 Working...Tue Jan 26 16:14:58 EST 1999
 Verifying

Loading 28 of 108 subset(s)....

CDE Desktop Environment
 Copying from serveris (inet)
 Working...Tue Jan 26 16:15:23 EST 1999
 Verifying
 Working...Tue Jan 26 16:16:57 EST 1999

Loading 29 of 108 subset(s)....

X Servers Base
 Copying from serveris (inet)
 Working...Tue Jan 26 16:17:17 EST 1999
 Verifying

Loading 30 of 108 subset(s)....

X Servers for PCbus
 Copying from serveris (inet)
 Verifying

Loading 31 of 108 subset(s)....

X Servers for TurboChannel
 Copying from serveris (inet)
 Verifying

Loading 32 of 108 subset(s)....

X Servers for Open3D
 Copying from serveris (inet)
 Working...Tue Jan 26 16:17:56 EST 1999
 Verifying

Loading 33 of 108 subset(s)....

X Fonts
 Copying from serveris (inet)
 Working...Tue Jan 26 16:18:16 EST 1999
 Verifying

Loading 34 of 108 subset(s)....

DECwindows 100dpi Fonts
 Copying from serveris (inet)
 Broken pipe
 Verifying

Loading 35 of 108 subset(s)....

DECwindows 75dpi Fonts
 Copying from serveris (inet)
 Verifying
```

Loading 36 of 108 subset(s)....  
LK201 Keyboard Support  
  Copying from serveris (inet)  
  Verifying

Loading 37 of 108 subset(s)....  
LK401 Keyboard Support  
  Copying from serveris (inet)  
  Verifying

Loading 38 of 108 subset(s)....  
LK411 Keyboard Support  
  Copying from serveris (inet)  
  Verifying

Loading 39 of 108 subset(s)....  
LK421 Keyboard Support  
  Copying from serveris (inet)  
  Verifying

Loading 40 of 108 subset(s)....  
LK444 Keyboard Support  
  Copying from serveris (inet)  
  Verifying

Loading 41 of 108 subset(s)....  
PCXAL Keyboard Support  
  Copying from serveris (inet)  
  Verifying

Loading 42 of 108 subset(s)....  
X Customizations for OEM  
  Copying from serveris (inet)  
Broken pipe  
  Verifying

Loading 43 of 108 subset(s)....  
Old X Environment  
  Copying from serveris (inet)  
  Verifying

Loading 44 of 108 subset(s)....  
RAND Corp. Mail Handler (MH)  
  Copying from serveris (inet)  
  Verifying

Loading 45 of 108 subset(s)....  
CDE Mail Interface  
  Copying from serveris (inet)  
  Verifying

Loading 46 of 108 subset(s)....  
DECwindows Mail Interface



```
 Copying from serveris (inet)
Broken pipe
 Verifying

Loading 47 of 108 subset(s)....

UNIX(tm) SVID2 Compatibility
 Copying from serveris (inet)
 Verifying

Loading 48 of 108 subset(s)....

DOS tools
 Copying from serveris (inet)
Broken pipe
 Verifying

Loading 49 of 108 subset(s)....

Local Area Transport (LAT)
 Copying from serveris (inet)
 Verifying

Loading 50 of 108 subset(s)....

UNIX(tm) to UNIX(tm) Copy Facility
 Copying from serveris (inet)
 Working....Tue Jan 26 16:21:21 EST 1999
 Verifying

Loading 51 of 108 subset(s)....

Computer Aided System Tutor
 Copying from serveris (inet)
 Working....Tue Jan 26 16:21:43 EST 1999
 Verifying

Loading 52 of 108 subset(s)....

Additional Terminfo databases
 Copying from serveris (inet)
 Working....Tue Jan 26 16:22:00 EST 1999
 Verifying

Loading 53 of 108 subset(s)....

GNU Emacs
 Copying from serveris (inet)
 Working....Tue Jan 26 16:22:17 EST 1999
 Verifying
 Working....Tue Jan 26 16:23:06 EST 1999

Loading 54 of 108 subset(s)....

Tk Toolkit Commands
 Copying from serveris (inet)
 Verifying

Loading 55 of 108 subset(s)....

