HP OpenVMS Alpha Version 7.3-2 Upgrade and Installation Manual

OpenVMS 7.3-2

This manual supersedes Version 7.3-1.

Manufacturing Part Number: AA-RV8ZA-TE

September 2003

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The HP OpenVMS documentation set is available on CD-ROM.

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Preface

Intended Audience

This manual is intended for anyone responsible for installing or upgrading the HP OpenVMS Alpha operating system and for the startup, shutdown, and backup operations required on Alpha computers running this software.

When to Use This Manual

If you received factory-installed software (FIS) with your Alpha computer, refer to that user documentation to start up your system for the first time. Use this manual if you need to install or upgrade the OpenVMS Alpha operating system software yourself or if you need to perform certain startup, shutdown, or backup operations.

Document Structure

This manual is organized as follows:

- Chapter 1 defines key terms and provides information about hardware and software components. Review this chapter before performing any installation or upgrade.
- Chapter 2 provides preliminary information.
- Chapter 3 describes how to install the operating system and includes information about installing the operating system in an OpenVMS Cluster environment.
- Chapter 4 describes the tasks you must perform after installing the operating system.
- Chapter 5 describes how to prepare your system for an upgrade.
- Chapter 6 supplements Chapter 5 with additional tasks you must perform before upgrading an OpenVMS Cluster system.
- Chapter 7 describes how to upgrade the operating system.
- Chapter 8 describes the tasks you must perform after upgrading the operating system.
- Appendix A contains instructions for halting the system, booting the operating system CD-ROM and the system disk, using console commands to set system parameters, using the Writeboot utility, and invoking system shutdown procedures.
- Appendix B describes how to back up and restore the system disk.
- Appendix C contains supplementary information about registering licenses.
- Appendix D describes how to prepare your OpenVMS system and your PC to run the OpenVMS Management Station server and client software.
- Appendix E explains how to remove the OpenVMS Alpha operating system from your disk.
- The Glossary defines key terms used in this manual.

Related Documents

Before installing, upgrading, or using the OpenVMS Alpha operating system on your Alpha computer, be sure you have access to the following documents:

- All cover letters included with the kit.
- *HP OpenVMS Alpha Version 7.3-2 Release Notes*, which provides important supplementary information about the OpenVMS Alpha operating system.
- *HP OpenVMS Alpha Version 7.3-2 New Features and Documentation Overview*, which describes enhancements and new features included in the OpenVMS Alpha 7.3-2 operating system.
- *OpenVMS Cluster Systems* and *Guidelines for OpenVMS Cluster Configurations*, if you plan to install your system in an OpenVMS Cluster environment.
- The most recent version of the *DECwindows Motif for OpenVMS Installation Guide* and *Managing DECwindows Motif for OpenVMS Systems* (if you plan to install and customize DECwindows Motif™ for OpenVMS software).
- *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture*, which provides information about CDSA software.
- *HP Open Source Security for OpenVMS, Volume 3: Kerberos*, which provides information about Kerberos software.
- The following networking software documents (if you plan to install and configure DECnet-Plus for OpenVMS, DECnet Phase IV for OpenVMS, or TCP/IP Services for OpenVMS software):
  - *DECnet-Plus for OpenVMS Installation and Basic Configuration*
  - *DECnet for OpenVMS Guide to Networking*
  - *HP TCP/IP Services for OpenVMS Installation and Configuration*

  Documentation for the networking products listed above is included on the OpenVMS Online Documentation CD-ROM. Hardcopy documentation must be purchased separately.
- The hardware manuals that are supplied with your Alpha computer. These manuals provide detailed information about your system hardware, including the operation of the system unit, the drives, and the monitor.

During the course of installing, upgrading, or using the OpenVMS Alpha operating system on your Alpha computer, you might need to refer to the following documents as well:

- *OpenVMS License Management Utility Manual*, which contains detailed information about registering your software licenses.
- *HP OpenVMS System Manager's Manual* and the *HP OpenVMS System Management Utilities Reference Manual*, which contain information about system management operations and utilities that you might need to use when you install, upgrade, customize, and maintain your OpenVMS Alpha system. The *HP OpenVMS System Management Utilities Reference Manual: M-Z* provides complete information about using the POLYCENTER Software Installation utility PRODUCT command to add or remove files, install other software, and related operations.
- *HP Volume Shadowing for OpenVMS*, which you might need if you are installing or upgrading the OpenVMS Alpha operating system on a shadowed system disk.
- *OpenVMS Management Station Installation Guide*, which provides information about getting started, setting up, and using OpenVMS Management Station.

For additional information about HP OpenVMS products and services, see the following World Wide Web address:

`http://www.hp.com/go/openvms`

Reader's Comments

HP welcomes your comments on this manual.

Please send comments to either of the following addresses:

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Conventions

The following conventions are used in this manual:

Convention	Meaning
Ctrl/x	A sequence such as Ctrl/x indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.
PF1 x	A sequence such as PF1 *x* indicates that you must first press and release the key labeled PF1 and then press and release another key (x) or a pointing device button.
Return	In examples, a key name in bold indicates that you press that key.
...	A horizontal ellipsis in examples indicates one of the following possibilities: – Additional optional arguments in a statement have been omitted. – The preceding item or items can be repeated one or more times. – Additional parameters, values, or other information can be entered.
. . .	A vertical ellipsis indicates the omission of items from a code example or command format; the items are omitted because they are not important to the topic being discussed.
( )	In command format descriptions, parentheses indicate that you must enclose choices in parentheses if you specify more than one. In installation or upgrade examples, parentheses indicate the possible answers to a prompt, such as: `Is this correct? (Y/N) [Y]`

Convention	Meaning
[ ]	In command format descriptions, brackets indicate optional choices. You can choose one or more items or no items. Do not type the brackets on the command line. However, you must include the brackets in the syntax for OpenVMS directory specifications and for a substring specification in an assignment statement. In installation or upgrade examples, brackets indicate the default answer to a prompt if you press Return without entering a value, as in: `Is this correct? (Y/N) [Y]`
|	In command format descriptions, vertical bars separate choices within brackets or braces. Within brackets, the choices are optional; within braces, at least one choice is required. Do not type the vertical bars on the command line.
{ }	In command format descriptions, braces indicate required choices; you must choose at least one of the items listed. Do not type the braces on the command line.
bold type	Bold type represents the introduction of a new term. It also represents the name of an argument, an attribute, or a reason. In command and script examples, bold indicates user input.
italic type	Italic type indicates important information, complete titles of manuals, or variables. Variables include information that varies in system output (Internal error *number*), in command lines (/PRODUCER=*name*), and in command parameters in text (where *dd* represents the predefined code for the device type).
UPPERCASE TYPE	Uppercase type indicates a command, the name of a routine, the name of a file, or the abbreviation for a system privilege.
`Example`	This typeface indicates code examples, command examples, and interactive screen displays. In text, this type also identifies URLs, UNIX command and pathnames, PC-based commands and folders, and certain elements of the C programming language.
–	A hyphen at the end of a command format description, command line, or code line indicates that the command or statement continues on the following line.
numbers	All numbers in text are assumed to be decimal unless otherwise noted. Nondecimal radixes—binary, octal, or hexadecimal—are explicitly indicated.

1 Getting Started

This chapter defines key terms and describes preliminary procedures you must perform before an installation or upgrade to version 7.3-2 of the OpenVMS Alpha operating system.

Key Terms

The following are a few key terms you need to know before you install or upgrade the system:

Table 1-1 Definitions of Terms

Term	Definition
Operating system CD-ROM	The CD-ROM containing the OpenVMS Alpha operating system and the installation and other procedures described in this manual.
HS*x* device	A self-contained, intelligent, mass storage subsystem that lets computers in an OpenVMS Cluster environment share disks. The disk on which you install or upgrade the operating system can be connected to one of these systems (for example, an HSC or HSD).
InfoServer	A general-purpose disk storage server that allows you to use the operating system CD-ROM to install the operating system on remote client systems connected to the same local area network (LAN).
Local drive	A drive, such as an RRD42 CD-ROM drive, that is connected directly to an Alpha computer. If you have a standalone Alpha computer, it is likely that all drives connected to the system are local drives.
Source drive	The drive that holds the operating system CD-ROM during the upgrade or installation.
System disk	The disk that contains or will contain the OpenVMS Alpha operating system. The installation or upgrade procedure transfers the OpenVMS Alpha operating system from the operating system CD-ROM on the source drive to the system disk, also referred to as the target system disk.
Target drive	The drive that holds the target system disk during the upgrade or installation.

Examining Software and Hardware Components

Before beginning an installation or upgrade, be sure you have all the required hardware and software components, as described in the following sections.

Hardware Components

Before you begin an installation or upgrade, do the following:

- Be sure the hardware has been installed and checked for proper operation. For detailed information, see the hardware manuals you received with your Alpha computer.
- Be sure you know how to turn on and operate the components of your system, including the system unit, console, monitor, drives, terminals, and printers. If necessary, read the hardware manuals that came with these components.
- Set up your system to record the installation procedure on either a hardcopy terminal or a printer attached to the console terminal. (See your hardware manuals for more details about connecting those components to your system.) If you do not do this, the screen messages will be lost. You will need a transcript in case there is a problem during the installation.

Software Components

Before you begin an installation or upgrade, do the following:

- Be sure you have all the items listed on the bill of materials contained in the distribution kit. If your distribution kit is incomplete, notify your HP support representative and request priority shipment of any missing items.
- Before installing the OpenVMS Alpha operating system software, review all cover letters and release notes.

Operating System CD-ROM

Included in your kit is the OpenVMS Alpha operating system CD-ROM, which you use to install or upgrade the operating system, or to perform operations such as backing up the system disk. The CD-ROM is labeled similar to the following:

CD-ROM Label:	OpenVMS Alpha V7.3-2 Operating System
Volume Label:	ALPHA0732

NOTE The *volume label* is the machine-readable name that the OpenVMS Alpha operating system and InfoServer systems use to access the CD-ROM.

Firmware Revision Checking

OpenVMS Alpha Version 7.3-2 provides firmware checking for systems during each boot operation. When you boot the OpenVMS Alpha operating system CD-ROM, the system automatically checks the version of console firmware that is running on your computer. The system also provides information about how to upgrade the firmware.

If you do not have the *required* version of console firmware, the system displays a message similar to the following:

```
%SYSBOOT-F-FIRMREV, Firmware rev.nnn is below the absolute minimum of nnn.
                    Please update your firmware to the recommended revision nnn,
                       Alpha Systems Firmware Update Vn.n.
```

If you do not have the *recommended* version of console firmware, the system displays a message similar to the following:

```
%SYSBOOT-W-FIRMREV, Firmware rev.nnn is below the recommended minimum of nn.
                    Please update your firmware to the recommended revision,
                    which can be found on the firmware CD labeled:
                       Alpha Systems Firmware Update Vn.n.
```

The latest firmware CD-ROM is included with your OpenVMS Alpha media kit. It includes system firmware for current and recent Alpha systems and some I/O adapters. Firmware for older hardware might not be included on the current CD-ROM but can be found on previous CD-ROMs or at the following website:

```
http://ftp.digital.com/pub/DEC/Alpha/firmware/
```

HP recommends upgrading to the latest released firmware for all systems and I/O adapters. Firmware is released more often than the OpenVMS Alpha operating system. The firmware version recommendations included in OpenVMS Alpha V7.3-2 might be superseded before the next version of the OpenVMS Alpha operating system is released.

NOTE After you install this version of the OpenVMS Alpha operating system, the firmware check will occur each time you reboot the system.

Device Naming Conventions

When you perform specific operations, you are asked to specify device names for the source drive and target drive. When specifying those device names, note the following naming conventions:

- When the source drive is a local CD-ROM drive, the device name is similar to the following:

  `DKA400`

- When the source drive is a CD-ROM drive connected to the InfoServer, the device name is *always* the following:

  `DAD1`

- When the target drive is a local disk, the device name is similar to the following:

  `DKA0:`

  Note the following conventions:

  — *DK* is the device code of the boot device.

  — *A* is the boot device controller designation.

  — *0* is the unit number of the boot device.

- On Alpha systems configured in certain OpenVMS Cluster or HS*x* environments, the device naming convention is similar to the following:

  ```
  DUA20.14.0.2.0
  ```

  The values you specify identify components such as the boot device, controller, unit number of the boot device, HS*x* controller node number, and channel numbers. Because these values vary depending on your specific hardware configuration, refer to the owner, operator, and technical service manuals that came with your computer for detailed information.

Using the Operating System CD-ROM Menu

The following sections describe how you use the operating system CD-ROM menu system to install, upgrade, and modify your system disk, and perform other related tasks.

The OpenVMS Alpha operating system CD-ROM main menu displays automatically when you boot the OpenVMS Alpha operating system CD-ROM. From this menu, you can choose options to perform any of the following tasks:

- Install or upgrade the operating system from the CD-ROM.
- Display a list of products that can be installed from the CD-ROM.
- Install or upgrade layered products from the CD-ROM.
- Show which products are installed on your system.
- Reconfigure layered products installed on your system.
- Remove products.
- Enter the DCL environment from which you can perform preinstallation or maintenance tasks such as mounting or showing devices and backing up or restoring files on the system disk.
- Shut down the system.

The following is a sample display of the CD-ROM main menu:

```
OpenVMS (TM) Alpha Operating System, Version 7.3-2

(c) Copyright 1976-2003 Hewlett-Packard Development Company, L.P.


Installing required known files...

Configuring devices...

****************************************************************
You can install or upgrade the OpenVMS Alpha operating system
or you can install or upgrade layered products that are included
on the OpenVMS Alpha operating system CD-ROM.

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

Please choose one of the following:

    1)  Upgrade, install or reconfigure OpenVMS Alpha Version 7.3-2
    2)  Display products and patches that this procedure can install
```

```
        3)  Install or upgrade layered products and patches
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Execute DCL commands and procedures
        8)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?)
```

Review the following sections to understand how the menu works. You will then be prepared to choose appropriate menu options when you are asked to do so before, during, and after an installation or upgrade.

Using the Install, Upgrade, or Reconfigure OpenVMS Option (1)

Select option 1 from the CD-ROM main menu to install, upgrade, or reconfigure your OpenVMS Alpha software. Selecting option 1 implements a POLYCENTER Software Installation (PCSI) utility concept called a **platform**. The OpenVMS Alpha platform contains the OpenVMS Alpha operating system, plus options for certain other products, including the optional DECwindows Motif, DECnet-Plus, DECnet Phase IV, TCP/IP Services for OpenVMS products, and the required **Kerberos** and **Common Data Security Architecture (CDSA)** products. Including these products in the OpenVMS Alpha platform allows you to install or upgrade these products along with the OpenVMS Alpha operating system. When you choose to upgrade the system disk, and the OpenVMS software on the disk is the same version, then you are given options to re-install or reconfigure the OpenVMS system or reconfigure the OpenVMS platform.

You can look at the platform Product Definition File (PDF) itself. This file is located in [VMS$COMMON] on the OpenVMS operating system CD-ROM. The file has a name similar to DEC-AXPVMS-OVMS-V*nnnn-n*.PCSI$DESCRIPTION, where the variables indicate the version number.

After you select which of the optional products you want to install, information is retained in the database maintained by the PCSI utility. This information allows future OpenVMS upgrades to present the choices made in this installation as defaults to be used in an upgrade or reconfiguration.

When you select option 1 from the CD-ROM main menu, the system asks whether you want to preserve or initialize the system disk. The display is similar to the following:

```
   There are two choices for Installation/Upgrade:

   INITIALIZE - Removes all software and data files that were
       previously on the target disk and installs OpenVMS Alpha.

   PRESERVE -- Installs or upgrades OpenVMS Alpha on the target disk
       and retains all other contents of the target disk.

   * Note: You cannot use PRESERVE to install OpenVMS Alpha on a disk on
        which OpenVMS VAX or any other operating system is installed.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE]
```

INITIALIZE Option

When you specify the INITIALIZE option, the following operations take place:

- All software and data files that were previously on the target disk are removed.
- The operating system is installed.

Specify the INITIALIZE option and perform a full installation under the following conditions:

- If your Alpha computer is new (it has never had any version of any operating system running on it, including factory-installed software).

- If your Alpha computer is running a version of the OpenVMS Alpha operating system and you want to overwrite the entire contents of the system disk (the operating system, application software, and user files).
- If you want to keep an existing system disk and install OpenVMS Alpha on a different disk.
- If you are running the OpenVMS Alpha operating system but cannot upgrade. For example, if you changed the names of system directories on the system disk, the upgrade procedure will not work correctly. Therefore, unless you chose to restore the system disk to its original directory structure, you would have to reinstall the operating system.

PRESERVE Option

When you specify the PRESERVE option, the following operations take place:

IF ...	THEN ...
the OpenVMS Alpha operating system is *not* already installed on the target disk,	• the operating system is *installed*. • all other contents of the target disk are retained.
the OpenVMS Alpha operating system *is* installed on the target disk,	the operating system is *upgraded*, as follows: • old operating system files and new files are merged or replaced. • all other contents of the target disk are retained.

NOTE If you intend to choose the PRESERVE option (because there are certain files on the disk that you want to retain), HP recommends that you first make a backup copy of your system disk. If there is any problem during the installation or upgrade that might affect the integrity of the disk, you will have the backup copy as a safeguard.

If you choose the PRESERVE option and choose a target disk that already contains the OpenVMS Alpha Version 7.3-2 software, you are provided with the option to either reconfigure or reinstall the OpenVMS Alpha operating system. Reconfigure the operating system if you want to change the options you chose to include when the operating system was installed. Reinstall the operating system if you think that your system files might have become corrupted.

See “Adding and Removing Operating System Files” on page 120 for additional configuration information.

Using the Display Products and Patches Option (2)

When you select option 2 from the CD-ROM main menu, the following information is displayed:

- The version of OpenVMS and the versions of the required components and optional products that can be installed or upgraded along with the OpenVMS operating system when you select the install or upgrade option 1 from the main menu.
- The layered product kits that are available for installation when you select the layered products option 3 from the CD-ROM main menu. The DECwindows graphical user interface and HP networking products are shown again, along with other layered products.

NOTE The two lists of products (the products that can be installed or upgraded and the layered product kits available for installation) might be the same or very similar. Generally, products that can be installed or upgraded along with the OpenVMS operating system should be installed or upgraded with the OpenVMS operating system.

The product lists and other output often identify DECnet-Plus as "DECNET_OSI," which represents "DECnet/OSI." DECnet-Plus was formerly known as DECnet/OSI.

The display is similar to the following:

```
    The following versions of the OpenVMS operating system,
    required components, and optional products
    are available on the OpenVMS Distribution compact disk.
    They can be installed by selecting choice 1:

DEC AXPVMS VMS version V7.3-2
CPQ AXPVMS CDSA version V2.0-67
HP  AXPVMS KERBEROS version V2.0
DEC AXPVMS DWMOTIF version V1.3-1
DEC AXPVMS DECNET_OSI version V7.3-2
DEC AXPVMS DECNET_PHASE_IV version V7.3-2
DEC AXPVMS TCPIP version V5.4

    The following Layered Product kits are available on the OpenVMS
    Distribution Compact Disk.  They can be installed by selecting
    choice 3.  If already installed, they can be reconfigured by
    selecting choice 5, or removed by selecting choice 6.

----------------------------------- ----------- ----------
PRODUCT                             KIT TYPE    KIT FORMAT
----------------------------------- ----------- ----------
CPQ AXPVMS CDSA X2.0-67             Full LP     Sequential
DEC AXPVMS DECNET_OSI V7.3-2        Full LP     Sequential
DEC AXPVMS DECNET_PHASE_IV V7.3-2   Full LP     Sequential
DEC AXPVMS DWMOTIF V1.3-1           Full LP     Sequential
DEC AXPVMS TCPIP V5.4               Full LP     Sequential
HP AXPVMS KERBEROS V2.0             Full LP     Sequential
HP AXPVMS KERBEROS V1.0             Transition  Sequential
----------------------------------- ----------- ----------

8 items found

Press Return to continue...
```

Using the Install or Upgrade Layered Products Option (3)

Use option 3 of the CD-ROM main menu for normal installations or upgrades of the layered products. Note that you can install or upgrade the DECwindows graphical user interface and HP networking products along with the OpenVMS operating system by selecting the install or upgrade option 1 from the main menu.

When you select the layered products option (3), the POLYCENTER Software Installation utility allows you to choose whether to install layered products or to register layered products that are on the target disk but are not in the Product Database. If you attempt to reinstall the same version of a product that is already installed, the product will be reinstalled. If you want to reconfigure, select the reconfigure option (5) from the main menu.

As shown in the following example, you are also prompted for a target disk and asked whether you want brief or detailed descriptions. The procedure presents a list of products and allows you to select any or all of these products. Alternatively, you can exit without installing or upgrading any products.

NOTE The layered products listed include CDSA and Kerberos, which are required, and DECnet Phase IV, DECnet-Plus, and TCP/IP Services for OpenVMS, which are optional.

You can install (or upgrade to) the new implementation of TCP/IP Services for OpenVMS, Version 5.4, as part of the OpenVMS upgrade. If you want to install Version 5.4 separately, choose the product:

```
        DEC AXPVMS TCPIP V5.4
```

```
Do you want to INSTALL or REGISTER? (INSTALL/REGISTER/?) [INSTALL] INSTALL
    ************************************************************

    If you choose to install or upgrade DECwindows Motif,
    please note the following:

      o If you did not select the OpenVMS DECwindows server support
        and workstation files options, DECwindows Motif will not run.
        You must add these options to use DECwindows Motif.

      o If you are upgrading DECwindows Motif from version V1.1 and
        want to save the OSF/Motif Release 1.1.3 programming files,
        DO NOT upgrade now.  Instead, see the DECwindows Motif
        installation manual and follow the instructions for running
        PCSI_INSTALLATION.COM.

    If you choose to install or upgrade DECnet-Plus or DECnet Phase IV,
    please note the following:

      o If you did not select the OpenVMS DECNET option, neither version
        of DECnet will run.  You must add this option to use DECnet.

Press Return to continue...

    ************************************************************

    The installation procedure will ask a series of questions.

          () - encloses acceptable answers
          [] - encloses default answers

    Type your response and press the <Return> key.  Type:

          ? - to repeat an explanation
          ^ - to change prior input (not always possible)
          Ctrl/Y - to exit the installation procedure


    You must enter the device name for the target disk on which
    the layered product(s) installation will be performed.

Enter device name for target disk: [dkb300] (? for choices) DKB300
    DKB300: is labeled V732TOV732.


    The install operation can provide brief or detailed descriptions.
    In either case, you can request the detailed descriptions by typing "?".

Do you always want detailed descriptions? (Yes/No) [No] NO

   1 - CPQ AXPVMS CDSA X2.0-67             Layered Product
   2 - DEC AXPVMS DECNET_OSI V7.3-2        Layered Product
```

```
   3 - DEC AXPVMS DECNET_PHASE_IV V7.3-2   Layered Product
   4 - DEC AXPVMS DWMOTIF V1.3-1           Layered Product
   5 - DEC AXPVMS TCPIP V5.4               Layered Product
   6 - HP AXPVMS KERBEROS V2.0             Layered Product
   7 - All products listed above

   8 - Exit

Choose one or more items from the menu separated by commas:
```

NOTE When you **boot** the OpenVMS Alpha operating system CD-ROM and select the option to install layered products, that installation procedure does not run the Installation Verification Procedure (IVP) for layered products. Because the operating system is booted from the CD-ROM and the layered products are installed on a different device (the target drive), the IVPs cannot execute correctly. However, you can run the IVP for each layered product after you boot the target system (see the layered product installation documents for information on running the IVP).

Using the Show Installed Products Option (4)

Use option 4 of the CD-ROM main menu to display a list of products that have been installed on a selected target disk by the POLYCENTER Software Installation utility. Products that were installed by VMSINSTAL or other installation methods will not appear in this display unless they have been registered in the POLYCENTER Software Installation utility's product database.

The following is a sample display of the prompts and information that appear when you select option 4:

```
    You must enter the device name for the system disk for which
    you want to display installed products.

    If you enter an invalid device or one which is not a system disk
    an error will coccur.

    (Enter "^" and press Return to return to main menu.)

Enter device name for system disk:  (? for choices) DKB300
%MOUNT-I-MOUNTED, V732TOV732 mounted on _DKB300:

    The default is an 80-column display that does not include
    Maintenance (patches) or Referenced by information.

Do you want the full, 123-column display? (Yes/No) [No] NO

----------------------------------- ----------- ------------
PRODUCT                             KIT TYPE    STATE
----------------------------------- ----------- ------------
CPQ AXPVMS CDSA V2.0                Full LP     Installed
DEC AXPVMS DECNET_OSI V7.3-2        Full LP     Installed
DEC AXPVMS DWMOTIF V1.3-1           Full LP     Installed
DEC AXPVMS OPENVMS V7.3-2           Platform    Installed
DEC AXPVMS TCPIP V5.4               Full LP     Installed
DEC AXPVMS VMS X7.3-2               Oper System Installed
HP AXPVMS KERBEROS V2.0             Full LP     Installed
----------------------------------- ----------- ------------

7 items found
Do you wish to display product history? (Yes/No) [No] YES
----------------------------------- ----------- ----------- --------------------
PRODUCT                             KIT TYPE    OPERATION   DATE AND TIME
```

```
---------------------------------- ----------- ----------- --------------------
CPQ AXPVMS CDSA V2.0               Full LP     Install     25-MAY-2003 18:04:23
DEC AXPVMS DECNET_OSI V7.3-2       Full LP     Install     25-MAY-2003 18:04:23
DEC AXPVMS DWMOTIF V1.3-1          Full LP     Install     25-MAY-2003 18:04:23
DEC AXPVMS OPENVMS V7.3-2          Platform    Install     25-MAY-2003 18:04:23
DEC AXPVMS VMS V7.3-2              Oper System Install     25-MAY-2003 18:04:23
DEC AXPVMS TCPIP V5.4              Full LP     Install     25-MAY-2003 18:04:23
HP AXPVMS KERBEROS V2.0            Full LP     Install     25-MAY-2003 18:04:23
CPQ AXPVMS CDSA V2.0               Full LP     Remove      25-MAY-2003 18:04:23
DEC AXPVMS DECNET_PHASE_IV V7.3-2  Full LP     Remove      25-MAY-2003 18:04:23
DEC AXPVMS DWMOTIF V1.3-1          Full LP     Remove      25-MAY-2003 18:04:23
DEC AXPVMS OPENVMS V7.3-2          Platform    Remove      25-MAY-2003 18:04:23
DEC AXPVMS VMS V7.3-2              Oper System Remove      25-MAY-2003 18:04:23
HP AXPVMS KERBEROS V2.0            Transition  Remove      25-MAY-2003 18:04:23
HP AXPVMS KERBEROS V2.0            Transition  Reg Product 25-MAY-2003 17:20:44
CPQ AXPVMS CDSA V1.0               Full LP     Install     27-JAN-2003 21:07:15
DEC AXPVMS DECNET_PHASE_IV V7.3-1  Full LP     Install     27-JAN-2003 21:07:15
DEC AXPVMS DWMOTIF V1.3-1          Full LP     Install     27-JAN-2003 21:07:15
DEC AXPVMS OPENVMS V7.3-1          Platform    Install     27-JAN-2003 21:07:15
DEC AXPVMS TCPIP V5.3-18           Full LP     Install     27-JAN-2003 21:07:15
DEC AXPVMS VMS V7.3-1              Oper System Install     27-JAN-2003 21:07:15
---------------------------------- ----------- ----------- --------------------

19 items found

Press Return to continue...
```

Using the Reconfigure Installed Products Option (5)

Option 5 of the CD-ROM main menu allows you to reconfigure layered products, including the DECwindows graphical user interface and HP networking products. This allows you to change the product choices you made during a previous installation or upgrade.

You can reconfigure a product only if all of the following conditions are true:

- The product is available for installation while your system is booted from the operating system CD-ROM. For information about displaying products that are available for installation, see "Using the Display Products and Patches Option (2)" on page 20 (option 2 from the main menu).
- The product is installed. For information about displaying installed products, see "Using the Show Installed Products Option (4)" on page 23 (option 4 from the main menu).
- The version of the product that is available for installation is the same as the version of the product that is installed.

When you select option 5 of the CD-ROM main menu, the procedure prompts you for a target disk name and asks whether you want brief or detailed descriptions about the reconfiguration options. The procedure then lists the products you can configure. You can select any or all of these products, or you can exit without reconfiguring products.

The following is a sample display of the prompts and information that appear when you select option 5:

```
 The reconfiguration procedure will ask a series of questions.

          () - encloses acceptable answers
          [] - encloses default answers

    Type your response and press the <Return> key.  Type:

          ? - to repeat an explanation
          ^ - to change prior input (not always possible)
          Ctrl/Y - to exit the installation procedure
```

```
    You must enter the device name for the target disk on which
    the layered product(s) reconfiguration will be performed.

Enter device name for target disk: (? for choices) DKB300
 DKB300: is labeled V732TOV732.


    The reconfigure operation can provide brief or detailed descriptions.
    In either case, you can request the detailed descriptions by typing "?".

Do you always want detailed descriptions? (Yes/No) [No]NO

   1 - CPQ AXPVMS CDSA XV2.0               Layered Product
   2 - DEC AXPVMS DECNET_OSI V7.3-2        Layered Product
   3 - DEC AXPVMS DWMOTIF V1.3-1           Layered Product
   4 - DEC AXPVMS TCPIP V5.4               Layered Product
   5 - HP  AXPVMS KERBEROS V2.0            Layered Product
   6 - All products listed above
   7 - Exit

Choose one or more items from the menu separated by commas:
```

Using the Remove Installed Products Option (6)

Option 6 of the CD-ROM main menu allows you to remove products that were installed or registered with the POLYCENTER Software Installation (PCSI) utility.

NOTE When you remove a product that was registered using a transition kit, some of the product's directories, files, or other objects might not be removed. Transition kits typically do not contain all the directories, files, and other objects that make up the product.

When you select option 6, you are prompted for a target disk name and whether you want brief or detailed descriptions about the remove options. The procedure then lists the products you can remove. You can select any or all of these products, or you can exit without removing any products.

The following is a sample display of the prompts and information that appear when you select option 6:

```
    The removal procedure will ask a series of questions.

          () - encloses acceptable answers
          [] - encloses default answers

    Type your response and press the <Return> key.  Type:

          ? - to repeat an explanation
          ^ - to change prior input (not always possible)
          Ctrl/Y - to exit the installation procedure


    You must enter the device name for the target disk on which
    the layered product(s) removal will be performed.

Enter device name for target disk: [DKB300:] (? for choices) DKB300

    DKB300: is labeled V732TOV732.


    The remove operation can provide brief or detailed descriptions.
```

```
    In either case, you can request the detailed descriptions by typing "?".

Do you always want detailed descriptions? (Yes/No) [No] NO

   1 - CPQ AXPVMS CDSA V2.0                Layered Product
   2 - DEC AXPVMS DECNET_OSI V7.3-2        Layered Product
   3 - DEC AXPVMS DWMOTIF V1.3-1           Layered Product
   4 - DEC AXPVMS OPENVMS V7.3-2           Platform (product suite)
   5 - DEC AXPVMS TCPIP V5.4               Layered Product
   6 - DEC AXPVMS VMS X7.3-2               Operating System
   7 - HP AXPVMS KERBEROS V2.0             Layered Product
   8 - All products listed above
   9 - Exit

Choose one or more items from the menu separated by commas
```

Using the Execute DCL Option (7)

When you select option 7 from the CD-ROM main menu, you can use a *subset* of DCL commands (such as SHOW DEVICE, MOUNT, and BACKUP) to perform specific preinstallation and maintenance operations. Note, however, that this is a restricted DCL environment in that certain DCL commands (such as PRODUCT) and certain utilities (such as VMSINSTAL) will not function as expected because you are booting from read-only or write-locked media and because the full system startup is not performed.

A triple dollar sign system prompt ($$$) indicates that you are in this restricted DCL environment, as shown in the following example:

```
$$$ SHOW DEVICE
```

To exit from the DCL environment and return to the main menu, enter the LOGOUT command.

Using the Shut Down This System Option (8)

When you select option 8 from the CD-ROM main menu, your system shuts down and you are returned to the console prompt (>>>). The system displays a message similar to the following:

```
    Shutting down the system

        SYSTEM SHUTDOWN COMPLETE
```

Making the Install/Upgrade/Backup Selection

Now that you have reviewed key terms, examined hardware and software requirements, and learned how to use the menu system included on the OpenVMS Alpha operating system CD-ROM, you can do the following:

IF ...	THEN GO TO...
you want to install the operating system in an OpenVMS Cluster environment,	Chapter 2.
you want to install the operating system in a nonclustered environment,	Chapter 3.
you want to upgrade the operating system in *any* environment,	Chapter 5.

IF ...	THEN GO TO...
you want only to back up or restore your system disk,	Appendix B.

2 Preparing to Install in an OpenVMS Cluster Environment

This chapter contains information that you should review before performing an installation in an OpenVMS Cluster environment. If you are not installing your operating system in an OpenVMS Cluster environment, go to Chapter 3.

Preinstallation Checklist for OpenVMS Cluster Environments

Use the checklist in Table 2-1 to ensure that you perform all necessary tasks prior to installing your system in an OpenVMS Cluster environment.

Table 2-1 Preinstallation Checklist

	Task	Section Title
❑	Before installing the operating system in an OpenVMS Cluster environment, review relevant OpenVMS Alpha operating system and OpenVMS Cluster documentation.	"Review OpenVMS Cluster Documentation and Other Sources of Information" on page 29
❑	Familiarize yourself with mixed-version and mixed-architecture support, and migration support in OpenVMS Cluster systems.	"Mixed-Version Support in OpenVMS Cluster Systems" on page 30
❑	Have information ready to provide at the system prompt.	"OpenVMS Cluster Information You Will Need" on page 31
❑	Begin the installation.	Chapter 3, "Installing the OpenVMS Alpha Operating System," on page 33

Review OpenVMS Cluster Documentation and Other Sources of Information

Before installing the operating system in an OpenVMS Cluster environment, be sure you review any relevant OpenVMS Cluster information contained in the following documents:

- The cover letters and the software product descriptions included with your distribution kit
- *HP OpenVMS Alpha Version 7.3-2 New Features and Documentation Overview*
- *HP OpenVMS Alpha Version 7.3-2 Release Notes*

Be sure the following sources of information are available as well:

- *OpenVMS Cluster Systems* manual
- *Guidelines for OpenVMS Cluster Configurations*
- Your network or system manager

Mixed-Version Support in OpenVMS Cluster Systems

HP provides two levels of support for mixed-version and mixed-architecture OpenVMS Cluster systems. These two support types are **warranted** and **migration**.

Warranted support means that HP has fully qualified the two versions coexisting in an OpenVMS Cluster and will answer all problems identified by customers using these configurations.

Migration support means that HP has qualified the versions for use together in configurations that are migrating in a staged fashion to a newer version of OpenVMS VAX or OpenVMS Alpha systems. Problem reports submitted against these configurations will be answered by HP. However, in exceptional cases, HP may request that you move to a warranted configuration as part of the solution. Migration support helps customers move to warranted OpenVMS Cluster pairs.

NOTE HP supports only two versions of OpenVMS running in a cluster at a time, regardless of architecture.

Table 2-2 shows the level of support provided for all possible version pairings. In this table, "*Alpha V7.3x*" refers to versions 7.3, 7.3-1, and 7.3-2. Standard support for OpenVMS Alpha V7.3 systems ends on December 31, 2003. After that, OpenVMS Alpha V7.3 systems will not be under Prior Version Support (PVS). This statement does not apply to OpenVMS VAX systems. For more information, see the OpenVMS Technical Software Support Service web site at `ftp://ftp.compaq.com/pub/services/software/ovms.pdf`.

Table 2-2 OpenVMS Cluster Warranted and Migration Support

	Alpha V7.3*x* and VAX V7.3	**Alpha V7.2-2 and VAX V7.2[1]**
Alpha V7.3*x* and VAX V7.3	WARRANTED	Migration
Alpha V7.2-2 and VAX V7.2[1]	Migration	WARRANTED

[1] OpenVMS Alpha V7.2 is not supported for migration.

In a mixed-version cluster, you might need to install remedial kits on earlier versions of OpenVMS. For a complete list of required remedial kits, see the *HP OpenVMS Alpha Version 7.3-2 Release Notes*.

OpenVMS Cluster Information You Will Need

If during the installation you answer YES to the system prompt asking whether your system will be a member of an OpenVMS Cluster, you will need to provide the following information after you boot the system disk:

Required Information	Explanation
Type of configuration	Configuration types (CI, DSSI, SCSI, local area, or mixed-interconnect) are distinguished by the interconnect device that the VAX and Alpha computers in the OpenVMS Cluster use to communicate with one another.
DECnet node name and node address	See the network or system manager to obtain the DECnet node name and node address for the computer on which you are installing the OpenVMS Alpha operating system. If you install DECnet-Plus for OpenVMS (Phase V) software and do not plan to use DECnet Phase IV for OpenVMS addresses, then you do not need to provide this information.
Allocation class value	During the installation procedure, you are asked for the allocation class value (ALLOCLASS) of the Alpha computer on which you are installing the OpenVMS Alpha operating system. For example: `Enter a value for this_node ALLOCLASS parameter:` See *OpenVMS Cluster Systems* for the rules on specifying allocation class values. Note that in a mixed-interconnect OpenVMS Cluster environment, the allocation class value cannot be zero if the nodes serve DSSI or CI disks. It must be a value from 1 to 255. This is also true for any Alpha computer that is connected to a dual-pathed disk. After you enter the allocation class value, the installation procedure uses it to automatically set the value of the ALLOCLASS system parameter.
Whether you want a quorum disk	See *OpenVMS Cluster Systems* to help you determine whether you want a quorum disk in the cluster.
Location of the page and swap files	On a nonclustered system, the page and swap files are on one or more local disks but on a clustered system, the files are on one or more local or clustered disks. See *OpenVMS Cluster Systems* to help you determine where the page and swap files will be located for the system on which you are installing the OpenVMS Alpha operating system software.
Systems that will be **MOP**[1] servers, disk servers, and tape servers	If you are going to set up either a local area or a mixed-interconnect cluster, you will need to make these determinations.

Required Information	Explanation
Cluster group number and cluster password[2]	If you are going to set up a local area cluster or a mixed-interconnect cluster that is LAN-based, use the following rules to determine the cluster group number and password: • Cluster group number — A number in the range from 1 to 4095 or 61440 to 65535 • Cluster password — Must be from 1 to 31 alphanumeric characters in length and can include dollar signs ($) and underscores(_)

[1] Servers that use the DECnet maintenance operation protocol.

[2] Cluster group number and password are not required if all the cluster nodes are directly connected; that is, the entire cluster uses interconnects such as CI (computer interconnect), DSSI (Digital Storage Systems Interconnect), or MEMORY CHANNEL. In a cluster that uses mixed interconnects, if any of the interconnects require the cluster number and password, then you must set the cluster number and password for all nodes.