Java 1.1.7B-2 Environment
 Copying from serveris (inet)
 Working....Tue Jan 26 16:23:34 EST 1999
 Verifying
```

Loading 56 of 108 subset(s)....  
Additional X Applications  
  Copying from serveris (inet)  
  Verifying  
Loading 57 of 108 subset(s)....  
Nested X Server  
  Copying from serveris (inet)  
  Verifying  
Loading 58 of 108 subset(s)....  
Virtual X Frame Buffer  
  Copying from serveris (inet)  
Broken pipe  
  Verifying  
Loading 59 of 108 subset(s)....  
Demo X Applications  
  Copying from serveris (inet)  
  Verifying  
Loading 60 of 108 subset(s)....  
CDE Additional Applications  
  Copying from serveris (inet)  
  Working....Tue Jan 26 16:24:41 EST 1999  
  Verifying  
Loading 61 of 108 subset(s)....  
Additional DECwindows Applications  
  Copying from serveris (inet)  
  Verifying  
Loading 62 of 108 subset(s)....  
Netscape Communicator V4.5  
  Copying from serveris (inet)  
  Working....Tue Jan 26 16:25:11 EST 1999  
  Verifying  
Loading 63 of 108 subset(s)....  
Old Additional DECwindows Applications  
  Copying from serveris (inet)  
  Working....Tue Jan 26 16:26:21 EST 1999  
  Verifying  
Loading 64 of 108 subset(s)....  
System Accounting Utilities  
  Copying from serveris (inet)  
  Verifying  
Loading 65 of 108 subset(s)....  
Logical Volume Manager  
  Copying from serveris (inet)  
Broken pipe

```
Verifying
Loading 66 of 108 subset(s)....

System Exercisers
 Copying from serveris (inet)
Broken pipe
 Verifying

Loading 67 of 108 subset(s)....

Single-Byte European Locales
 Copying from serveris (inet)
 Verifying

Loading 68 of 108 subset(s)....

C2-Security
 Copying from serveris (inet)
 Verifying

Loading 69 of 108 subset(s)....

Kernel Debugging Tools
 Copying from serveris (inet)
 Working....Tue Jan 26 16:27:30 EST 1999
 Verifying

Loading 70 of 108 subset(s)....

Base System Management Applications and Utilities
 Copying from serveris (inet)
 Working....Tue Jan 26 16:27:46 EST 1999
Broken pipe
 Verifying

Loading 71 of 108 subset(s)....

Basic Networking Configuration Applications
 Copying from serveris (inet)
 Verifying

Loading 72 of 108 subset(s)....

NFS(tm) Configuration Application
 Copying from serveris (inet)
Broken pipe
 Verifying

Loading 73 of 108 subset(s)....

Graphical Base System Management Utilities
 Copying from serveris (inet)
 Working....Tue Jan 26 16:28:33 EST 1999
 Verifying

Loading 74 of 108 subset(s)....

Environmental Monitoring
 Copying from serveris (inet)
 Verifying

Loading 75 of 108 subset(s)....
```

Graphical System Administration Utilities  
Copying from serveris (inet)  
Working...Tue Jan 26 16:29:08 EST 1999  
Verifying

Loading 76 of 108 subset(s)....

Graphical Print Configuration Application  
Copying from serveris (inet)  
Verifying

Loading 77 of 108 subset(s)....

Insight Manager  
Copying from serveris (inet)  
Working...Tue Jan 26 16:29:33 EST 1999  
Verifying

Loading 78 of 108 subset(s)....

C2-Security GUI  
Copying from serveris (inet)  
Verifying

Loading 79 of 108 subset(s)....

Logical Storage Manager GUI  
Copying from serveris (inet)  
Verifying

Loading 80 of 108 subset(s)....

GNU Revision Control System  
Copying from serveris (inet)  
Verifying

Loading 81 of 108 subset(s)....

Source Code Control System  
Copying from serveris (inet)  
Working...Tue Jan 26 16:30:18 EST 1999  
Verifying

Loading 82 of 108 subset(s)....

Software Development Tools and Utilities  
Copying from serveris (inet)  
Working...Tue Jan 26 16:30:36 EST 1999  
Broken pipe  
Verifying

Loading 83 of 108 subset(s)....

Standard Programmer Commands  
Copying from serveris (inet)  
Working...Tue Jan 26 16:31:00 EST 1999  
Broken pipe  
Verifying

Loading 84 of 108 subset(s)....

Standard Header Files  
Copying from serveris (inet)  
Working...Tue Jan 26 16:31:16 EST 1999

```
Verifying
Loading 85 of 108 subset(s)....