Beginning the Installation

After you have completed all the tasks in this chapter, go to Chapter 3 to begin the installation.

3 Installing the OpenVMS Alpha Operating System

This chapter explains how to install the OpenVMS Alpha operating system. It includes sample scripts and messages you might see during an installation and explains how to respond to the prompts.

This chapter describes the following installation tasks:

- Responding to prompts during the installation
- Booting from the operating system CD-ROM
- Installing OpenVMS using option 1 of the CD-ROM main menu
- Creating the system disk
- Providing information such as SYSTEM account password, OpenVMS Cluster and Galaxy intentions, and the time zone for your system
- Registering licenses
- Installing windowing and networking products
- Completing the installation
- Installing layered products
- Booting the new system disk
- Joining an OpenVMS Cluster (optional)
- Running AUTOGEN
- Logging in to the SYSTEM account

NOTE Before you install the operating system, ensure that the correct version of console firmware is running on your computer, as described in "Firmware Revision Checking" on page 17.

Responding to Prompts During the Installation

At different points during the installation, you must respond to prompts asking you to supply specific information. This manual and the Help text available during the installation procedure tell you how to obtain most of this information and how to make decisions when responding to specific prompts.

However, HP recommends that you review the following summary before you begin the installation so that you have an understanding beforehand of the types of information you will need to provide.

During the installation, the system will prompt you for the following information:

- The names of the source drive, target drive, and local area network device (if you are booting from an InfoServer system).

- Whether you want to select the INITIALIZE or PRESERVE option (as described in "Using the Install, Upgrade, or Reconfigure OpenVMS Option (1)" on page 19).
- A volume label for the target disk (if you choose not to use the default volume label).
- A password for the SYSTEM account.
- Whether you want to form or join an OpenVMS Cluster system and, if so, what kind (as described in "OpenVMS Cluster Information You Will Need" on page 31).
- DECnet node name and address (or values for the system parameters, SCSNODE and SCSSYSTEMID).

NOTE If you install the DECnet-Plus for OpenVMS software but want to use addresses compatible with DECnet Phase IV software, you still need to provide this information. These settings identify your system by name and number in a DECnet or cluster environment. Note that if you supply a DECnet Phase IV address, the system will automatically calculate the SCSSYSTEMID value. If necessary, see the network or system manager to obtain this information.

- Information listed on Product Authorization Keys (PAKs) for your OpenVMS licenses. To register your licenses, you will need to enter the information listed on the PAK for each license.
- Optional operating system components that you want to install. You can install all components by default, or you can select specific components from this list:
  - — DECwindows Motif for OpenVMS (a graphical user interface)

    If you install this product, you must also include the DECwindows Server Support component.
  - — OpenVMS Management Station
  - — TCP/IP Services for OpenVMS
  - — Either DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS (but not both)

    If you install either DECnet implementation, you must also include the Support for DECnet component.

NOTE If you are not installing DECwindows as part of the OpenVMS installation now, but you plan to install it later, you should install the DECwindows Server Support component now.

If you are not installing DECnet-Plus or DECnet Phase IV now, but you plan to install one of them later, you should install the Support for the DECnet-Plus or DECnet Phase IV component now. (The same support component applies to both implementations of DECnet.)

If you need to create a kit to install the PC component of the OpenVMS Management Station software, then you must include the OpenVMS Management Station Software — PC files component.

For a complete list of components included with the OpenVMS Alpha operating system, see "List of Components Included with the Operating System" on page 51.

Booting the Operating System CD-ROM

The OpenVMS Alpha Version 7.3-2 operating system includes procedures that allow you to easily install the operating system using the POLYCENTER Software Installation utility. To get started, boot the OpenVMS Alpha operating system CD-ROM either from your local CD-ROM drive or from a CD-ROM drive connected to the InfoServer, as described in "Booting from the Local Drive" on page 35 and "Booting from the InfoServer" on page 35. First, you need to identify the name of the CD-ROM drive, as explained in "Determining the Boot Device" on page 35. For more information on booting operations, see Appendix A, "Halt, Boot, and Shutdown Procedures."

Determining the Boot Device

To boot the operating system CD-ROM, you need to determine the identity of the CD-ROM drive. Follow these steps:

1. Insert the operating system CD-ROM into the local CD-ROM drive.
2. Enter the SHOW DEVICE command at the console prompt (>>>) and look for the correct drive listed in the output (for example, DKA400). If you are booting from the InfoServer, look for a device listed with its hardware address, as in the last line of the following example (EWA0):

   ```
   >>>SHOW DEVICE

   dva0.0.0.1000.0     DVA0                    RX23
   dka200.2.0.5.0      DKA200                  RZ28M  1004
   dka300.3.0.5.0      DKA300                  RZ29B  0016
   dka400.4.0.5.0      DKA400                  RRD42  442E
   ewa0.0.0.3.0        EWA0         00-00-F8-1F-70-3D
   ```

   For additional information, see the *HP OpenVMS Operating System for Alpha and VAX Software Product Description* and the hardware manuals that you received with your Alpha computer.

Booting from the Local Drive

To boot the operating system CD-ROM from the local CD-ROM drive, enter the boot command in the following format:

```
BOOT -FLAGS 0,0 source-drive
```

Substitute the device name of the CD-ROM drive for *source-drive*, such as DKA400, as listed in the SHOW DEVICE display example in "Determining the Boot Device" on page 35. In this case, you would enter the following command and press the Return key:

```
>>> BOOT -FLAGS 0,0 DKA400
```

Booting from the InfoServer

To boot the operating system CD-ROM using the InfoServer, follow these steps:

1. At the console prompt, enter the boot command in the following format:

   ```
   >>> BOOT -FLAGS 0,0 -FILE APB_2073 lan-device-name
   ```

Substitute the name of the local area network device for *lan-device-name*, such as EWA0, as listed in the SHOW DEVICE display example in "Determining the Boot Device" on page 35.

The APB file name is the unique file name that was assigned to the APB.EXE file when it was copied from the operating system CD-ROM to the InfoServer. This file is the name of the APB program used for the initial system load (ISL) boot program.

NOTE If you are using a DEC 3000 or 4000 series system, note the following:

- On DEC 3000 series systems, you can boot through the InfoServer using an alternate TURBOchannel device, such as a PMAD (Ethernet) or DEFTA (FDDI), by specifying the device name as "*n*/ESA0". The value for *n* is the TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. For more information, see "Booting over the Network with an Alternate TURBOchannel Adapter" on page 137 in Appendix A.
- On DEC 4000 series systems, you *must* specify the ISL file name in uppercase (APB_2073).

---

2. The InfoServer ISL program then displays the following menu:

```
Network Initial System Load Function
Version 1.2


  FUNCTION          FUNCTION
    ID
    1      -        Display Menu
    2      -        Help
    3      -        Choose Service
    4      -        Select Options
    5      -        Stop

Enter a function ID value:
```

3. Respond to the prompts as follows, pressing the Return key after each entry:

   a. Enter 3 for the function ID.

   b. Enter 2 for the option ID.

   c. Enter the service name (ALPHA0732).

   A sample display follows:

```
Enter a function ID value: 3
OPTION           OPTION
   ID
   1      -       Find Services
   2      -       Enter known Service Name

Enter an Option ID value: 2
Enter a Known Service Name: ALPHA0732
```

NOTE If you boot the OpenVMS Alpha operating system CD-ROM from an InfoServer but lose your connection during the installation procedure (the system is unresponsive and pressing Ctrl/Y does not return you to the menu), do the following:

IF ...	THEN ...
you previously chose the INITIALIZE option,	1. reboot the OpenVMS Alpha operating system CD-ROM. 2. choose the install option from the menu and perform the installation again, as described in this chapter.
you previously chose the PRESERVE option,	1. reboot the OpenVMS Alpha operating system CD-ROM. 2. enter the DCL environment by choosing option 7 from the menu. 3. mount the device containing your backup copy of the target disk and the device that is your target disk. 4. restore the backup copy of your target disk by entering the appropriate BACKUP commands. (See Appendix B for complete information using MOUNT and BACKUP commands to restore a system disk.) 5. log out from the DCL environment. 6. choose the install option from the menu and perform the installation again, as described in this chapter.

Installing OpenVMS Using Option 1 of the Operating System CD-ROM Menu

After you boot the operating system CD-ROM, choose the installation option (1) from the menu displayed on the screen. For example:

```
OpenVMS (TM) Alpha Operating System, Version 7.3-2

(c) Copyright 1976-2003 Hewlett-Packard Development Company, L.P.

Installing required known files...

Configuring devices...

******************************************************************

You can install or upgrade the OpenVMS Alpha operating system
or you can install or upgrade layered products that are included
on the OpenVMS Alpha operating system CD-ROM.

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

Please choose one of the following:
```

```
      1)  Upgrade, install or reconfigure OpenVMS Alpha Version 7.3-2
      2)  Display products and patches that this procedure can install
      3)  Install or upgrade layered products and patches
      4)  Show installed products
      5)  Reconfigure installed products
      6)  Remove installed products
      7)  Execute DCL commands and procedures
      8)  Shut down this system

   Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?) 1
```

The OpenVMS Alpha operating system CD-ROM might contain patch kits. If it does, information similar to the following is displayed:

```
   The following PATCH kits are present on the OpenVMS Alpha
   distribution media.

   ---------------------------------- ----------- ----------
   PRODUCT                            KIT TYPE    KIT FORMAT
   ---------------------------------- ----------- ----------
   DEC AXPVMS TCPIP_ECO V5.3-182      Patch       Sequential
   ---------------------------------- ----------- ----------

   1 item found

   Please consult the OpenVMS Alpha Upgrade and Installation Manual,
   the Release Notes, and the Cover Letter to determine if any or
   all of these patches may be required for your system.
```

If you have not already done so, check to determine if you need to install any patches.

Creating the System Disk

The following sections describe how to create the system disk from the operating system CD-ROM after you have begun the installation procedure using option 1 of the CD-ROM main menu.

Choosing INITIALIZE or PRESERVE

After you choose the install option (1) from the CD-ROM main menu, the system displays the following information and prompts after the patch kit information (if any):

```
   ************************************************************

   The installation procedure will ask a series of questions.

         () - encloses acceptable answers
         [] - encloses default answers

   Type your response and press the <Return>key.  Type:

         ? - to repeat an explanation
         ^ - to change prior input (not always possible)
         Ctrl/Y - to exit the installation procedure


   There are two choices for Installation/Upgrade:
```

```
    INITIALIZE - Removes all software and data files that were
        previously on the target disk and installs OpenVMS Alpha.

    PRESERVE -- Installs or upgrades OpenVMS Alpha on the target disk
        and retains all other contents of the target disk.

   * NOTE: You cannot use preserve to install OpenVMS Alpha on a disk on
         which OpenVMS VAX or any other operating system is installed.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE]
```

Respond to the INITIALIZE or PRESERVE prompt as follows:

IF ...	THEN ...
your system disk is new,	1. enter INITIALIZE. 2. press the Return key.
you want to remove all files from an existing system disk,	1. enter INITIALIZE. 2. press the Return key.
you want to retain certain files on an existing disk,	press the Return key to accept the default (PRESERVE).

Specifying the Target Disk

The procedure next asks you for the name of the target disk. If you enter a question mark (?), the system displays a list of devices on your system. Select the appropriate disk and respond to the prompt. For example:

```
    You must enter the device name for the target disk on which
    OpenVMS Alpha will be installed.

Enter device name for target disk: (? for choices)  DKB400
```

If you select a device that is not available or that cannot be used for some other reason, the system displays information indicating why the device cannot be used. For example, if you enter MKA500, a tape device, a message similar to the following is displayed:

```
MKA500 is not a disk device
```

Specifying the Volume Label

If you select a device that can be used, the system then informs you of the volume label currently assigned to this device and asks if you want to keep that label. If you choose not to keep that label, you are prompted for a new label, as shown in the following example. The OpenVMS operating system uses the volume label to identify and reference the disk. Make sure the label you use is unique; problems occur if the same label is used by different disk volumes.

```
   DKB400: is now labeled ASPVMS732.

Do you want to keep this label? (Yes/No) [Yes] NO

Enter volume label for target system disk: [ALPHASYS]
```

You can keep the label already assigned to the disk, accept the default label assigned by the system (ALPHASYS), or specify a different volume label (with a limit of 12 characters that can include A to Z, 0 through 9, and optionally, the dollar sign ($), hyphen (-), and underscore (_) characters).

NOTE HP strongly recommends that the volume labels for all disks on your system or OpenVMS Cluster have unique labels. If a disk having the same label as the system disk is mounted, various OpenVMS components will not function as intended.

Specifying the On-Disk Structure Level

After you enter the volume label for the target system disk, you are asked if you want to initialize the target system disk with On-Disk Structure Level 2 (ODS-2) or Level 5 (ODS-5).

```
      The target system disk can be initialized with On-Disk Structure
      Level 2 (ODS-2) or Level 5 (ODS-5). (? for more information)

  Do you want to initialize with ODS-2 or ODS-5? (2/5/?)
```

For details about ODS-2 and ODS-5 file systems, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. A brief summary follows:

- **ODS-2**

  ODS-2 allows for full compatibility with all OpenVMS VAX systems and with OpenVMS Alpha systems prior to Version 7.2.

- **ODS-5**

  — ODS-5 supports file names that are longer, have a wider range of legal characters, and allow for mixed-case file names. This feature permits use of file names similar to those in a Microsoft Windows® or UNIX® environment.

  — ODS-5 supports hard links to files, access dates, and files whose names differ only by case.

  — ODS-5 volumes cannot be mounted on any version of OpenVMS prior to Version 7.2.

  — Systems running OpenVMS VAX Version 7.2 and later can mount ODS-5 volumes, but cannot create or access files having extended names. (Lowercase file name characters are seen in uppercase on OpenVMS VAX systems.)

Select ODS-2 or ODS-5 by entering 2 or 5 at the prompt. If you select ODS-5, you are asked whether you want to enable hard links. For more information about hard links, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

```
       Hard links can be enabled on ODS-5 disks. (? for more information)

   Do you want to enable hard links? (Yes/No/?)
```

Enter YES or NO to indicate your choice. Your target system disk choices are displayed, and you are asked to confirm that they are correct.

```
      You have chosen to install OpenVMS Alpha on a new disk.

      The target system disk, DKB400:, will be initialized
      with structure level 5 (ODS-5).
      Hard links will NOT be enabled.
      It will be labeled ALPHASYS.
      Any data currently on the target system disk will be lost.

  Is this OK? (Yes/No) Y

        Initializing and mounting target....

      Creating page and swap files....
```

Providing System Information

The following sections explain how to provide information for the following:

- SYSTEM account password
- OpenVMS Cluster member status
- OpenVMS Galaxy instance status
- SCSNODE and SCSSYSTEMID
- Time zone information

Setting the SYSTEM Account Password

Before you respond to the system prompt asking you to enter a password for the SYSTEM account, note the following:

- Passwords must be at least eight characters in length (but not exceeding 31 characters). Valid characters for the password include A through Z, 0 through 9, and optionally, the dollar sign ($) and underscore (_). Passwords must contain at least one alphabetic character (A through Z). The system converts all characters to uppercase, so the case of characters you enter is insignificant.
- Press the Return key after you enter the password. (The password does not display as you type it.)
- After you enter the password, the procedure checks to make sure it meets the requirements for a valid password.
- Reenter the password for verification.

The following is a sample display:

```
    You must enter a password for the SYSTEM account.

    The password must be a minimum of 8 characters in length,
    and may not exceed 31 characters. It will be checked and verified.
    The system will not accept passwords that can be guessed easily.

    The password will not be displayed as you enter it.

Password for SYSTEM account:

Reenter SYSTEM password for verification:
```

If you reenter the password incorrectly or if the system determines that the password is too easy for another user to guess, the system displays an error message and gives you the opportunity to specify a valid password.

Becoming an OpenVMS Cluster Member

The procedure now asks if your system will be part of an OpenVMS Cluster. The display is similar to the following:

```
Will this system be a member of an OpenVMS Cluster? (Yes/No)
```

You should answer YES if the system will be an **OpenVMS Galaxy instance** or a member of an OpenVMS cluster. Answering YES to this question causes SYS$MANAGER:CLUSTER_CONFIG.COM to run automatically when your newly installed system is first booted. The CLUSTER_CONFIG procedure will ask a

series of questions about the cluster. Your response to this question determines how the VAXCLUSTER system parameter will be set. (The parameter name "VAXCLUSTER" has been retained on OpenVMS Alpha systems.) For more information, see the *Guidelines for OpenVMS Cluster Configurations*.

If you answer YES to the cluster question, the display is similar to the following:

```
  When your new system is first booted you will be required to answer
  additional questions in order to configure the OpenVMS Cluster.
```

If you answer NO to the cluster question, the system can still be a member of an OpenVMS Cluster. However, in this case you will have to explicitly configure the cluster when your newly installed system is first booted. You can do this by executing a command similar to the following:

```
$ @SYS$MANAGER:CLUSTER_CONFIG
```

For detailed information about cluster configuration, see the *OpenVMS Cluster Systems* manual.

Becoming an OpenVMS Galaxy Instance

The procedure next asks if your system will be an instance in an OpenVMS Galaxy. The display is similar to the following:

```
Will this system be an instance in an OpenVMS Galaxy? (Yes/No)
```

Your answer to this question determines how the GALAXY system parameter will be set.

Setting the SCSNODE and SCSSYSTEMID System Parameters

The procedure now asks you to set values for the parameters SCSNODE and SCSSYSTEMID. SCSNODE is a name that can be from 1 to 6 letters or numbers; it must include at least one letter. If this system is part of an OpenVMS Cluster, SCSNODE must be unique within the cluster. If you are using DECnet Phase IV for OpenVMS or DECnet-Plus for OpenVMS with DECnet Phase IV addresses, then SCSNODE must be the same as your DECnet node name.

SCSSYSTEMID must also be unique within an OpenVMS Cluster. In addition, if you are using DECnet Phase IV for OpenVMS or DECnet-Plus for OpenVMS with DECnet Phase IV addresses, SCSSYSTEMID depends on the DECnet Phase IV address that your system is using.

The following is an example of the display and valid responses:

```
    For your system to operate properly, you must set two parameters:
    SCSNODE and SCSSYSTEMID.

    SCSNODE can be from 1 to 6 letters or numbers.  It must contain at
    least one letter.

    If you plan to use DECnet, SCSNODE must be the DECnet Phase IV
    node name, or the DECnet-Plus node synonym.

    If you have multiple OpenVMS systems, the SCSNODE on each system
    must be unique.

Enter SCSNODE: ALPCSI

    If you plan to use DECnet, SCSSYSTEMID must be set based on the
    DECnet Phase IV address.

Do you plan to use DECnet (Y/N) [YES]:
```

If you answer YES, the display is similar to the following:

```
    DECnet Phase IV addresses are in the format

        DECnet_area_number.DECnet_node_number

    DECnet_area_number is a number between 1 and 63.
    DECnet_node_number is a number between 1 and 1023.

    If you plan to use DECnet-Plus WITHOUT Phase IV compatible addresses,
    enter 0.0.


Enter DECnet (Phase IV) Address [1.1]: 63.180

    SCSSYSTEMID will be set to 64692.

        This was calculated as follows:

        (DECnet_area_number * 1024) + DECnet_node_number
```

If you are not using DECnet, or if you enter 0.0 as the DECnet Phase IV address, you are prompted to enter a SCSSSYSTEMID in the range of 1 to 65535. If this is a standalone system, the default 65534 is acceptable. However, if this system is part of an OpenVMS Cluster, you must enter a unique SCSSYSTEMID. The following is a sample display:

```
   The system cannot calculate SCSSYSTEMID from an address that is not
   compatible with DECnet Phase-IV.
   You will have to choose a value for SCSSYSTEMID.


   If you plan to use LAT software, you may have to add /NODECNET to any
   CREATE LINK commands in SYS$MANAGER:LATSYSTARTUP.COM.

   Please choose a SCSSYSTEMID between 1 and 65535.  If you have multiple
   OpenVMS systems, the SCSSYSTEMID on each system must be unique.

Enter SCSYSTEMID [65535]: 12345
```

Setting Time Zone Information

The following sections explain how to provide information about the local time zone and the time differential factor (TDF).

Selecting the Local Time Zone

At this point in the installation, the procedure asks you for information that is used for providing local time zone support.

For local time zone support to work correctly, the installation procedure must set the time zone that accurately describes the location you want to be considered as your default time zone. Usually, this is the time zone in which your system is running. In addition, your system must be correctly configured to use a valid OpenVMS time differential factor (TDF).

The procedure displays the main time zone menu. You can select the time zone in either of two ways:

- Selecting the number in the main time zone menu that best represents the time zone desired (if multiple time zones exist for the selection you make, you must select the exact time zone from another menu).
- Using a search option that allows you to bypass the time zone menu and search by name.

If you select one of the numbers in the time zone menu, the corresponding time zone is selected.

NOTE An asterisk (*) next to a number indicates that more than one time zone exists for that selection. If you select such a number, an additional menu displays choices that allow you to select the appropriate time zone. For example, if you choose the United States (US) time zone from the main time zone menu, a second menu displays the specific time zones within the United States.

The following example shows how you would select the Eastern time zone for the United States by using the menu numbers:

```
  Configuring the Local Time Zone


TIME ZONE SPECIFICATION -- MAIN Time Zone Menu            "*" indicates a menu

  0* GMT
  1* AFRICA          12) EET             23) JAPAN           34) ROK
  2* AMERICA         13) EGYPT           24) LIBYA           35) SINGAPORE
  3* ANTARCTICA      14) FACTORY         25) MET             36* SYSTEMV
  4* ASIA            15) GB-EIRE         26* MEXICO          37) TURKEY
  5* ATLANTIC        16) GREENWICH       27) NAVAJO          38) UCT
  6* AUSTRALIA       17) HONGKONG        28) NZ-CHAT         39) UNIVERSAL
  7* BRAZIL          18) ICELAND         29) NZ              40* US
  8* CANADA          19* INDIAN          30* PACIFIC         41) UTC
  9) CET             20) IRAN            31) POLAND          42) W-SU
 10* CHILE           21) ISRAEL          32) PRC             43) WET
 11) CUBA            22) JAMAICA         33) ROC             44) ZULU

Press "Return" to redisplay, enter "=" to search or "?" for help, or
Select the number above that best represents the desired time zone: 40


US Time Zone Menu                                         "*" indicates a menu

  0* RETURN TO MAIN TIME ZONE MENU
  1) ALASKA           4) CENTRAL          7) HAWAII          10) MOUNTAIN
  2) ALEUTIAN         5) EAST-INDIANA     8) INDIANA-STARKE  11) PACIFIC
  3) ARIZONA          6) EASTERN          9) MICHIGAN        12) SAMOA

Press "Return" to redisplay, enter "=" to search or "?" for help, or
Select the number above that best represents the desired time zone: 6

You selected EASTERN / US as your time zone.
Is this correct? (Yes/No) [YES]:
```

To use the search option instead of menu numbers to select the time zone, enter an equal string ("=") at the menu prompt instead of a number. The procedure then prompts you for the full or partial name of the time zone you want to select. After you enter that information, the procedure displays all matching time zones, and you can then select the appropriate one.

NOTE Search only for a specific submenu name, such as US or INDIAN, or for a menu entry, such as POLAND or EASTERN (or partial names POL or EAST). Attempts to search for "EASTERN / US" or "REUNION / INDIAN" will fail to bring up choices for you.

The following example shows how you would select the Eastern time zone for the United States by using the search option:

```
  Configuring the Local Time Zone


TIME ZONE SPECIFICATION -- MAIN Time Zone Menu            "*" indicates a menu

  0* GMT
  1* AFRICA          12) EET             23) JAPAN           34) ROK
  2* AMERICA         13) EGYPT           24) LIBYA           35) SINGAPORE
  3* ANTARCTICA      14) FACTORY         25) MET             36* SYSTEMV
  4* ASIA            15) GB-EIRE         26* MEXICO          37) TURKEY
  5* ATLANTIC        16) GREENWICH       27) NAVAJO          38) UCT
  6* AUSTRALIA       17) HONGKONG        28) NZ-CHAT         39) UNIVERSAL
  7* BRAZIL          18) ICELAND         29) NZ              40* US
  8* CANADA          19* INDIAN          30* PACIFIC         41) UTC
  9) CET             20) IRAN            31) POLAND          42) W-SU
 10* CHILE           21) ISRAEL          32) PRC             43) WET
 11) CUBA            22) JAMAICA         33) ROC             44) ZULU

Press "Return" to redisplay, enter "=" to search or "?" for help, or
Select the number above that best represents the desired time zone: =EAST

Search for Time Zone by Full or Partial Name


          "*" indicates a menu

          1) EAST / BRAZIL
          2) EAST-SASKATCHEWAN / CANADA
          3) EASTERN / CANADA
          4) EASTERISLAND / CHILE
          5) EASTER / PACIFIC
          6) EAST-INDIANA / US
          7) EASTERN / US

Press "Return" to redisplay this menu,
enter "=" to search for a new zone,
enter "0" to return to the Main Time Zone Menu,
enter "?" for help, or
Select the number above that best represents the desired time zone: 7

You selected EASTERN / US as your time zone.
Is this correct? (Yes/No) [YES]:
```

The procedure then prompts you for the TDF.

For more information about local time zone support, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

Setting the TDF

The TDF is the difference between your system time and Coordinated Universal Time (UTC), which is an international standard (similar to Greenwich Mean Time) for measuring time of day. The procedure supplies a default for TDF, which is generally the correct response.

```
    Configuring the Time Differential Factor (TDF)


    Default Time Differential Factor for standard time is -5:00.
    Default Time Differential Factor for daylight saving time is -4:00.
```

```
    The Time Differential Factor (TDF) is the difference between your
    system time and Coordinated Universal Time (UTC).  UTC is similar
    in most respects to Greenwich Mean Time (GMT).

    The TDF is expressed as hours and minutes, and should be entered
    in the hh:mm format.  TDFs for the Americas will be negative
    (-3:00, -4:00, etc.); TDFs for Europe, Africa, Asia and Australia
    will be positive (1:00, 2:00, etc.).

This time zone supports daylight saving time.
Is this time zone currently on daylight saving time? (Yes/No): N

Enter the Time Differential Factor [-5:00]:

    NEW SYSTEM TIME DIFFERENTIAL FACTOR = -5:00

Is this correct? [Y]:
```

For more information about TDF support, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

Registering Licenses

Before you can use the OpenVMS Alpha operating system and its components, you must register all licenses in one of two ways:

- During the installation (which HP recommends), by responding to the prompts displayed by the SYS$UPDATE:VMSLICENSE.COM procedure. This procedure is executed if you answer YES (the default) to the following question:

  ```
  Do you want to register any Product Authorization Keys?
  ```

- After the installation, by using the LICENSE REGISTER command or by invoking SYS$UPDATE:VMSLICENSE.COM.

In addition to reviewing the license information provided in this chapter, you can also refer to the following:

- Appendix C, which contains notes and supplemental information about licenses and licensing procedures
- The *OpenVMS License Management Utility Manual*, which contains complete, detailed information about the licensing procedure

Types of OpenVMS Alpha Licenses

The operating system uses one or more of the following types of licenses, depending on your hardware and software configuration.

NOTE All OpenVMS Alpha Base and SMP licenses include the NO_SHARE attribute and remain with the initial host computer.

Table 3-1 Types of OpenVMS Alpha Licenses

Type of License	Description
Operating System Base License	Grants the right to noninteractive use of the remote batch, print, application, and computing services of the operating system on a single processor and authorizes one direct login (for system management purposes only). This license is a prerequisite for OpenVMS Alpha Interactive User Licenses.
Symmetric Multiprocessing (SMP) Extension to the Operating System Base License	Upgrades the Operating System Base License to the matching multiprocessing level of your Alpha SMP system. Because the Symmetric Multiprocessing (SMP) Extension grants all the rights the existing Base provided at the uniprocessing level, you do not need to reinstall those licenses when you upgrade to a multiprocessing system. Each time you upgrade your system to a new multiprocessing level (for example, from a DEC 7000 Model 620 Alpha system to a DEC 7000 Model 630 Alpha system), you add an SMP Extension to your existing licenses.
OpenVMS concurrent-use Licenses	Grant the right to interactive use of the OpenVMS Alpha operating system, provided you have previously installed the appropriate OpenVMS Alpha Operating System Base License on your Alpha computer. These licenses, which are concurrent, are available in any quantity desired or as an unlimited user license. You can add interactive users to the computer at any time by specifying the same node name on the additional Interactive User License PAK and by following the license combination procedure described in the *OpenVMS License Management Utility Manual*.

How to Register Licenses

At this point in the installation, the system displays the following message:

```
    If you have Product Authorization Keys (PAKs) to register,
    you can register them now.

Do you want to register any Product Authorization Keys? (Yes/No) [Yes]
```

Respond to the prompt as follows:

IF ...	THEN ...
you choose to register your licenses at this time (which HP recommends),	1. be sure you review Appendix C and have the *OpenVMS License Management Utility Manual* available. 2. be sure you have a copy of the Product Authorization Key (PAK) for each license that you will register. 3. type Y and press the Return key. 4. register your licenses, as described in the next section, "Using the Licensing Procedure" on page 48.

IF ...	THEN ...
you choose *not* to register your licenses at this time,	1. type N and press the Return key. 2. skip the next section, "Using the Licensing Procedure" on page 48, and follow the directions in "Installing Windowing and Networking Products" on page 48. 3. after completing the installation, make sure you register your licenses using the LICENSE REGISTER command or by invoking SYS$UPDATE:VMSLICENSE.COM *before* performing any other postinstallation tasks.

Using the Licensing Procedure

Entering Y (YES) to register your licenses during the installation invokes the SYS$UPDATE:VMSLICENSE.COM procedure, which displays the following message:

```
VMS License Management Utility Options:

    1. REGISTER a Product Authorization Key
    2. AMEND an existing Product Authorization Key
    3. CANCEL an existing Product Authorization Key
    4. LIST Product Authorization Keys
    5. MODIFY an existing Product Authorization Key
    6. DISABLE an existing Product Authorization Key
    7. DELETE an existing Product Authorization Key
    8. COPY an existing Product Authorization Key
    9. MOVE an existing Product Authorization Key
   10. ENABLE an existing Product Authorization Key
   11. SHOW the licenses loaded on this node
   12. SHOW the unit requirements for this node

   99. Exit this procedure

   Type '?' at any prompt for a description of the information
   requested. Press Ctrl/Z at any prompt to return to this menu.

Enter one of the above choices [1]
```

1. Select the REGISTER option and enter each license key until you have successfully registered all required PAKs.
2. After you register all your licenses, exit from the License Management procedure by entering option 99.

Installing Windowing and Networking Products

The procedure now presents information about software that you can install along with the OpenVMS operating system. Some of this software is required, as noted; some is optional. The procedure asks if you want to install the following HP windowing and networking software products:

- CDSA (required)
- Kerberos (required)

- DECwindows Motif for OpenVMS
- DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS (but not both)
- TCP/IP Services for OpenVMS

The software that you choose to install (including the previously listed required software) will be installed along with the OpenVMS Alpha operating system. You can change the default values for these products later in the installation procedure.

NOTE The OpenVMS Alpha installation menu offers the choice to install DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS networking software. You *cannot* have both installed on your system at the same time. You can choose to install neither DECnet product; however, certain products that depend on DECnet might be affected.

After you have DECnet-Plus and TCP/IP installed on your system, you can run DECnet applications over your TCP/IP network. For more information on DECnet over TCP/IP, see the *DECnet-Plus for OpenVMS Network Management*.

The software products display is similar to the following:

```
You can install the following products along with the OpenVMS operating
system:

        o CDSA for OpenVMS Alpha (required part of OpenVMS)
        o KERBEROS for OpenVMS Alpha (required part of OpenVMS)
        o DECwindows Motif for OpenVMS Alpha
        o DECnet-Plus for OpenVMS Alpha
        o DECnet Phase IV for OpenVMS Alpha
        o HP TCP/IP Services for OpenVMS

    If you want to change your selections, you can do so later in the
    installation by answering "NO" to the following question:

        "Do you want the defaults for all options?"

    Do you want to install DECwindows Motif for OpenVMS Alpha V1.3-1?
(Yes/No) [YES] Y


    Beginning with OpenVMS V7.1, the DECnet-Plus kit is provided with
    the OpenVMS operating system kit.  HP strongly recommends that
    DECnet users install DECnet-Plus.  DECnet Phase IV applications are
    supported by DECnet-Plus.

    DECnet Phase IV is also provided as an option.  Support for DECnet
    Phase IV is available through a Prior Version Support Contract.

    If you install DECnet-Plus and TCP/IP  you can run DECnet
    applications over a TCP/IP network.  Please see the OpenVMS
    Management Guide for information on running DECnet over TCP/IP.

    Do you want to install DECnet-Plus for OpenVMS Alpha V7.3-2?
(Yes/No) [YES]
```

If you answer NO to the prompt to install DECnet-Plus for OpenVMS, you are prompted to install DECnet Phase IV for OpenVMS.

```
    Do you want to install DECnet Phase IV for OpenVMS Alpha V7.3-2?
(Yes/No) [YES]
```

Finally, you are asked whether you want to install HP TCP/IP Services for OpenVMS:

```
    Do you want to install HP TCP/IP Services for OpenVMS V5.4?
(Yes/No) [YES] Y
```

Completing the Installation

The following sections describe the remaining steps that you need to perform to complete the installation.

Choosing Descriptive Help Text

Next, the system prompts you as follows:

```
The installation can provide brief or detailed descriptions.
In either case, you can request the detailed descriptions by typing "?".

Do you always want detailed descriptions? (Yes/No) [No]
```

If you answer YES, the system will display additional explanatory text with each prompt.

Selecting Components

The system next displays a message, indicating that the procedure is ready to install the operating system:

```
The following product has been selected:
    DEC AXPVMS OPENVMS V7.3-2                    Platform (product suite)


Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for
any products that may be installed to satisfy software dependency requirements.

DEC AXPVMS OPENVMS V7.3-2: OPENVMS and related products Platform

    COPYRIGHT 1976, 27-JUN-2003
    Hewlett-Packard Development Company, L.P.

Do you want the defaults for all options? [YES]
```

When selecting options, note the following:

- If you want all the default values, press the Return key.

  If you want to select components of products individually, answer NO. The system will then prompt you for each option and suboption shown in “List of Components Included with the Operating System” on page 51.
- Review the list of options and compare them with the requirements for your system. If you are selecting components individually, be sure that you include all components necessary to support the needs of your users. Note also that certain components depend on the installation of other components.
- If you are not sure whether you want certain options, request help by entering a question mark (?) at the prompt for that option.

- After you select all the options you want, you will have an opportunity to view your selections and make changes (if necessary).
- OpenVMS Management Station software is automatically installed on your OpenVMS system disk when you accept all the default values. If you do not accept the default values, you must select the OpenVMS Management Station component (server and client files) if you plan to use that product. After the installation is complete, you can then prepare your OpenVMS Alpha system and your PC to run OpenVMS Management Station by following the procedures described in Appendix D.
- If you decide after the installation to change which OpenVMS Alpha operating system options you want installed on your system, you must reconfigure the installation as described in "PRESERVE Option" on page 20 and "Adding and Removing Operating System Files" on page 69.
- After you boot the new system disk and log in, you can obtain information about individual system files by entering HELP SYSTEM_FILES at the dollar sign prompt ($).

NOTE Unless you have specific reasons to do otherwise, HP recommends that you accept the defaults and install all OpenVMS options. OpenVMS and layered products have various dependencies on many of these options. Even if you think you do not need certain options, some OpenVMS or layered product operations might not work correctly if other OpenVMS options are not installed.

If you answer YES to accept the defaults for all options, the system displays a message similar to the following, the contents of which depend on the products you chose to install. If you answer NO, the system prompts you for each option and suboption.

```
CDSA for OpenVMS Alpha (required part of OpenVMS)

KERBEROS for OpenVMS Alpha (required part of OpenVMS)

DEC AXPVMS DWMOTIF V1.3-1: DECwindows Motif
  If a Local Language Variant is installed, refer to the Installation Guide.

  Do you want to continue? [YES]
```

If you answer NO, the installation takes you back to the main menu. If you answer YES, and you chose to install DECnet Phase IV, the procedure displays additional text similar to the following before continuing. If you did not install DECnet Phase IV, the installation continues as described in "Completing the Procedure" on page 52.

```
DEC AXPVMS DECNET_PHASE_IV V7.3-2: DECNET_PHASE_IV

 Support addendum to the DECnet Phase IV service contract required

 Do you want to continue? [YES]
```

If you answer NO, the installation takes you back to the main menu. If you answer YES, the installation continues as described in "Completing the Procedure" on page 52.

List of Components Included with the Operating System

The following components are included within the OpenVMS Alpha Version 7.3-2 operating system. Depending on the products you chose to install with the operating system, additional components are included as well.

```
DECdtm Distributed Transaction Manager
Support for DECnet-Plus or DECnet for OpenVMS
Programming Support
    Debugger Utility
```

```
    Image Dump Utility
    Macro libraries
    Macro-32 Migration Compiler
    TLB intermediary form of STARLET
    C Object Libraries
    C Header Files
    VMS text libraries of Ada declarations
RMS Journaling Recovery Utility
System Programming Support
    Delta Debugger
    System Dump Analyzer Utility
    Miscellaneous Symbol Table Files
OpenVMS Management Station Software -- PC files
Utilities
    Phone Utility
    Error Log Generator Utility
    XPG4 Internationalization Utilities
    World Wide PostScript Printing Subsystem
Bliss Require Files
Example Files
Message Facility Files (HELP/MESSAGE)
Translated Image Support
UETP Files
DECwindows Server Support
    DECwindows workstation files
    Video fonts
        100 dots-per-inch video fonts
    Euro base support
        Euro 100 dots-per-inch video fonts
Delete any obsolete OpenVMS files
Delete files archived by OpenVMS remedial kits
```

Completing the Procedure

When you have answered all the prompts and selected the components you want installed, the system displays information about the products you have selected. The system then allows you to review your selections and make changes if necessary, then installs the product, provides informational messages, and returns you to the menu.

First, you are asked if you want to review the options:

```
Do you want to review the options? [NO]
```

If you answer NO, the installation continues as described in "Installing OpenVMS on the Target Disk" on page 53. If you answer YES, the system displays all the selected options and suboptions, after which you are prompted as follows:

```
Are you satisfied with these options? [YES]
```

If you answer NO to this prompt, you are allowed to selectively configure options and suboptions, even if you did not do so previously. When you finish, you will again be asked whether you are satisfied with the options you selected. When you answer YES to indicate you are satisfied with the selections, the installation continues as described in "Installing OpenVMS on the Target Disk" on page 53.