Static Libraries
 Copying from serveris (inet)
 Working....Tue Jan 26 16:31:33 EST 1999
Broken pipe
 Verifying

Loading 86 of 108 subset(s)....

X Window and X/Motif Software Development
 Copying from serveris (inet)
Broken pipe
 Verifying

Loading 87 of 108 subset(s)....

X Window and X/Motif Header Files
 Copying from serveris (inet)
 Working....Tue Jan 26 16:32:01 EST 1999
 Verifying

Loading 88 of 108 subset(s)....

X Window and X/Motif Static Libraries
 Copying from serveris (inet)
 Working....Tue Jan 26 16:32:21 EST 1999
Broken pipe
 Verifying

Loading 89 of 108 subset(s)....

CDE Software Development and Programming Examples
 Copying from serveris (inet)
 Working....Tue Jan 26 16:32:47 EST 1999
 Verifying

Loading 90 of 108 subset(s)....

CDA(tm) Software Development
 Copying from serveris (inet)
 Verifying

Loading 91 of 108 subset(s)....

CDA(tm) for X/Motif Development
 Copying from serveris (inet)
 Verifying

Loading 92 of 108 subset(s)....

Software Development Desktop Environment
 Copying from serveris (inet)
 Verifying

Loading 93 of 108 subset(s)....

Ladebug Debugger Version 4.0-49
 Copying from serveris (inet)
 Working....Tue Jan 26 16:33:52 EST 1999
Broken pipe
 Verifying
```

Loading 94 of 108 subset(s)....  
Ladebug Debugger Version 4.0-49 Release Notes  
Copying from serveris (inet)  
Broken pipe  
Verifying  
Loading 95 of 108 subset(s)....  
Ladebug Debugger graphical user interface  
Copying from serveris (inet)  
Verifying  
Loading 96 of 108 subset(s)....  
Ladebug Debugger remote server  
Copying from serveris (inet)  
Broken pipe  
Verifying  
Loading 97 of 108 subset(s)....  
Programming Examples  
Copying from serveris (inet)  
Verifying  
Loading 98 of 108 subset(s)....  
X Window and X/Motif Programming Examples  
Copying from serveris (inet)  
Working....Tue Jan 26 16:34:50 EST 1999  
Broken pipe  
Verifying  
Loading 99 of 108 subset(s)....  
Obsolete Locale databases  
Copying from serveris (inet)  
Verifying  
Loading 100 of 108 subset(s)....  
Obsolete Commands and Utilities  
Copying from serveris (inet)  
Verifying  
Loading 101 of 108 subset(s)....  
X/Motif 1.1  
Copying from serveris (inet)  
Working....Tue Jan 26 16:35:29 EST 1999  
Broken pipe  
Verifying  
Loading 102 of 108 subset(s)....  
Ref Pages: Admin/User  
Copying from serveris (inet)  
Working....Tue Jan 26 16:35:51 EST 1999  
Verifying  
Loading 103 of 108 subset(s)....

```
Ref Pages: Windows Admin/User
Copying from serveris (inet)
Verifying

Loading 104 of 108 subset(s)....

Ref Pages: CDE Admin/User
Copying from serveris (inet)
Verifying

Loading 105 of 108 subset(s)....

Ref Pages: Programming
Copying from serveris (inet)
Working....Tue Jan 26 16:37:07 EST 1999
Verifying

Loading 106 of 108 subset(s)....

Ref Pages: Windows Programming
Copying from serveris (inet)
Working....Tue Jan 26 16:37:53 EST 1999
Verifying

Loading 107 of 108 subset(s)....

Ref Pages: CDE Development
Copying from serveris (inet)
Verifying

Loading 108 of 108 subset(s)....