NOTE If you perform two installations at the same time to systems connected by MEMORY CHANNEL, you might see a message similar to the following every 5 seconds:

```
%PMA0 CPU00: 27-MAY-2003 14:58:40 Remote System Conflicts with
Known System - REMOTE NODE
%PMA0 CPU00: 27-MAY-2003 14:58:45 Remote System Conflicts with
Known System - REMOTE NODE
```

Disregard the message. The installation or upgrade will proceed normally and the message will not be present when the system reboots with its actual node name.

Installing OpenVMS on the Target Disk

When you answer NO to the prompt asking whether you want to review the options, or YES to the prompt that asks whether you are satisfied with your selections, the installation of OpenVMS on the target disk begins. The following is a sample display.

```
Execution phase starting ...

The following products will be installed to destinations:
    CPQ AXPVMS CDSA V2.0                 DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS DECNET_OSI V7.3-2         DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS DWMOTIF V1.3-1            DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS OPENVMS V7.3-2            DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS TCPIP V5.4                DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS VMS V7.3-2                DISK$ALPHASYS:[VMS$COMMON.]
    HP AXPVMS KERBEROS V2.0              DISK$ALPHASYS:[VMS$COMMON.]

Portion done: 0%..10%..20%..30%..40%..50%..60%..70%..80%


  **** DECwindows Motif application and run-time support files DETECTED ****


  **** DECwindows device support files DETECTED ****
 ...90%
%PCSI-I-PRCOUTPUT, output from subprocess follows ...
% TCPIP-W-PCSI_INSTALL
% - Execute SYS$MANAGER:TCPIP$CONFIG.COM to proceed with configuration of
%   HP TCP/IP Services.
%
 Portion done: 100%

The following products have been installed:
    CPQ AXPVMS CDSA V2.0                 Layered Product
    DEC AXPVMS DECNET_OSI V7.3-2         Layered Product
    DEC AXPVMS DWMOTIF V1.3-1            Layered Product
    DEC AXPVMS OPENVMS V7.3-2            Platform (product suite)
    DEC AXPVMS TCPIP V5.4                Layered Product
    DEC AXPVMS VMS V7.3-2                Operating System
    HP AXPVMS KERBEROS V2.0              Layered Product

DEC AXPVMS OPENVMS V7.3-2: OPENVMS and related products Platform

    HP AXPVMS KERBEROS V2.0

      Configure the OpenVMS Kerberos clients & servers

      If Kerberos will be in use on this system
      and a current Kerberos configuration will
      not be used, please take the time to run
      the following command after the installation
      has completed (and after rebooting the system
```

```
      if this is an OpenVMS Installation or Upgrade):

          @SYS$STARTUP:KRB$CONFIGURE.COM

      After configuration, two system files need to
      be modified. The following line should be
      added to SYS$MANAGER:SYSTARTUP.COM

             $ @SYS$STARTUP:KRB$STARTUP

      The following line must be added to
      SYS$MANAGER:SYLOGIN.COM


            $ @SYS$MANAGER:KRB$SYMBOLS

      The Kerberos 5 V2.0 documentation has been
      provided as it was received from MIT.  This
      documentation may differ slightly from the
      OpenVMS Kerberos implementation as it describes
      the Kerberos implementation in a Unix environment.
      The documents are:

          KRB$ROOT:[DOC]IMPLEMENT.PDF
          KRB$ROOT:[DOC]LIBRARY.PDF
          KRB$ROOT:[DOC]ADMIN-GUIDE.PS
          KRB$ROOT:[DOC]INSTALL-GUIDE.PS
          KRB$ROOT:[DOC]KRB425-GUIDE.PS
          KRB$ROOT:[DOC]USER-GUIDE.PS

    DEC AXPVMS DWMOTIF V1.3-1: DECwindows Motif

      System reboot is required.

      If using a language variant, reboot after upgrade of language variant.

      Installation Verification Procedure can be run after reboot.

    DEC AXPVMS TCPIP V5.4: HP TCP/IP Services for OpenVMS.

      Check the release notes for current status of the product.

    The installation is now complete.

    When the newly installed system is first booted, a special
    startup procedure will be run.  This procedure will:

    o  Configure the system for standalone or OpenVMS Cluster operation.
    o  Run AUTOGEN to set system parameters.
    o  Reboot the system with the newly set parameters.


    You may shut down now or continue with other operations.


  Process AXPVMS_INSTALL logged out at 27-MAY-2003 14:45:49.54

Press Return to continue...

    ****************************************************************

    You can install or upgrade the OpenVMS Alpha operating system
    or you can install or upgrade layered products that are included
    on the OpenVMS Alpha operating system CD-ROM.
```

```
    You can also execute DCL commands and procedures to perform
    "standalone" tasks, such as backing up the system disk.

    Please choose one of the following:

        1)  Upgrade, install, or reconfigure OpenVMS Alpha Version 7.3-2
        2)  Display products and patches that this procedure can install
        3)  Install or upgrade layered products and patches
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Execute DCL commands and procedures
        8)  Shut down this system

    Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?)
```

If you want to install layered products, go to "Installing Layered Products" on page 55.

If you do not want to install layered products or perform any other operations prior to booting the new system disk, choose option 8 from the menu to shut down the system. The system display is similar to the following:

```
Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?)  8
    Shutting down the system


SYSTEM SHUTDOWN COMPLETE
```

After you complete the installation and shut down the system, go to "Booting the New System Disk" on page 55.

Installing Layered Products

You can use option 3 of the menu system included on the operating system CD-ROM to install certain layered products with the POLYCENTER Software Installation utility. You can view a list of the layered products that can be installed in this way by choosing option 2 from the menu. For more information on using these menu options, see "Using the Install or Upgrade Layered Products Option (3)" on page 21 and "Using the Show Installed Products Option (4)" on page 23. (To install layered products that are not listed, see Chapter 4 and the installation documentation for each layered product.)

Booting the New System Disk

After you have successfully installed the operating system, boot the new system disk, as described in the following sections.

Preparing to Boot the New System Disk

Before you boot the new system disk, you must do the following:

1. Halt the system by entering Ctrl/P or by pressing the Halt button. For more information about halting your Alpha computer, see Appendix A.
2. At the console prompt (>>>), enter the SET BOOTDEF_DEV command in the following format:

   SET BOOTDEF_DEV *target-drive*

   Substitute the device name of the system disk for *target-drive*. The SET BOOTDEF_DEV command tells the system which disk to boot from. For example, if the system disk has the device name DKA400, enter the following command and press the Return key:

   ```
   >>> SET BOOTDEF_DEV DKA400
   ```

   If the system disk is connected to a hierarchical storage device (HS*x*), the format for specifying that drive is different. For example, on a DEC 7000 series system connected to an HSC device, the command is similar to the following:

   ```
   >>> SET BOOTDEF_DEV DUA20.14.0.2.0
   ```

   For more information about setting and showing the default boot device, see Appendix A.

How to Boot the New System Disk

To boot the system disk, enter the following command and press the Return key:

```
>>> BOOT -FLAGS 0,0
```

When the system starts booting, the initial informational messages displayed are similar to the following:

```
OpenVMS (TM) Alpha Operating System, Version 7.3-2

Installing required known files...

Configuring devices...

(c) Copyright 1976-2003 Hewlett-Packard Development Company, L.P.
```

Joining an OpenVMS Cluster

If during the installation, you previously answered YES to the question about joining an OpenVMS Cluster, the system now asks a series of questions about your configuration (CI, DSSI, SCSI, local area, or mixed-interconnect). If you answered NO to this question, then skip to "Running AUTOGEN" on page 57.

You might need to see *OpenVMS Cluster Systems* or *Guidelines for OpenVMS Cluster Configurations* to answer these questions.

OpenVMS Cluster Prompts

Table 3-2 lists the OpenVMS Cluster prompts and suggested responses. Note that, depending on your responses and particular cluster configuration, some prompts will not be displayed.

Table 3-2 Prompts for OpenVMS Cluster Configurations

Question	How to Respond
Will this node be a cluster member (Y/N)?	Enter Y.

Table 3-2 Prompts for OpenVMS Cluster Configurations (Continued)

Question	How to Respond
What is the node's DECnet node name?	Enter the DECnet node name (for example, MYNODE). The DECnet node name may be from one to six alphanumeric characters in length and cannot include dollar signs or underscores.
What is the node's DECnet node address?	Enter the DECnet node address --- for example, 2.2.
Will the Ethernet be used for cluster communications (Y/N)?	Enter N for a CI only or DSSI-only OpenVMS Cluster. Otherwise, answer Y.[1]
Enter this cluster's group number[2]:	Enter a number in the range from 1 to 4095 or 61440 to 65535.
Enter this cluster's password[2]:	Enter the cluster password. The password must be from 1 to 31 alphanumeric characters in length and may include dollar signs and underscores.
Reenter this cluster's password for verification:	Reenter the password.
Will MYNODE be a disk server (Y/N)?	Enter Y if you want local disks to be served to the cluster (mandatory for local area and mixed-interconnect configurations). See *OpenVMS Cluster Systems* for information about served cluster disks.
Will MYNODE serve RFxx disks (Y)?	Enter a response appropriate for your DSSI configuration, if such disks are available.
Enter a value for MYNODE's ALLOCLASS parameter:	In a CI only system (connected to a dual-ported disk), a DSSI-only system, or a local area or mixed-interconnect configuration where nodes serve DSSI or CI disks, enter the appropriate allocation class value (1 to 255). Otherwise, enter 0. For information about selecting the ALLOCLASS parameter, see *OpenVMS Cluster Systems*.
Does this cluster contain a quorum disk (Y/N)?	For CI only, SCSI, local area, and mixed-interconnect configurations, enter Y or N, depending on your configuration. For most DSSI systems, enter Y. However, if you are adding a two-system DSSI configuration to an existing cluster (in which case you might not need a quorum disk), you can answer N. If you enter Y, the system asks for the name of the quorum disk. Enter the device name of the quorum disk. See *OpenVMS Cluster Systems* for information about quorum disks.

[1] The Ethernet may not be required for communication within a local area OpenVMS Cluster system configured with FDDI devices. Within certain DSSI or CI mixed-interconnect configurations, neither the Ethernet nor FDDI may be required for communication. If your configuration fits either scenario, you can answer NO (N) to this prompt.

[2] Cluster group number and password are not required if all the cluster nodes are directly connected; that is, the entire cluster uses interconnects such as CI (computer interconnect), DSSI (Digital Storage Systems Interconnect), or MEMORY CHANNEL. In a cluster that uses mixed interconnects, if any of the interconnects require the cluster number and password, then you must set the cluster number and password for all nodes.

Running AUTOGEN

The system next runs AUTOGEN to evaluate your hardware configuration and estimate typical work loads. AUTOGEN then sets system parameters, the sizes of page, swap, and dump files, and the contents of VMSIMAGES.DAT. When AUTOGEN finishes and you reboot your system, the installation procedure is complete.

The installation procedure displays messages similar to the following:

```
    AUTOGEN will now be run to compute the new SYSGEN parameters. The system
    will then shut down and reboot, and the installation or upgrade will be
    complete.

    After rebooting you can continue with such system management tasks as:

            Decompressing the System Libraries
            Configuring DECnet
            Using SYS$MANAGER:CLUSTER_CONFIG.COM to create an OpenVMS Cluster
            Creating FIELD, SYSTEST, and SYSTEST_CLIG accounts if needed

%AUTOGEN-I-BEGIN, GETDATA phase is beginning.
%AUTOGEN-I-NEWFILE, A new version of SYS$SYSTEM:PARAMS.DAT has been created.
        You may wish to purge this file.
%AUTOGEN-I-END, GETDATA phase has successfully completed.
%AUTOGEN-I-BEGIN, GENPARAMS phase is beginning.
%AUTOGEN-I-NEWFILE, A new version of SYS$MANAGER:VMSIMAGES.DAT has been created.
         You may wish to purge this file.
%AUTOGEN-I-NEWFILE, A new version of SYS$SYSTEM:SETPARAMS.DAT has been created.
        You may wish to purge this file.
%AUTOGEN-I-END, GENPARAMS phase has successfully completed.
%AUTOGEN-I-BEGIN, GENFILES phase is beginning.
%SYSGEN-I-EXTENDED, SYS$SYSROOT:[SYSEXE]PAGEFILE.SYS;1 extended
%SYSGEN-I-EXTENDED, SYS$SYSROOT:[SYSEXE]SWAPFILE.SYS;1 extended
%SYSGEN-I-CREATED, SYS$SYSROOT:[SYSEXE]SYSDUMP.DMP;1 created

%AUTOGEN-I-REPORT, AUTOGEN has produced some informational messages that
        have been stored in the file SYS$SYSTEM:AGEN$PARAMS.REPORT. You may
        wish to review the information in that file.

%AUTOGEN-I-END, GENFILES phase has successfully completed.
%AUTOGEN-I-BEGIN, SETPARAMS phase is beginning.
.
.
.
```

Automatic Reboot after AUTOGEN

After AUTOGEN finishes, the system automatically reboots, displaying messages similar to the following:

```
The system is shutting down to allow the system to boot with the
generated site-specific parameters and installed images.

The system will automatically reboot after the shutdown and the
installation will be complete.



        SHUTDOWN -- Perform an Orderly System Shutdown
                    on node ALPCSI

%SHUTDOWN-I-BOOTCHECK, performing reboot consistency check...
%SHUTDOWN-I-CHECKOK, basic reboot consistency check completed
.
.
.
```

Manual Reboot after AUTOGEN

If the system does not reboot automatically, reboot the system manually.

For example, if the system disk is on an RZ25 disk drive with a unit number of 1, enter the following command and press the Return key:

```
>>> BOOT DKA1
```

When the system starts booting, a message similar to the following is displayed:

```
     OpenVMS (TM) Alpha Operating System, Version 7.3-2

     Copyright (c) 1976-2003 Hewlett-Packard Development Company, L.P.


%STDRV-I-STARTUP, OpenVMS startup begun at 27-MAY-2003 14:50:18.35
.
.
.
```

The system next displays informational messages and accounting information indicating that your OpenVMS Alpha operating system has finished booting and is now ready for use. For example:

```
%SET-I-INTSET, login interactive limit = 64, current interactive value = 0
  SYSTEM       job terminated at  27-MAY-2003 14:51:23.47
   Accounting information:
   Buffered I/O count:            2177     Peak working set size:    6848
   Direct I/O count:              1358     Peak page file size:    179552
   Page faults:                   1805     Mounted volumes:             0
   Charged CPU time:     0 00:00:13.37     Elapsed time:    0 00:01:06.20
```

At this time, you can log in to the SYSTEM account (so you can perform postinstallation tasks), as described in the following sections.

Logging in to the System Account

The following two sections explain how to log in to the system account from a character cell terminal and from a workstation.

Logging in from a Character Cell Terminal

Log in from a character cell terminal by entering the user name SYSTEM followed by the password. The display is similar to the following:

```
        OpenVMS (TM) Alpha Operating System, Version 7.3-2

Username: SYSTEM
Password:
.
.
.
      OpenVMS (TM) Alpha Operating System, Version 7.3-2
```

If you forget your password, follow the instructions in Appendix A to perform an emergency startup.

Logging in from a Workstation

If you installed the DECwindows Motif for OpenVMS software on your workstation, do the following after the login window displays on your screen:

1. Enter the user name SYSTEM followed by the password.
2. Click on the OK button.
3. At this point, you can create a DECterm session or initiate other management functions. For information on creating a DECterm session, see the *DECwindows Motif for OpenVMS Applications Guide*.

Postinstallation Tasks

After you have successfully installed the OpenVMS Alpha operating system and logged in to the SYSTEM account, you must perform certain postinstallation tasks before you can use the system. For complete information, go to Chapter 4.

4 After Installing the OpenVMS Alpha Operating System

After you have installed the OpenVMS Alpha operating system, you must perform several important tasks to prepare the system for operation. The next section includes a checklist that you can use to make sure you perform all the postinstallation tasks described in this chapter.

Postinstallation Checklist

Use the checklist in Table 4-1 to ensure that you perform all necessary postinstallation tasks.

Table 4-1 Postinstallation Checklist

	Task	Section Title
❑	Register licenses if you did not do so during installation.	"Registering Your Licenses" on page 62
❑	Create user accounts.	"Creating Accounts" on page 62
❑	Back up system disk as safeguard before customizing system.	"Backing Up Your System Disk" on page 63
❑	Customize your system.	"Customizing the System" on page 63
❑	Initialize CDSA.	"Initializing CDSA" on page 64
❑	Configure Kerberos.	"Configuring Kerberos" on page 65
❑	Configure and start networking software.	"Configuring and Starting Networking Software" on page 65
❑	Run the User Environment Test Package (UETP) to test the system.	"Testing the System with UETP" on page 67
❑	Expand the system libraries using LIBDECOMP.COM.	"Expanding the System Libraries" on page 67
❑	Add and remove operating system files.	"Adding and Removing Operating System Files" on page 69
❑	Prepare your OpenVMS Alpha system and your PC to run OpenVMS Management Station (follow procedures in Appendix D).	"Preparing to Use OpenVMS Management Station" on page 71
❑	Install layered products.	"Installing Layered Products" on page 72
❑	Install OpenVMS Debugger clients on a PC.	"Installing OpenVMS Debugger Clients on a PC" on page 73

Table 4-1 Postinstallation Checklist (Continued)

	Task	Section Title
❑	Configure your multihead system if applicable.	"Configuring a Multihead System" on page 74
❑	Tune your operating system; after the system has run for at least 24 hours, run AUTOGEN to collect feedback and, if necessary, modify the MODPARAMS.DAT file.	"Running AUTOGEN to Tune the System" on page 75 "Modifying Parameters" on page 76
❑	Tune BAP system parameters.	"Tuning BAP System Parameters" on page 76
❑	After you have customized and tuned your system and installed layered products, back up system disk.	"Backing Up the Customized System Disk" on page 78

Registering Your Licenses

The installation procedure gave you the opportunity to register any software product licenses. If you did not register your OpenVMS Alpha licenses at that time, you must do so before you can use the OpenVMS Alpha operating system. You must also register the licenses for OpenVMS Alpha layered products.

You can invoke the OpenVMS License utility by entering the following command:

```
$ @SYS$UPDATE:VMSLICENSE
```

(You can also use the LICENSE REGISTER command.)

For information about registering licenses, see the following:

- "Registering Licenses" on page 46
- Appendix C
- The *OpenVMS License Management Utility Manual*

Creating Accounts

During the installation, DEFAULT and SYSTEM accounts are created for you automatically. However, if you plan to have HP service representatives test your system or if you plan to run testing software such as UETP, you must create accounts for each representative and a SYSTEST (standalone system) or SYSTEST_CLIG (OpenVMS Cluster system) account to run UETP.

For complete information about creating accounts for HP service representatives and UETP, see the *HP OpenVMS System Manager's Manual*.

Backing Up Your System Disk

After you install the operating system, protect your work by making a backup copy of the system disk in case you have any problems while customizing it.

To back up the system disk:

1. Shut down the system (described in Appendix A).
2. Boot the operating system CD-ROM (locally or from the InfoServer, as described in "Booting the Operating System CD-ROM" on page 35).
3. Use the menu system to enter the DCL environment (option 7).
4. Mount the system disk and the target device on which you will make the backup copy. For example, if your system disk is on DKA0: and the target device is on DKA100:, you might use the following commands. The /OVERRIDE qualifier used in this example allows you to mount the system disk without typing its volume label. The /FOREIGN qualifier is required for the target disk when using the BACKUP /IMAGE command.

   ```
   $ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
   $ MOUNT /FOREIGN DKA100:
   ```

5. Enter the BACKUP command to back up the system disk to the target device. For example, if your system disk is on DKA0: and your target disk is on DKA100:, you might use the following command:

   ```
   $ BACKUP /IMAGE DKA0: DKA100:
   ```

   The /IMAGE qualifier causes the backup to produce a functionally equivalent copy of the system disk, which will also be rebootable.
6. Log out from the DCL environment.
7. Shut down the system by selecting option 8 from the menu.
8. Boot from either the original system disk or the backup copy.

In addition to backing up the system disk now before you customize it, you should back up your system disk again after you successfully complete your customization tasks and install layered products.

For complete information about backup operations, including a description of an alternate method that does not require booting from the operating system CD-ROM and that allows you to back up a shadowed disk without disabling the shadow set, see Appendix B.

Customizing the System

You can customize the system to meet your site-specific needs. In addition, if your Alpha computer is part of an OpenVMS Cluster environment, you must prepare the cluster environment and configure the cluster.

For instructions on customizing the system, review the following documentation:

- *OpenVMS Cluster Systems* (if the computer is part of an OpenVMS Cluster environment)
- The release notes, for notes and restrictions that might be relevant to your customization plans

- The *HP OpenVMS System Manager's Manual*, for instructions on customizing and using your system. You will find information about the following tasks:
  - — Editing the template files SYCONFIG.COM, SYLOGICALS.COM, SYLOGIN.COM, and SYSTARTUP_VMS.COM
  - — Starting the queue manager and creating a queue database
  - — Setting up user accounts
  - — Adjusting system parameters
  - — Setting up your system to run DECdtm services
- "Configuring and Starting Networking Software" on page 65, for information about configuring and starting networking software

NOTE If you have installed the DECwindows Motif for OpenVMS layered product (see "Installing Layered Products" on page 72), you can customize your DECwindows environment.

Initializing CDSA

The Common Data Security Architecture (CDSA) is automatically installed with the operating system. However, use of CDSA is not required. If you do not plan to use CDSA or any products that depend on it, you can skip to the next section.

If you do plan to use CDSA, you must execute the following command to perform a one-time configuration procedure. Execute the command from an account that has both SYSPRV and CMKRNL privileges (for example, the SYSTEM account).

```
$ @SYS$STARTUP:CDSA$INITIALIZE
```

NOTE Do not attempt to remove CDSA from your system. The PRODUCT REMOVE command is not supported for CDSA even though there appears to be an option to remove CDSA. CDSA is installed with the operating system and is tightly bound with it. Any attempt to remove it will not work cleanly, and could create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product CPQ AXPVMS CDSA V2.0 is referenced
   by DEC AXPVMS OPENVMS V7.3-2
 -PCSI-E-HRDRF1, the two products are tightly bound by this
   software dependency
 -PCSI-E-HRDF2, if you override the recommendation to terminate the operation,
 -PCSI-E-HRDF3, the referenced product will be removed, but the referencing
 -PCSI-E-HRDF4, product may no longer function correctly; please review
 -PCSI-E-HRDF5, dependency requirements for the referencing product
 Terminating is strongly recommended. Do you want to terminate? [YES]
```

For more information about CDSA, see *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture*.

Configuring Kerberos

The Kerberos OpenVMS Security software, which is based on MIT Kerberos, is automatically installed with the operating system. Although Kerberos installs automatically, use of Kerberos is not required. If you do not plan to use Kerberos or any products that depend upon Kerberos, you can skip to the next section.

To configure Kerberos, perform the following steps from a privileged OpenVMS user account (for example, SYSTEM).

1. Run the following command procedure to configure the Kerberos clients and servers:

   ```
   $ @SYS$STARTUP:KRB$CONFIGURE.COM
   ```

2. Add the following line to your SYLOGIN command procedure or to the LOGIN.COM of each user who will use Kerberos:

   ```
   $ @SYS$MANAGER:KRB$SYMBOLS
   ```

3. Insert the following line into SYS$MANAGER:SYSTARTUP_VMS.COM. This line must be entered *after* the startup command for HP TCP/IP Services for OpenVMS. (If you start HP TCP/IP Services for OpenVMS as a batch job, make sure that TCP/IP has started before you start Kerberos.)

   ```
   $ @SYS$STARTUP:KRB$STARTUP.COM
   ```

For additional setup and configuration information, see the *HP Open Source Security for OpenVMS, Volume 3: Kerberos*. This document contains links to the MIT Kerberos documentation, and is available from the OpenVMS Alpha Version 7.3-2 documentation CD-ROM.

NOTE Do not attempt to remove Kerberos from your system. The PRODUCT REMOVE command is not supported for Kerberos even though there appears to be an option to remove Kerberos. Kerberos is installed with the operating system and is tightly bound with it. Any attempt to remove it will not work cleanly, and could create other undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP AXPVMS Kerberos V2.0 is referenced
   by DEC AXPVMS OPENVMS V7.3-2
 -PCSI-E-HRDRF1, the two products are tightly bound by this
   software dependency
 -PCSI-E-HRDF2, if you override the recommendation to terminate the operation,
 -PCSI-E-HRDF3, the referenced product will be removed, but the referencing
 -PCSI-E-HRDF4, product may no longer function correctly; please review
 -PCSI-E-HRDF5, dependency requirements for the referencing product
 Terminating is strongly recommended. Do you want to terminate? [YES]
```

Configuring and Starting Networking Software

The following sections describe how to configure and start your networking software.

DECnet-Plus for OpenVMS

If you installed DECnet-Plus for OpenVMS software, see the *DECnet-Plus for OpenVMS Release Notes* and *DECnet-Plus for OpenVMS Installation and Basic Configuration* for postinstallation instructions.

DECnet Phase IV for OpenVMS

NOTE Support for DECnet Phase IV is available only under the HP Prior Version Support Program. Contact your local HP support representative for additional information.

If you plan to run DECnet Phase IV for OpenVMS software, note the following:

- After you have registered the license for the DECnet Phase IV for OpenVMS software, execute the interactive command procedure SYS$MANAGER:NETCONFIG.COM to automatically configure your system for networking. See the *DECnet for OpenVMS Guide to Networking* for instructions on using NETCONFIG.COM.
- After you start the queue manager (see the *HP OpenVMS System Manager's Manual*), edit the commands in SYS$COMMON:[SYSMGR]SYSTARTUP_VMS.COM that pertain to networking so that the DECnet Phase IV for OpenVMS software starts automatically when your system is booted. Edit the file as follows:

  — If you have batch queues set up on your system, choose the following command by removing the comment delimiter (!) from the command line. Enabling this command allows the system to start up more quickly and decreases the amount of time you must wait to log in.

  ```
  !$ SUBMIT SYS$MANAGER:STARTNET.COM
  ```

  — If you do *not* have batch queues set up on your system, remove the comment delimiter (!) from the following lines:

  ```
  $! DECNET_VERSION = F$INTEGER(F$EXTRACT(2,2,F$GETSYI("DECNET_VERSION") ) )
  $! IF DECNET_VERSION .GE. 5
  $!     THEN
  $!         START/NETWORK "DECNET/OSI"$!     ELSE
  $!         START/NETWORK DECNET
  $! ENDIF
  ```

- If you plan to run both DECnet Phase IV for OpenVMS and DECwindows software, you must also edit SYS$COMMON:[SYSMGR]SYSTARTUP_VMS.COM to *add* a comment delimiter (!) immediately following the dollar sign ($) in the following command:

  ```
  $ DEFINE DECW$IGNORE_DECNET TRUE
  ```

  If you are not going to start the DECnet Phase IV for OpenVMS software or have not yet started it, this command tells the DECwindows software not to wait for the DECnet Phase IV for OpenVMS software.

HP TCP/IP Services for OpenVMS

If you installed TCP/IP Services for OpenVMS software, see the *HP TCP/IP Services for OpenVMS Installation and Configuration* manual for information about how to configure this software using the TCPIP$CONFIG.COM procedure.

Testing the System with UETP

The **User Environment Test Package (UETP)** is a software package designed to test whether the OpenVMS Alpha operating system is installed correctly. As part of the postinstallation procedure, HP recommends that you run UETP to verify the installation.

For complete information about using UETP, see the *HP OpenVMS System Manager's Manual*.

Expanding the System Libraries

Some of the larger system libraries ship with the OpenVMS operating system in a data-reduced (compressed) format. Expanding (that is, decompressing) these libraries gives the system faster access to them, but also consumes more disk space. Table 4-2 lists the libraries that ship in data-reduced format on OpenVMS Alpha Version 7.3-2 and shows the approximate sizes of the libraries in both data-reduced and expanded format.

NOTE File sizes are subject to change. For the most accurate information, run the Library Decompression utility (LIBDECOMP.COM) on your own system and review the output from the list function. To run the utility, enter the following command:

```
$ @SYS$UPDATE:LIBDECOMP
```

Table 4-2 Reduced and Expanded Library Sizes

Library Name	Reduced Size (as shipped)	Expanded Size	Description
[SYSHLP] directory; Help library files (.HLB)			
ACLEDT.HLB	70	102	Access Control List Editor help
BKM$HELP.HLB	156	248	Backup Manager help
DBG$HELP.HLB	1234	2133	OpenVMS Debugger help
DBG$UIHELP.HLB	269	438	OpenVMS Debugger help
EDTHELP.HLB	154	229	EDT Editor help
EVE$HELP.HLB	676	1197	EVE Editor help
EVE$KEYHELP.HLB	99	145	EVE Keypad help
EXCHNGHLP.HLB	83	118	Exchange Utility help
HELPLIB.HLB[1]	10595	19279	DCL help
LANCP$HELP.HLB	125	184	LAN Control Program help
LATCP$HELP.HLB	157	243	LAT Control Program help
MAILHELP.HLB	211	316	Mail Utility help

Table 4-2 Reduced and Expanded Library Sizes (Continued)

Library Name	Reduced Size (as shipped)	Expanded Size	Description
NCPHELP.HLB	261	412	Network Control Program help
SDA.HLB	318	471	System Dump Analyzer help
SHWCLHELP.HLB	103	151	Show Cluster Utility help
SYSGEN.HLB	354	555	System Generation Utility help
SYSMANHELP.HLB	542	873	System Management Utility help
TPUHELP.HLB	575	1036	Text Processing Utility help
UAFHELP.HLB	248	383	Authorize Utility help
[SYSLIB] directory; Macro library files (.MLB)			
LANIDEF.MLB	185	248	LAN internal driver macros
LIB.MLB	2802	4845	Operating system macros
STARLET.MLB	2422	3608	Operating system macros
[SYSLIB] directory; Object library files (.OLB)			
STARLET.OLB[1]	28651	46375	System object library and run-time library
VAXCRTL.OLB	1236	1646	HP C RTL routine name entry points; VAX G_floating double-precision, floating-point entry points
VAXCRTLD.OLB	1696	2754	Limited support of VAX D_floating double-precision, floating-point entry points
VAXCRTLDX.OLB	1623	2603	VAX D_floating support; support for /L_DOUBLE_SIZE=128 compiler qualifier
VAXCRTLT.OLB	1544	2447	IEEE T_floating double-precision, floating-point entry points
VAXCRTLTX.OLB	1558	2451	IEEE T_floating support; support for /L_DOUBLE_SIZE=128 compiler qualifier
VAXCRTLX.OLB	1388	1963	G_floating support; support for /L_DOUBLE_SIZE=128 compiler qualifier
VMS$VOLATILE_PRIVATE_INTERFACES.OLB	558	809	OpenVMS bugcheck processing codes
[SYSLIB] directory; Text library files (.TLB)			
ERFLIB.TLB	64	85	ANALYZE/ERROR device descriptions

Table 4-2 Reduced and Expanded Library Sizes (Continued)

Library Name	Reduced Size (as shipped)	Expanded Size	Description
LIB_ADA_SUBSET.TLB	1854	3413	Ada programmers toolkit of operating system definitions
NTA.TLB	34	42	Files to build against NTA facility
STARLET_RECENT_ADA_SUBSET.TLB	1106	1948	Ada programmers toolkit of operating system definitions
STARLETSD.TLB	4086	7468	STARLET definitions used during layered product installations
SYS$LIB_C.TLB	9576	20445	C language variant of the LIB library, containing internal and version-dependent declarations for system services
SYS$STARLET_C.TLB	6059	13141	C language variant of the STARLET library, containing version-independent declarations for system services
TOTALS:	**82672**	**144804**	

[1] Layered products and user applications might add entries to the HELPLIB.HLB and STARLET.OLB libraries. The sizes listed in this table do not reflect such additional entries.

To expand all the libraries, you would need approximately 60,000 free disk blocks. However, you can choose to expand only selected libraries. For complete details about expanding and reducing system library files and using LIBDECOMP.COM, see the *HP OpenVMS System Manager's Manual*.

Adding and Removing Operating System Files

If you decide after the installation to change which OpenVMS Alpha operating system files you want installed on your system, you can use the menu system contained on the OpenVMS Alpha operating system CD-ROM to add or remove files.

NOTE You can obtain information about individual system files by entering HELP SYSTEM_FILES at the dollar sign prompt ($).

To add or remove operating system files:

1. Mount and boot the OpenVMS Alpha operating system CD-ROM.
2. Choose option 1 from the menu.
3. Choose the PRESERVE option.
4. Enter the name of the device that contains the system disk and answer the questions.

5. After you answer the question "Do you want detailed descriptions?," information regarding reconfiguring or reinstalling is displayed. Read the instructions, then choose the desired entry from the menu of options.

The following is a sample display:

```
    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS Alpha Version 7.3-2
        2)  Display products and patches that this procedure can install
        3)  Install or upgrade layered products and patches
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Execute DCL commands and procedures
        8)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?) 1
    ************************************************************

.
.
.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE] PRESERVE


.
.
.
    Version 7.3-2 of the OpenVMS operating system is already installed
    on the target disk.  You may choose one of the following actions:

    o Reconfigure the OpenVMS platform.

      This action will allow you to change your selections of which
      of the windowing and network products you included with your
      OpenVMS operating system installation.

    o Reconfigure the OpenVMS operating system.
      This action will allow you to change your choices about which
      options you included for the OpenVMS operating system.

    o Reinstall the OpenVMS operating system.

      This action will cause ALL operating system  files to be replaced.
      You can also change your choices about which options you included
      for the OpenVMS operating system.

      Reinstall will take longer than Reconfigure.  Reinstall may be
      appropriate if you suspect that files in the operating system,
      or in the windowing and network products have become corrupted.

    If you want to reinstall any of the windowing and network products,
    choose "Install or upgrade layered products and patches" (option 3)
    from the main menu.

    If you want to change your choices about which options you included
    for any of the windowing and network products, choose "Reconfigure
    installed products" (option 5) from the main menu.

    Please choose one of the following:

        1)  Reconfigure the OpenVMS platform.
        2)  Reconfigure the OpenVMS operating system.
```

```
        3)  Reinstall the OpenVMS operating system.
        4)  Return to the Main Menu (abort the upgrade/installation).


Enter choice or ? for help: (1/2/3/4/?) 2
The following product has been selected:
    DEC AXPVMS VMS V7.3-2              Operating System


Configuration phase starting ...

You will be asked to choose options, if any, for each selected product
and for any products that may be installed to satisfy software dependency
requirements.

DEC AXPVMS VMS V7.3-2: OpenVMS Operating System

     COPYRIGHT (c) 7-MAY-2003
     Hewlett-Packard Development Company, L.P.


Do you want the defaults for all options? [YES]
```

Answer NO to this question, and select the options you want, as described in "Selecting Components" on page 50. A list of components is provided in "List of Components Included with the Operating System" on page 51. After you respond to the prompts, the display continues and the installation procedure completes as described in "Completing the Procedure" on page 52. The following is a continuation of the sample display:

```
    Do you want to review the options? [NO] NO

Execution phase starting ...
The following product will be reconfigured:
    DEC AXPVMS VMS V7.3-2
Portion done: 0%...10%...20%...30%...40%...50%...60%...80%...90%...100%
The following product has been reconfigured:
    DEC AXPVMS VMS V7.3-2
.
.
.
```

For detailed instructions on how to remove the OpenVMS Alpha operating system from your disk, see Appendix E.

Preparing to Use OpenVMS Management Station

If you installed the OpenVMS Management Station software on your system (either by accepting all default values or by selecting the component manually during the installation procedure), you must perform several tasks on your OpenVMS Alpha system and your PC before you can use OpenVMS Management Station. These tasks include the following:

- Editing system files
- Starting OpenVMS Management Station on other nodes
- Verifying that you have the proper memory, disk space, media, and the required software to install and run OpenVMS Management Station on your PC
- Installing the client software on your PC

- Defining DECnet nodes

For complete information about preparing your OpenVMS system and your PC to run the OpenVMS Management Station server and client software, see Appendix D.

Installing Layered Products

You can use the menu system included on the operating system CD-ROM to install certain layered products with the POLYCENTER Software Installation utility. If you did not install those layered products previously during the installation procedure, you can do so using the following procedure. To install layered products that require VMSINSTAL, see "Alternate Procedure" on page 72.

NOTE To use this procedure, the target system must have the exact same version of the OpenVMS Alpha operating system as the CD-ROM. If you need to install layered products on a target system that has a *different* version of the operating system, use the alternate procedure described in "Alternate Procedure" on page 72.

1. Shut down the system (described in Appendix A).
2. Boot the operating system CD-ROM (locally or from the InfoServer).
3. Choose option 2 from the menu to view which layered products can be installed using the POLYCENTER Software Installation utility.
4. Choose option 3 from the menu to install the layered products.
5. Shut down the system by selecting option 8 from the menu.
6. Boot from the system disk.

If the layered product that you want to install is not listed in the display, see the documentation you received with that layered product for installation information.

For additional information about installing layered products, see the *HP OpenVMS System Manager's Manual*.

Be sure you back up the system disk after you install all your layered products.

NOTE HP does not support PRODUCT INSTALL and other PRODUCT commands from the DCL option on the operating system CD-ROM. Not all products can be installed when booted from the CD-ROM. Those that can be installed in this manner require special considerations. If products do not appear in the layered products menu as described in the preceding steps in this section, please use the alternative procedure described below, or refer to the installation documentation for the specific product.

Alternate Procedure

Following is another method for installing layered products from the OpenVMS Alpha operating system CD-ROM:

1. From your running OpenVMS system (the target system disk), mount the OpenVMS Alpha operating system CD-ROM.

   ```
   $ MOUNT/OVERRIDE=IDENTIFICATION DKA400
   ```

2. Locate the directories and files containing the available layered products by entering the following command (where, in the example, DKA400: is the device name of the CD-ROM):

   ```
   $ DIRECTORY /NOHEAD/NOTRAIL DKA400:[*.KIT]
   ```

   You can use the PRODUCT FIND command to locate kits that are installed using the POLYCENTER Software Installation utility. For example:

   ```
   $ PRODUCT FIND * /SOURCE=DKA400:[*.KIT]
   ```

3. To install layered products that require VMSINSTAL (indicated in the directories by save-set file names with file types of .A, .B, and so on), enter the @SYS$UPDATE:VMSINSTAL command and then specify the CD-ROM device and directory. For example:

   ```
   $ @SYS$UPDATE:VMSINSTAL
   * Where will the distribution volumes be mounted: DKA400:[DIAA032.KIT]
   ```

4. To install layered products that require the POLYCENTER Software Installation utility (indicated in the directories by file names with file types of .PCSI or .PCSI$DESCRIPTION), use the PRODUCT INSTALL command to specify the CD-ROM device name and directory. Following is an example of the PRODUCT INSTALL command:

   ```
   $ PRODUCT INSTALL FORTRAN /SOURCE=DKB400:[ALPHA_FORT075.KIT]
   ```

Installing OpenVMS Debugger Clients on a PC

OpenVMS Debugger includes a client/server interface. The debug server runs on OpenVMS; debug clients run on OpenVMS and on Microsoft® Windows® 95, Windows 98, Windows NT®, Windows 2000, and Windows XP. There is no special installation procedure for the components that run on OpenVMS. This section describes the procedure for installing the debug client on a PC.

If you have Windows NT, you might need to install a COM update kit (Windows XP, Windows 2000, Windows 98, and Windows 95 do not require such a kit); choose one of the following options:

CPU	Operating System	Client Kit
Alpha	Windows NT	40COMAXP.EXE
Intel®	Windows NT	40COMUPD.EXE

You must also install the debug client kit:

CPU	Operating System	Client Kit
Alpha	Windows NT	DEBUGALPHA011.EXE
Intel	Windows 95, 98, Me, NT, 2000, XP	DEBUGX86011.EXE

These client kits are self-extracting .EXE files. To make these clients available to PC users, copy these files from the distribution media to a suitable PATHWORKS or Advanced Server for OpenVMS share, FTP server, or other device available to the PC. (See the *Guide to OpenVMS Alpha Version 7.3-2 CD-ROMs* for the directory where these kits ship on the media.)

After the appropriate executable file has been transferred to the PC, the user can run the file to install the debug client on the PC. The InstallShield installation procedure guides the user through the installation.

By default, the debug client is installed in the \Programs\OpenVMS Debugger directory on the PC. Click Browse to select an alternate directory.

Choose one of the following options:

Install Option	Details
Typical	Debug client and *OpenVMS Debugger Manual* in HTML format
Compact	Debug client only
Custom	Choice of Debug Client and/or *OpenVMS Debugger Manual* in HTML format

The installation procedure creates an OpenVMS Debugger program folder that contains the following items:

- Debug client
- Debug client help file
- *OpenVMS Debugger Manual* in HTML format
- Readme file
- Uninstall procedure

Configuring a Multihead System

A multihead configuration consists of a single system (such as an HP AlphaServer ES40) that supports multiple graphics options. A graphics option consists of a graphics controller and a graphics display interface (monitor).

Your system can be automatically configured for multihead use if you rename the private server setup file from a template file type to a command procedure file type. The DECwindows Motif server loads this command procedure on startup or restart.

To set up your system for multihead support:

1. After installing the DECwindows Motif software on your system, log in to your system.
2. Copy the private server setup template file to a new .COM file by entering the following command:

```
$ COPY SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.TEMPLATE
_To: SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM
```

3. Restart the DECwindows server by entering the following command:

```
$ @SYS$STARTUP:DECW$STARTUP RESTART
```

See the most recent version of the *DECwindows Motif for OpenVMS Installation Guide* and *Managing DECwindows Motif for OpenVMS Systems* for more information about customizing your DECwindows environment using the SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM file.

Running AUTOGEN to Tune the System

When you install the OpenVMS Alpha operating system, the system executes the AUTOGEN.COM procedure to set the values of system parameters and the sizes of the page, swap, and dump files according to the system configuration. As a postinstallation procedure, run the AUTOGEN.COM procedure again to properly tune the system.

Run AUTOGEN as follows:

1. After 24 hours of operation, run AUTOGEN in feedback mode, examine AGEN$PARAMS.REPORT, and reboot the system. To run AUTOGEN in feedback mode, use the following command:

   ```
   $ @SYS$UPDATE:AUTOGEN SAVPARAMS SETPARAMS FEEDBACK
   ```

   To view AGEN$PARAMS.REPORT on your screen, enter the following command and press the Return key:

   ```
   $ TYPE SYS$SYSTEM:AGEN$PARAMS.REPORT
   ```

   You can also print this file or examine it using the EDIT/READ_ONLY command.

   If the report includes a message similar to the following, you might need to modify the size of the page, swap, or dump file:

   ```
   %AUTOGEN-W-DSKSPC, The disk on which DKA0:[SYS0.SYSEXE]PAGEFILE.SYS
            resides would be over 95% full if it were modified to hold 20000
            blocks.
   ```

   For more information on AGEN$PARAMS.REPORT, see the *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems*.

2. Run AUTOGEN again in feedback mode two workdays later and examine AGEN$PARAMS.REPORT, and then reboot the system. (For information about the importance of having a current AGEN$FEEDBACK.DAT file, see "Ensuring You Have a Recent FEEDBACK.DAT File" on page 86.)

3. HP recommends that you run AUTOGEN from the SAVPARAMS phase through the TESTFILES phase weekly thereafter until the system stabilizes (that is, AUTOGEN finds nothing that needs to be adjusted). Make sure you run AUTOGEN when your system is running under a typical work load. Examine AGEN$PARAMS.REPORT to determine the need for additional changes.

IMPORTANT If you invoke AUTOGEN without specifying the execution-mode parameter (FEEDBACK, NOFEEDBACK, or CHECK_FEEDBACK), AUTOGEN uses the feedback information in its calculations, but if the feedback information reflects system uptime of less than 24 hours, or if the feedback information is more than 30 days old, AUTOGEN terminates execution. AUTOGEN does not set the parameter settings: this helps prevent you from setting inexpedient values. If you reboot the system, you will see the values are unchanged.

If you specify CHECK_FEEDBACK, and AUTOGEN determines the feedback is suspect, then AUTOGEN ignores the feedback when computing parameter values. It sets the parameter values if you specify the final execution phase as SETPARAMS, SHUTDOWN, or REBOOT. If you wrongly assumed the feedback was valid, the parameter settings might vary significantly from your expectations.

For more information on running AUTOGEN, see the chapter entitled "Managing System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

Modifying Parameters

Based on your examination of AGEN$PARAMS.REPORT, you might need to modify parameter values in MODPARAMS.DAT. If so, note the following:

- In general, you should allow AUTOGEN to calculate system parameters. You can hardcode values (such as GBLPAGES=*value*), but doing so overrides AUTOGEN and might not allow it to set an optimal value based on observed usage.
- Whenever possible, use MIN_parameter values (such as MIN_GBLPAGES) to set a minimum value. AUTOGEN will use this value as a starting point and increase it if necessary. It will also adjust related parameters, unless they are hardcoded, in which case information will be provided in the AGEN$PARAMS.REPORT file. Use MAX_parameter values to set a maximum value when it is necessary to limit a parameter to a known maximum value.
- Enter numeric values as integers, without commas (for example, 10000). Enter alphabetic characters in lower or uppercase.
- HP recommends that you include comments in the MODPARAMS.DAT file indicating who changed the value, when it was done, and why it was done. An exclamation point serves as a comment starter and can appear anywhere on a line. The following is an example illustrating the modifications recommended in the preceding bulleted items:

```
! the following changes made by K.Newcomb on 9/20/03
!
SWAPFILE=0                    ! don't re-size the SWAPFILE on AUTOGEN runs
MIN_gblsections=750           ! required for DECwindows MOTIF
MIN_NPAGEDYN=2750000            ! set npagedyn to a min of 2.75 million
```

For more information about the MODPARAMS.DAT file and about using AUTOGEN in general, see the chapter entitled "Managing System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

Tuning BAP System Parameters

OpenVMS Alpha Version 7.1 and later contains system parameters that control the operation of bus-addressable pool (BAP).

The CIPCA, CIXCD, KFMSB, and Qlogic 1020ISP adapters are some of the adapters that use bus-addressable pool to improve performance. BAP is a non-paged dynamic, physical-address-filtered memory pool used to overcome I/O bus and 32-bit adapter physical addressing limits.

The following table lists the system parameters that control BAP operation along with their default values:

System Parameter	Default Value
NPAG_BAP_MIN	0
NPAG_BAP_MAX	0
NPAG_BAP_MIN_PA	0
NPAG_BAP_MAX_PA	-1

The default values of these parameters allow the system to boot with any configuration. When AUTOGEN is run on a configured system, it resets these parameters to values that should enhance performance for the current system configuration.

If the system fails to boot after an installation, upgrade, or configuration change, and displays a message that refers to incorrect BAP parameters, HP recommends that you perform the following steps:

1. Reset the BAP parameters to the default values.
2. Reboot the system.
3. Allow the installation procedure to run AUTOGEN, or manually run AUTOGEN yourself.

   A typical AUTOGEN with FEEDBACK command to set these parameters follows:

   ```
   $ @SYS$UPDATE:AUTOGEN SAVPARAMS SETPARAMS FEEDBACK
   ```

NOTE These parameters are critical. HP recommends that you run AUTOGEN through the SETPARAMS phase with FEEDBACK to ensure that they are set correctly.

If you prefer not to use this command because you want to adjust only the BAP parameters settings, use the following procedure:

1. Boot the system using the default BAP parameter values.
2. Manually run SYS$SYSTEM:AGEN$FEEDBACK.EXE:

   ```
   $ RUN SYS$SYSTEM:AGEN$FEEDBACK.EXE
   ```

3. Search SYS$SYSTEM:AGEN$FEEDBACK.DAT for the BAP_* system parameter values:

   ```
   $ SEARCH SYS$SYSTEM:AGEN$FEEDBACK.DAT "BAP_"
   ```

4. Run SYSGEN to set the following system parameters with the BAP values you obtained in Step 3:

AGEN$FEEDBACK Data	System Parameter	Units
BAP_MIN	NPAG_BAP_MIN	bytes
BAP_MAX	NPAG_BAP_MAX	bytes
BAP_MIN_PA	NPAG_BAP_MIN_PA	Mbytes[1]
BAP_MAX_PA	NPAG_BAP_MAX_PA	Mbytes[1]

[1] On OpenVMS Alpha systems prior to Version 7.2, the value of this parameter is specified in bytes.

The BAP allocation amount (specified by BAP_MIN and BAP_MAX) depends on the adapter type, the number of adapters, and the version of the operating system. The physical address range (specified by BAP_MIN_PA and BAP_MAX_PA) depends on the adapter type and the way the Galaxy logical partitions, if any, are defined.

NOTE If you manually set parameters NPAG_BAP_MIN_PA and NPAG_BAP_MAX_PA, be sure to specify the value for each parameter in the correct units (bytes or megabytes) for your operating system version.

Backing Up the Customized System Disk

After you have customized the OpenVMS Alpha operating system to your satisfaction and installed your layered products, protect your work by making a standalone backup copy of the system disk, following the steps explained earlier in "Backing Up Your System Disk" on page 63.

For complete information about backup operations, including a description of an alternate method that does not require booting from the operating system CD-ROM, see Appendix B, "Backing Up and Restoring the System Disk."

5 Before Upgrading the OpenVMS Alpha Operating System

This chapter describes which tasks you should perform prior to beginning an upgrade. The next section includes a checklist that you can use to make sure you perform all the tasks described in this chapter.

Preupgrade Checklist

Use the checklist in Table 5-1 to ensure that you perform all necessary tasks prior to upgrading your system:

Table 5-1 Preupgrade Checklist

	Task	Section Title
❑	Review relevant documentation.	"Documentation You Might Need to Review Before Upgrading Your System" on page 80
❑	Review notes, cautions, and restrictions about the following: • Upgrade paths available to Version 7.3-2 • Update license requirements • Components you choose not to install • Upgrade issues after the system disk directory structure has been changed • Licenses and possible reinstallation requirements for layered products	"Notes, Cautions, and Restrictions" on page 80
❑	Perform required actions before upgrading in a volume shadowing environment.	"Shadowing Environment" on page 82
❑	Prepare the system disk.	"Preparing the System Disk" on page 83
❑	Ensure that you have a recent FEEDBACK.DAT file.	"Ensuring You Have a Recent FEEDBACK.DAT File" on page 86
❑	Back up the current system disk.	"Backing Up the System Disk" on page 87
❑	Shut down the system.	"Finishing Preupgrade Tasks" on page 88

Documentation You Might Need to Review Before Upgrading Your System

In addition to reviewing the information in this chapter, you might need to refer to the following sources of information as well:

- *HP OpenVMS Alpha Version 7.3-2 Release Notes*
- *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems* (specifically, the chapter entitled "Managing System Parameters"), for information about using AUTOGEN, modifying the system parameters file (MODPARAMS.DAT), and related operations
- *HP OpenVMS System Management Utilities Reference Manual*, for information about using system management utilities such as SYSMAN and ANALYZE/DISK_STRUCTURE
- *HP OpenVMS Guide to System Security*, for information about reestablishing your security environment after the upgrade

Notes, Cautions, and Restrictions

This section provides important information that can affect the success of your upgrade. Review the cautions, restrictions, and notes carefully before you begin the upgrade.

Upgrade Paths

The following sections describe the various types of upgrades to Version 7.3-2.

Direct Upgrade Paths

You can upgrade *directly* to OpenVMS Alpha Version 7.3-2 from only the following versions of OpenVMS Alpha:

- Version 7.3-1
- Version 7.3
- Version 7.2-2
- Version 7.2-1
- Version 7.2-1H1
- Version 7.2

If you are currently running an OpenVMS Alpha system Version 6.2*x* through 7.1*x* inclusive, you must do a two-step upgrade: first to Version 7.2-2 or 7.3, and then to Version 7.3-2.

Cluster Concurrent Upgrades

During a concurrent upgrade, you must shut down the entire cluster and upgrade each system disk. No one can use the cluster until you upgrade and reboot every computer. When you reboot, each computer will be running the upgraded version of the operating system.

Cluster Rolling Upgrades

During a cluster rolling upgrade, you upgrade each system disk individually, allowing old and new versions of the operating system to run together in the same cluster. There must be more than one system disk. The systems that are not being upgraded remain available.

Only the following OpenVMS Alpha and OpenVMS VAX versions are supported in mixed-version clusters that include OpenVMS Alpha Version 7.3-2:

- Version 7.3-1 (Alpha)
- Version 7.3 (Alpha and VAX)
- Version 7.2-2 (Alpha)

If you are upgrading in a cluster environment, rolling upgrades are supported from Version 7.2-2, 7.3, and 7.3-1 of the OpenVMS Alpha operating system. If you have other versions in a cluster, you cannot do a rolling upgrade until those versions are upgraded to a supported version. See Chapter 6 for more information about upgrading clusters.

Update License Requirements

IMPORTANT To upgrade to OpenVMS Alpha Version 7.3-2, you must have an appropriate license.

HP software licenses grant the right to use the current version of a product or any previous version of the product at the time of purchase. If you have an OpenVMS Alpha license prior to Version 7.3-2 and are not covered by a Software Product Services agreement, which includes the right to use new versions (RTNV), you must purchase an Update License before upgrading to OpenVMS Alpha Version 7.3-2.

NOTE When you initially purchase the OpenVMS Alpha software and license, HP provides you a Product Authorization Key (PAK) that is required to enable the License Management Facility (LMF) to register the license and to validate and authorize subsequent use of the product. A PAK does not provide license or new version rights. For more information on licensing and the License Management Facility, see the *OpenVMS License Management Utility Manual*.

If you need an Update License, please contact your HP sales representative, who will assist you in purchasing the appropriate license(s) for your system.

If you are upgrading TCP/IP Services for OpenVMS, DECwindows Motif, DECnet, or any third-party products, you might need update licenses.

Components You Choose Not to Install

If you choose not to install optional OpenVMS Alpha software during the upgrade, the upgrade procedure removes existing files for those components from the system disk.

Files and Directories

If you have changed directory structure on your system disk, the upgrade procedure will not work correctly. Restore your system disk to a standard directory structure before you attempt an upgrade.

The OpenVMS Alpha Version 7.3-2 upgrade procedure provides new files and directories in the directory [VMS$COMMON...]. If you had any special protections and access control lists (ACLs) before the upgrade, you need to reapply them to reestablish the security environment you previously set up. For more information about creating and maintaining a secure environment, see the *HP OpenVMS Guide to System Security*.

Licenses and Layered Products

The upgrade procedure is designed so that you should not have to reinstall most layered products after the upgrade. However, you might need to reinstall certain layered products because of product-specific installation procedures.

The upgrade procedure leaves your OpenVMS Alpha license and layered product licenses intact. You do not need to reinstall these licenses after you upgrade.

Shadowing Environment

Because you cannot upgrade the operating system on a shadowed system disk (the upgrade will fail), you need to disable shadowing on that disk and perform other operations before you can upgrade the operating system.

There are several methods for creating a nonshadowed target disk. This chapter describes how to change one of your *existing* shadowed system disks in a multimember shadow set to a nonshadowed disk that you can use as your target disk for the upgrade.

If you have a larger configuration with disks that you can physically access, you might want to use a *copy* of the system disk as your target disk. *HP Volume Shadowing for OpenVMS* describes two methods you can use to create this copy (using volume shadowing commands or BACKUP commands) and how to disable volume shadowing.

Creating a Nonshadowed Target Disk

Follow the procedure described in this section to change one of your existing shadowed system disks to a nonshadowed disk.

CAUTION If you simply use a MOUNT/OVERRIDE=SHADOW_MEMBERSHIP command to mount the volume to be upgraded, volume shadowing can overwrite the newly upgraded disk with information from a prior volume that has not been upgraded.

1. Shut down all systems booted from the shadowed system disk.
2. Perform a conversational boot (see Appendix A, if necessary) on the system disk you have chosen for your target disk. For example:

   ```
   >>> BOOT -FLAGS 0,1 DKA100
   ```

3. At the SYSBOOT> prompt, enter the following command to disable volume shadowing on the disk:

   ```
   SYSBOOT> SET SHADOW_SYS_DISK 0
   ```

4. Enter the CONTINUE command to resume the boot procedure. For example:

   ```
   SYSBOOT> CONTINUE
   ```

5. After the boot completes, log in to the system.

You now have a nonshadowed system disk that you can use for the upgrade.

Changing the Label

If you want to change the label on the upgrade disk, use the DCL command SET VOLUME/LABEL=*volume-label device-spec[:]* to perform this optional task. (The SET VOLUME/LABEL command requires write access [W] to the index file on the volume. If you are not the volume owner, you must have either a system UIC or the SYSPRV privilege.)

For OpenVMS Cluster systems, be sure that the volume label is a unique name across the cluster. HP strongly recommends that a volume label contain only alphanumeric characters and, optionally, the dollar sign ($), underscore (_), and hyphen (-) characters. You can include other characters in a volume label, but doing so on a system disk can cause the upgrade procedure to fail.

NOTE If you need to change the volume label of a disk that is mounted across the cluster, be sure you change the label on all nodes in the OpenVMS Cluster system. The following example shows how to use the SYSMAN utility to define the environment as a cluster and propagate the volume label change to all nodes in that cluster:

```
SYSMAN> SET ENVIRONMENT/CLUSTER
SYSMAN> DO SET VOLUME/LABEL=new-label disk-device-name:
```

Setting the Boot Device

Be sure your system is set to boot from the upgrade disk by default. Use the SHOW BOOTDEF_DEV and SET BOOTDEF_DEV console commands to accomplish this task. (For more information, see Appendix A.)

Preparing the System Disk

The following sections describe how to prepare the system disk for the upgrade. The operations include the following:

- Examining the system disk
- Checking the SYSCOMMON directories
- Checking the size of the system disk
- Returning authorization and AGEN$INCLUDE files to the system disk
- Verifying system parameters

Examining the System Disk

Examine and repair (if necessary) the system disk using the ANALYZE/DISK_STRUCTURE command. (See the *HP OpenVMS System Management Utilities Reference Manual: A-L* for more information about this command.) Use the following procedure:

1. Analyze the system disk for inconsistencies and errors in the file structure by entering the following command:

```
$ ANALYZE/DISK_STRUCTURE SYS$SYSDEVICE
```

Ignore the following message:

```
%ANALDISK-I-OPENQUOTA, error opening QUOTA.SYS
```

2. If you find any other errors on the system disk, repair the errors by entering the following command:

```
$ ANALYZE/DISK_STRUCTURE/REPAIR SYS$SYSDEVICE
```

Checking the SYSCOMMON Directories

For the upgrade to be successful, the SYSCOMMON directories in all system roots must be aliases (or hard links) for the VMS$COMMON directory. To check whether this is the case, execute the following DIRECTORY/FILE_ID commands and compare the displayed file identifiers to ensure that they are all the same.

```
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING device:[000000]VMS$COMMON.DIR
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING device:[SYS*]SYSCOMMON.DIR
```

If you are booted from the system disk that you will be upgrading, you can use SYS$SYSDEVICE as the device name in these commands, as follows:

```
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING SYS$SYSDEVICE:[000000]VMS$COMMON.DIR
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING SYS$SYSDEVICE:[SYS*]SYSCOMMON.DIR
```

If you did not boot from the system disk that you will be upgrading, mount the disk to be upgraded and specify the actual device name in the command. For example, if the system disk to be upgraded is mounted on DKA100, you would use commands similar to the following:

```
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING DKA100:[000000]VMS$COMMON.DIR
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING DKA100:[SYS*]SYSCOMMON.DIR
```

Output from the first command should list a single file. Output from the second command should list one file for each system root on the disk. Check whether the file ID is the same for all of the listed files and take action as follows:

- If all the file IDs are the same, continue with the procedure described in the next section.
- If all the file IDs are not the same, this system disk does not have the directory structure that OpenVMS requires, and the upgrade will not succeed.

  Correcting this problem requires detailed knowledge about how the problem was created. There is no general solution. Because it can be difficult to correct this problem, it is often easier to reinstall OpenVMS (and any layered products) on a new system disk.

Checking the Size of the System Disk

It is difficult to determine in advance how many blocks of disk space you will need for the upgrade. It depends on how many files you have on the target disk already and on how many components you select during the upgrade procedure. However, the following information will help:

- The *maximum* amount of disk space you will need is approximately 675,000 blocks, but your system might use substantially less.
- After you select the components you want installed on the system for the upgrade, the upgrade procedure calculates whether you have enough disk space, displaying the number of available blocks and the number required for the upgrade. If the procedure determines that your disk does not have enough space to perform the upgrade, it displays a message to alert you and allows you to terminate the upgrade so you can create more disk space and try the upgrade again.

To see how much space you have on the system disk, enter the following command:

```
$ SHOW DEVICE SYS$SYSDEVICE
```

Returning Authorization and AGEN$INCLUDE Files to the System Disk

If you have placed authorization and AGEN$INCLUDE files on disks other than the system disk, the upgrade procedure will not find these files. This is because the other disks will not be mounted during the upgrade. In addition, the logical names you have set up to point to these files will not be defined. The following sections explain how to make these files available to the upgrade procedure.

Authorization Files

The authorization files include the following:

SYSUAF.DAT
NETPROXY.DAT
RIGHTSLIST.DAT

If they are not located in the SYS$SYSTEM directory, make sure they are returned there before you upgrade. You can move them back to the original locations after the upgrade is complete.

AGEN$INCLUDE Files

If you use the AGEN$INCLUDE feature in SYS$SYSTEM:MODPARAMS.DAT to include files containing additional parameter settings, and the files that are being included are not on the system disk, then do the following before upgrading:

1. Move the files to the system disk.
2. Update the AGEN$INCLUDE entries to reflect the new locations of these files. For these entries, do not use logical names that you defined in SYS$STARTUP:SYLOGICALS.COM or elsewhere for your normal startup procedure. When you boot the system from the OpenVMS operating system CD-ROM for an upgrade, your normal startup procedure is not run, and so these logical names will not be defined for the upgrade. In addition, when you first boot the upgraded system, a special startup procedure is used.

After the upgrade is complete, you can move these included files back to their original locations. If you do so, remember to re-set the AGEN$INCLUDE entries in SYS$SYSTEM:MODPARAMS.DAT.

Verifying System Parameters

Verify (and modify if necessary) system parameters, described as follows. (If necessary, see the chapter entitled "Managing System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems* for more information about modifying system parameters.) Any system parameters that you modified and *did not* enter in SYS$SYSTEM:MODPARAMS.DAT are lost during the upgrade. To retain these parameters, enter their names and the values that you have in use for them in SYS$SYSTEM:MODPARAMS.DAT. (When AUTOGEN runs after the upgrade, it uses the values in SYS$SYSTEM:MODPARAMS.DAT.)

For example, if you modified GBLPAGES by 128 pages above the default, add the following line to SYS$SYSTEM:MODPARAMS.DAT:

```
ADD_GBLPAGES=128
```

During an upgrade, everything is set back to the default. Use current feedback.

IMPORTANT If you do modify system parameters, note the following:

- In general, you should allow AUTOGEN to calculate system parameters. You can hardcode values (such as GBLPAGES=*value*), but doing so overrides AUTOGEN and might not allow it to set an optimal value based on observed usage.
- Whenever possible, use MIN_parameter values (such as MIN_GBLPAGES) to set a minimum value. AUTOGEN will use this value as a starting point and increase it if necessary. It will also adjust related parameters, unless they are hardcoded, in which case information will be provided in the AGEN$PARAMS.REPORT file. Use MAX_parameter values to set a maximum value when it is necessary to limit a parameter to a known maximum value.
- Enter numeric values as integers, without commas (for example, 10000). Enter alphabetic characters in lower or uppercase.
- HP recommends that you include comments in the MODPARAMS.DAT file indicating who changed the value, when it was done, and why it was done. An exclamation point serves as a comment starter and can appear anywhere on a line. The following is an example illustrating the modifications recommended in the preceding bulleted items:

```
! the following changes made by K.Newcomb on 9/20/03
!
SWAPFILE=0                    ! don't re-size the SWAPFILE on AUTOGEN runs
MIN_gblsections=750           ! required for DECwindows MOTIF
MIN_NPAGEDYN=2750000            ! set npagedyn to a min of 2.75 million
```

For more information on using AUTOGEN as recommended, see "Running AUTOGEN to Tune the System" on page 75.

If your system was upgraded previously, a new SYS$SYSTEM:MODPARAMS.DAT file was created then. This file has comments and possibly duplicated entries that were created during that upgrade. If you upgrade again, SYS$SYSTEM:MODPARAMS.DAT can become unnecessarily large and potentially confusing. HP recommends that you edit and reorganize SYS$SYSTEM:MODPARAMS.DAT before you upgrade again.

NOTE On a cluster system disk, MODPARAMS.DAT should exist in SYS$SYSROOT:[SYSEXE] for each root. You must edit MODPARAMS.DAT as necessary for each root.

Ensuring You Have a Recent FEEDBACK.DAT File

Before upgrading your system, HP recommends that you have a recent AGEN$FEEDBACK.DAT file. This file is in SYS$SPECIFIC:[SYSEXE] (that is, in [SYS*x*.SYSEXE], where *x* is the root; for example, SYS0 or SYS1). In OpenVMS Cluster systems, this file should exist in each node's SYS$SPECIFIC directory. When the system (or each system in a cluster) is rebooted after the upgrade, AUTOGEN is run. If a recent AGEN$FEEDBACK.DAT file is available, it is used. The data in this file helps AUTOGEN set system parameters for your specific applications and work load.

NOTE If you do not have a current AGEN$FEEDBACK.DAT file, AUTOGEN might calculate system parameters that do not reflect your system's requirements. In that case, it can take multiple cycles of running AUTOGEN and rebooting before all layered products can be started. In some cases, successful startup can require additional entries in MODPARAMS.DAT. This should not be necessary when a current AGEN$FEEDBACK.DAT file is available.

Create a current AGEN$FEEDBACK.DAT during a time when your system is running under a typical work load. To ensure the greatest data reliability, the system should be running for more than 24 hours, and the feedback information should be less than 30 days old. When these conditions exist, enter the following command:

```
$ RUN SYS$SYSTEM:AGEN$FEEDBACK.EXE
```

This runs very quickly and should not affect the performance of your system while it executes.

You can also specify the SAVE_FEEDBACK option when you execute SYS$SYSTEM:SHUTDOWN.COM. However, the data captured might not fully reflect the typical work load on your system.

IMPORTANT If you invoke AUTOGEN without specifying the execution-mode parameter (FEEDBACK, NOFEEDBACK, or CHECK_FEEDBACK), AUTOGEN uses the feedback information in its calculations, but if the feedback information reflects system uptime of less than 24 hours, or if the feedback information is more than 30 days old, AUTOGEN terminates execution. AUTOGEN does not set the parameter settings: this helps prevent you from setting inexpedient values. If you reboot the system, you will see the values are unchanged.

If you specify CHECK_FEEDBACK, and AUTOGEN determines the feedback is suspect, then AUTOGEN ignores the feedback when computing parameter values. It sets the parameter values if you specify the final execution phase as SETPARAMS, SHUTDOWN, or REBOOT. If you wrongly assumed the feedback was valid, the parameter settings might vary significantly from your expectations.

Backing Up the System Disk

HP strongly recommends that you make a backup copy of the system disk and, if your configuration allows it, upgrade the *backup copy*. Then, if there are problems, you will still have a working system disk.

NOTE OpenVMS Engineering has encountered cases where recovery from a failed upgrade has been difficult, expensive, or impossible because no backup of the preupgrade system disk was available. Various hardware or software failures or a power failure can make a partially upgraded system disk unusable. A backup copy might be the only route to recovery. The minimal time required to make a backup is a very wise investment!

To back up the system disk, do the following:

1. Shut down the system (described in Appendix A).
2. Boot the operating system CD-ROM (locally or from the InfoServer, as described in "Booting the Operating System CD-ROM" on page 35).
3. Use the menu system to enter the DCL environment (option 7).
4. Mount the system disk and the target device on which you will make the backup copy. For example, if your system disk is on DKA0: and the target device is on DKA100:, you might use the following commands. The /OVERRIDE qualifier used in this example allows you to mount the system disk without typing its volume label. The /FOREIGN qualifier is required for the target disk when you use the BACKUP /IMAGE command.

```
$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
$ MOUNT /FOREIGN DKA100:
```

5. Enter the BACKUP command to back up the system disk to the target device. For example, if your system disk is on DKA0: and your target disk is on DKA100:, you might use the following command:

   ```
   $ BACKUP /IMAGE DKA0: DKA100:
   ```

   The /IMAGE qualifier causes the backup to produce a functionally equivalent copy of the system disk, which will also be bootable.

6. Log out from the DCL environment.
7. Shut down the system by selecting option 8 from the menu.
8. Boot either from the original system disk or from the backup copy.

For complete information about backup operations, including a description of an alternate method that does not require booting from the operating system CD-ROM, see Appendix B.

Finishing Preupgrade Tasks

Continue the preupgrade tasks as follows, depending on whether you are upgrading in a standalone or OpenVMS Cluster environment:

IF ...	THEN ...
you are upgrading a **standalone system**,	1. log in to the SYSTEM account. 2. enter the following command and then press the Return key: `$ @SYS$SYSTEM:SHUTDOWN` 3. when the procedure asks if an automatic system reboot should be performed, enter N (NO) and press the Return key. 4. go to the checklist at the beginning of this chapter to verify that you have performed the necessary tasks; then go to Chapter 7 to begin the upgrade procedure.
you are upgrading an **OpenVMS Cluster system**,	1. review the checklist at the beginning of this chapter. 2. go to Chapter 6.

6 Preparing to Upgrade in an OpenVMS Cluster Environment

This chapter describes how to prepare to upgrade in an OpenVMS Cluster environment, depending on the type of upgrade you perform and whether you need to add any new computers to the cluster. If you are not upgrading in an OpenVMS Cluster environment, go to Chapter 7.

Preupgrade Checklist for OpenVMS Cluster Environments

NOTE Be sure you have performed the preupgrade tasks described in Chapter 5 before you upgrade your OpenVMS Cluster system.

Use the checklist in Table 6-1 to ensure that you perform all necessary tasks prior to upgrading your system in an OpenVMS Cluster environment.

Table 6-1 Preupgrade Checklist for OpenVMS Cluster Environments

	Task	Section Title
❑	Before upgrading the operating system in an OpenVMS Cluster environment, review relevant OpenVMS Alpha operating system and OpenVMS Cluster documentation.	"Review Documentation" on page 90
❑	Familiarize yourself with mixed-version and mixed-architecture support, and migration support, in OpenVMS Cluster systems.	"Mixed-Version Support in an OpenVMS Cluster Environment" on page 90
❑	If you are adding a new OpenVMS Alpha computer system to an existing OpenVMS Cluster, choose one of two options for upgrading.	"Adding a New System to the Cluster" on page 91
❑	Perform the preliminary tasks required for the type of upgrade you want to perform: • Concurrent upgrade • Rolling upgrade	"Types of Upgrades" on page 91 • "Concurrent Upgrade" on page 91 • "Rolling Upgrade" on page 92
❑	Begin the upgrade.	Chapter 7, "Upgrading the OpenVMS Alpha Operating System," on page 95

Review Documentation

When you upgrade the operating system in an OpenVMS Cluster environment, be sure the following information is available to review:

- The cover letters and the software product descriptions included with your distribution kit
- *HP OpenVMS Alpha Version 7.3-2 Release Notes*
- *OpenVMS Cluster Systems*
- *Guidelines for OpenVMS Cluster Configurations*
- *HP OpenVMS Alpha Version 7.3-2 New Features and Documentation Overview*

Mixed-Version Support in an OpenVMS Cluster Environment

HP provides two levels of support for mixed-version and mixed-architecture OpenVMS Cluster systems. These two support types are **warranted** and **migration**.

Warranted support means that HP has fully qualified the two versions coexisting in an OpenVMS Cluster and will answer all problems identified by customers using these configurations.

Migration support means that HP has qualified the versions for use together in configurations that are migrating in a staged fashion to a newer version of OpenVMS VAX or OpenVMS Alpha. Problem reports submitted against these configurations will be answered by HP. However, in exceptional cases, HP may request that you move to a warranted configuration as part of the solution. Migration support helps customers move to warranted OpenVMS Cluster pairs.

NOTE HP supports only two versions of OpenVMS running in a cluster at a time, regardless of architecture.

Table 6-2 shows the level of support provided for all possible version pairings. In this table, Alpha V7.3*x* refers to versions 7.3, 7.3-1, and 7.3-2. Standard support for OpenVMS Alpha V7.3 systems ends on December 31, 2003. After that, it will not be under Prior Version Support (PVS). This statement does not apply to OpenVMS VAX systems. For more information, see the OpenVMS Technical Software Support Service web site at `ftp://ftp.compaq.com/pub/services/software/ovms.pdf`.

Table 6-2 OpenVMS Cluster Warranted and Migration Support

	Alpha V7.3*x* and VAX V7.3	**Alpha V7.2-2 and VAX V7.2[1]**
Alpha V7.3*x* and VAX V7.3	WARRANTED	Migration
Alpha V7.2-2 and VAX V7.2[1]	Migration	WARRANTED

[1] OpenVMS Alpha Version 7.2 is not supported for migration.

In a mixed-version cluster, you might need to install remedial kits on earlier versions of OpenVMS. For a complete list of required remedial kits, see the *HP OpenVMS Alpha Version 7.3-2 Release Notes*.

Adding a New System to the Cluster

If you need to add a new computer supported by OpenVMS Alpha Version 7.3-2 to an existing OpenVMS Cluster configuration, HP supports two options, listed in the following preferred order:

1. Upgrade the entire cluster to OpenVMS Alpha Version 7.3-2 and add the new computer as a member.
2. If you need to keep some systems in the cluster running an older version of OpenVMS Alpha, you must upgrade a system disk in the cluster to OpenVMS Alpha Version 7.3-2 using the rolling upgrade procedure. Then boot the new computer into the cluster using that upgraded system disk.

Types of Upgrades

There are two types of cluster upgrades: **concurrent** and **rolling**. The type of upgrade you use depends on whether you want to maintain the availability of the cluster during the upgrade and whether you have more than one system disk. Review this chapter and then perform the preliminary tasks for the upgrade procedure (concurrent or rolling) that best suits your configuration.

Concurrent Upgrade

This section describes the following:

- How a concurrent upgrade works
- Preparing your system for a concurrent upgrade

How a Concurrent Upgrade Works

During a concurrent upgrade, you must shut down the entire cluster and upgrade each system disk. No one can use the cluster until you upgrade each system disk and reboot each Alpha computer. When the cluster reboots, each Alpha computer will be running the upgraded version of the OpenVMS Alpha operating system.

If all Alpha systems in the OpenVMS Cluster environment are booted from one system disk, you must perform a concurrent upgrade.

Preparing Your System for a Concurrent Upgrade

To prepare for a concurrent upgrade:

1. Log in locally to the SYSTEM account.

   If you have more than one system disk, make sure that you have performed the preupgrade tasks on each system disk that you will be upgrading. Then go to Chapter 7 and perform an upgrade on each system disk. You do not have to reboot the operating system CD-ROM for each upgrade. You only need to choose option 1 from the menu for each upgrade.

2. Shut down all systems by entering the following command on each system (satellites first, then the boot nodes):

   ```
   $ @SYS$SYSTEM:SHUTDOWN
   ```

3. When the procedure asks if an automatic system reboot should be performed, enter N (NO) and press the Return key.

4. Choose the CLUSTER_SHUTDOWN option.
5. When the shutdown procedure is finished on all nodes, halt each system by entering Ctrl/P or by pressing the Halt button. For more information about halting your Alpha computer, see Appendix A.
6. If you have only one system disk for your cluster, go to Chapter 7 to begin the upgrade procedure.

   After the upgrade is complete, you are instructed to reboot each computer in the OpenVMS Cluster environment before beginning other postupgrade procedures.

Rolling Upgrade

This section describes the following:

- How a rolling upgrade works
- Notes and restrictions
- Preparing your system for a rolling upgrade

How a Rolling Upgrade Works

During a rolling upgrade, you upgrade each system disk individually, allowing old and new versions of the operating system to run together in the same cluster, creating a **mixed-version** cluster. Because rolling upgrades allow mixed-version clusters, the systems that you are not upgrading remain available. During a rolling upgrade, you keep some of the computers in the cluster running while you upgrade others (you must have more than one system disk).

Notes and Restrictions

The following restrictions apply to rolling upgrades. See the *HP OpenVMS Alpha Version 7.3-2 Release Notes* for additional compatibility issues and restrictions.

- Rolling upgrades are supported from Version 7.2-2, 7.3, and 7.3-1 of the OpenVMS Alpha operating system. Rolling upgrades in mixed-architecture OpenVMS Cluster environments are supported with VAX computers running Versions 7.2 or 7.3 of the OpenVMS VAX operating system (see Table 6-2).
- The system being upgraded does not attempt to access any disk that is being accessed by one or more of the remaining OpenVMS Cluster systems.
- The remaining OpenVMS Cluster systems do not attempt to access the target disk of the system being upgraded.

  If the target disk being upgraded is locally attached to the system performing the upgrade, then it is not accessible to the remaining OpenVMS Cluster systems. (The OpenVMS system booted from the operating system CD-ROM does not MSCP serve local disks.) Whenever possible, HP recommends that you perform the upgrade on a local disk or that you perform a concurrent upgrade.

  During the upgrade, be sure that the target disk you select, as well as any disk you access from the DCL menu option, is either a local disk or one that is not being accessed by any of the remaining OpenVMS Cluster members.