XIE Version 5 Online Documentation
Copying from serveris (inet)
Broken pipe
Verifying

108 of 108 subset(s) installed successfully.
```

The installation software has successfully installed your system.

There are logfiles that contain a record of your installation.  
These are:

```
 /var/adm/smlogs/install.cdf - configuration description file
 /var/adm/smlogs/install.log - general log file
 /var/adm/smlogs/install.FS.log - file system creation logs
 /var/adm/smlogs/setld.log - log for the setld(8) utility
 /var/adm/smlogs/verify.log - verification log file
```

The above message is also recorded in /etc/motd for your future reference.

Issue the following console commands to set your default bootpath variable and to boot your system disk to multiuser:

```
>>> set boot_osflags A
>>> set bootdef_dev DKA100
>>> boot
```

```

syncing disks... done
CPU 0: Halting... (transferring to monitor)

?05 HLT INSTR
 PC= FFFFFFFF.00212520 PSL= 00000000.00000005

>>> set boot_osflags A

BOOT_OSFLAGS = A

>>> set bootdef_dev DKA100

BOOTDEF_DEV = DKA100

>>> boot

```

**System initialization messages display as the system boots from the newly-installed system. Software configuration begins next:**

```

*** SYSTEM CONFIGURATION ***

Configuring "Base System " (OSFBASE440)
Configuring "Base System - Hardware Support " (OSFHWBASE440)
Configuring "Compiler Back End " (OSFCMPLRS440)
Configuring "Kernel Header and Common Files " (OSFBINCOM440)
Configuring "Standard Kernel Modules " (OSFBIN440)
Configuring "Hardware Kernel Header and Common Files" (OSFHWBINCOM440)
Configuring "Hardware Kernel Modules " (OSFHWBIN440)
Configuring "ATM Kernel Header and Common Files " (OSFATMBINCOM440)
Configuring "ATM Kernel Modules " (OSFATMBIN440)
Configuring "Logical Storage Manager Kernel Header and Common Files"
(OSFLSMBINCOM440)
Configuring "Logical Storage Manager Kernel Modules" (OSFLSMBIN440)
Configuring "POLYCTR advfs Kernel Modules " (OSFADVFSBIN440)
Configuring "Tcl Commands " (OSFTCLBASE440)
Configuring "Basic Networking Services " (OSFCLINET440)
Configuring "Additional Networking Services " (OSFINET440)
Configuring "ATM Commands " (OSFATMBASE440)
Configuring "Logical Storage Manager " (OSFLSMBASE440)
Configuring "POLYCTR advfs " (OSFADVFS440)
Configuring "NFS(tm) Utilities " (OSFNFS440)
Configuring "Remote Installation Service " (OSFRIS440)

```



Configuring "Dataless Management Services " (OSFDMS440)  
Configuring "Local Printer Support " (OSFPRINT440)  
Configuring "Adobe Font Metric Files " (OSFAFM440)  
Configuring "Doc. Preparation Tools " (OSFDCMT440)  
Configuring "Doc. Preparation Tools Extensions " (OSFDCMTEXT440)  
Configuring "Basic X Environment " (OSFX11440)  
Configuring "CDE Minimum Runtime Environment " (OSFCDEMIN440)  
Configuring "CDE Desktop Environment " (OSFCDEDT440)  
Configuring "X Servers Base " (OSFSER440)  
Configuring "X Servers for PCbus " (OSFSERPC440)  
Configuring "X Servers for TurboChannel " (OSFSERTC440)  
Configuring "X Servers for Open3D " (OSFSER3D440)  
Configuring "X Fonts " (OSFMITFONT440)  
Configuring "DECwindows 100dpi Fonts " (OSFFONT15440)  
Configuring "DECwindows 75dpi Fonts " (OSFFONT440)  
Configuring "LK201 Keyboard Support " (OSFKBDLK201440)  
Configuring "LK401 Keyboard Support " (OSFKBDLK401440)  
Configuring "LK411 Keyboard Support " (OSFKBDLK411440)  
Configuring "LK421 Keyboard Support " (OSFKBDLK421440)  
Configuring "LK444 Keyboard Support " (OSFKBDLK444440)  
Configuring "PCXAL Keyboard Support " (OSFKBDPCXAL440)  
Configuring "X Customizations for OEM " (OSFXOEM440)  
Configuring "Old X Environment " (OSFOLDX11440)  
Configuring "RAND Corp. Mail Handler (MH) " (OSFMH440)  
Configuring "CDE Mail Interface " (OSFCDEMAIL440)  
Configuring "DECwindows Mail Interface " (OSFXMAIL440)  
Configuring "UNIX(tm) SVID2 Compatibility " (OSFSVID2440)  
Configuring "DOS tools " (OSFDOSTOOLS440)  