NOTE Any attempt to access the target disk from the remaining OpenVMS Cluster members will corrupt the target disk in most cases. Even if the target disk is only mounted by a remaining cluster member, and no file access is done, the target disk will probably be corrupted. If a disk is corrupted in this way, the only supported recovery is to restore the backup copy of the corrupted disk.

- HP recommends that all Alpha computers in a cluster run the same (and preferably the latest) version of the OpenVMS Alpha operating system.
- You cannot perform a rolling upgrade if all systems boot from a single system disk. Perform a concurrent upgrade instead.
- The upgrade procedure affects the queuing system as follows:
  - — The queuing system is not active on the system you are upgrading; do not attempt to execute a START/QUEUE/ MANAGER command.
  - — You cannot create a queue database on the operating system CD-ROM (because it is not writable).
  - — The queue manager process on other nodes in the cluster can continue to run during the upgrade if the queue database is not on the disk being upgraded.

Preparing Your System for a Rolling Upgrade

To prepare for a rolling upgrade:

1. Log in to any node where the target disk is mounted as a *data* disk, rather than as the *system* disk. (That disk must be the one on which you already performed the preupgrade tasks described in Chapter 5.)
2. Check the votes and make adjustments to maintain the proper quorum so the cluster can continue to operate throughout the upgrade. (*OpenVMS Cluster Systems* describes this procedure in detail.)
3. Use the DCL command DISMOUNT/CLUSTER to dismount the data disk. (You can also perform this operation using the SYSMAN utility.)

   Note that you can ignore messages from nodes where the specified data disk is being used as the system disk.
4. Verify that the data disk has been dismounted successfully by entering the following commands:

   ```
   $ MCR SYSMAN
   SYSMAN> SET ENVIRONMENT/CLUSTER
   SYSMAN> DO SHOW DEVICE disk-name
   ```

   Examine the display to be sure the disk is not mounted on any nodes as a data disk. Noting the value listed in the Trans Count field can help you make that determination: A value of less than 50 indicates that the disk is mounted as a data disk rather than as the system disk; a much larger value (for example, 300) indicates that the disk most likely is the system disk.
5. If the disk is still mounted on any nodes as a data disk, use the SYSMAN utility to dismount the disk; otherwise, exit from the SYSMAN utility.
6. Use the following command to shut down any nodes that boot from the system disk you are upgrading (shut down satellite nodes first):

   ```
   $ @SYS$SYSTEM:SHUTDOWN
   ```

   a. When the procedure asks if an automatic system reboot should be performed, enter N (NO) and press the Return key.

   b. Choose the REMOVE_NODE option.

If a proper quorum is not maintained at any time during the upgrade procedure, the shutdown procedure will hang the cluster. If the cluster hangs during a shutdown, enter the following commands on the system console of a system that is still a cluster member:

```
$ Ctrl/P
>>> D SIRR C
>>> C
IPC> Q
IPC> Ctrl/Z
```

After the shutdown procedure is finished on all nodes, go to Chapter 7 to begin the upgrade procedure.

CAUTION During the upgrade it is very important that the system disk being upgraded is accessed *only* by the node on which the upgrade is being performed. If the disk can be accessed from other nodes in the cluster, for example, through an HSC or HSJ device, you *must* ensure that this does not happen. Even if the disk is only mounted and no file access is performed, the disk can still become corrupted.

Ensure that any users who might mount disks know that they must not access the system disk being upgraded. Also make sure that any procedures that might mount the disk do not run during the upgrade. If you have automatic procedures that periodically check and remount disks, it might be wise to disable them during the upgrade.

---

7 Upgrading the OpenVMS Alpha Operating System

This chapter explains how to upgrade the OpenVMS Alpha operating system and includes information about reinstalling or reconfiguring your system.

This chapter describes the following tasks:

- Beginning the upgrade from the operating system CD-ROM
- Performing the upgrade
- Reinstallation and reconfiguration options
- Upgrading windowing and networking products
- Completing the upgrade
- Installing layered products
- Performing tasks after system shutdown

Booting the Operating System CD-ROM

The OpenVMS Alpha Version 7.3-2 operating system includes procedures that allow you to easily upgrade the operating system using the POLYCENTER Software Installation utility. To get started, boot the OpenVMS Alpha operating system CD-ROM either from your local CD-ROM drive or from a CD-ROM drive connected to the InfoServer, as described in "Booting from the Local Drive" on page 96 and "Booting from the InfoServer" on page 96. First, you need to identify the name of the CD-ROM drive, as explained in "Determining the Boot Device" on page 95. For more information on booting operations, see Appendix A, "Halt, Boot, and Shutdown Procedures."

Determining the Boot Device

To boot the operating system CD-ROM, you need to determine the identity of the CD-ROM drive. Follow these steps:

1. Insert the operating system CD-ROM into the local CD-ROM drive.
2. Enter the SHOW DEVICE command at the console prompt (>>>) and look for the correct drive listed in the output (for example, DKA400). If you are booting from the InfoServer, look for a device listed with its hardware address, as in the last line of the following example (EWA0):

```
>>>SHOW DEVICE

dva0.0.0.1000.0     DVA0                    RX23
dka200.2.0.5.0      DKA200                  RZ28M  1004
dka300.3.0.5.0      DKA300                  RZ29B  0016
dka400.4.0.5.0      DKA400                  RRD42  442E
ewa0.0.0.3.0        EWA0         00-00-F8-1F-70-3D
```

For additional information, see the *HP OpenVMS Operating System for Alpha and VAX Software Product Description* and the hardware manuals that you received with your Alpha computer.

Booting from the Local Drive

To boot the operating system CD-ROM from the local CD-ROM drive, enter the boot command in the following format:

```
BOOT -FLAGS 0,0 source-drive
```

Substitute the device name of the CD-ROM drive for *source-drive*, such as DKA400, as listed in the SHOW DEVICE display example in "Determining the Boot Device" on page 95. In this case, you would enter the following command and press the Return key:

```
>>> BOOT -FLAGS 0,0 DKA400
```

Booting from the InfoServer

To boot the operating system CD-ROM using the InfoServer, follow these steps:

1. At the console prompt, enter the boot command in the following format:

   ```
   >>> BOOT -FLAGS 0,0 -FILE APB_2073 lan-device-name
   ```

   Substitute the name of the local area network device for *lan-device-name*, such as EWA0, as listed in the SHOW DEVICE display example in "Determining the Boot Device" on page 95.

   The APB file name is the unique file name that was assigned to the APB.EXE file when it was copied from the operating system CD-ROM to the InfoServer. This file is the name of the APB program used for the initial system load (ISL) boot program.

NOTE If you are using a DEC 3000 or 4000 series system, note the following:

- On DEC 3000 series systems, you can boot through the InfoServer using an alternate TURBOchannel device, such as a PMAD (Ethernet) or DEFTA (FDDI), by specifying the device name as "*n*/ESA0". The value for *n* is the TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. For more information, see "Booting over the Network with an Alternate TURBOchannel Adapter" on page 137 in Appendix A.
- On DEC 4000 series systems, you *must* specify the ISL file name in uppercase (APB_2073).

---

2. The InfoServer ISL program then displays the following menu:

   ```
   Network Initial System Load Function
   Version 1.2
   ```

```
  FUNCTION          FUNCTION
    ID
    1      -        Display Menu
    2      -        Help
    3      -        Choose Service
    4      -        Select Options
    5      -        Stop

Enter a function ID value:
```

3. Respond to the prompts as follows, pressing the Return key after each entry:

   a. Enter 3 for the function ID.

   b. Enter 2 for the option ID.

   c. Enter the service name (ALPHA0732).

   A sample display follows:

```
Enter a function ID value: 3
 OPTION           OPTION
   ID
   1      -       Find Services
   2      -       Enter known Service Name

Enter an Option ID value: 2
Enter a Known Service Name: ALPHA0732
```

NOTE If you boot the OpenVMS Alpha operating system CD-ROM from an InfoServer system but lose your connection during the upgrade procedure (the system is unresponsive and pressing Ctrl/Y does not return you to the menu), do the following:

1. Reboot the OpenVMS Alpha operating system CD-ROM.
2. Enter the DCL environment by choosing option 7 from the menu.
3. Mount the device containing your backup copy of the target disk and the device that is your target disk.
4. Restore the backup copy of your target disk by entering the appropriate BACKUP commands. (See Appendix B for complete information about using MOUNT and BACKUP commands to restore a system disk.)
5. Log out from the DCL environment.
6. Perform the upgrade again by choosing the upgrade option (1) from the menu and following the procedures described in this chapter.

Performing the Upgrade

The following sections describe how to upgrade from the operating system CD-ROM.

Upgrading the System Using Option 1 of the Operating System CD-ROM Menu

After you boot the operating system CD-ROM, choose the upgrade option (1) from the menu displayed on the screen. The display is similar to the following:

```
     OpenVMS (TM) Alpha Operating System, Version 7.3-2

    Installing required known files...

    Configuring devices...
    (c) Copyright 1976-2003 Hewlett-Packard Development Company, L.P.


    ****************************************************************

    You can install or upgrade the OpenVMS Alpha operating system
    or you can install or upgrade layered products that are included
    on the OpenVMS Alpha operating system CD-ROM.

    You can also execute DCL commands and procedures to perform
    "standalone" tasks, such as backing up the system disk.

    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS Alpha Version 7.3-2
        2)  Display products and patches that this procedure can install
        3)  Install or upgrade layered products and patches
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Execute DCL commands and procedures
        8)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?) 1
```

The OpenVMS Alpha operating system CD-ROM might contain patch kits. If it does, information similar to the following is displayed:

```
    The following PATCH kits are present on the OpenVMS Alpha
    distribution media.

    ---------------------------------- ----------- ----------
    PRODUCT                            KIT TYPE    KIT FORMAT
    ---------------------------------- ----------- ----------
    DEC VAXVMS TCPIP_ECO V5.3-182      Patch       Sequential
    ---------------------------------- ----------- ----------

    1 item found

    Please consult the OpenVMS Alpha Upgrade and Installation Manual,
    the Release Notes, and the Cover Letter to determine if any or
    all of these patches may be required for your system.
```

Choosing INITIALIZE or PRESERVE

After you choose the upgrade option, the system displays the following information and prompts:

```
    ****************************************************

    The installation procedure will ask a series of questions.

          () - encloses acceptable answers
          [] - encloses default answers
```

```
    Type your response and press the <Return>key.  Type:

          ? - to repeat an explanation
          ^ - to change prior input (not always possible)
          Ctrl/Y - to exit the installation procedure

    There are two choices for Installation/Upgrade:

    INITIALIZE - removes all software and data files that were
        previously on the target disk and installs OpenVMS Alpha.

    PRESERVE -- installs or upgrades OpenVMS Alpha on the target disk
        and retains all other contents of the target disk.

   * NOTE: You cannot use PRESERVE to install OpenVMS Alpha on a disk on
        which OpenVMS VAX or any other operating system is installed.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE])
```

For an upgrade, press the Return key to accept the default (PRESERVE).

Specifying the Target Disk

Next, the procedure asks you for the name of the target disk. If you enter a question mark (?), the system displays a list of devices on your system. Select the appropriate disk and respond to the prompt. For example:

```
You must enter the device name for the target disk on which
    OpenVMS Alpha will be installed.

Enter device name for target disk: (? for choices)  DKB400
```

If you select a device that is not available or that cannot be used for some other reason, the system displays information indicating why the device cannot be used. For example, if you enter MKA500, a tape device, a message similar to the following is displayed:

```
MKA500 is not a disk device
```

If you select a device that can be used, the system then informs you of the volume label currently assigned to this device and asks if you want to keep that label. As shown in the following example, if you choose not to keep that label, you are prompted for a new label. The OpenVMS operating system uses the volume label to identify and reference the disk. Make sure the label you use is unique; problems occur if the same label is used by different disk volumes.

```
   DKB400: is now labeled ASPVMS732.

Do you want to keep this label? (Yes/No) [Yes] NO

Enter volume label for target system disk: [ALPHASYS]
```

Checking for Recovery Data

If you specify the /SAVE_RECOVERY_DATA qualifier with the PRODUCT INSTALL command, the POLYCENTER Software Installation (PCSI) utility will save information that can be used to remove patches and mandatory update kits at a later time. Use the PRODUCT UNDO PATCH command to remove the patches and kits. The /SAVE_RECOVERY_DATA qualifier and PRODUCT UNDO PATCH command were added in OpenVMS Alpha Version 7.3-2 and backported to OpenVMS for Alpha Version 7.2-2, 7.3, and 7.3-1.

The upgrade procedure now checks the disk for recovery data saved by the PCSI utility. Any recovery data has to be removed before the upgrade can continue, because this data would become invalid after the upgrade. If no recovery data is present, the upgrade continues. If recovery data is present, and all the data found

applies only to the OpenVMS operating system, the upgrade procedure deletes the data and continues. If any of the recovery data applies to products other than the OpenVMS operating system, then the upgrade procedure displays a message similar to the following:

```
     The target system has recovery data from PRODUCT operations which
     used the /SAVE_RECOVERY_DATA qualifier.  This data must be deleted
     to continue the OpenVMS upgrade.

     Please examine the following display.

     If you wish to delete this data and continue the OpenVMS upgrade,
     answer YES to the question "Do you want to continue?"

     If you do not wish to delete this data, answer NO.  A NO answer
     will preserve the recovery data and abort the OpenVMS upgrade.

The following patch recovery data has been selected:

RECOVERY DATA SET 001 created 22-JUL-2003 15:23:39.69
   ------------------------------------ ----------------------------------------
   PATCH                                APPLIED TO
   ------------------------------------ ----------------------------------------

   JAK VMS RM1 V1.0                     JAK VMS RMTEST V1.0
   ------------------------------------ ----------------------------------------

* If you continue, recovery data for the patches listed above will be deleted.
* The deletion of recovery data does not affect the installation status of
* patches applied to products that are not participating in this operation.
* However, continuing with this operation prevents you from uninstalling
* these patches at a future time by use of the PRODUCT UNDO PATCH command.

Do you want to continue? [YES]
```

If you answer YES (the default) the recovery data sets are deleted and the OpenVMS upgrade continues.

```
Do you want to continue? [YES]

Deleting RECOVERY DATA SET 002 ...

Deleting RECOVERY DATA SET 001 ...
```

If you answer NO the recovery data sets are not deleted and the OpenVMS upgrade aborts.

```
Do you want to continue? [YES] NO
%PCSIUI-I-USERABORT, operation terminated by user request

     You chose to retain recovery data on the target system disk.
     The OpenVMS upgrade cannot continue.

     Please corect the situation the prevents you from deleting the
     recovery data and then retry the upgrade.
```

Specifying the Volume Label

You can accept the default label assigned by the system (AXPVMSSYS) or specify a different volume label (with a limit of 12 characters that can include the A to Z, 0 through 9, and optionally, the dollar sign ($), hyphen (-), and underscore(_) characters).

NOTE HP strongly recommends that the volume labels for all disks on your system or OpenVMS Cluster have unique labels. If a disk that has the same label as the system disk is mounted, various OpenVMS components will not function as intended.

Specifying the On-Disk Structure Level

If the target disk is currently initialized with On-Disk Structure Level 2 (ODS-2), you now have the option to convert the disk to On-Disk structure Level 5 (ODS-5).

For details about ODS-2 and ODS-5 file systems, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. A brief summary follows:

- **ODS-2**

  ODS-2 allows for full compatibility with all OpenVMS VAX systems and with OpenVMS Alpha systems prior to Version 7.2.

- **ODS-5**

  — ODS-5 supports file names that are longer and have a wider range of legal characters. This feature permits use of file names similar to those in a Windows or UNIX environment.

  — ODS-5 supports hard links to files, access dates, and files whose names differ only by case.

  — ODS-5 volumes cannot be mounted on any version of OpenVMS prior to Version 7.2.

  — Systems running OpenVMS VAX Version 7.2 and later can mount ODS-5 volumes, but cannot create or access files having extended names. (Lowercase file name characters are seen in uppercase on OpenVMS VAX systems.)

```
The  target  system disk is currently at On-Disk Structure Level 2
(ODS-2).  It can be converted to On-Disk Structure Level 5 (ODS-5).
(? for more information)
```

If you choose not to change to ODS-5, the upgrade continues. The target disk is mounted and page and swap files are created. For example:

```
Do you want to convert the target system disk to ODS-5? (Yes/No/?) NO

  OpenVMS Alpha will be upgraded on DKB400:.
```

If you choose to change to ODS-5, you will be given the option to enable hard links. For more information about hard links, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. The upgrade will then continue.

```
Do you want to convert the target system disk to ODS-5? (Yes/No/?) YES

  DKB400: has been converted to ODS-5.

  You can use the BACKUP/CONVERT command to convert ODS-5 disks back
  to ODS-2 format. For more information, refer to the OpenVMS System
  Management Utilities Reference Manual.

  Hard links can be enabled on ODS-5 disks. (? for more information)
  (***Enabling hard links can take from 5-10 minutes to an hour or more.***)

Do you want to enable hard links? (Yes/No/?) YES
```

If you choose to enable hard links, the procedure automatically executes an ANALYZE/DISK_STRUCTURE/REPAIR operation to correctly set the reference counts. This operation can take 5 to 10 minutes to an hour or more, depending on the complexity of the system disk configuration, the number of layered products installed, and the number of user files. When the process completes, a message similar to the following is displayed:

```
    Hard links have been enabled on DKB400:.

    The newly enabled hard links are not correct and need to be updated.
    The Analyze/Disk_Structure utility will now be run to do this.

    This can take from 5 - 10 minutes to an hour or more.  It is a normal
    requirement when hard links are enabled on an existing disk.

%ANALDISK-I-COUNT, 1000 hard link updates completed
%ANALDISK-I-COUNT, 2000 hard link updates completed
%ANALDISK-I-COUNT, 3000 hard link updates completed
%ANALDISK-I-COUNT, 4000 hard link updates completed
%ANALDISK-I-COUNT, 5000 hard link updates completed
%ANALDISK-I-COUNT, 6000 hard link updates completed

    OpenVMS Alpha will be upgraded on DKB400:.
```

Checking Related Software

At this point the upgrade performs checks of some related software products.

DECamds

Beginning with OpenVMS Version 7.3 and DECamds Version 7.3, certain parts of DECamds that were previously supplied with the layered product kit are now incorporated into OpenVMS. Because of this, prior versions of DECamds must be removed.

If the upgrade procedure detects a prior version of DECamds, it will display the following message and automatically remove the prior version of DECamds. Note that you must reinstall DECamds if you want to continue using it.

```
    The target system contains a version of DECamds that is not
    compatible with this version of the operating system.

    If you continue DECamds will be removed.  A current version of
    DECamds can be installed after the upgrade completes.
```

PATHWORKS

If PATHWORKS is installed on the system, OpenVMS Version 7.3-2 requires PATHWORKS Version V6.1 or higher. The installation determines the PATHWORKS version and displays the following message if PATHWORKS Version 5 or earlier is present:

```
PATHWORKS V5 is installed on the target system.

This version of PATHWORKS will not work on OpenVMS V7.3-2.

Before you upgrade OpenVMS you must either upgrade to a supported
version of PATHWORKS or migrate to Advanced Server for OpenVMS.

Please refer to the PATHWORKS or Advanced Server for OpenVMS installation
guides for additional information.

Do you want to continue? (Yes/No) [NO]
```

The default is to terminate the upgrade. Take the default and upgrade PATHWORKS.

Advanced Server for OpenVMS

If Advanced Server for OpenVMS is installed on the system, OpenVMS Version 7.3-2 requires Advanced Server for OpenVMS Version 7.3 or higher.

If you plan to upgrade your OpenVMS system, and a version of Advanced Server for OpenVMS earlier than V7.3 is present, first upgrade Advanced Server for OpenVMS to the latest version before you upgrade the OpenVMS operating system.

Setting OpenVMS Cluster Membership Information

The procedure now asks if your system will be part of an OpenVMS Cluster. The display is similar to the following:

```
Will this system be a member of an OpenVMS Cluster? (Yes/No) NO
```

You should answer YES if the system will be an OpenVMS Galaxy instance or a member of an OpenVMS cluster. Unlike an installation, answering YES to this question will *not* cause SYS$MANAGER:CLUSTER_CONFIG.COM to be run. However, correct cluster membership information is required by the upgrade procedure. Your response to this question determines how the VAXCLUSTER system parameter will be set. (The parameter name "VAXCLUSTER" has been retained on OpenVMS Alpha systems.) For more information, see the *Guidelines for OpenVMS Cluster Configurations*.

Setting OpenVMS Galaxy Information

The procedure next asks if your system will be an instance in an OpenVMS Galaxy. The display is similar to the following:

```
Will this system be an instance in an OpenVMS Galaxy? (Yes/No) NO
```

If you answer YES to this question, and you also answered YES to the OpenVMS Cluster question, then information about required remedial kits is displayed. Your answer to this question determines how the system parameter GALAXY will be set.

Updating Time Zone Information

For local time zone support to work correctly, the time zone that accurately describes the location you want to be considered as your default time zone must be set. In addition, your system must be correctly configured to use a valid OpenVMS time differential factor (TDF).

If the installation procedure determines that time zone information is incomplete, it will prompt you to set the correct default time zone and TDF for your system. For details about setting the time zone information, see "Selecting the Local Time Zone" on page 43.

For more information about TDF and local time zone support, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

Selecting Reinstallation and Reconfiguration Options

If you are using the OpenVMS Alpha Version 7.3-2 CD-ROM and have selected a target disk that already has Version 7.3-2 installed, you are presented with several configuration options. A sample display follows. See also the example in "Adding and Removing Operating System Files" on page 120.

```
Version 7.3-2 of the OpenVMS operating system is already installed
on DKB400:.

Please choose one of the following:
```

```
    1)  Reconfigure the OpenVMS platform.
    2)  Reconfigure the OpenVMS operating system.
    3)  Reinstall the OpenVMS operating system.
    4)  Return to the Main Menu (abort the upgrade/installation).

    Enter a "?" for more information.
```

If you enter a question mark (?), the following information displays:

```
  o Reconfigure the OpenVMS platform.

    This action will allow you to change your selections of which
    products you installed along with the OpenVMS operating system
    installation.

    This will NOT change any options in the OpenVMS operating system,
    nor will it reinstall any operating system files.

  o Reconfigure the OpenVMS operating system.

    This action will allow you to change your choices about which
    options you included for the OpenVMS operating system.

    This will NOT change any options for the products you installed
    along with the OpenVMS operating system installation, nor will
    it reinstall or upgrade any of them.

  o Reinstall the OpenVMS operating system.

    This action will cause ALL operating system  files to be replaced.
    You can also change your choices about which options you included
    for the OpenVMS operating system.

    This will NOT change any options for the products you installed
    along with the OpenVMS operating system installation, nor will
    it reinstall or upgrade any of them.

    Reinstall will take longer than Reconfigure.  Reinstall may be
    appropriate if you suspect that files in the operating system,
    or in the windowing and network products have become corrupted.


If you want to reinstall or upgrade any of the products you installed
along with the OpenVMS operating system installation, choose "Install
or upgrade layered products and patches" (option 3) from the main menu.

If you want to change your choices about which options you included
for any of the products you installed along with the OpenVMS operating
system installation, choose "Reconfigure installed products" (option 5)
from the main menu.
```

Next, the menu is then redisplayed:

```
Please choose one of the following:

    1)  Reconfigure the OpenVMS platform.
    2)  Reconfigure the OpenVMS operating system.
    3)  Reinstall the OpenVMS operating system.
    4)  Return to the Main Menu (abort the upgrade/installation).


Enter choice or ? for help: (1/2/3/4/?)
```

See "Adding and Removing Operating System Files" on page 120 for additional configuration information.

Upgrading Windowing and Networking Products

The procedure now presents information about software that you can install along with the OpenVMS operating system. Some of this software is required, as noted; some is optional. The procedure asks if you want to install the following HP windowing and networking software products:

- CDSA (required)
- Kerberos (required)
- DECwindows Motif for OpenVMS
- DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS (but not both)
- TCP/IP Services for OpenVMS

The software that you choose to install (including the required software) is included with the OpenVMS Alpha operating system. You can change the default values for these products later in the installation/upgrade procedure.

If you are upgrading DECnet, the procedure removes the existing version of DECnet during the upgrade.

The display is similar to the following:

```
If necessary, the following products will be upgraded along with
the OpenVMS operating system:

    o CDSA for OpenVMS Alpha (required part of OpenVMS)
    o KERBEROS for OpenVMS Alpha (required part of OpenVMS)
    o DECwindows Motif for OpenVMS Alpha
    o DECnet-Plus for OpenVMS Alpha
    o DECnet Phase IV for OpenVMS Alpha
    o HP TCP/IP Services for OpenVMS

If you want to add or delete these products, you can do so later in
the upgrade by answering NO to the following question:

    "Do you want the defaults for all product options?"

CDSA for OpenVMS Alpha (required part of OpenVMS)
is installed on your system. It will be upgraded.

KERBEROS for OpenVMS Alpha (required part of OpenVMS)
is installed on your system. It will be upgraded.

DECwindows Motif for OpenVMS Alpha
is installed on your system. It will be upgraded.


Beginning with OpenVMS V7.1, the DECnet-Plus kit is provided with
the OpenVMS operating system kit. HP strongly recommends that
DECnet users install DECnet-Plus. DECnet Phase IV applications are
supported by DECnet-Plus.

DECnet Phase IV is also provided as an option.  Support for DECnet
Phase IV is available through a Prior Version Support Contract.

If you install DECnet-Plus and TCP/IP you can run DECnet
applications over a TCP/IP network.  Please see the OpenVMS
Management Guide for information on running DECnet over TCP/IP.
```

```
Do you want to install DECnet-Plus for OpenVMS Alpha V7.3-2? (Yes/No) [YES] Y

DECnet Phase IV for OpenVMS Alpha is installed on your system.
It will be removed.

V5.3-18 of HP TCP/IP Services for OpenVMS
is already installed. You can keep the installed version or upgrade to V5.4.

 Do you want to install HP TCP/IP Services for OpenVMS V5.4? (Yes/No) [YES]
```

Some of the windowing and networking products might have versions installed that are earlier than the current versions, but which still work on OpenVMS Version 7.3-2. In this case, you will see a message similar to the TCP/IP Services for OpenVMS message in the preceding example, indicating the software is already installed and asking whether you want to install the newer version. You can choose to keep the currently installed version, or to upgrade to the newer version supplied with OpenVMS Version 7.3-2. If you choose to keep the currently installed version, you should verify what level of support is available from HP for this version.

Some windowing and networking products might have versions installed that do not work on OpenVMS Version 7.3-2. In this case, you are not given a choice to upgrade. The software will be upgraded automatically. For example, if the version of TCP/IP Services for OpenVMS currently installed on your system does not work on OpenVMS Version 7.3-2, you will see a message similar to the following:

```
TCP/IP Services for OpenVMS
is installed on your system. It will be upgraded.
```

Completing the Upgrade

The following sections describe the remaining steps that you need to perform to complete the upgrade.

Choosing Descriptive Help Text

The system next prompts you as follows:

```
     The installation operation can provide brief or detailed descriptions.
     In either case, you can request the detailed descriptions by typing "?".

Do you always want detailed descriptions? (Yes/No) [No]
```

If you answer YES, the system will display additional explanatory text with each prompt.

Saving Archived Files

By default, the OpenVMS upgrade deletes files that were archived as *filename.extension_OLD* by OpenVMS remedial kits. If you do not want to delete these files, you can save them by taking one of the following steps:

1. When the script asks if you want the defaults for all options, answer NO. (This script is shown in the example in “Selecting Components” on page 107.) Step through the options and deselect the option to delete files archived by remedial kits. This will save all such files.
2. Before beginning the upgrade, rename any _OLD files that you want to save. Files that you do not rename will be deleted.

Note that the upgrade will not delete all files with an extension ending in _OLD. Only those _OLD files that were archived by OpenVMS remedial kits will be deleted.

NOTE OpenVMS patches save these _OLD files in VMS$REMEDIAL_OLD_FILES.TXT. All files listed in this file are supposed to have the _OLD extension appended to their names; however, some patch kits have added the files without this extension. If the upgrade procedure detects files without the appended _OLD extension, it will display a message similar to the following:

```
%UPGRADE-I-FIXUP, appending _OLD to file names in PCSI$DESTINATION:[SYSUPD]
VMS$REMEDIAL_OLD_FILES.TXT
[SYSUPD]VMSKITBLD.DAT
[SYSHLP]XFC$SDA.HLP
[SYS$LDR]SYSTEM_SYNCHRONIZATION.EXE-OLD
[SYS$LDR]SYS$XFCACHE.DSF
[SYS$LDR]SHELL9K.EXE_STB
[000000]DEC-AXPVMS-VMS-V0703-1-2.PCSI$DESCRIPTION
```

Selecting Components

As you begin the upgrade procedure, the system asks if you want all the default values, meaning all the files and subgroups of files for each component included in the operating system. The display is similar to the following:

```
The following product has been selected:
     DEC AXPVMS OPENVMS V7.3-2       Platform (product suite)


Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and
for any products that may be installed to satisfy software dependency
requirements.

DEC AXPVMS OPENVMS V7.3-2: OPENVMS and related products Platform

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    Hewlett-Packard Development Company, L.P.

Do you want the defaults for all options? [YES] YES

    CDSA for OpenVMS Alpha (required part of OpenVMS)

    KERBEROS for OpenVMS Alpha (required part of OpenVMS)

    DEC AXPVMS DWMOTIF V1.3-1: DECwindows Motif
      If a Local Language Variant is installed, refer to the Installation
      Guide.

      Do you want to continue? [YES]
```

During an upgrade, the POLYCENTER Software Installation utility defines “default values” as the values that you selected when you last installed or upgraded the OpenVMS Alpha operating system on your system. Therefore, before you respond to the prompt, note the following:

- If you answer YES (by pressing the Return key) to accept the default values, you will receive the same components that you selected when you last installed or upgraded the system (instead of *all* the components currently available) plus any new components that were not in the previous version of the OpenVMS Alpha operating system.
- If you want to include or exclude any components differently from the last installation or upgrade, you must answer NO and then respond to the prompts for *each* option, even those that you are not changing.
- If you want to review the current defaults first, you can answer NO. Then answer YES when the system asks if you want to view the values.

  If you review the defaults and are satisfied, answer YES to the prompt asking if you are satisfied with the values. However, if you want to make changes, answer NO to that question and then answer YES when the system asks if you want to reenter the values.

When selecting components, note the following as well:

- Whether you choose all the default values or select individual files, the system will allow you to view your selections and make changes (if necessary).
- If you are not sure whether you want certain components, request help by entering a question mark (?) at the prompt for that component (or group of components).
- You should review the list of options and compare them with the requirements for your system. If you are selecting components individually, be sure that you include all components necessary to support the needs of your users. Note also that certain components depend upon the installation of other components.
- OpenVMS Management Station software is automatically installed on your OpenVMS system disk when you accept all the default values. If you do not accept the default values, you must select the OpenVMS Management Station component (server and client files) if you plan to use that product. After the installation is complete, you can then prepare your OpenVMS Alpha system and your PC to run OpenVMS Management Station by following the procedures described in Appendix D.
- If you decide after the upgrade to change which OpenVMS Alpha operating system components you want installed on your system, you must reconfigure the installation as described in "PRESERVE Option" on page 20.
- After you boot the upgraded system disk and log in, you can obtain information about individual system files by entering HELP SYSTEM_FILES at the dollar sign prompt ($).

NOTE Unless you have specific reasons to do otherwise, HP recommends that you accept the defaults and install all OpenVMS options. OpenVMS and layered products have various dependencies on many of these options. Even if you think you do not need certain options, some OpenVMS or layered product operations might not work correctly if other OpenVMS options are not installed.

For a complete list of components included with the OpenVMS Alpha Version 7.3-2 operating system, see "List of Components Included with the Operating System" on page 51.

Final Upgrade Procedure Messages

When you have answered all the prompts and selected the components you want installed, the system allows you to review your selections (and make changes if necessary) and then displays messages about the following:

- Notification that DECwindows Motif for OpenVMS, DECnet-Plus for OpenVMS, DECnet Phase IV for OpenVMS, or TCP/IP Services for OpenVMS has been upgraded (or installed) on your system.

- Notification that the upgrade has been completed.
- Information about running AUTOGEN.
- The menu.

The following is a sample display.

NOTE If you perform two installations at the same time to systems connected via MEMORY CHANNEL, you might see a message similar to the following every 5 seconds:

```
%PMA0 CPU00: 30-MAY-2003 14:58:40 Remote System Conflicts with
Known System - REMOTE NODE
%PMA0 CPU00: 30-MAY-2003 14:58:45 Remote System Conflicts with
Known System - REMOTE NODE
```

Disregard the message. The installation or upgrade will proceed normally and the messages will not be present when the system reboots with its real node name.

```
Do you want to review the options? [NO] NO

Execution phase starting ...

The following products will be installed to destinations:
    CPQ AXPVMS CDSA V2.0                  DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS DECNET_OSI V7.3-2          DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS DWMOTIF V1.3-1             DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS OPENVMS V7.3-2             DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS VMS V7.3-2                 DISK$ALPHASYS:[VMS$COMMON.]
    HP AXPVMS KERBEROS V2.0               DISK$ALPHASYS:[VMS$COMMON.]

The following products will be removed from destinations:
    DEC AXPVMS CDSA V1.0-2
    DEC AXPVMS DECNET_PHASE_IV V7.3-1     DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS DWMOTIF V1.2-6             DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS OPENVMS V7.3-1             DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS VMS V7.3-1                 DISK$ALPHASYS:[VMS$COMMON.]
    HP AXPVMS KERBEROS V1.0               DISK$ALPHASYS:[VMS$COMMON.]

Portion done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%

**** DECwindows Motif application and run-time support files DETECTED
****  **** DECwindows device support files DETECTED ****
...100%

The following products have been installed:
    CPQ AXPVMS CDSA V2.0                  Layered Product
    DEC AXPVMS DECNET_OSI V7.3-2          Layered Product
    DEC AXPVMS DWMOTIF V1.3-1             Layered Product
    DEC AXPVMS OPENVMS V7.3-2             Platform (product suite)
    DEC AXPVMS VMS V7.3-2                 Operating System
    HP AXPVMS KERBEROS V2.0               Layered Product
The following products have been removed:
    DEC AXPVMS CDSA V1.02                 Layered Product
    DEC AXPVMS DECNET_PHASE_IV V7.3-1     Layered Product
    DEC AXPVMS DWMOTIF V1.2-6             Layered Product
    DEC AXPVMS OPENVMS V7.3-1             Platform (product suite)
    DEC AXPVMS VMS V7.3-1                 Operating System
    HP AXPVMS KERBEROS V1.0               Transition (registration)

DEC AXPVMS OPENVMS X7.3-9NA: OPENVMS and related products Platform

    HP AXPVMS KERBEROS V2.0
```

```
      Configure the OpenVMS Kerberos clients & servers

      If Kerberos will be in use on this system
      and a current Kerberos configuration will
      not be used, please take the time to run
      the following command after the installation
      has completed (and after rebooting the system
      if this is an OpenVMS Installation or Upgrade):

          @SYS$STARTUP:KRB$CONFIGURE.COM

      After configuration, two system files need to
      be modified. The following line should be
      added to SYS$MANAGER:SYSTARTUP.COM

             $ @SYS$STARTUP:KRB$STARTUP

      The following line must be added to
      SYS$MANAGER:SYLOGIN.COM


            $ @SYS$MANAGER:KRB$SYMBOLS

      The Kerberos 5 V2.0 documentation has been
      provided as it was received from MIT.  This
      documentation may differ slightly from the
      OpenVMS Kerberos implementation as it describes
      the Kerberos implementation in a Unix environment.
      The documents are:

          KRB$ROOT:[DOC]IMPLEMENT.PDF
          KRB$ROOT:[DOC]LIBRARY.PDF
          KRB$ROOT:[DOC]ADMIN-GUIDE.PS
          KRB$ROOT:[DOC]INSTALL-GUIDE.PS
          KRB$ROOT:[DOC]KRB425-GUIDE.PS
          KRB$ROOT:[DOC]USER-GUIDE.PS

    DEC AXPVMS DWMOTIF FV1.3-1: DECwindows Motif

      System reboot is required.

      If using a language variant, reboot after upgrade of language variant.

      Installation Verification Procedure can be run after reboot.

    The upgrade is now complete.

    When the newly upgraded system is first booted, a special
    startup procedure will be run.  This procedure will:

        o  Run AUTOGEN to set system parameters.
        o  Reboot the system with the newly set parameters.

    You may shut down now or continue with other operations.


  Process AXPVMS_INSTALL logged out at 12-MAY-2003 15:34:22.47

Press Return to continue...

    ************************************************************

    You can install or upgrade the OpenVMS Alpha operating system
```

```
or you can install or upgrade layered products that are included
on the OpenVMS Alpha operating system CD-ROM.

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

Please choose one of the following:

    1)  Upgrade, install or reconfigure OpenVMS Alpha Version 7.3-2
    2)  Display products and patches that this procedure can install
    3)  Install or upgrade layered products and patches
    4)  Show installed products
    5)  Reconfigure installed products
    6)  Remove installed products
    7)  Execute DCL commands and procedures
    8)  Shut down this system
```

Installing Layered Products or Shutting Down the System

If you want to install layered products, you can use the menu system included on the operating system CD-ROM, as explained in "Using the Install or Upgrade Layered Products Option (3)" on page 21. For layered products requiring VMSINSTAL, the section "Alternate Procedure" on page 72 gives an alternate procedure.

If you do not want to install layered products or perform any other operations prior to booting the upgraded disk, do the following:

1. Shut down the system by choosing the shutdown option (8) from the menu.
2. Go to "What to Do After the Shutdown" on page 111.

What to Do After the Shutdown

After the system shuts down, you need to perform certain tasks, depending on the configuration of your system and the type of upgrade you are performing. See the appropriate section.

NOTE When you boot your system following the shutdown (regardless of the type of upgrade and configuration), note that your system will automatically run AUTOGEN and boot again.

Standalone Upgrade

If you are upgrading a standalone system:

1. Reboot the system.
2. Log in to the system.
3. Go to Chapter 8 to perform additional postupgrade procedures.

Concurrent OpenVMS Cluster Upgrade

If you are performing a concurrent upgrade in an OpenVMS Cluster environment, refer to the following table:

IF ...	THEN ...
you have one system disk,	1. reboot each system that uses the upgraded disk. 2. go to Chapter 8.
you have multiple system disks,	1. reboot the upgraded system. 2. repeat the upgrade process for each system disk in the cluster, beginning with the preupgrade tasks described in Chapter 5. 3. reboot each system in the cluster. 4. log in to an upgraded system. 5. go to Chapter 8 to perform additional postupgrade procedures.