Configuring "Local Area Transport (LAT) " (OSFLAT440)  
Configuring "UNIX(tm) to UNIX(tm) Copy Facility " (OSFUUCP440)  
Configuring "Computer Aided System Tutor " (OSFLEARN440)  
Configuring "Additional Terminfo databases " (OSFTERM440)

Configuring "GNU Emacs " (OSFEMACS440)  
Configuring "Tk Toolkit Commands " (OSFTKBASE440)  
Configuring "Java 1.1.7B-2 Environment " (OSFJAVA440)  
Configuring "Additional X Applications " (OSFXMIT440)  
Configuring "Nested X Server " (OSFXNEST440)  
Configuring "Virtual X Frame Buffer " (OSFXVFB440)  
Configuring "Demo X Applications " (OSFXDEMOS440)  
Configuring "CDE Additional Applications " (OSFCDEAPPS440)  
Configuring "Additional DECwindows Applications " (OSFDECW440)  
Configuring "Netscape Communicator V4.5 " (OSFNETSCAPE440)  
Configuring "Old Additional DECwindows Applications" (OSFOLDDECW440)  
Configuring "System Accounting Utilities " (OSFACCT440)  
Configuring "Logical Volume Manager " (OSFLVM440)  
Configuring "System Exercisers " (OSFEXER440)  
Configuring "Single-Byte European Locales " (OSFEURLOC440)  
Configuring "C2-Security " (OSFC2SEC440)  
Configuring "Kernel Debugging Tools " (OSFKTOOLS440)  
Configuring "Base System Management Applications and Utilities" (OSFSYSMAN440)  
Configuring "Basic Networking Configuration Applications" (OSFNETCONF440)  
Configuring "NFS(tm) Configuration Application " (OSFNFSCONF440)  
Configuring "Graphical Base System Management Utilities" (OSFXSYSMAN440)  
Configuring "Environmental Monitoring " (OSFENVMON440)  
Configuring "Graphical System Administration Utilities" (OSFXADMIN440)  
Configuring "Graphical Print Configuration Application" (OSFXPRINT440)  
Configuring "Insight Manager " (OSFIMXE440)  
Configuring "C2-Security GUI " (OSFXC2SEC440)  
Configuring "Logical Storage Manager GUI " (OSFLSMX11440)  
Configuring "GNU Revision Control System " (OSFRCS440)  
Configuring "Source Code Control System " (OSFSCCS440)  
Configuring "Software Development Tools and Utilities" (OSFSDE440)  
Configuring "Standard Programmer Commands " (OSFPGMR440)  
Configuring "Standard Header Files " (OSFINCLUDE440)

Configuring "Static Libraries " (OSFLIBA440)  
Configuring "X Window and X/Motif Software Development" (OSFXDEV440)  
Configuring "X Window and X/Motif Header Files " (OSFXINCLUDE440)  
Configuring "X Window and X/Motif Static Libraries" (OSFXLIBA440)  
Configuring "CDE Software Development and Programming Examples" (OSFCDEDEV440)  
Configuring "CDA(tm) Software Development " (OSFCDAPGMR440)  
Configuring "CDA(tm) for X/Motif Development " (OSFXCDADEV440)  
Configuring "Software Development Desktop Environment" (OSFSDECDE440)  
Configuring "Laddebug Debugger Version 4.0-49 " (OSFLDBBASE440)  
Configuring "Laddebug Debugger Version 4.0-49 Release Notes" (OSFLDBDOC440)  
Configuring "Laddebug Debugger graphical user interface" (OSFLDBGUI440)  
Configuring "Laddebug Debugger remote server " (OSFLDBSRV440)  
Configuring "Programming Examples " (OSFEXAMPLES440)  
Configuring "X Window and X/Motif Programming Examples" (OSFXEXAMPLES440)  
Configuring "Obsolete Locale databases " (OSFCTABLOC440)  
Configuring "Obsolete Commands and Utilities " (OSFOBSOLETE440)  
Configuring "X/Motif 1.1 " (OSFMOTIF11440)  
Configuring "Ref Pages: Admin/User " (OSFMANOS440)  
Configuring "Ref Pages: Windows Admin/User " (OSFMANWOS440)  
Configuring "Ref Pages: CDE Admin/User " (OSFCDEMANOS440)  
Configuring "Ref Pages: Programming " (OSFMANOP440)  
Configuring "Ref Pages: Windows Programming " (OSFMANWOP440)  
Configuring "Ref Pages: CDE Development " (OSFCDEMANOP440)  
Configuring "XIE Version 5 Online Documentation " (OSFXIEDOC440)

The system name assigned to your machine is 'mysystem'.

## H.2.3 Kernel Build Procedure

This section shows the kernel build procedure.

\*\*\* KERNEL CONFIGURATION AND BUILD PROCEDURE \*\*\*

\*\*\* KERNEL OPTION SELECTION \*\*\*

Selection    Kernel Option

```

1 System V Devices
2 Logical Volume Manager (LVM)
3 NTP V3 Kernel Phase Lock Loop (NTP_TIME)
4 Kernel Breakpoint Debugger (KDEBUG)
5 Packetfilter driver (PACKETFILTER)
6 Point-to-Point Protocol (PPP)
7 STREAMS pckt module (PCKT)
8 X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
9 ISO 9660 Compact Disc File System (CDFS)
10 Audit Subsystem
11 ACL Subsystem
12 Logical Storage Manager (LSM)
13 ATM UNI 3.0/3.1 ILMI (ATMILMI3X)
14 IP Switching over ATM (ATMIFMP)
15 LAN Emulation over ATM (LANE)
16 Classical IP over ATM (ATMIP)
17 ATM UNI 3.0/3.1 Signalling for SVCs (UNI3X)
18 Asynchronous Transfer Mode (ATM)

```

--- MORE TO FOLLOW ---

```

19 All of the above
20 None of the above
21 Help
22 Display all options again

```

Enter the selection number for each kernel option you want.  
For example, 1 3 [20]: 19

You selected the following kernel options:

```

System V Devices
Logical Volume Manager (LVM)
NTP V3 Kernel Phase Lock Loop (NTP_TIME)
Kernel Breakpoint Debugger (KDEBUG)
Packetfilter driver (PACKETFILTER)
Point-to-Point Protocol (PPP)
STREAMS pckt module (PCKT)
X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
ISO 9660 Compact Disc File System (CDFS)
Audit Subsystem
ACL Subsystem
Logical Storage Manager (LSM)
ATM UNI 3.0/3.1 ILMI (ATMILMI3X)
IP Switching over ATM (ATMIFMP)
LAN Emulation over ATM (LANE)
Classical IP over ATM (ATMIP)
ATM UNI 3.0/3.1 Signalling for SVCs (UNI3X)
Asynchronous Transfer Mode (ATM)

```

Is that correct? (y/n) [y]:

Do you want to edit the configuration file? (y/n) [n]:

The system will now automatically build a kernel and then reboot. This will take approximately 15 minutes, depending on the processor type.

When the login prompt appears after the system has rebooted, use 'root' as the login name and the SUPERUSER password that was entered during

this procedure, to log into the system.

\*\*\* PERFORMING KERNEL BUILD \*\*\*

Working....Tue Jan 26 16:47:00 EST 1999

Working....Tue Jan 26 16:49:03 EST 1999

Working....Tue Jan 26 16:51:06 EST 1999

syncing disks... done

rebooting.... (transferring to monitor)



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## Special Characters

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\*

( *See asterisk* )

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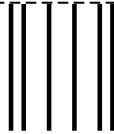
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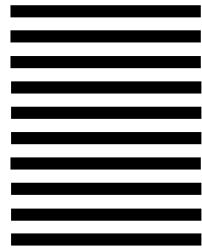
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