Rolling OpenVMS Cluster Upgrade

If you are performing a rolling upgrade in an OpenVMS Cluster environment, do the following:

1. Log in to the upgraded system.
2. Go to Chapter 8 to perform additional postupgrade procedures. (You will reboot the other systems that boot from the upgraded disk after you complete those tasks.)

8 After Upgrading the OpenVMS Alpha Operating System

After you upgrade the OpenVMS Alpha operating system, you need to perform several important tasks before you can use the system. The next section includes a checklist that you can use to make sure you perform all the postupgrade tasks described in this chapter.

Postupgrade Checklist

Use the checklist in Table 8-1 to ensure that you perform all necessary postupgrade tasks.

Table 8-1 Postupgrade Checklist

	Task	Section Title
❑	If you upgraded a disk in a volume shadowing environment, reform the shadow set.	"Reforming the Shadow Set" on page 114
❑	Register any new OpenVMS Alpha or layered product licenses, as required.	"Registering New Licenses" on page 115
❑	Run AUTOGEN to tune the newly upgraded operating system.	"Running AUTOGEN to Tune the Newly Upgraded System" on page 115
❑	Modify the system parameters file if necessary.	"Modifying the System Parameters File" on page 116
❑	Examine your command procedures and check against any new templates.	"Examining Your Command Procedures" on page 118
❑	Initialize CDSA.	"Initializing CDSA" on page 118
❑	Configure Kerberos.	"Configuring Kerberos" on page 119
❑	Run UETP to test the system.	"Testing the System with UETP" on page 120
❑	Expand the system libraries using LIBDECOMP.COM.	"Expanding the System Libraries" on page 120
❑	Add and remove operating system files.	"Adding and Removing Operating System Files" on page 120
❑	Prepare your OpenVMS Alpha system and your PC to run OpenVMS Management Station.	"Preparing to Use OpenVMS Management Station" on page 122
❑	Install layered products.	"Installing Layered Products" on page 123
❑	Install OpenVMS Debugger clients on a PC.	"Installing OpenVMS Debugger Clients on a PC" on page 124

Table 8-1 Postupgrade Checklist (Continued)

	Task	Section Title
❑	Back up your customized system disk.	"Backing Up the Customized System Disk" on page 125
❑	Reboot cluster members (if applicable).	"Rebooting Cluster Members" on page 126
❑	Tune BAP system parameters.	"Tuning BAP System Parameters" on page 126
❑	Run AUTOGEN to tune your operating system.	"Running AUTOGEN to Tune the System" on page 128

Reforming the Shadow Set

If you have upgraded a disk in a volume shadowing environment, you must now reform the shadow set as follows:

1. Enter the SHOW DEVICE D command to display a list of disks available on your system. For example:

```
$ SHOW DEVICE D
Device                 Device     Error    Volume       Free  Trans Mnt
 Name                  Status     Count     Label      Blocks Count Cnt
$11$DKB100:   (NODE1)  Online         0
$11$DKB200:   (NODE1)  Mounted        0      ALPHA070   918150    1  31
```

2. Enter a command in the following format:

   MOUNT/CONFIRM/SYSTEM DSA*n*: /SHADOW=(*upgraded-disk:*,*new-member:*) *volume-label*

   Note the following conventions:

   - DSA*n*: is the virtual unit name of the shadow set.
   - *upgraded-disk:* is the name of the shadowed system disk you just upgraded.
   - *new-member:* is the name of the disk you want to add as a member of the shadow set.
   - *volume-label* is the volume label of the shadowed system disk you just upgraded.

NOTE When you reform the shadow set, the contents of the new member are replaced by the contents of the disk you upgraded. Specifying the /CONFIRM qualifier reminds you of this fact, confirming that you are specifying the correct name of a disk that either is blank or contains files you no longer need.

Example

```
$ MOUNT/CONFIRM/SYSTEM DSA54: /SHADOW=($11$DKB200:,$11$DKB100:) ALPHA0732

%MOUNT-F-SHDWCOPYREQ, shadow copy required
Virtual Unit - DSA54 Volume label ALPHA0732
     Member                    Volume label Owner UIC
     $11$DKB100:   (NODE1)     SCRATCH      [100,100]
Allow FULL shadow copy on the above member(s)? [N]: YES
```

Registering New Licenses

If you need to register new OpenVMS Alpha or layered product licenses, you can do so by entering the following command:

```
$ @SYS$UPDATE:VMSLICENSE
```

You can also use the LICENSE REGISTER command.

For information about registering licenses, see the following:

- "Registering Licenses" on page 46 in Chapter 3
- Appendix C
- The *OpenVMS License Management Utility Manual*

Running AUTOGEN to Tune the Newly Upgraded System

When you upgrade the OpenVMS Alpha operating system, the system executes the AUTOGEN.COM procedure to set the values of system parameters and the sizes of the page, swap, and dump files according to the system configuration. As a post-uprade procedure, you should run the AUTOGEN.COM procedure again to properly tune the system.

When AUTOGEN runs, it writes informational and, if necessary, warning messages to the file SYS$SYSTEM:AGEN$PARAMS.REPORT. You should examine the contents of this report file.

Run AUTOGEN as follows:

1. After 24 hours of operation, run AUTOGEN in feedback mode, examine the AGEN$PARAMS.REPORT file, and reboot the system.

   To view AGEN$PARAMS.REPORT on your screen, enter the following command and press the Return key:

   ```
   $ TYPE SYS$SYSTEM:AGEN$PARAMS.REPORT
   ```

   You can also print this file or examine it using the EDIT/READ_ONLY command.

   If the report includes a message similar to the following, you might need to modify the size of the page, swap, or dump file:

   ```
   %AUTOGEN-W-DSKSPC, The disk on which DKA0:[SYS0.SYSEXE]PAGEFILE.SYS
            resides would be over 95% full if it were modified to hold 20000
            blocks.
   ```

   For more information on AGEN$PARAMS.REPORT, see the *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems*.

2. Run AUTOGEN again in feedback mode two workdays later, and then reboot the system. (For information about the importance of having a current AGEN$FEEDBACK.DAT file, see "Ensuring You Have a Recent FEEDBACK.DAT File" on page 86.)

3. HP recommends that you run AUTOGEN from the SAVPARAMS phase through the TESTFILES phase weekly thereafter until the system stabilizes (that is, AUTOGEN finds nothing that needs to be adjusted). Make sure you run AUTOGEN when your system is running under a typical work load. Examine AGEN$PARAMS.REPORT to determine the need for additional changes.

IMPORTANT If you invoke AUTOGEN without specifying the execution-mode parameter (FEEDBACK, NOFEEDBACK, or CHECK_FEEDBACK), AUTOGEN uses the feedback information in its calculations, but if the feedback information reflects system uptime of less than 24 hours, or if the feedback information is more than 30 days old, AUTOGEN terminates execution. AUTOGEN does not set the parameter settings: this helps prevent you from setting inexpedient values. If you reboot the system, you will see the values are unchanged.

If you specify CHECK_FEEDBACK, and AUTOGEN determines the feedback is suspect, then AUTOGEN ignores the feedback when computing parameter values. It sets the parameter values if you specify the final execution phase as SETPARAMS, SHUTDOWN, or REBOOT. If you wrongly assumed the feedback was valid, the parameter settings might vary significantly from your expectations.

For more information on running AUTOGEN, see the chapter entitled "Managing System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

Modifying the System Parameters File

Review the file SYS$SYSTEM:MODPARAMS.DAT. The upgrade procedure created a new version of this file. The old version is named SYS$SYSTEM:MODPARAMS.DAT_OLD. The new MODPARAMS.DAT file contains all the parameters in the old file, plus various parameters that the upgrade procedure added to ensure that all necessary system parameters are properly propagated from the prior version of OpenVMS. The upgrade procedure also adds comment lines to explain the source of the parameters in each section of the new MODPARAMS.DAT file.

Note that the old MODPARAMS.DAT is included in the new MODPARAMS.DAT each time an upgrade is performed. Because of this, if MODPARAMS.DAT is not reviewed and cleaned up after each upgrade, it might eventually contain many levels of duplicated parameters. For this reason, you should review MODPARAMS.DAT after each upgrade. This allows you to eliminate any duplication. You can also take this opportunity to modify any parameters, if necessary.

Based on your examination of AGEN$PARAMS.REPORT, you might need to modify parameter values in MODPARAMS.DAT. If so, note the following:

- In general, you should allow AUTOGEN to calculate system parameters. You can hardcode values (such as GBLPAGES=*value*), but doing so overrides AUTOGEN and might not allow it to set an optimal value based on observed usage.
- Whenever possible, use MIN_parameter values (such as MIN_GBLPAGES) to set a minimum value. AUTOGEN will use this value as a starting point and increase it if necessary. It will also adjust related parameters, unless they are hardcoded, in which case information will be provided in the AGEN$PARAMS.REPORT file. Use MAX_parameter values to set a maximum value when it is necessary to limit a parameter to a known maximum value.
- Enter numeric values as integers, without commas (for example, 10000). Enter alphabetic characters in lower or uppercase.

- HP recommends that you include comments in the MODPARAMS.DAT file indicating who changed the value, when it was done, and why it was done. An exclamation point serves as a comment starter and can appear anywhere on a line. The following is an example illustrating the modifications recommended in the preceding bulleted items:

```
! the following changes made by K.Newcomb on 9/20/03
!
SWAPFILE=0                    ! don't re-size the SWAPFILE on AUTOGEN runs
MIN_gblsections=750           ! required for DECwindows MOTIF
MIN_NPAGEDYN=2750000            ! set npagedyn to a min of 2.75 million
```

For more information about the MODPARAMS.DAT file and about using AUTOGEN in general, see the chapter entitled "Managing System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

The following sections are examples of instances where you need to modify parameters in MODPARAMS.DAT.

System File Sizes

AUTOGEN sets the following files at sizes appropriate for your system:

- [SYSEXE]SYSDUMP.DMP
- [SYSEXE]PAGEFILE.SYS
- [SYSEXE]SWAPFILE.SYS

If you have special work loads or configurations, you can specify different sizes for these files by performing the following steps:

1. Log in to the SYSTEM account.
2. Enter the following command:

   ```
   $ @SYS$UPDATE:AUTOGEN SAVPARAMS TESTFILES
   ```

3. If the file sizes displayed need to be adjusted, add symbols to the MODPARAMS.DAT file (described in detail in the chapter entitled "Managing System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*) and repeat step 2 until you are satisfied with the file sizes.
4. When you are satisfied with the file sizes, enter the following command to ensure that the modified system files are installed when the system is rebooted:

   ```
   $ @SYS$UPDATE:AUTOGEN GENPARAMS REBOOT
   ```

OpenVMS Cluster Parameters

If you are upgrading an OpenVMS Cluster system, note the following:

- The upgrade procedure creates a new MODPARAMS.DAT for each system root on your system disk. Normally, there is one root for each Alpha computer that boots from the system disk. You must review each of these MODPARAMS.DAT files.

  The MODPARAMS.DAT file for the system on which you are running is located in SYS$SYSTEM:MODPARAMS.DAT. The MODPARAMS.DAT files for other roots on the same system disk can be found in SYS$SYSDEVICE:[SYS*x*.SYSEXE]MODPARAMS.DAT, where *x* represents the root number; for example, SYS0, SYS1, SYS2, and so forth. (Valid root numbers may include hexadecimal digits -- SYSA, SYSB, and so forth.)

- Be sure the EXPECTED_VOTES value is correct. That value is the sum of all VOTES in the cluster. For example, if there are five Alpha computers in the cluster and each has one VOTE, the value is 5.
- As you reboot each Alpha computer, AUTOGEN runs automatically. The cluster forms when you have booted enough computers to attain cluster quorum.

Examining Your Command Procedures

The upgrade procedure retains the site-specific versions of the following files located in the [VMS$COMMON] directory:

```
[SYSMGR]LAT$SYSTARTUP.COM
[SYSMGR]LOGIN.COM
[SYSMGR]SYCONFIG.COM
[SYSMGR]SYLOGICALS.COM
[SYSMGR]SYLOGIN.COM
[SYSMGR]SYPAGSWPFILES.COM
[SYSMGR]SYSECURITY.COM
[SYSMGR]SYSHUTDWN.COM
[SYSMGR]SYSTARTUP_VMS.COM
[SYSMGR]TFF$SYSTARTUP.COM
[SYSMGR]WELCOME.TXT
[SYS$STARTUP]ESS$LAST_STARTUP.DAT
```

The upgrade procedure might provide new templates for some of these files with the .TEMPLATE extension. The new templates might include features that are not in your site-specific files. Check the templates against your site-specific files and edit your files as necessary.

Initializing CDSA

The Common Data Security Architecture (CDSA) is automatically installed with the operating system. Starting with Version 2.0 of CDSA (the version supplied with OpenVMS Alpha Version 7.3-2), the requirement to increase the FILLM process quota has been eliminated. However, you cannot use CDSA until it has been initialized. After an upgrade, you must initialize CDSA even if it has been initialized previously. To set up and initialize CDSA, execute the following command. You must have SYSPRV and CMKRNL privileges to do this.

```
$ @SYS$STARTUP:CDSA$UPGRADE
```

NOTE Do not attempt to remove CDSA from your system. The PRODUCT REMOVE command is not supported for CDSA even though there appears to be an option to remove CDSA. CDSA is installed with the operating system and is tightly bound with it. Any attempt to remove it will not work cleanly, and could create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product CPQ AXPVMS CDSA V2.0 is referenced
   by DEC AXPVMS OPENVMS V7.3-2
 -PCSI-E-HRDRF1, the two products are tightly bound by this
```

```
  software dependency
-PCSI-E-HRDF2, if you override the recommendation to terminate the operation,
-PCSI-E-HRDF3, the referenced product will be removed, but the referencing
-PCSI-E-HRDF4, product may no longer function correctly; please review
-PCSI-E-HRDF5, dependency requirements for the referencing product
Terminating is strongly recommended. Do you want to terminate? [YES]
```

For more information about CDSA, see *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture*.

Configuring Kerberos

The Kerberos OpenVMS Security Client, which is based on MIT Kerberos, is automatically installed with the operating system. Although Kerberos installs automatically, use of Kerberos is not required. If you do not plan to use Kerberos or any products that depend upon Kerberos, you can skip to the next section.

To configure Kerberos, perform the following steps from a privileged OpenVMS user account (for example, SYSTEM).

1. Run the following command procedure to configure the Kerberos clients and servers:

   ```
   $ @SYS$STARTUP:KRB$CONFIGURE.COM
   ```

2. Add the following line to your SYLOGIN command procedure, or to the LOGIN.COM of each user who will use Kerberos:

   ```
   $ @SYS$MANAGER:KRB$SYMBOLS
   ```

3. Insert the following line into SYS$MANAGER:SYSTARTUP_VMS.COM. This line must be entered *after* the startup command for HP TCP/IP Services for OpenVMS. (If you start HP TCP/IP Services for OpenVMS as a batch job, make sure that TCP/IP has started before you start Kerberos.)

   ```
   $ @SYS$STARTUP:KRB$STARTUP.COM
   ```

For additional setup and configuration information, see the *HP Open Source Security for OpenVMS, Volume 3: Kerberos*. This document contains links to the MIT Kerberos documentation, and is available from the OpenVMS Alpha Version 7.3-2 documentation CD-ROM.

NOTE Do not attempt to remove Kerberos from your system. The PRODUCT REMOVE command is not supported for Kerberos even though there appears to be an option to remove Kerberos. Kerberos is installed with the operating system and is tightly bound with it. Any attempt to remove it will not work cleanly, and could create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP AXPVMS Kerberos V2.0 is referenced
   by DEC AXPVMS OPENVMS V7.3-2
 -PCSI-E-HRDRF1, the two products are tightly bound by this
   software dependency
 -PCSI-E-HRDF2, if you override the recommendation to terminate the operation,
 -PCSI-E-HRDF3, the referenced product will be removed, but the referencing
 -PCSI-E-HRDF4, product may no longer function correctly; please review
 -PCSI-E-HRDF5, dependency requirements for the referencing product
 Terminating is strongly recommended. Do you want to terminate? [YES]
```

Testing the System with UETP

The User Environment Test Package (UETP) is a software package designed to test whether the OpenVMS Alpha operating sytem is installed correctly. As part of the postupgrade procedure, HP recommends that you run UETP to verify the upgrade.

For complete information about using UETP, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

Expanding the System Libraries

Some of the larger system libraries ship with the OpenVMS operating system in a data-reduced (compressed) format. Expanding (that is, decompressing) these libraries gives the system faster access to them, but also consumes more disk space. See "Expanding the System Libraries" on page 67 and Table 4-2, "Reduced and Expanded Library Sizes," for more information about the libraries that ship in data-reduced format on OpenVMS Alpha systems. For complete details about expanding and reducing system library files and using LIBDECOMP.COM, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

Adding and Removing Operating System Files

If you decide after the upgrade to change which OpenVMS Alpha operating system files you want installed on your system, you can use the menu system contained on the OpenVMS Alpha operating system CD-ROM to add or remove files.

Note that you can obtain information about individual system files by entering HELP SYSTEM_FILES at the dollar sign prompt ($).

The procedure is as follows:

1. Mount and boot the OpenVMS Alpha operating system CD-ROM.
2. Choose option 1 from the menu.
3. Choose the PRESERVE option.
4. Enter the name of the device that contains the system disk and answer the questions.
5. After you answer the question "Do you want detailed descriptions?," information regarding reconfiguring or reinstalling is displayed. Read the instructions, then choose the desired entry from the menu of reconfigure/reinstall options.

The following is a sample reconfigure operation:

```
Please choose one of the following:

    1)  Upgrade, install or reconfigure OpenVMS Alpha Version 7.3-2
    2)  Display products and patches that this procedure can install
    3)  Install or upgrade layered products and patches
```

```
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Execute DCL commands and procedures
        8)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?) 1

.
. {Information that is documented elsewhere is omitted here.}
.

Version 7.3-2 of the OpenVMS operating system is already installed
    on DKB300:.

    Please choose one of the following:

        1)  Reconfigure the OpenVMS platform.
        2)  Reconfigure the OpenVMS operating system.
        3)  Reinstall the OpenVMS operating system.
        4)  Return to the Main Menu (abort the upgrade/installation).

        Enter a "?" for more information.


Enter choice or ? for help: (1/2/3/4/?) ?

      o Reconfigure the OpenVMS platform.

        This action will allow you to change your selections of which
        of the windowing and network products you included with your
        OpenVMS operating system installation.

      o Reconfigure the OpenVMS operating system.

        This action will allow you to change your choices about which
        options you included for the OpenVMS operating system.

      o Reinstall the OpenVMS operating system.

        This action will cause ALL operating system  files to be replaced.
        You can also change your choices about which options you included
        for the OpenVMS operating system.

        Reinstall will take longer than Reconfigure.  Reinstall may be
        appropriate if you suspect that files in the operating system,
        or in the windowing and network products have become corrupted.

Press Return to continue...

    If you want to reinstall any of the windowing and network products,
    choose "Install or upgrade layered products and patches" (option 3)
    from the main menu.

    If you want to change your choices about which options you included
    for any of the windowing and network products, choose "Reconfigure
    installed products" (option 5) from the main menu.

Press Return to continue...

    Please choose one of the following:

        1)  Reconfigure the OpenVMS platform.
        2)  Reconfigure the OpenVMS operating system.
```

```
        3)  Reinstall the OpenVMS operating system.
        4)  Return to the Main Menu (abort the upgrade/installation).

        Enter a "?" for more information.


Enter choice or ? for help: (1/2/3/4/?) 2

    The following product has been selected:
        DEC AXPVMS VMS V7.3-2             Operating System


    Configuration phase starting ...

    You will be asked to choose options, if any, for each selected
    product and for any products that may be installed to satisfy
    software dependency requirements.

    DEC AXPVMS VMS V7.3-2: OpenVMS Operating System

        COPYRIGHT (c) 7-MAY-2003
        Hewlett-Packard Development Company, L.P.

    Do you want the defaults for all options? [YES]
```

Answer NO to this question, and select the options you want, as described in "Selecting Components" on page 50. A list of components is provided in "List of Components Included with the Operating System" on page 51. After you respond to the prompts, the display continues and the installation procedure completes as described in "Completing the Procedure" on page 52. The following is a continuation of the sample display:

```
    Do you want to review the options? [NO]

Execution phase starting ...

The following product will be reconfigured:
    DEC AXPVMS VMS V7.3-2
Portion done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%..100%
The following product has been reconfigured:
    DEC AXPVMS VMS V7.3-2
.
.
.
```

For detailed instructions on how to remove the OpenVMS Alpha operating system from your disk, see Appendix E.

Preparing to Use OpenVMS Management Station

If you installed the OpenVMS Management Station software on your system (either by accepting all default values or by selecting the component manually during the upgrade procedure), you must perform several tasks on your OpenVMS Alpha system and your PC before you can use OpenVMS Management Station. These tasks include the following:

- Editing system files
- Starting OpenVMS Management Station on other nodes

- Verifying that you have the proper memory, disk space, media, and the required software to install and run OpenVMS Management Station on your PC
- Installing the client software on your PC

For complete information about preparing your OpenVMS system and your PC to run the OpenVMS Management Station server and client software, see Appendix D.

Installing Layered Products

Except in certain instances, you should not have to reinstall layered products that you had on your system prior to the upgrade. However, if you need to install layered products, you can use the menu system included on the operating system CD-ROM to install certain layered products with the POLYCENTER Software Installation utility. If you did not install those layered products previously during the installation procedure, you can do so using the following procedure. To install layered products that require VMSINSTAL, see "Alternate Procedure" on page 124.

NOTE To use this procedure, the target system must have the exact same version of the OpenVMS Alpha operating system as the CD-ROM. If you need to install layered products on a target system that has a *different* version of the operating system, use the alternate procedure described in "Alternate Procedure" on page 124.

1. Shut down the system (described in Appendix A).
2. Boot the operating system CD-ROM (locally or from the InfoServer).
3. Choose option 2 from the menu to view which layered products can be installed using the POLYCENTER Software Installation utility.
4. Choose option 3 from the menu to install the layered products.
5. Shut down the system by selecting option 8 from the menu.
6. Boot from the system disk.

If the layered product that you want to install is not listed in the display, see the documentation you received with that layered product for installation information.

For additional information about installing layered products, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

Be sure you back up the system disk after you install all your layered products.

NOTE HP does not support PRODUCT INSTALL and other PRODUCT commands from the DCL option on the operating system CD-ROM. Not all products can be installed when booted from the CD-ROM. Those that can be installed in this manner require special considerations. If products do not appear in the layered products menu as described in the preceding steps in this section, use the alternative procedure described below, or refer to the installation documentation for the specific product.

Alternate Procedure

The following is another method for installing layered products from the OpenVMS Alpha operating system CD-ROM:

1. From your running OpenVMS system (the target system disk), mount the OpenVMS Alpha operating system CD-ROM.

   ```
   $ MOUNT/OVERRIDE=IDENTIFICATION DKA400
   ```

2. Locate the directories and files containing the available layered products by entering the following command (where, in the example, DKA400: is the device name of the CD-ROM):

   ```
   $ DIRECTORY /NOHEAD/NOTRAIL DKA400:[*.KIT]
   ```

   You can use the PRODUCT FIND command to locate kits that are installed using the POLYCENTER Software Installation utility. For example:

   ```
   $ PRODUCT FIND * /SOURCE=DKA400:[*.KIT]
   ```

3. To install layered products that require VMSINSTAL (indicated in the directories by save-set file names with file types of .A, .B, and so on), enter the @SYS$UPDATE:VMSINSTAL command and then specify the CD-ROM device and directory. For example:

   ```
   $ @SYS$UPDATE:VMSINSTAL
   * Where will the distribution volumes be mounted: DKA400:[DIAA032.KIT]
   ```

4. To install layered products that require the POLYCENTER Software Installation utility (indicated in the directories by file names with file types of .PCSI or .PCSI$DESCRIPTION), use the PRODUCT INSTALL command to specify the CD-ROM device name and directory. The following is an example of the PRODUCT INSTALL command:

   ```
   $ PRODUCT INSTALL FORTRAN /SOURCE=DKB400:[ALPHA_FORT075.KIT]
   ```

Installing OpenVMS Debugger Clients on a PC

The OpenVMS Debugger Version 7.3-2 includes a client/server interface. The debug server runs on the OpenVMS operating system; there are debug clients that run on OpenVMS, Microsoft Windows 95, Windows 98, Windows 2000, Windows XP, and Microsoft Windows NT. There is no separate installation procedure for the components that run on the OpenVMS operating system. They are installed when you install the operating system. This section describes the procedure for installing debug clients on a PC.

If you have Windows NT, you might need to install a COM update kit (Windows XP, Windows 2000, Windows 98, and Windows 95 do not require such a kit); choose one of the following options:

CPU	Operating System	Client Kit
Alpha	Windows NT	40COMAXP.EXE
Intel	Windows NT	40COMUPD.EXE

You must also install the debug client kit:

CPU	Operating System	Client Kit
Alpha	Windows NT	DEBUGALPHA011.EXE
Intel	Windows 95, 98, Me, NT, 2000, XP	DEBUGX86011.EXE

The client kits are self-extracting .EXE files. To make these clients available to PC users, copy these files from the distribution media to a suitable PATHWORKS share, FTP server, or other device available to the PC. (See the *Guide to OpenVMS Alpha Version 7.3-2 CD-ROMs* for the directory where these kits ship on the media.)

After the appropriate executable file has been transferred to the PC, you can run the file to install the debug client on the PC. The InstallShield installation procedure guides you through the installation.

By default, the debug client is installed in the \Programs\OpenVMS Debugger directory. You can also click on the Browse button to select an alternate directory.

Choose one of the following options:

Install Option	Details
Typical	Debug Client and the *OpenVMS Debugger Manual* in HTML format
Compact	Debug Client only
Custom	Choice of Debug Client and/or the *OpenVMS Debugger Manual* in HTML format

The Typical installation option creates an OpenVMS Debugger program folder that contains shortcuts to the following items:

- Debug client
- Debug client Help file
- The *OpenVMS Debugger Manual* in HTML format
- A Readme file
- An Uninstall procedure

For information about using the OpenVMS Debugger, see the *OpenVMS Debugger Manual*.

Backing Up the Customized System Disk

After you have upgraded and customized the OpenVMS Alpha operating system to your satisfaction and installed layered products, protect your work by making a backup copy of the system disk.

To back up the system disk:

1. Shut down the system (described in Appendix A).
2. Boot the operating system CD-ROM (locally or from the InfoServer, as described in "Booting the Operating System CD-ROM" on page 35).
3. Use the menu system to enter the DCL environment (option 7).
4. Mount the system disk and the target device on which you will make the backup copy. For example, if your system disk is on DKA0: and the target device is on DKA100:, you might use the following commands. The /OVERRIDE qualifier used in this example allows you to mount the system disk without typing its volume label. The /FOREIGN qualifier is required for the target disk when using the BACKUP /IMAGE command.

   ```
   $ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
   $ MOUNT /FOREIGN DKA100:
   ```

5. Enter the BACKUP command to back up the system disk to the target device. For example, if your system disk is on DKA0: and your target disk is on DKA100:, you might use the following command:

   ```
   $ BACKUP /IMAGE DKA0: DKA100:
   ```

   The /IMAGE qualifier causes the backup to produce a functionally equivalent copy of the system disk, which will also be rebootable.
6. Log out from the DCL environment.
7. Shut down the system by selecting option 8 from the menu.
8. Boot from either the original system disk or from the backup copy.

For complete information about backup operations, including a description of an alternate method that does not require booting from the operating system CD-ROM and that allows you to back up a shadowed disk without disabling the shadow set, see Appendix B.

Rebooting Cluster Members

If you are performing a rolling upgrade in an OpenVMS Cluster environment and have completed all the postupgrade tasks required for your upgraded system disk, reboot each system that boots from that system disk.

For more information about booting your system, see Appendix A.

Tuning BAP System Parameters

OpenVMS Alpha Version 7.1 and later contains system parameters that control the operation of bus-addressable pool (BAP).

The CIPCA, CIXCD, KFMSB, and Qlogic 1020ISP adapters are some of the adapters that use bus-addressable pool to improve performance. BAP is a non-paged dynamic, physical-address-filtered memory pool used to overcome I/O bus and 32-bit adapter physical addressing limits.

The following table lists the system parameters that control BAP operation along with their default values:

System Parameter	Default Value
NPAG_BAP_MIN	0
NPAG_BAP_MAX	0
NPAG_BAP_MIN_PA	0
NPAG_BAP_MAX_PA	-1

The default values of these parameters allow the system to boot with any configuration. When AUTOGEN is run on a configured system, it resets these parameters to values that should enhance performance for the current system configuration.

If the system fails to boot after an installation, upgrade, or configuration change, and displays a message that refers to incorrect BAP parameters, HP recommends that you perform the following steps:

1. Reset the BAP parameters to the default values.
2. Reboot the system.
3. Allow the installation procedure to run AUTOGEN, or manually run AUTOGEN yourself.

A typical AUTOGEN with FEEDBACK command to set these parameters follows:

```
$ @SYS$UPDATE:AUTOGEN SAVPARAMS SETPARAMS FEEDBACK
```

NOTE These parameters are critical. HP recommends that you run AUTOGEN as described to ensure that they are set correctly.

If you prefer not to use this command because you want to adjust only the BAP parameters settings, use the following procedure:

1. Boot the system using the default BAP parameter values.
2. Manually run SYS$SYSTEM:AGEN$FEEDBACK.EXE:

   ```
   $ RUN SYS$SYSTEM:AGEN$FEEDBACK.EXE
   ```

3. Search SYS$SYSTEM:AGEN$FEEDBACK.DAT for the BAP_* system parameter values:

   ```
   $ SEARCH SYS$SYSTEM:AGEN$FEEDBACK.DAT "BAP_"
   ```

4. Run SYSGEN to set the following system parameters with the BAP values you obtained in Step 3:

AGEN$FEEDBACK Data	System Parameter	Units
BAP_MIN	NPAG_BAP_MIN	bytes
BAP_MAX	NPAG_BAP_MAX	bytes
BAP_MIN_PA	NPAG_BAP_MIN_PA	Mbyte[1]
BAP_MAX_PA	NPAG_BAP_MAX_PA	Mbytes[1]

[1] On OpenVMS Alpha systems prior to Version 7.2, the value of this parameter is specified in bytes.

The BAP allocation amount (specified by BAP_MIN and BAP_MAX) depends on the adapter type, the number of adapters, and the version of the operating system. The physical address range (specified by BAP_MIN_PA and BAP_MAX_PA) depends on the adapter type and the way the Galaxy logical partitions, if any, are defined.

NOTE If you manually set parameters NPAG_BAP_MIN_PA and NPAG_BAP_MAX_PA, be sure to specify the value for each parameter in the correct units (bytes or megabytes) for your operating system version.

IMPORTANT Run AUTOGEN immediately after you make changes to adapters. For more information, see "Running AUTOGEN to Tune the System" on page 128

Running AUTOGEN to Tune the System

Although AUTOGEN runs automatically at the end of the upgrade procedure, HP recommends that you run AUTOGEN periodically after you perform an upgrade. In addition, run AUTOGEN immediately after you make hardware changes, such as installations or changes to memory, the CPU, and adapter and network cards, or changes made to the Galaxy configuration. Following this advice is a critical first step toward helping enhance system performance and uptime. Each time you run AUTOGEN, be sure to reboot your system so that usage-based changes can be incorporated into the system's parameters file.

If you have feedback for your system, HP recommends that you run AUTOGEN weekly through the SAVPARAMS and TESTFILES phases. Examine AGEN$PARAMS.REPORT to determine the need for additional changes. AUTOGEN sets the values of system parameters and the sizes of the page and swap files according to the system's work load. If the reports recommend a significant change, then run AUTOGEN through the SETPARAMS and REBOOT phases. (For information about the importance of having a current AGEN$FEEDBACK.DAT file, and a cautionary note about running AUTOGEN, see "Ensuring You Have a Recent FEEDBACK.DAT File" on page 86.)

Hardcoded values in MODPARAMS.DAT should not hinder AUTOGEN's ability to calculate feedback parameters. AUTOGEN generally does not reduce the value of parameters that allocate resources; it considers current parameter values to be minimum values, which means you do not have to add MIN_* symbols to MODPARAMS.DAT. AUTOGEN does increase parameter values according to its calculations unless you have specified explicit or maximum values (by adding MAX_* symbols) in MODPARAMS.DAT.

For more information about the MODPARAMS.DAT file and about using AUTOGEN in general, see the chapter entitled "Managing System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

A Halt, Boot, and Shutdown Procedures

This appendix explains how to halt, boot, and shut down the operating system and includes related information, such as setting the system for automatic booting and using the Writeboot utility. The chapter also includes brief troubleshooting procedures.

This chapter contains the following information:

- Booting operations, including the following:
  - — Booting the operating system CD-ROM locally and from an InfoServer system
  - — Booting manually from the system disk
  - — Performing a conversational boot
  - — Booting with minimum startup
  - — Booting with the XDelta utility (XDELTA)
  - — Booting from a different directory
  - — Booting with a PMAZB or PMAZC TURBOchannel adapter
  - — Booting over the network with an alternate TURBOchannel adapter
  - — Booting in an emergency
- Set, Show, and Writeboot operations, including the following:
  - — Setting the system for automatic booting
  - — Setting and showing boot devices
  - — Setting boot parameters
  - — Using the Writeboot utility
- Halt and shutdown operations
- Troubleshooting procedures

Booting Operations

The following sections describe different methods of booting your system.

Booting the Operating System CD-ROM

If you need to boot the OpenVMS Alpha operating system CD-ROM, either to perform an installation or upgrade or to perform related operations such as mounting or backing up the system disk, follow the steps in the following sections, depending on whether you are booting locally or from the InfoServer.

Booting from the Local Drive

Boot from the local drive as follows:

1. Insert the operating system CD-ROM into the local CD-ROM drive.
2. At the console prompt (>>>), enter the SHOW DEVICE command so you can identify the name of the CD-ROM drive (for example, DKA400:)
3. Enter the boot command in the following format:

   `BOOT -FLAGS 0,0` *`source-drive`*

   Substitute the device name of the CD-ROM drive (as listed in the SHOW DEVICE display) for *source-drive*.

   For example, if the SHOW DEVICE display lists the device name of your CD-ROM drive as DKA400, enter the following command and press the Return key:

   ```
   >>> BOOT -FLAGS 0,0 DKA400
   ```

After you boot, the system displays a menu from which you can choose options to perform the following tasks:

- Install or upgrade the operating system using the POLYCENTER Software Installation utility.
- Enter a DCL environment from which you can perform preinstallation or maintenance tasks such as mounting or showing devices and backing up or restoring files on the system disk.
- Shut down the system.

Booting from the InfoServer

To boot the operating system CD-ROM using the InfoServer, do the following:

1. At the console prompt (>>>), enter the SHOW DEVICE command and scan the devices listed in the output to determine the name of the CD-ROM drive. Look for a device listed with its hardware address, as in the last line of the following example; compare this information with that provided by the table in step 2.

   ```
   >>>SHOW DEVICE

   dva0.0.0.1000.0     DVA0                    RX23
   dka200.2.0.5.0      DKA200                  RZ28M  1004
   dka300.3.0.5.0      DKA300                  RZ29B  0016
   dka400.4.0.5.0      DKA400                  RZ26L  442E
   ewa0.0.0.3.0        EWA0         00-00-F8-1F-70-3D
   ```

   For additional information, see the *HP OpenVMS Operating System for Alpha and VAX Software Product Description* and the hardware manuals that you received with your Alpha computer.

2. At the console prompt, enter the following command, where *`lan-device-name`* is the local area network (LAN) device (for example, EWA0) identified with your computer:

   ```
   >>> B -FLAGS 0,0 -FILE APB_2073 lan-device-name
   ```

   For information about the LAN devices your system supports, see the following table. For additional information, see the hardware manuals that you received with your Alpha computer and the OpenVMS software product description (SPD). The APB file name in the previous command is the unique file name that was assigned to the APB.EXE file when it was copied from the operating system CD-ROM to the InfoServer. This file is the name of the APB program used for the initial system load (ISL) boot program.

Alpha Computer	Ethernet Device	FDDI Device
ALPHAbook 1	EOA0	-
AlphaServer 400 series	EWA0	FWA0
AlphaServer 1000 series	ERA0, EWA0	FRA0
AlphaServer 1000A series	EWA0	FWA0
AlphaServer 1200 series	EWA0	FWA0
AlphaServer 2000 series	ERA0, EWA0	FRA0
AlphaServer 2100, 2100A series	ERA0, EWA0	FRA0
AlphaServer 4100 series	EWA0	FWA0
AlphaServer 8200 series	EXA0, EWA0	FXA0
AlphaServer 8400 series	EXA0, EWA0	FXA0
AlphaStation 200 series	EWA0	FWA0
AlphaStation 400 series	EWA0	FWA0
AlphaStation 500 series	EWA0	FWA0
AlphaStation 600 series	ERA0, EWA0	FWA0
DEC 2000 series	ERA0	—
DEC 3000 series	ESA0	"n/ESA0"
DEC 4000 series	EZA0	—
DEC 7000 series	EXA0	FXA0
DEC 10000 series	EXA0	FXA0
Digital Personal Workstation (DPWS) series	EWA0	FWA0

NOTE If you are using a DEC 3000 or 4000 series system, note the following:

- On DEC 3000 series systems, you can boot through the InfoServer with an Ethernet PMAD device or FDDI DEFTA device by specifying the device name as "*n*/ESA0". The value for *n* is the TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. For more information, see "Booting with a PMAZB or PMAZC TURBOchannel Adapter" on page 136.
- On DEC 4000 series, you *must* specify the ISL file name in uppercase (for example, APB_2073).

3. The InfoServer ISL program then displays the following menu:

```
Network Initial System Load Function
Version 1.2


  FUNCTION          FUNCTION
    ID
    1      -        Display Menu
    2      -        Help
    3      -        Choose Service
    4      -        Select Options
    5      -        Stop

Enter a function ID value:
```

4. Respond to the prompts as follows, pressing the Return key after each entry:

   a. Enter 3 for the function ID.

   b. Enter 2 for the option ID.

   c. Enter the service name (ALPHA0732).

   A sample display follows:

```
Enter a function ID value: 3
 OPTION           OPTION
   ID
   1      -       Find Services
   2      -       Enter known Service Name

Enter an Option ID value: 2
Enter a Known Service Name: ALPHA0732
```

After you boot, the system displays a menu from which you can choose options to perform the following tasks:

- Install or upgrade the operating system using the POLYCENTER Software Installation utility.
- Enter a DCL environment from which you can perform preinstallation or maintenance tasks such as mounting or showing devices and backing up or restoring files on the system disk.
- Shut down the system.

Booting Manually from the System Disk

Boot the system disk manually as follows:

IF ...	THEN GO TO...
the OpenVMS Alpha operating system is running,	step 1.
the OpenVMS Alpha operating system is *not* running,	step 4.

1. Log in to the SYSTEM account.
2. Enter the following command and press the Return key:

   ```
   $ @SYS$SYSTEM:SHUTDOWN
   ```

3. Answer the questions displayed by the system. When the procedure asks if an automatic reboot should be performed, press the Return key for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE
   ```

4. Halt the system by entering Ctrl/P or by pressing the Halt button. (See "Halting the System" on page 146 for more information about how to halt your Alpha computer.)
5. Enter the BOOT command in the following format:

   BOOT *device-name*

   Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA400, enter the following command and press the Return key:

   ```
   >>> BOOT DKA400
   ```

   To boot from the network, enter the following command and press the Return key:

   ```
   >>> BOOT ESA0
   ```

Performing a Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot to stop the boot process before it completes. The boot process stops after it loads SYS$SYSTEM:SYSBOOT.EXE and displays the SYSBOOT> prompt. At the SYSBOOT> prompt, you can enter specific OpenVMS System Generation utility (SYSGEN) commands to do the following:

- Examine system parameter values
- Change system parameter values
- Specify another parameter file
- Specify another system startup command procedure
- Select the default system parameter file if you modified system parameters to values that render the system unbootable
- Specify a minimum startup

There are several ways to perform a conversational boot. The following procedure is the most direct:

IF ...	THEN GO TO...
the OpenVMS Alpha operating system is running,	step 1.
the OpenVMS Alpha operating system is *not* running,	step 4.

1. Log in to the SYSTEM account.
2. Enter the following command and press the Return key:

   ```
   $ @SYS$SYSTEM:SHUTDOWN
   ```

3. Answer the questions displayed by the system. When the procedure asks if an automatic reboot should be performed, press the Return key for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE
   ```

4. Halt the system by entering Ctrl/P or by pressing the Halt button. ("Halting the System" on page 146 for more information about how to halt your Alpha computer.)
5. To begin the conversational boot, enter the BOOT command in the following format:

   ```
   BOOT -FLAGS 0,1 [device-name]
   ```

   for *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press the Return key:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

   If you do not specify a device name, the system boots from the boot device assigned when you entered the SET BOOTDEF_DEV command.
6. At the SYSBOOT> prompt, you can enter any of the SYSGEN commands listed in Table A-1. For more information about these SYSGEN commands, see the *HP OpenVMS System Management Utilities Reference Manual: M-Z*.
7. When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

Table A-1 SYSGEN Commands Used in the SYSBOOT Procedure

Command	Description
CONTINUE	Resumes the boot procedure.
DISABLE CHECKS	Inhibits checking of parameter values specified with the SET command.
ENABLE CHECKS	Permits checking of parameter values specified with the SET command.
HELP	Displays a summary of the SYSBOOT commands on the terminal screen.
SET *parameter-name*	Establishes the value of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.

Table A-1 SYSGEN Commands Used in the SYSBOOT Procedure (Continued)

Command	Description
SHOW [*parameter*]	Displays active, current, default, maximum, and minimum values for specific parameters. (Use qualifiers to display characteristics of parameters grouped by categories.)
USE [*file-spec*]	Specifies a parameter file to be used as a source of values. You must enter the entire file specification, including device and directory; you cannot specify a logical name.

For examples of using conversational booting, see "Booting with Minimum Startup" on page 135 and "Booting in an Emergency" on page 138.

Booting with Minimum Startup

In certain cases, you might want to boot your system without performing the full sequence of startup events. For example, if a startup event prevents you from logging in, you might want to boot the system without executing the startup so that you can log in and fix the problem. You can use the conversational boot to specify a minimum startup.

NOTE Because this procedure bypasses specific startup operations, it does not autoconfigure the system's peripheral devices.

Boot the system with minimum startup as follows:

1. Begin the conversational boot by entering the BOOT command in the following format:

   ```
   BOOT -FLAGS 0,1 [device-name]
   ```

   For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press the Return key:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

2. Enter the following command and press the Return key:

   ```
   SYSBOOT> SET STARTUP_P1 "MIN"
   ```

3. Enter the following command to continue booting:

   ```
   SYSBOOT> CONTINUE
   ```

4. After the system boots, log in and enter the following commands to invoke SYSMAN and clear the STARTUP_P1 parameter you set in step 2:

   ```
   $ RUN SYS$SYSTEM:SYSMAN
   SYSMAN> PARAMETERS USE CURRENT
   SYSMAN> PARAMETERS SET STARTUP_P1 ""
   SYSMAN> PARAMETERS WRITE CURRENT
   ```

Booting with the XDelta Utility (XDELTA)

The XDelta utility (XDELTA) is a debugging tool that system programmers use. The procedure for booting all Alpha computers with XDELTA is the same.

The following table describes the valid values you can specify when booting with XDELTA:

Value	System Response
0	Normal, nonstop boot (default).
1	Begins a conversational boot and then displays the SYSBOOT prompt.
2	Includes XDELTA but does not take the initial breakpoint.
3	Displays the SYSBOOT prompt and includes XDELTA but does not take the initial breakpoint.
6	Includes XDELTA and takes the initial breakpoint.
7	Includes XDELTA, displays the SYSBOOT prompt, and takes the initial breakpoint at system initialization.

The following is an example of booting with XDELTA from the console prompt:

```
>>> BOOT -FLAGS 0,7
```

For more information about using XDELTA, see the *OpenVMS Delta/ XDelta Debugger Manual*.

Booting from a Different Directory

By default, the OpenVMS Alpha operating system is installed in the system root directory [SYS0]. However, if you have created a cluster system disk, you can use the SYS$MANAGER:CLUSTER_CONFIG.COM procedure to add a copy of the operating system to a different root directory. (See the *HP OpenVMS System Manager's Manual* for more information about using the SYS$MANAGER:CLUSTER_CONFIG.COM procedure.)

To boot from a different directory (for example, [SYS3]), enter the BOOT command as follows:

```
>>> BOOT -FLAGS 3,0  DKA200
```

Booting with a PMAZB or PMAZC TURBOchannel Adapter

PMAZB and PMAZC TURBOchannel adapters are adapters that are software-compatible with the integrated SCSI ports on DEC 3000 Alpha series systems.

The DEC 3000 Alpha series system consoles implement the SHOW CONFIGURATION console command, which displays information about the TURBOchannel options and the built-in adapters in the system. When a PMAZB or PMAZC adapter is installed in the TURBOchannel, the SHOW CONFIGURATION command displays the "PMAZB-AA" or "PMAZC-AA" string, the TURBOchannel slot number, and the device status.

The DEC 3000 Alpha series consoles also implement the SHOW DEVICE command, which displays information about the devices in the system. Because the integrated SCSI adapter is built into every DEC 3000 Alpha series system, the SHOW DEVICE console command can display the SCSI devices connected to the integrated SCSI ports. However, the SHOW DEVICE console command cannot display the SCSI devices connected to the PMAZB or PMAZC SCSI ports.

To make the console display the devices connected to the PMAZB or PMAZC SCSI ports, enter the following command at the console prompt, where *x* is the TURBOchannel slot number in which the PMAZB or PMAZC adapter is installed:

```
>>> TEST TCx CNFG
```

This command displays the devices that are connected to each SCSI port of the PMAZB or PMAZC adapter. The device controller letters are either A or B, based upon the PMAZB or PMAZC ports to which the devices are connected. Do not confuse these devices with any DKA*xxx* or DKB*xxx* devices displayed by the SHOW DEVICE command, which shows SCSI devices on the integrated SCSI ports only.

To boot from a device connected to a PMAZB or PMAZC adapter, enter the boot command as follows:

```
>>> BOOT "x/dkyzzz"
```

The following conventions are used:

- *x* is the TURBOchannel slot number in which the PMAZB or PMAZC adapter is installed.
- *dk* is the device code of the boot device.
- *y* is either A or B, depending on the SCSI port of the PMAZB or PMAZC adapter that contains the boot device.
- *zzz* is the SCSI unit number of the boot device.

The OpenVMS Alpha operating system does not distinguish between the PMAZB or PMAZC adapter and the integrated SCSI adapter. The operating system views them as identical adapters. Because the operating system searches for I/O adapters in backplane slot number order, device controller letters are assigned that correspond to the backplane order of the TURBOchannel options, followed by the integrated adapters. This is different from console SCSI device naming, which always designates SCSI devices on the integrated SCSI ports as either "A" or "B" port devices.

Example

On a DEC 3000 Model 500 Alpha system with no TURBOchannel options installed, the OpenVMS Alpha operating system names the integrated SCSI ports PKA0 and PKB0, and the devices connected to the ports inherit the controller letter from the port controller letter (A or B). However, if a PMAZB or PMAZC adapter is installed in the TURBOchannel, the operating system names the PMAZB or PMAZC SCSI ports PKA0 and PKB0 and names the integrated SCSI ports PKC0 and PKD0. The devices connected to the ports inherit the controller letter from the port controller letter (A, B, C, or D).

Booting over the Network with an Alternate TURBOchannel Adapter

You can use an alternate TURBOchannel adapter to boot a DEC 3000 series Alpha computer (with the TURBOchannel option) over the network in an InfoServer or OpenVMS Cluster environment. Examples of alternate TURBOchannel adapters are the PMAD (which connects to the Ethernet) and the DEFTA (which connects to the FDDI).

To boot from a TURBOchannel device connected to one of these alternate adapters, enter the boot command as follows:

```
>>> BOOT "n/ESA0"
```

The value for *n* is the TURBOchannel slot number for the device, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. In the following example, the TURBOchannel slot number (listed under the “TCINFO” column) is 0:

```
>>> SHOW CONFIG
DEC 3000 - M300
Digital Equipment Corporation
     VPP PAL X5.56-80800101/OSF PAL X1.34-80800201 - Built on 18-DEC-1996 11:376

              TCINFO     DEVNAM     DEVSTAT
              ------     --------   --------
                CPU      OK KN16-AA -V3.2-S6CD-I151-sV2.0-DECchip 21064 P3.0-150
               ASIC      OK
```

```
                  MEM       OK
                  MEM       OK
6
                  CXT       OK
5
                  NVR       OK
                  SCC       OK
                   NI       OK
                 ISDN       OK
4
                 SCSI       OK
0-PMAD-AA        TC0
```

Booting in an Emergency

If a system problem prevents your system from booting, you might need to perform an emergency boot operation. Table A-2 summarizes these emergency boot operations, and the sections that follow describe each boot operation in more detail.

Table A-2 Emergency Boot Procedures

Operation	When to Use
Booting with default system parameters	When parameter values in the parameter file have been modified so that the system is unbootable
Booting without startup and login procedures	If an error in the startup or login procedures prevents you from logging in
Booting without the user authorization file	If you have forgotten the password and cannot log in to a privileged account

Booting with Default System Parameters

If the current values stored in the parameter file have been incorrectly modified, these incorrect values might cause the system to become unbootable. With a conversational boot operation, you can reset the active values for all system parameters to the default value. (In most cases, HP recommends that you use AUTOGEN to modify system parameters. In certain cases, however, you can use a conversational boot to modify a parameter value *temporarily*. To change a parameter value *permanently*, you must edit MODPARAMS.DAT and run AUTOGEN. For instructions, see the chapter entitled "Modifying System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.) The default values allow you to boot the system temporarily so you can correct the problem.

How to Perform This Task

1. Begin the conversational boot by entering the BOOT command in the following format:

   ```
   BOOT -FLAGS 0,1 [device-name]
   ```

   For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press the Return key:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

2. At the SYSBOOT> prompt, enter the following command:

   ```
   SYSBOOT> USE DEFAULT
   ```

   This command specifies that default values should be used for all parameters.

3. Enter the following command to continue booting:

   ```
   SYSBOOT> CONTINUE
   ```

4. When the system finishes booting, determine which changed parameter caused the problem and reset the parameter value. If you specified the value for the parameter in the AUTOGEN parameter file MODPARAMS.DAT, fix the value in that file and run AUTOGEN. For more information, see the chapter entitled "Modifying System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

5. Shut down and reboot the system.

Example

```
SYSBOOT> USE DEFAULT
SYSBOOT> CONTINUE
Username: SYSTEM
Password:
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SET NPAGEDYN 2999808
SYSMAN> PARAMETERS WRITE CURRENT
SYSMAN> EXIT
$ EDIT SYS$SYSTEM:MODPARAMS.DAT
.
.
.
[Insert the following line in MODPARAMS.DAT:]
MIN_NPAGEDYN = 2999808
.
.
.
$ @SYS$UPDATE:AUTOGEN SAVPARAMS REBOOT
```

Booting Without Startup and Login Procedures

If the system does not complete the startup procedures or does not allow you to log in, you might need to bypass the startup and login procedures. The startup and login procedures provided by HP should always work. However, if you introduce an error when modifying the startup or login procedures, it is possible to accidentally lock yourself out of the system.

How to Perform This Task

1. Begin the conversational boot by entering the BOOT command in the following format:

   ```
   BOOT -FLAGS 0,1 [device-name]
   ```

   For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press the Return key:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

2. Enter the following command at the SYSBOOT> prompt:

   ```
   SYSBOOT> SET/STARTUP OPA0:
   ```

3. Enter the following command to continue booting:

   ```
   SYSBOOT> CONTINUE
   ```

4. When the system is booted, the operator console displays the DCL command prompt ($). You are logged in.
5. Enter the following DCL command:

   ```
   $ SET NOON
   ```

   This command directs the operating system to ignore any errors that might occur. If you do not enter this command and you invoke an error, the system will log you out.
6. Correct the error condition that caused the login failure. (That is, make the necessary repairs to the startup or login procedures, or to the SYSUAF.DAT file.)

   Invoke a text editor to correct the startup or login file. Note that some system consoles might not supply a screen-mode editor. You can also copy a corrected file and delete the incorrect version by using the RENAME and DELETE commands.
7. Invoke SYSMAN and enter the following commands to reset the startup procedure:

   ```
   $ RUN SYS$SYSTEM:SYSMAN
   SYSMAN> PARAMETERS USE CURRENT
   SYSMAN> PARAMETERS SET/STARTUP SYS$SYSTEM:STARTUP.COM
   SYSMAN> PARAMETERS WRITE CURRENT
   SYSMAN> EXIT
   $
   ```
8. Perform a normal startup by entering the following command:

   ```
   $ @SYS$SYSTEM:STARTUP
   ```

Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> CONTINUE
$ SET NOON
$ SET DEFAULT SYS$SYSROOT:[SYSEXE]
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SET/STARTUP SYS$SYSTEM:STARTUP.COM
SYSMAN> PARAMETERS WRITE CURRENT
SYSMAN> EXIT
$ @SYS$SYSTEM:STARTUP
```

Booting Without the User Authorization File

Ordinarily, the startup and login procedures provided by HP always work; however, certain user interventions can cause them to fail. A very simple way to lock yourself out of the system is to set passwords to login accounts and forget them. In such an emergency, you can use the alternate user authorization file rather than the standard user authorization file.

NOTE You can use this method only to log in to the system from the console terminal; you cannot use other terminal lines.

Setting the system parameter UAFALTERNATE defines the logical name SYSUAF to refer to the file SYS$SYSTEM:SYSUAFALT.DAT. If this file is found during a normal login, the system uses it to validate the account and prompts you for the user name and password.

If it cannot find this file, the system assumes that the UAF is corrupt and accepts any user name and any two passwords to log you in to the system from the system console. Logins are prohibited from all other terminal lines.

When you perform this procedure, the system assigns the following values to your user account:

Field	Value
Name	User name
UIC	[001,004]
Command interpreter	DCL
Login flags	None
Priority	Value of the system parameter, DEFPRI
Resources	Values of the PQL system parameters
Privileges	All

The process name is usually the name of the device on which you logged in (for example, _OPA0:).

How to Perform This Task

1. Begin the conversational boot by entering the BOOT command in the following format:

   `BOOT -FLAGS 0,1 [`*`device-name`*`]`

   For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press the Return key:

   `>>> BOOT -FLAGS 0,1 DKA400`

2. At the SYSBOOT> prompt, enter the following command:

   `SYSBOOT> SET UAFALTERNATE 1`

3. If your system is running DECwindows software, you must also disable the windowing system by entering the following command:

   `SYSBOOT> SET WINDOW_SYSTEM 0`

4. Enter the CONTINUE command to continue booting:

   `SYSBOOT> CONTINUE`

5. When the startup procedure completes, log in on the console terminal by entering any user name and any two passwords in response to the Username: and Password: prompts.

6. Enter the following command to use the default UAF:

   `$ DEFINE/SYSTEM/EXECUTIVE_MODE SYSUAF SYS$SYSTEM:SYSUAF.DAT`

7. Use the Authorize utility to fix the problem that caused you to be locked out of the system (for example, a forgotten password). Enter HELP MODIFY at the UAF> prompt for information about modifying passwords. For more details, see the *HP OpenVMS System Management Utilities Reference Manual: A-L*.

8. Enter the following commands to invoke SYSMAN and clear the UAFALTERNATE system parameter you set in step 2:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SET UAFALTERNATE 0
```

In most cases, HP recommends that you use AUTOGEN to modify system parameters. However, because this parameter is only being changed temporarily, you can use SYSMAN to change it back.

9. If you disabled the windowing system in step 3, reenable it by entering the following command:

```
SYSMAN> PARAMETERS SET WINDOW_SYSTEM 1
```

10. Enter the following command to save the changed system parameter values:

```
SYSMAN> PARAMETERS WRITE CURRENT
```

11. Shut down and reboot the system.

Example

```
SYSBOOT> SET UAFALTERNATE 1
SYSBOOT> SET WINDOW_SYSTEM 0
SYSBOOT> CONTINUE
Username: Return
Password: Return
Password: Return
$ DEFINE/SYSTEM/EXECUTIVE_MODE SYSUAF SYS$SYSTEM:SYSUAF.DAT
$ SET DEFAULT SYS$SYSTEM
$ RUN AUTHORIZE
AUTHORIZE> MODIFY SYSTEM/PASSWORD=FGLFTUTU
AUTHORIZE> EXIT
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SET WINDOW_SYSTEM 1
SYSMAN> PARAMETERS SET UAFALTERNATE 0
SYSMAN> PARAMETERS WRITE CURRENT
SYSMAN> EXIT
$ @SYS$SYSTEM:SHUTDOWN
```

Set, Show, and Writeboot Operations

The following sections describe how to perform SET, SHOW, and Writeboot operations.

Setting the System for Automatic Booting

Alpha computers can boot automatically from a designated boot device. When you installed the OpenVMS Alpha operating system, you designated the system disk as the default boot device. “Setting and Showing Boot Devices” on page 143 describes how to change the default boot device.

Alpha computers can boot automatically from the default boot device under the following conditions:

- When you first turn on system power
- When system power comes on after a power failure
- After you shut down the system (if you enter Y when the shutdown procedure asks if an automatic reboot should be performed)

- After a bugcheck
- If the system halts under program control

Set the system to boot automatically by performing one of the following steps:

IF ...	THEN GO TO...
the OpenVMS Alpha operating system is running,	step 1.
the OpenVMS Alpha operating system is *not* running,	step 4.

1. Log in to the SYSTEM account.
2. Enter the following command and press the Return key:

   ```
   $ @SYS$SYSTEM:SHUTDOWN
   ```

3. Answer the questions displayed by the system. When the procedure asks if an automatic reboot should be performed, press the Return key for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE
   ```

4. Halt the system by entering Ctrl/P or by pressing the Halt button. (See "Halting the System" on page 146 for more information about how to halt your Alpha computer.)
5. If you have an SMP system with multiple CPUs, enter the following command at the console prompt (>>>) to stop the other CPUs:

   ```
   >>> INITIALIZE
   ```

6. Enter the following command to show whether the system has been set to boot automatically:

   ```
   >>> SHOW AUTO_ACTION
   ```

   The system displays one of the following:

   - Restart
   - Boot
   - Halt

7. Enter the SET AUTO_ACTION command if you want to change the automatic booting behavior. For example, the following command sets the system to reboot automatically:

   ```
   >>> SET AUTO_ACTION RESTART
   ```

8. After you set this variable, HP recommends that you set the boot device and operating system flags as well, using the SET BOOTDEF_DEV and SET BOOT_OSFLAGS commands described in the following sections.

Setting and Showing Boot Devices

Use the SET BOOTDEF_DEV command to tell the system which drive you want to boot from (that drive becomes the default boot device). Use the SHOW BOOTDEF_DEV command to display the current default boot device.

Note that when you set this variable, HP recommends that you set the operating system boot parameters as well, using the SET BOOT_OSFLAGS command.

At the console prompt (>>>), enter the SET BOOTDEF_DEV command in the following format:

SET BOOTDEF_DEV *device-name*

Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA400 on a DEC 3000 Alpha series computer, enter the following command and press the Return key:

>>> **SET BOOTDEF_DEV DKA400**

The next time you boot the system, you can enter the BOOT command without specifying a device name (because DKA400 is now the default boot device). For example:

>>> **BOOT**

NOTE If you have not used the SET BOOTDEF_DEV command to set the drive to boot from and you enter the BOOT command without specifying a device name, the system displays an error message.

Use the SHOW BOOTDEF_DEV command to find out what drive was specified in the last SET BOOT command. For example:

>>> **SHOW BOOTDEF_DEV**

To cancel the drive specified in a previous SET BOOTDEF_DEV command, enter the following command and press the Return key:

>>> **SET BOOTDEF_DEV**

NOTE This command is not valid on DEC 3000 Alpha series systems.

Setting Boot Parameters

By default, when you boot the operating system, the flags parameter is set to 0. If you want to define parameters to enable specific functions during the booting process, use the SET BOOT_OSFLAGS console command.

The following is a list of values you can specify with the SET BOOT_OSFLAGS command:

Hexadecimal Value	System Response
1	Allows a conversational boot (the system displays the SYSBOOT> prompt).
2	Maps XDELTA to a running system.
4	Stops the boot procedure at the initial system breakpoint.
8	Performs a diagnostic bootstrap.
10	Stops the boot procedure at the bootstrap breakpoints.
20	Omits header from secondary bootstrap image.
80	Prompts for the name of the secondary bootstrap file.
100	Halts the system before the secondary bootstrap.
2000	Marks corrected read data error pages as bad.

Hexadecimal Value	System Response
10000	Displays extensive, detailed debug messages during the boot process.
20000	Displays selected user-oriented messages during the boot process.

The following examples show how to use the SET BOOT_OSFLAGS command:

- The following command specifies the root directory as 0 and the parameter as 1, which sets the system to perform a conversational boot from the [SYS0] directory when you enter the BOOT command:

  ```
  >>> SET BOOT_OSFLAGS 0,1
  ```

- The following command specifies the root directory as 1 and the parameter as 0, which sets the system (for example, the second host in a two-system DSSI OpenVMS Cluster configuration) to boot from the [SYS1] directory (instead of [SYS0]) when you enter the BOOT command:

  ```
  >>> SET BOOT_OSFLAGS 1,0
  ```

- The following example specifies the root directory as 0 and the parameters as 1, 2, 4, and 20000 (for a total hexadecimal value of 20007). As a result, when you enter the BOOT command, the system will perform a conversational boot from the [SYS0] directory with XDELTA, stop at the initial system breakpoint, and display relevant user messages.

  ```
  >>> SET BOOT_OSFLAGS 0,20007
  ```

To display the parameters you have just set, use the SHOW BOOT_OSFLAGS command. For example:

```
>>> SHOW BOOT_OSFLAGS
BOOT_OSFLAGS = 0,20007
```

Using the Writeboot Utility

The Writeboot utility (WRITEBOOT.EXE) is copied to your system disk during the installation procedure. It allows you to create a bootable OpenVMS Alpha system disk from one that was originally created by one of the following methods:

- A nonimage backup of an Alpha system disk (possibly corrupting the boot block)
- A nonimage restore of an Alpha system disk from an image save set

The Writeboot utility also allows you to rewrite the boot block of an OpenVMS Alpha system disk to point to a new version of the OpenVMS Alpha primary bootstrap file (APB.EXE) that you have previously copied to the disk. (Note that the file must be contiguous.)

To invoke the Writeboot utility, enter the following command:

```
$ RUN SYS$SYSTEM:WRITEBOOT
```

The utility prompts you as follows:

```
Update VAX portion of boot block (default is Y):
Update Alpha portion of boot block (default is Y):
```

Answer N (NO) to the VAX prompt. If you answer Y (YES) to update the Alpha boot block, the utility prompts you for the Alpha boot file:

```
Enter Alpha boot file:
```

Specify *device-name*:[VMS$COMMON.SYSEXE]APB.EXE in response to this prompt, where *device-name* indicates the device on which the system disk is mounted.

Halt and Shutdown Operations

The following sections describe halt and shutdown operations for Alpha computers.

Halting the System

During installation, upgrade, and related system operations, you might need to halt your system. The methods for halting Alpha computers differ slightly with certain models, as described in the next section.

The following table summarizes the ways you can halt specific Alpha computers:

Alpha Computer	How to Halt
AlphaServer 300, 800, 1000, 1200, 2000, 2100 series	Do one of the following: • Press the Halt button. • Press Ctrl/P.
AlphaServer 8200, 8400 series	Press Ctrl/P.
AlphaStation 200, 400, 500, 600 series	Do one of the following: • Press the Halt button (if the graphics monitor is serving as the console). • Press Ctrl/P (if you are using the alternate console and port).
DEC 2000, 3000 series	Do one of the following: • Press the Halt button (if the graphics monitor is serving as the console). • Press Ctrl/P (if you are using the alternate console and port).
DEC 4000 series	Do one of the following: • Press the Halt button. • Press the Break key on the console (the default setting). • Press Ctrl/P, but only after using the console command SET TTA0_HALTS*n* to enable this key combination, where *n* can be 6 (enables the Break key and Ctrl/P) or 2 (enables Ctrl/P but disables the Break key).

Alpha Computer	How to Halt
DEC 7000, 10000 series	Press Ctrl/P.

Shutting Down the System

Before you shut down the operating system, decide if you want it to reboot automatically or if you want to enter console-mode commands after the shutdown completes.

You can perform the following three types of shutdown operations:

- An orderly shutdown with SYS$SYSTEM:SHUTDOWN.COM (see "Orderly Shutdown" on page 147)
- An emergency shutdown with OPCCRASH.EXE (see "Emergency Shutdown with OPCCRASH.EXE" on page 147)
- An emergency shutdown with crash commands (see "Emergency Shutdown with Crash Commands" on page 147)

If you want the system to reboot automatically after the shutdown, see "Setting the System for Automatic Booting" on page 142.

Orderly Shutdown

The SHUTDOWN.COM procedure shuts down the system while performing maintenance functions such as disabling future logins, stopping the batch and printer queues, dismounting volumes, and stopping user processes. To use the SHUTDOWN.COM command procedure, log in to the SYSTEM account, enter the following command, and press the Return key:

```
$ @SYS$SYSTEM:SHUTDOWN
```

For more information about the SHUTDOWN.COM command procedure, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

Emergency Shutdown with OPCCRASH.EXE

If you cannot perform an orderly shutdown with the SHUTDOWN.COM procedure, run the OPCCRASH.EXE emergency shutdown program. To run the OPCCRASH.EXE program, log in to the SYSTEM account, enter the following command, and press the Return key:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

For more information about the OPCCRASH program, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

Emergency Shutdown with Crash Commands

Use crash commands only if the system is "hung" (stops responding to any commands) and you cannot log in to the SYSTEM account to use the SHUTDOWN.COM procedure or the OPCCRASH.EXE program.

NOTE The method described here works on all Alpha computers. However, on certain systems, you can force your processor to fail (crash) by entering a specific console command. See the hardware manuals that came with your computer for that information.

To force your processor to fail, do the following:

1. Halt the system by entering Ctrl/P or by pressing the Halt button. (See "Halting the System" on page 146 for more information about how to halt your Alpha computer.)

2. To examine processor registers, enter the following commands and press the Return key:

   ```
   >>> E -N F R0
   >>> E PS
   ```

   The system displays the contents of the registers. Write down these values if you want to save information about the state of the system.

3. Enter the following commands and press the Return key:

   ```
   >>> D PC FFFFFFFF00000000
   >>> D PS 1F00
   ```

   By depositing these values, you cause the system to write a memory dump to the system dump file on the disk.

4. Enter the following command and press the Return key:

   ```
   >>> CONTINUE
   ```

   This causes the system to perform a bugcheck.

5. After the system reboots, log in to the SYSTEM account.

6. To examine the dump file, enter the following commands and press the Return key after each one:

   ```
   $ ANALYZE/CRASH SYS$SYSTEM:SYSDUMP.DMP
   SDA> SHOW CRASH
   ```

   For more information about the System Dump Analyzer (SDA) utility, see the *OpenVMS Alpha System Analysis Tools Manual*.

Troubleshooting Procedures

The following sections describe procedures that you can follow if you encounter problems with your system.

If the System Does Not Boot

If the system does not boot because a hardware problem occurs, a question mark(?) usually precedes the error message displayed on the console terminal. An example of a hardware problem is a read error on a disk or tape cartridge drive.

For Hardware Problems

If you suspect a hardware problem, do the following:

1. Consult the hardware manual for your Alpha computer.
2. Contact an HP support representative.

For Software Problems

When the operating system is loaded into memory, a message similar to the following appears on the terminal screen:

```
SYSTEM   job terminated at 27-MAY-2003 15:05:03.17
```

If the system does not display this message, a software problem has probably occurred. Do the following:

1. Turn off the system. Turn it back on and try to reboot.
2. Perform a conversational boot using the default system parameters or try one of the emergency boot procedures described in "Booting in an Emergency" on page 138.
3. If the system boots, run the AUTOGEN procedure. For more information about the AUTOGEN procedure, see the chapter entitled "Modifying System Parameters" in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

Detecting and Responding to System Problems

If your system exhibits unexpected behavior, note the following:

- If the system displays a bugcheck message on the console terminal and shuts itself down, it means the system encountered a problem that made further operation impossible or dangerous. Reboot the system as explained in "Booting Manually from the System Disk" on page 133, or let it reboot automatically as explained in "Setting the System for Automatic Booting" on page 142.
- If the system stops responding to your commands (that is, the system "hangs"), there is a possible failure in a system software or hardware component or a possible power failure.
- If the system exhibits erratic behavior (it does not respond according to specifications), it indicates a possible failure in a system software or hardware component.

To determine if the failure is a system problem:

- Be sure that you did not press the F1 key (the Hold Screen key). The Hold Screen light goes on when you press either F1 or enter Ctrl/S.
- Enter Ctrl/T to check the status of your process. A status line should appear, indicating the name of the program that is executing and other information. If the status line does not appear, the program you are executing might be stalled or "hung." (If you have disabled Ctrl/T by entering the command SET NOCONTROL=T or have set the terminal to NOBROADCAST mode by entering the command SET TERMINAL/NOBROADCAST, this procedure does not work.)
- Make sure the cable connecting the terminal or monitor to the system is secure.

If you determine that you have a system problem:

1. Force an exit from a stalled or "hung" program by entering Ctrl/Y. Note that when you enter Ctrl/Y, any work performed by the program and not saved on disk is lost.
2. If the system is still unresponsive, halt it by entering Ctrl/P or by pressing the Halt button. (See "Halting the System" on page 146 for more information about how to halt your Alpha computer.)
3. Note in detail the sequence of events that caused the problem and notify an HP support representative.

B Backing Up and Restoring the System Disk

This appendix describes how to perform backup and restore operations on the system disk. You perform these tasks by entering commands from a specialized backup environment. You access this environment through the menu that is displayed when you boot the OpenVMS Alpha operating system CD-ROM or through an alternate method that does not require the CD-ROM.

This specialized backup environment is required because it allows you to create an *exact* copy of the system disk. You cannot create an exact copy in a standard operating system environment because the OpenVMS Backup utility saves only what is on the disk at the moment the BACKUP command is executing, excluding portions of open files contained in memory or data about files not yet written back to the disk (cache).

For more information about backup operations, including procedures for backing up and restoring files and directories, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

Reasons for Backing Up the System Disk

The primary reason why you should have a backup copy of the system disk is so you can fully restore your system in response to any hardware or software problem that affects the integrity of your original system disk or your ability to access it. For example, you would need to use the backup copy to restore your system under the following conditions:

- When a problem occurs during an OpenVMS Alpha upgrade or update, or during the installation of other software products. If you backed up the system disk *before* you attempted any of those procedures, you could restore the system disk and attempt the procedure again.
- When a system file that is accidentally deleted renders the system disk inoperable. If you backed up the system disk *after* you installed or upgraded the OpenVMS Alpha operating system and any other software products, you could restore the system disk.
- When the drive that holds the system disk malfunctions. If you have a backup copy of the system disk, you can restore it to a functioning disk and continue to use the system.

Another reason for backing up the system disk is to eliminate disk fragmentation, which occurs when files are stored noncontiguously on the disk. The BACKUP/IMAGE command creates a copy on which files are stored contiguously.

Suggested Procedures

HP recommends the following:

- The preferred method for performing system disk backup and restore operations is to boot the operating system CD-ROM, choose the DCL option from menu, and then enter the appropriate backup commands. The detailed procedures are described in "Backing Up the System Disk" on page 152 and "Restoring the System Disk" on page 154.

However, if you do not have access to the compact disc or if you want to back up a shadowed system disk without disabling the shadow set, you can use a different procedure, described in "Alternate Backup and Restore Procedure" on page 155.

- Store the backup media in a safe place.
- If you have an OpenVMS Cluster environment with more than one system disk, be sure the volume label on each system disk and backup copies of system disks are unique. Use the SET VOLUME/LABEL command to change a volume label, if necessary.

OpenVMS Cluster Caution

If any nodes except the node used to run BACKUP are booted during the backup operations described in this appendix, your cluster will become partitioned, where nodes in the existing cluster divide into two or more independent clusters. This condition can cause data file corruption.

In addition, these backup environments do not restrict your use of DCL commands to the BACKUP command only, which further increases your risk of accidentally destroying or corrupting data on a disk. Therefore, to avoid jeopardizing the integrity of your data in any way, HP recommends that you shut down the entire OpenVMS Cluster system before you back up your system disk.

Backing Up the System Disk

The following sections describe how to back up the system disk.

Getting Started

Before you back up the system disk, do the following:

1. In an OpenVMS Cluster environment, dismount the system disk from all systems in the cluster that have the disk mounted as a data disk (rather than as the system disk).
2. Shut down all systems booted from that disk.
3. Boot the operating system CD-ROM locally or from the InfoServer (as described in Appendix B).
4. Choose the DCL option (7) from the menu. For example:

```
************************************************************

You can install or upgrade the OpenVMS Alpha operating system
or you can install or upgrade layered products that are included
on the OpenVMS Alpha operating system CD-ROM.

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

Please choose one of the following:

    1)  Upgrade, install or reconfigure OpenVMS Alpha Version 7.3-2
    2)  Display products and patches that this procedure can install
```

```
        3)  Install or upgrade layered products and patches
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Execute DCL commands and procedures
        8)  Shut down this system

    Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?) 7
```

5. At the triple dollar sign prompt ($$$), enter the SHOW DEVICES command.
6. Examine the list of devices so you can determine which device is the source drive (the system disk you want to back up) and which device is your target drive (the supported disk or tape device that will hold the backed up files).

Mounting Devices

When you have determined which devices will be the source drive and target drive, mount those devices (and any other output devices you plan to use) before you perform any backup operations. Enter the MOUNT commands in the following format:

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION source-drive
$$$ MOUNT/FOREIGN target-drive
```

Note the following conventions:

- *source-drive* is the name of the drive holding the system disk
- *target-drive* is the name of the drive that will hold the backup files

Performing the System Disk Backup

When the system disk and output devices are mounted, back up the system disk by entering the BACKUP command in the following format:

```
$$$ BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

Example 1

In this example the system disk and a target disk are mounted so the BACKUP command can create a backup disk. (You can use a backup disk as a system disk.)

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION DKA200
$$$ MOUNT/FOREIGN DKA300
$$$ BACKUP/IMAGE/VERIFY DKA200: DKA300:
```

Example 2

In this example the system disk and a target tape device are mounted so the BACKUP command can create a backup tape.

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION DKA200
$$$ MOUNT/FOREIGN MKA300
$$$ BACKUP/IMAGE/VERIFY DKA200: MKA300:APR_06_BACKUP.BCK/SAVE_SET
```

Changing the CLUSTER_SIZE Parameter

The BACKUP command creates a system disk that includes a set of volume parameters provided by HP, including a CLUSTER_SIZE (disk access scheme) that is appropriate for your system. (The CLUSTER_SIZE refers to the way files are stored on the disk, *not* to cluster environments.) You can change most volume parameters later with the SET VOLUME command.

Note that to change the CLUSTER_SIZE, you must back up the system disk to a disk that has been previously initialized with the CLUSTER_SIZE that you want. For more information about initializing a disk and using the BACKUP command, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials* and the *HP OpenVMS System Management Utilities Reference Manual: A-L*, and see the description of the INITIALIZE and BACKUP commands in the *HP OpenVMS DCL Dictionary*.

Logout, Shutdown, and Reboot

After you complete the backup operation:

1. Enter the LOGOUT command to exit from the DCL environment and return to the menu.
2. Choose the shutdown option (8).
3. After the shutdown completes, boot from the system disk.

Restoring the System Disk

The following sections describe how to restore the system disk.

Getting Started

Before you can restore the system disk:

1. Shut down the system.
2. Boot the operating system CD-ROM locally or from the InfoServer (as described in Appendix A).
3. Choose the DCL option (7) from the menu. For example:

```
You can install or upgrade the OpenVMS Alpha operating system
or you can install or upgrade layered products that are included
on the OpenVMS Alpha operating system CD-ROM.

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

Please choose one of the following:

    1)  Upgrade, install or reconfigure OpenVMS Alpha Version 7.3-2
    2)  Display products and patches that this procedure can install
    3)  Install or upgrade layered products and patches
    4)  Show installed products
    5)  Reconfigure installed products
    6)  Remove installed products
    7)  Execute DCL commands and procedures
    8)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?) 7
```

4. At the triple dollar sign prompt ($$$), enter the SHOW DEVICES command.
5. Examine the list of devices so you can determine which device is the source drive (the drive holding the backed up files you want to restore) and which device is your target drive (the disk on which you want the files restored).

Mounting Devices

When you have determined which devices will be the source drive and target drive, mount those devices (and any other output devices you plan to use) before you perform any restore operations. Enter the MOUNT commands in the following format:

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION  source-drive
$$$ MOUNT/FOREIGN target-drive
```

Note the following conventions:

- *source-drive* is the device holding the files you want to restore

  (Note, however, that you must use the MOUNT/FOREIGN command if the source drive is a tape device.)

- *target-drive* is the destination

Performing the System Disk Restore

Enter the BACKUP command in the following format to restore the system disk:

```
$$$ BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

Example 1

In this example a backup disk and a target disk are mounted so the BACKUP command can restore the system disk from the backup disk:

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION DKA300
$$$ MOUNT/FOREIGN DKA200
$$$ BACKUP/IMAGE/VERIFY DKA300: DKA200:
```

Example 2

In this example a backup tape and a target disk are mounted so the BACKUP command can restore the system disk from the backup tape:

```
$$$ MOUNT/FOREIGN MKA300
$$$ MOUNT/FOREIGN DKA200
$$$ BACKUP/IMAGE/VERIFY MKA300:APR_06_BACKUP.BCK/SAVE_SET DKA200:
```

Logout, Shutdown, and Reboot

After you complete the restore operation:

1. Enter the LOGOUT command to exit from the DCL environment and return to the menu.
2. Choose the shutdown option (8).
3. After the shutdown completes, boot from the system disk.

Alternate Backup and Restore Procedure

This section describes an alternate method of performing backup and restore operations on your system disk. With this method, you install the operating system (without options) on another disk and perform your backup and restore operations on the system disk from there. Use this method under the following conditions:

- If you do not have access to the operating system CD-ROM and its menu system
- If you want to back up a shadowed system disk without disabling the shadow set

---

NOTE It is also possible to back up your running system disk by using the qualifier /IGNORE=INTERLOCK with the BACKUP command and ignoring warning messages. However, that method requires that all other use of the system be suspended, including disabling logins, stopping print and batch queues, and turning off networking software. In addition, you cannot use this method to restore files to the running system disk. Because of these limitations, HP recommends that if you must use an alternate method to back up or restore the system disk, you use the method described in this section.

Preparing an Alternate System Disk

Prepare an alternate system disk as follows:

1. Log in to a privileged account on your running OpenVMS Alpha system.
2. Using the SHOW DEVICE command, identify a data disk on which you can install the operating system, with no options. This will be your target disk during that installation. Note the following:
   - You will need approximately 75,000 blocks to install the operating system with no options
   - Existing data will remain on the disk
3. The target disk must be mounted privately to your process. (This prevents other users from accessing this disk during the installation and backup procedures.) Therefore, if the target disk was mounted with /SYSTEM, /CLUSTER, /GROUP, or /SHARE, dismount that disk and mount it without using those qualifiers or the /FOREIGN qualifier. For example:

   ```
   $ MOUNT/OVERRIDE=IDENTIFICATION DKA200
   ```

4. Enter the following command to install the OpenVMS Alpha operating system, with no options, on the target disk:

   ```
   $ @SYS$SYSTEM:AXPVMS$PCSI_INSTALL_MIN.COM [target-disk]
   ```

   (The procedure will prompt you for a device name if you do not specify it on the command line.)

5. As the procedure completes the installation, the display is similar to the following:

```
DEC AXPVMS OPENVMS V7.3-2: OpenVMS and related products platform

    COPYRIGHT (c) 7-MAY-2003
    Hewlett-Packard Development Company, L.P.

Execution phase starting ...

The following product will be installed:
    DEC AXPVMS VMS V7.3-2

Portion Done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%..100%

The following product has been installed:
    DEC AXPVMS VMS V7.3-2
    .
    .
    .
    The installation of minimum OpenVMS Alpha is now complete.

    Use the following command to boot minimum OpenVMS:
```

```
    BOOT -FLAGS E,0 device-name

(Your system may require additional parameters to boot.)
```

CAUTION If your system is a cluster member, HP recommends that you shut down the entire OpenVMS Cluster system before you back up your system disk. This will prevent you from creating a partitioned cluster and from jeopardizing the integrity of your data in any other way.

Using the Alternate System Disk

Use the alternate system disk (on which you installed the operating system with no options) to perform backup and restore operations as follows:

1. Shut down your system.
2. Boot the alternate system disk from the SYSE root. For example:

   ```
   >>> BOOT -FLAGS E,0 DKA200
   ```

   The system automatically logs you in to the SYSTEM account and then displays a triple dollar sign prompt ($$$).

NOTE During the boot and login operations on this minimum version of the operating system, you can ignore license messages that are similar to the following:

```
%LICENSE-I-NOLICENSE, no license is active for this software product
```

3. If your system disk is shadowed, install and load a Volume Shadowing license on this data disk. You will then be able to back up the shadowed system disk from this data disk without disabling the shadow set.

NOTE HP recommends that you do *not* install any other licenses, including OpenVMS licenses, on this alternate system. You will be able to use the system only from the console.

4. Mount the system disk and any output devices you plan to use during the backup or restore operations. See “Mounting Devices” on page 155 for more information.
5. Perform the necessary backup or restore operations by entering the appropriate BACKUP commands. For examples using the BACKUP command to back up the system disk, see “Performing the System Disk Backup” on page 153; for examples using the BACKUP command to restore the system disk, see “Performing the System Disk Restore” on page 155.
6. Shut down the system.
7. Boot from your original system disk.

C License Management Supplement

This appendix contains information that supplements the license instructions in this manual and in the *OpenVMS License Management Utility Manual*. It describes what licenses you need to register after installing the operating system, explains how to use the License Unit Requirement Table (LURT) that many PAKs refer to, and includes notes and restrictions regarding the License Management Facility and PAKs.

Licenses You Need to Register

After you install the OpenVMS Alpha operating system, you must register OpenVMS Alpha licenses, which let you use the OpenVMS Alpha operating system. You must also register the licenses for the OpenVMS Alpha layered products you have purchased, such as DECnet for OpenVMS. To register a license, you need to obtain a Product Authorization Key (PAK). A PAK is a printed document provided by HP that contains the appropriate information to authorize access to software on an Alpha computer (or in an OpenVMS Cluster environment). You can obtain a PAK from an HP support representative in the same way that you obtain software.

Using the License Unit Requirement Table (LURT)

Many PAKs contain an alphabetic letter in the Availability or Activity fields. This letter refers to a column in the License Unit Requirement Table (LURT), which you can access online at the following URL:

`http://licensing.hp.com/swl/view.slm?page=index`

The second column (Operating System Units) in the LURT is also known as Column A. This column lists the number of license units required for each processor listed in the System Model column. The last column (Layered Product Units) in the LURT is also referred to as Column H. It indicates the number of OpenVMS Alpha layered products license units you need to run the system integrated products (SIPs) included with the operating system. For example, if your PAK specifies *Availability = A*, you would require 50 license units to load the license on a DEC 3000 Alpha Model 500 series computer, or 500 license units to load the license on a DEC 7000 Alpha Model 610 computer.

Note that some PAKs specify MOD_UNITS in the options field. The MOD_UNITS option allows the system manager to use the DCL command LICENSE MODIFY/UNITS to temporarily increase the size of the PAK. This permits a product to be used, in certain emergency situations, on a processor larger than the processor size specified in the license. Check your license terms and conditions before modifying license units. Reset the PAK size to its original size after the emergency situation is resolved.

License Management Facility (LMF) Notes

The following list addresses some common concerns and questions regarding the License Management Facility (LMF). For full explanations of these issues, see the *OpenVMS License Management Utility Manual*.

- If you do not have a valid OpenVMS Alpha license that is registered and activated, the system displays a warning message as part of system startup and restricts system use to the operator's console, OPA0.
- If a checksum error is displayed when you register a license, check *all* the fields of data that you entered, including the checksum itself.
- After your PAKs are registered, they are activated (loaded) automatically as part of each system startup.
- If an OpenVMS Alpha license is registered with insufficient license units, the system displays the following message when the user (process) attempts to log in:

  ```
  %LICENSE-F-EXCEEDED, licensed product has exceeded current license limits
  ```

  Users can always log in to the operator's console, OPA0, however.
- The default LICENSE database is located in the file SYS$COMMON:[SYSEXE]LMF$LICENSE.LDB. You can move the database, although HP does not recommend doing so. If you move the database, you must either define the logical name LMF$LICENSE at the system level to point to the new database or use the /DATABASE=*filespec* qualifier with all LICENSE commands. To redirect LMF to another database location on a more permanent basis, add the following line to the command procedure SYS$MANAGER:SYLOGICALS.COM:

  ```
  $ DEFINE/SYSTEM LMF$LICENSE device:[directory]LMF$LICENSE.LDB
  ```

  If you specify a device other than SYS$SYSDEVICE, you must also mount the specified disk in the SYLOGICALS.COM command procedure.
- Each OpenVMS Alpha license is restricted to a single node for permanent PAKs. You must assign a System Communications Services (SCS) name to the license when you register with the VMSLICENSE.COM command procedure, or you must enter a LICENSE MODIFY/INCLUDE=*node-name* command after you register the license.

NOTE The SCS node name is not necessarily the DECnet node name. SCSNODE is a system parameter; it can be a maximum of six alphabetic characters.

Restrictions

Availability Product Authorization Keys (PAKs) are available for the OpenVMS Alpha operating system. An OpenVMS Alpha PAK is identified by the keyword ALPHA in the PAK's option field. Note the following restrictions:

- PAKs having the ALPHA option can be loaded and used only on Alpha computers. However, they can safely reside in a license database (LDB) shared by both VAX and Alpha systems.
- Because the LMF for Alpha systems is capable of handling all types of PAKs, including those for VAX systems, HP recommends that you perform your LDB tasks using the Alpha LMF.

- Availability PAKs for VAX systems (availability PAKs without the ALPHA option) will not load on Alpha systems. Only those availability PAKs containing the ALPHA option will load on Alpha systems.
- Other PAK types such as activity (also known as concurrent or n-user) and personal use (identified by the RESERVE_UNITS option) work on both VAX and Alpha systems.
- Avoid using the following LICENSE commands from a VAX system on a PAK containing the ALPHA option:
  - REGISTER
  - DELETE/STATUS
  - DISABLE
  - ENABLE
  - ISSUE
  - MOVE
  - COPY
  - LIST
- *Caution:* By default, all Alpha availability PAKs look disabled to a VAX system. Never use the DELETE/STATUS=DISABLED command from a VAX system on an LDB that contains Alpha PAKs. If you do, all Alpha PAKs will be deleted.
- With the exception of the DELETE/STATUS=DISABLED command, if you inadvertently use one of the previously listed LICENSE commands on an Alpha PAK while using a VAX system, the PAK and the database will not be adversely affected. Repeat the command using LMF running on an Alpha system, and the PAK should return to a valid state.
- If you do not repeat the command using LMF on an Alpha system, the system that you intended to disable will remain enabled (the system is not otherwise affected). Only the Alpha LMF can disable an Alpha PAK.

  However, if you attempt to use any of the previously listed commands on a PAK located in an LDB that is shared with a VAX system, the following serious problems might result:
  - Because Alpha PAKs look disabled to a VAX system, they are normally ignored at load time by VAX systems. However, if one of the previously listed commands is entered from a VAX system and the PAK information is not set to a valid state by an Alpha system, there is a chance the VAX system will attempt to load the Alpha PAK. Because the VAX system will be unable to load the PAK, the VAX LMF will report an error.
  - Even if a valid VAX PAK for the affected product is in the LDB, it too might not load. In this case, system users might be denied access to the product.

  If the PAK cannot be restored to a valid state because all Alpha systems are inaccessible for any reason, use your VAX system to disable the Alpha PAK. This prevents your VAX system from attempting to load the Alpha PAK.

D Preparing to Use OpenVMS Management Station

This appendix explains how to prepare your OpenVMS system to run the OpenVMS Management Station server software and how to prepare your PC to run the OpenVMS Management Station client software. This appendix also includes other related information.

During the OpenVMS installation or upgrade procedure, the OpenVMS Management Station server software is automatically installed on your OpenVMS system disk.

If you accepted the default options, the PC client files will be located in SYS$COMMON:[TNT.CLIENT]. If these files are deleted from your system, you can download them from the following location:

`http://www.hp.com/go/openvms/argus`

If the TNT$* server files have been deleted from SYS$SYSTEM, you can recover the server files by reinstalling the OpenVMS operating system or by downloading and installing the new kit from this website.

After you have ensured that OpenVMS Management Station software is installed on your system, follow the procedures described in this appendix.

Preparing Your OpenVMS System

You must prepare your OpenVMS system to run the server software so that your system can properly interact with the PC running the client software. The procedures include the following:

- Set up within a mixed-architecture cluster environment (if applicable).
- Start the server on other nodes.
- Update the printer and storage database.
- Edit the system files.
- Allow OpenVMS Management Station to control the printer and storage environment.
- Keep your printer environment up to date.
- Check if running third-party TCP/IP stacks.
- Determine and report problems.

Setting Up in a Mixed-Architecture Cluster Environment

The OpenVMS Management Station server creates several configuration files:

- TNT$UADB.DAT
- TNT$ACS.DAT
- TNT$JOURNAL.TNT$TRANSACTION_JOURNAL
- TNT$MONITOR.DAT

- TNT$MONITOR.TNT$MONITOR_JOURNAL
- TNT$EMERGENCY_MOUNT.COM

In a common-environment cluster with one common system disk, you use a common copy of each of these files located in the SYS$COMMON:[SYSEXE] directory on the common system disk, or on a disk that is mounted by all cluster nodes. No further action is required.

However, to prepare a common user environment for an OpenVMS Cluster system that includes more than one common VAX system disk or more than one common Alpha system disk, you must coordinate the files on those disks.

The following rules apply:

- Disks holding common resources must be mounted early in the system startup procedure, such as in the SYLOGICALS.COM procedure.
- You must ensure that the disks are mounted with each cluster reboot.

Follow these steps to coordinate files:

1. Decide where to locate the files. In a cluster with multiple system disks, system management is much easier if the common system files are located on a single disk that is not a system disk.
2. Copy the following files from SYS$COMMON:[SYSEXE] to a directory on a disk other than the system disk: TNT$UADB.DAT, TNT$ACS.DAT, TNT$MONITOR.DAT, TNT$MONITOR.TNT$MONITOR_JOURNAL, TNT$EMERGENCY_MOUNT.COM, and TNT$JOURNAL.TNT$TRANSACTION_JOURNAL.
3. Edit the file SYS$COMMON:[SYSMGR]SYLOGICALS.COM *on each system disk* and define logical names that specify the location of the cluster common files.

   Example

   If the files will be located on 1DJA15, define logical names as follows:

   ```
   $ DEFINE/SYSTEM/EXEC TNT$ACS -
   _$ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$ACS.DAT
   ```

   TNT$EMERGENCY_MOUNT.COM will be created in SYS$SYSTEM or in the directory pointed to by the TNT$ACS logical, if the logical exists.

   ```
   $ DEFINE/SYSTEM/EXEC TNT$UADB -
   _$ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$UADB.DAT

   $ DEFINE/SYSTEM/EXEC TNT$JOURNAL -
   _$ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$JOURNAL.TNT$TRANSACTION_JOURNAL

   $ DEFINE/SYSTEM/EXEC TNT$MONITOR -
   _$ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$MONITOR.DAT

   $ DEFINE/SYSTEM/EXEC TNT$MONITORJOURNAL -
   _$ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$MONITOR.TNT$MONITOR_JOURNAL
   ```

4. To ensure that the system disks are mounted correctly with each reboot, follow these steps:

   1. Copy the SYS$EXAMPLES:CLU_MOUNT_DISK.COM file to the [VMS$COMMON.SYSMGR] directory, and edit it for your configuration.
   2. Edit SYLOGICALS.COM and include commands to mount, with the appropriate volume label, the system disk containing the shared files.

      Example

If the system disk is 1DJA16, include the following command:

```
$  @SYS$SYSDEVICE:[VMS$COMMON.SYSMGR]CLU_MOUNT_DISK.COM -
_$ $1$DJA16: volume-label
```

Starting the Server on Other Nodes

If you plan to run OpenVMS Management Station on more than one node in an OpenVMS Cluster without a reboot, you need to start the software on those nodes.

Use SYSMAN to start the server as follows:

```
$ @SYS$STARTUP:TNT$STARTUP.COM
```

Or, you can log in to each node that shares the SYS$COMMON: directory and enter the following command:

```
$ @SYS$STARTUP:TNT$STARTUP.COM
```

If you are performing an upgrade or a reinstallation and OpenVMS Management Station is already running on the node, add the RESTART parameter to the startup command, as follows:

```
$ @SYS$STARTUP:TNT$STARTUP.COM RESTART
```

Error Log Information

OpenVMS Management Station writes error log information to the file TNT$SERVER_ERROR.LOG. This error log is created in the SYS$SPECIFIC:[SYSEXE] directory. If you start the OpenVMS Management Station server on multiple nodes in a cluster, which is recommended, there will be multiple server error logs.

Updating the Printer and Storage Database

When you installed OpenVMS Management Station, the installation started the OpenVMS Management Station server on the installation node. If this installation was an upgrade, the server converts the existing OpenVMS Management Station database to the latest V3.* format. If this was a new installation, the server creates an initial version of the database file TNT$ACS.DAT and invokes the update functions automatically.

To complete the database, start the OpenVMS Management Station server on each node in your cluster. The instances of the server communicate with each other to determine device, queue, and volume information, and the server must be running on each node for this communication to take place.

Editing the System Files

To start the OpenVMS Management Station server from your system startup files, insert one of the following commands into your system startup procedures (probably SYS$MANAGER:SYSTARTUP_VMS.COM) after both the Queue Manager and network are started, but immediately prior to the ENABLE AUTOSTART/QUEUES.

NOTE Remove any other invocations of TNT$STARTUP you might have added in previous releases of the OpenVMS Management Station.

OpenVMS Management Station cannot start until the network has started. If you start your network using a batch process, OpenVMS Management Station might start before the batch process completes and the network is started.

Command	Parameter 1	Parameter 2	Description
@TNT$STARTUP	blank	N.A.	Starts the server. Does not start printer queues or mount volumes.
@TNT$STARTUP	RESTART	N.A.	Shuts down a running server, then starts the server. Does not start printer queues or mount volumes.
@TNT$STARTUP	BOOT	blank	Starts the server. Starts any printer queues that are not yet started and are managed by OpenVMS Management Station. Does not mount volumes managed by OpenVMS Management Station.
@TNT$STARTUP	BOOT	ALL	Starts the server. Starts any printer queues that are not yet started and are managed by OpenVMS Management Station. Mounts any volumes that are not yet mounted and are managed by OpenVMS Management Station.
@TNT$STARTUP	BOOT	PRINTERS	Starts the server. Starts any printer queues that are not yet started and are managed by OpenVMS Management Station. Does not mount volumes managed by OpenVMS Management Station.
@TNT$STARTUP	BOOT	STORAGE	Starts the server. Mounts any volumes that are not yet mounted and are managed by OpenVMS Management Station. Does not start any printer queues.

Note that the effect of TNT$STARTUP BOOT, with no second parameter, has not changed from earlier releases. This command starts any printer queues that are not yet started and are managed by OpenVMS Management Station, but does not mount any volumes.

Add the following command line to the system shutdown file, SYS$MANAGER:SYSHUTDWN.COM:

```
$ @SYS$STARTUP:TNT$SHUTDOWN.COM
```

Allowing OpenVMS Management Station to Control the Printer and Storage Environment

It is not necessary to remove your existing queue startup and volume mount DCL procedures immediately. The OpenVMS Management Station server will recognize that you started a queue or mounted a volume with your command procedures and will assume that you want it that way.

As you become familiar with the server's management ability, you can remove or comment out the DCL commands and procedures that perform these tasks and allow OpenVMS Management Station to control your printer and storage environment.

In addition, the OpenVMS Management Station server periodically (every 24 hours) generates a DCL command procedure that includes the commands to mount all of the volumes managed by OpenVMS Management Station. If you are familiar with DCL, you can look at this command procedure to see what actions OpenVMS Management Station performs for you. And, in the event of an unforeseen system problem or a corrupt server database (SYS$SYSTEM:TNT$ACS.DAT), you could use this command procedure to mount the volumes.

The name of the generated file is TNT$EMERGENCY_MOUNT.COM. TNT$EMERGENCY_MOUNT.COM is created in SYS$SYSTEM or in the directory pointed to by the TNT$ACS logical, if that logical name exists.

The OpenVMS Management Station server limits TNT$EMERGENCY_MOUNT.COM to seven versions.

Keeping Your Printer Environment Up to Date

The OpenVMS Management Station server installation creates a file named SYS$STARTUP:TNT$UTILITY.COM. This command procedure scans the OpenVMS system and updates the database of known printers, queues, and related devices.

When Is the Database Updated?

The database is updated:

- As part of the OpenVMS Management Station installation.
- When you specifically invoke TNT$UTILITY.COM.
- At periodic intervals as a server background thread. Two logical names control how often this server thread runs:

Logical Name	Description
TNT$PRINTER_RECON_INTERVAL	How often the thread should run, in minutes, from when the server was last started on this node. If you do not define this logical, the default value is 1440 minutes (24 hours).
TNT$PRINTER_RECON_INTERVAL_MIN	The minimum number of minutes that must elapse before the thread should run again, starting from when the database was last updated. If you do not define this logical, the default value is 60 minutes (1 hour).

You can think of these logicals as meaning “run the thread this often (TNT$PRINTER_RECON_INTERVAL), but make sure this much time has elapsed since the database was last updated (TNT$PRINTER_RECON_INTERVAL_MIN).”

Because you can run TNT$UTILITY.COM yourself, and because the OpenVMS Management Station server also updates the database, the TNT$PRINTER_RECON_INTERVAL_MIN logical prevents the database from being updated more frequently than is actually needed.

If you want to change the defaults for one of these logicals, define the logical on all nodes on which the OpenVMS Management Station server is running.

Do You Need to Run TNT$UTILITY.COM Manually?

If you use OpenVMS Management Station to make all of the changes to your printer configuration, the configuration files are immediately modified to reflect the changes and you probably do not need to specifically run TNT$UTILITY.COM.

However, if you or someone else uses DCL to make a change --- for example, if you use the DELETE /QUEUE command to delete a queue --- the configuration files will not be synchronized. In this case, the OpenVMS Management Station client will advise you to run TNT$UTILITY.COM to resynchronize the database.

Run the following procedure on one node in the cluster to make the database match your system:

```
$ @SYS$STARTUP:TNT$UTILITY.COM UPDATE PRINTERS
```

For example, if you or someone else used DCL to delete a queue, you need to delete that queue from the database. TNT$UTILITY.COM assumes that your system is set up and running the way that you want it to, so you should fix any problems before you run TNT$UTILITY.COM.

Are There Any Requirements for Running TNT$UTILITY.COM?

You need the SYSNAM privilege to run TNT$UTILITY.COM.

TNT$UTILITY.COM connects to the OpenVMS Management Station server on the current OpenVMS system to determine device and queue information. Therefore, the OpenVMS Management Station server must be running on the node where you run TNT$UTILITY.COM.

The OpenVMS Management Station server then connects to the other OpenVMS Management Station servers in the OpenVMS Cluster to determine device and queue information. It is generally a good idea to keep the OpenVMS Management Station server running on the other nodes in an OpenVMS Cluster to keep the database up to the minute.

However, if the OpenVMS Management Server is not able to connect to the OpenVMS Management Station server on a given node, it uses the known information about that OpenVMS node from the database. That is, in the absence of a valid connection to that OpenVMS node, the information in the database is assumed to be correct.

Keeping Your Storage Environment Up to Date

The TNT$UTILITY.COM utility accepts parameters (UPDATE STORAGE) to update the storage database. However, the storage database is updated dynamically every time you use the OpenVMS Management Station client to perform a storage management operation. Therefore, you do not need to run TNT$UTILITY.COM to update the storage database.

Enabling Disk Quotas

Before installing OpenVMS Management Station, you might have disabled disk quotas on the SYSTEM disk. If so, you should reenable the quotas and then rebuild to update quota information by entering the following commands:

```
$ RUN SYS$SYSTEM:DISKQUOTA
DISKQUOTA>ENABLE
DISKQUOTA>REBUILD
DISKQUOTA>EXIT
```

Caching Storage Configuration Data

OpenVMS Management Station uses two logical names to determine how often to refresh cached (in-memory) storage configuration data.

- TNT$PURGE_CYCLE_LATENCY -- Determines how often to wait (in seconds) after purging stale device reports before purging again. This value affects how frequently the clusterwide data (maintained by a “master server”) is updated in memory.

  ```
  min = 180
  default =  1800   (30 minutes)
  max = 18000       (5 hours)
  ```

- TNT$LOCAL_SURVEY_LATENCY -- Determines the delay (in seconds) from one node-specific device survey to the next. This value is independent of clusterwide surveys requested by the “master server” when performing a purge.

```
min = 6
default =  60   (1 minute)
max = 600       (10 minutes)
```

For both logical names, smaller values result in the OpenVMS Management Station server consuming more CPU cycles in periodic purges or surveys.

If you do not accept the defaults, you might find that larger OpenVMS Cluster systems behave better with values on the high end of the allowed range.

If you do not define these logicals, the OpenVMS Management Station server uses the default values. If you do define these logical names, the values are used only if they are within the minimum to maximum range.

Running Third-Party TCP/IP Stacks

HP TCP/IP Services for OpenVMS Version 3.2 or higher is the only supported TCP/IP stack. Additional stacks have not been tested. However, TCP/IP stacks that are 100 percent compliant with the QIO interface for TCP/IP Services for OpenVMS should also work. (Contact your TCP/IP vendor for additional information and support issues.)

For the best chance of success, check the following:

- Make sure that the QIO service (for example, UCXQIO) is enabled.
- For TCPware, also make sure that TCPware's UCX$IPC_SHR.EXE is an installed image.
- Also for TCPware, make sure you are running a version of TCPware that correctly implements a DECC-compatible socket interface, such as Version 5.3-3.

Determining and Reporting Problems

If you encounter a problem while using OpenVMS Management Station, please report it to HP. Depending on the nature of the problem and the type of support you have, you can take one of the following actions:

- If your software contract or warranty agreement entitles you to telephone support, call HP.
- If the problem is related to OpenVMS Management Station documentation, use the Internet address printed in front of this book to send us your comments.

Removing the OpenVMS Management Station Server

When you execute the OpenVMS installation or upgrade procedure, the OpenVMS Management Station server software is automatically installed on your OpenVMS system disk. If this server software is later reinstalled using another kit (for example, a kit downloaded from the web or a patch kit), you have the option to remove the OpenVMS Management Station. If you use the POLYCENTER Software Installation utility to remove the OpenVMS Management Station from the OpenVMS system, the following files are not removed:

- TNT$ACS.DAT
- TNT$JOURNAL.TNT$TRANSACTION_JOURNAL
- TNT$SERVER_ERROR.LOG
- TNT$UADB.DAT
- TNT$EMERGENCY_MOUNT.COM

Do not delete these files unless you have already removed the OpenVMS Management Station.

Preparing Your PC

During the OpenVMS installation or upgrade procedure, you selected the OpenVMS Management Station client software files to be installed on your OpenVMS system disk (or you added them later using the DCL command PRODUCT INSTALL TNT). After you have prepared your OpenVMS system to run the server software, you must next prepare your PC to run the client software.

Required Memory and Disk Space

Your PC requires 20 MB of free disk space to install the OpenVMS Management Station client software.

Distribution Files

The OpenVMS Management Station client kit, TNT032.EXE for Intel systems (Windows NT, 95, 98, 2000, and Me), is located in the SYS$COMMON:[TNT.CLIENT] directory.

Required Software

Microsoft Windows NT Version 4.0 (Service Pack 3 or higher) or Windows 95, 98, 2000, Me, or higher (Intel only) must be installed on each PC on which you want to install the OpenVMS Management Station client.

The version of the Microsoft Management Console (MMC) included in this baselevel requires files provided by Microsoft Internet Explorer, Version 3.02 or higher, which must be present on the system.

Time Required for Installation

The time required to install the OpenVMS Management Station client software is approximately 5 minutes.

Copying the Client File to the PC

The client file TNT032.EXE is located in the SYS$COMMON:[TNT.CLIENT] directory. Copy the client file to a temporary directory on the PC using either of the following procedures:

- Create a file share to the OpenVMS system and copy the file.
- Use FTP on the PC to copy the file from the OpenVMS system.

Installation Directory

The installation procedure allows you to select the installation directory, and suggests \ Program Files\ OpenVMS Mgmt Station\ as the default.

Installation Procedure

Run TNT032.EXE from a temporary directory. It is a self-extracting executable file that automates the OpenVMS Management Station installation.

Recovering from Errors

If an error occurs during installation, you will receive an error message describing the problem. This information can help you determine the cause of the problem. An error can occur during the installation if one or more of the following conditions exist:

- The operating system version is incorrect
- Disk space and memory necessary for successful installation are inadequate

After Installing the Client Software on Your PC

When you create an OpenVMS Cluster or OpenVMS Node object in an OpenVMS Management Domain, you select the transport you want to use for all connections to that system. You can choose DECnet Phase IV for OpenVMS or TCP/IP.

OpenVMS Management Station uses this transport for all communications between the PC and this system, or between any other OpenVMS system that is running the OpenVMS Management Station server and this system.

NOTE The OpenVMS Management Station client supports only TCP/IP connections for primary servers. That is, the connection between the PC and the OpenVMS system uses only TCP/IP. Therefore, at least one OpenVMS system *must* be running TCP/IP.

You do need to make sure that your PC can connect to the primary-server systems, as described in the following sections. OpenVMS Management Station connects your PC to the primary-server system and then routes management operations to the target systems.

Defining TCP/IP Nodes

Your hosts file or name server must be able to resolve the IP name or address of all primary-server systems. If you can successfully ping the primary-server systems from your PC, then this condition is met.

Uninstalling Version 2.1 of the OpenVMS Management Station Client

Version 3.2 of the OpenVMS Management Station client is not dependent on Version 2.1 and does not share any files with this prior version. After installing the Version 3.2 client, you can uninstall the Version 2.1 client software.

Uninstalling OpenVMS Management Station

If you need to uninstall the OpenVMS Management Station client software, make sure you first exit OpenVMS Management Station. The uninstallation fails if OpenVMS Management Station is currently running.

If you run the OpenVMS Management Station Help, the following files might be created:

- VMSMGMT.FTS
- VMSMGMT.GID
- VMSPRINT.FTS
- VMSPRINT.GID
- VMSSCOPE.FTS
- VMSSCOPE.GID
- VMSSTORE.FTS
- VMSSTORE.GID
- VMSACNT.FTS
- VMSACNT.GID

The OpenVMS Management Station Uninstall program does not delete these files. To complete the uninstall:

1. Delete these files.
2. Delete the OpenVMS Management Station directory.

Note that the OpenVMS Management Station Uninstall program does not uninstall the Microsoft Management Console (MMC) support files.

Getting Started with OpenVMS Management Station

All information about getting started, setting up, and using OpenVMS Management Station is contained in online help and the *OpenVMS Management Station Overview*.

E Removing the OpenVMS Alpha Operating System

This appendix explains how to remove the OpenVMS Alpha operating system from your disk.

You can remove the OpenVMS Alpha operating system from your disk in the following ways:

- If the disk contains a small number of user files, copy those user files elsewhere and then reinitialize the disk.
- If the disk contains many user files, use the PRODUCT REMOVE command to remove an obsolete or extra copy of the OpenVMS Alpha operating system without removing any of the user files. Note that you must also delete or archive certain operating system files that the PRODUCT REMOVE command cannot delete.

Follow these steps to remove OpenVMS Alpha operating system files:

1. If your system disk has multiple system-specific roots, boot the system and execute SYS$MANAGER:CLUSTER_CONFIG.COM to remove all roots except the one from which you are booted.
2. Shut down and boot from the distribution CD-ROM or from a system disk other than the one from which OpenVMS Alpha is being removed. Then do one of the following:
   - If OpenVMS Alpha is not running from the distribution CD-ROM, log in to a privileged account.
   - If OpenVMS Alpha is running from the distribution CD-ROM, choose the option to execute DCL commands.
3. Enter the following DCL commands:

   ```
   $ DEFINE/NOLOG PCSI$SYSDEVICE target-disk
   $ DEFINE/NOLOG PCSI$SPECIFIC target-disk:[SYSx.]
   $ DEFINE/NOLOG PCSI$DESTINATION target-disk:[VMS$COMMON]
   ```

   where:

   - *target-disk* is the device name of the disk from which OpenVMS Alpha is being removed
   - SYS*x* is the root number that you did *not* remove in step 1
4. If the disk also contains layered products that were installed using the POLYCENTER Software Installation utility, HP recommends that you remove them as well. Remove any layered products *before* using the PRODUCT REMOVE VMS command.

   Use the following command to remove all the products at once. Select the layered products you want to remove from the menu.

   ```
   $ PRODUCT REMOVE * /REMOTE
   ```

   Use the following commands to remove individual products:

   ```
   $ PRODUCT SHOW PRODUCT/REMOTE
   $ PRODUCT REMOVE product-name /REMOTE
   ```
5. Enter the following DCL command:

   ```
   $ PRODUCT REMOVE VMS /REMOTE
   ```

6. Because the PRODUCT REMOVE command does not delete certain files, review the target disk to determine if you want to delete, move, or archive the operating system files that still remain on the disk.

   Following are lists of the files that the PRODUCT REMOVE command does not delete:

   - In *target-disk*:[SYS*.SYSEXE], where * is 0 or the hexadecimal number of any additional OpenVMS Cluster roots on the target disk:
     - ALPHAVMSSYS.PAR
     - MODPARAMS.DAT
     - PAGEFILE.SYS
     - SWAPFILE.SYS
   - In *target-disk*:[VMS$COMMON.SYSEXE]:
     - LMF$LICENSE.LDB
     - PCSI$FILE_SYSTEM.PCSI$DATABASE
     - PCSI$PROCESSOR.PCSI$DATABASE
     - PCSI$ROOT.PCSI$DATABASE
     - RIGHTSLIST.DAT
     - SYSUAF.DAT

   As you examine the preceding lists of files, you might want to archive, rather than delete, the following files:

   - ALPHAVMSSYS.PAR
   - MODPARAMS.DAT
   - LMF$LICENSE.LDB
   - RIGHTSLIST.DAT
   - SYSUAF.DAT

   Also, if you previously removed layered products, there might be additional files created by the layered products that you might want to delete, move, or archive.

7. Review the target disk for the directory structures [VMS$COMMON...] and [SYS*x*...] that remain after you remove the OpenVMS Alpha operating system. You might want to delete these directories.

   Note that the directories [SYSx]SYSCOMMON.DIR (in all [SYS*x*]) are aliases for the file [000000]VMS$COMMON.DIR. DO NOT DELETE THESE SYSCOMMON.DIR files. Instead, use SET FILE /REMOVE as follows:

   ```
   $ SET FILE /REMOVE [SYS*]SYSCOMMON.DIR
   ```

   After you have executed this command and deleted, moved or archived all the files in [VMS$COMMON...] you can delete [000000]VMS$COMMON.DIR. You can then proceed to delete, move or archive the files in each [SYS*x*] directory.

Glossary

This glossary defines key terms in the context of an OpenVMS Alpha computing environment.

boot, bootstrap The process of loading system software into a processor's main memory. This guide uses the term *boot* to refer to this process.

boot server An Alpha computer that is part of a local area OpenVMS Cluster system. The boot server is a combination of a MOP server and a disk server for the satellite system disk. *See also satellite node.*

CDSA Common Data Security Architecture. CDSA is automatically installed with the operating system. For more information about CDSA, see *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture.*

CI-only Cluster A computer system consisting of a number of computers. It uses only the computer interconnect (CI) to communicate with other computers in the cluster. These computers share a single file system.

computer interconnect (CI) A type of I/O subsystem. It links computers to each other and to HS*x* devices (for example, an HSJ or HSG).

concurrent upgrade The entire OpenVMS Cluster is shut down and unusable while upgrading each system disk. When the cluster reboots, all cluster members will start up the upgraded version of the OpenVMS operating system. *Contrast with rolling upgrade.*

device name The name used to identify a device on the system. A device name indicates the device code, controller designation, and unit number.

disk server A computer within a local area cluster that provides an access path to CI, DSSI, and locally connected disks for other computers that do not have a direct connection.

HS*x* device A self-contained, intelligent, mass storage subsystem (for example, an HSJ or HSG) that lets computers in a cluster environment share disks.

HS*x* drive Any disk or tape drive connected to an HS*x* device (for example, an HSJ or HSG). A system disk on an HS*x* drive can be shared by several computers in an OpenVMS Cluster environment.

InfoServer A general-purpose disk storage server that allows you to use the distribution compact disc to install the operating system on remote client systems connected to the same local area network (LAN).

Kerberos A network authentication protocol that provides authentication for applications using secret-key crytpography. Kerberos is automatically installed with the OpenVMS operating system.

local area OpenVMS Cluster system A configuration consisting of one or more computers that act as a MOP server and disk server, and a number of low-end computers that act as satellite nodes. The local area network (LAN) connects all of the computers. These computers share a single file system.

local drive A drive, such as a disk drive, that is connected directly to a computer. If you have a standalone computer, it is likely that all drives connected to the system are local drives.

media Any packaging agent capable of storing computer software (for example, compact discs, magnetic tapes, floppy disks, disk packs, and tape cartridges).

MOP server A computer system using either the LAN Auxiliary Control Process (LANACP) or DECnet software to downline load systems using the Maintenance Operations Protocol (MOP). Systems loaded include OpenVMS systems, print servers, and LAT servers.

OpenVMS Cluster system A computer system consisting of two or more Alpha or VAX computers (or two or more instances in an OpenVMS Galaxy configuration) running HP OpenVMS Cluster software. There are many types of cluster interconnects that can be used to create a cluster environment: for example, CI, DSSI, and LAN devices in a local area network, and Shared Memory CI (SMCI) for OpenVMS Galaxy instances. An OpenVMS Cluster can consist of a single interconnect or a mixed-interconnect cluster with any combination of cluster interconnects.

OpenVMS Galaxy instance The OpenVMS operating system running on either a soft or a hard partition of a hardware platform.

operating system CD-ROM The CD-ROM containing the OpenVMS Alpha operating system and the installation and other procedures described in this manual.

platform A POLYCENTER Software Installation utility concept whereby the OpenVMS Alpha operating system is kitted with options for selected other products (for example, DECwindows Motif and networking products) so that the user can optionally elect to install all at once.

rolling upgrade Each system disk in an OpenVMS Cluster is upgraded individually, allowing old and new versions of the operating system to run together. Certain members of the cluster are available for use while others are being upgraded. *Contrast with concurrent upgrade.*

satellite node A computer that is part of a local area cluster. A satellite node is downline loaded from a MOP server and then boots remotely from the system disk served by a disk server in the local area cluster. *See also* boot server, disk server, MOP server.

scratch disk A blank disk or a disk with files you no longer need.

source drive The drive that holds the distribution kit during an upgrade or installation, or the drive from which you restore files to a target disk.

standalone system A computer system consisting of a single computer that is not part of a network or OpenVMS Cluster.

system disk The disk that contains or will contain the OpenVMS operating system. The installation or upgrade procedure transfers the OpenVMS Alpha operating system from the operating system CD-ROM on the source drive to the system disk, also referred to as the target system disk.

target drive The drive that holds the system disk during an upgrade or installation, or the drive you designate when backing up the system disk.

UETP (User Environment Test Package) A software package that tests all the standard peripheral devices on your system, various commands and operating system functions, the system's multiuser capability, DECnet software, and the cluster environment.

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