
OpenVMS AXP Version T6.1-FT4 Upgrade and Installation Manual

Order Number: AA-Q1Z5B-TE

February 1994

This document contains step-by-step instructions for installing and upgrading the OpenVMS AXP Version operating system on AXP computers. It also includes information about booting, shutdown, backup, and licensing procedures.

Digital Equipment Corporation

PROPRIETARY INFORMATION

Furnished for Field Test Purposes Only

The information contained herein is furnished in confidence and is subject to the terms and conditions of a License Agreement for Field Testing Digital Software.

Revision/Update Information: This manual supersedes the *OpenVMS AXP Version 1.5 Upgrade and Installation Manual* and the previous field test version of the *OpenVMS AXP Version 2.0 Upgrade and Installation Manual*.

Software Version: OpenVMS AXP Version T6.1-FT4
Digital Equipment Corporation
Maynard, Massachusetts

February 1994

Digital Equipment Corporation makes no representations that the use of its products in the manner described in this publication will not infringe on existing or future patent rights, nor do the descriptions contained in this publication imply the granting of licenses to make, use, or sell equipment or software in accordance with the description.

Possession, use, or copying of the software described in this publication is authorized only pursuant to a valid written license from Digital or an authorized sublicensor.

© Digital Equipment Corporation 1994. All rights reserved.

The postpaid Reader's Comments forms at the end of this document request your critical evaluation to assist in preparing future documentation.

The following are trademarks of Digital Equipment Corporation: Alpha AXP, AXP, Bookreader, CI, DEC, DEC C, DECdtm, DECterm, DECnet, DECwindows, Digital, HSC, InfoServer, LAT, OpenVMS, POLYCENTER, RRD42, RZ, TURBOchannel, UETP, VAX, VAX DOCUMENT, VMS, VMScluster, XUI, and the DIGITAL logo.

The following are third-party trademarks:

All other trademarks and registered trademarks are the property of their respective holders.

ZK6361

This document is available on CD-ROM.

This document was prepared using VAX DOCUMENT Version 2.1.

Send Us Your Comments

We welcome your comments on this or any other OpenVMS manual. If you have suggestions for improving a particular section or find any errors, please indicate the title, order number, chapter, section, and page number (if available). We also welcome more general comments. Your input is valuable in improving future releases of our documentation.

You can send comments to us in the following ways:

- Internet electronic mail: OPENVMSDOC@ZKO.MTS.DEC.COM
- Fax: 603-881-0120 Attn: OpenVMS Documentation, ZK03-4/U08
- A completed Reader's Comments form (postage paid, if mailed in the United States), or a letter, via the postal service. Two Reader's Comments forms are located at the back of each printed OpenVMS manual. Please send letters and forms to:

Digital Equipment Corporation
Information Design and Consulting
OpenVMS Documentation
110 Spit Brook Road, ZK03-4/U08
Nashua, NH 03062-2698
USA

You may also use an online questionnaire to give us feedback. Print or edit the online file SYS\$HELP:OPENVMSDOC_SURVEY.TXT. Send the completed online file by electronic mail to our Internet address, or send the completed hardcopy survey by fax or through the postal service.

Thank you.

Contents

Preface	xiii
1 Getting Started	
Overview	1-2
Introduction	1-2
Key Terms	1-2
Examining Software and Hardware Components	1-3
Introduction	1-3
Hardware Components	1-3
Software Components	1-3
Distribution Compact Disc	1-3
Required PALcode	1-4
Device Naming Conventions	1-4
Using the Distribution Compact Disc	1-6
Using the Menu	1-6
Sample Menu Display	1-6
How the Install or Upgrade Option Works	1-7
How the DCL Option Works	1-8
How the Shutdown Option Works	1-8
Where to Go Next	1-9
2 Preparing to Install in a Cluster Environment	
Preparing for a VMSccluster Environment	2-2
Introduction	2-2
Where to Find More Information	2-2
VMSccluster Information You Will Need	2-3
Where to Go Next	2-4
3 Installing the OpenVMS AXP Operating System	
Overview	3-2
Field Test Notes	3-2
Booting the Distribution Compact Disc	3-3
Introduction	3-3
Booting from the Local Drive	3-3
Booting from the InfoServer	3-3
Creating the System Disk	3-7
Selecting the Install Option	3-7
Specifying the Target Disk	3-8
Specifying the Volume Label	3-8
Setting the SYSTEM Account Password	3-9
Becoming a Cluster Member	3-9

Registering Licenses	3-10
Introduction	3-10
Types of OpenVMS AXP Licenses	3-10
Where to Find More Information	3-11
How to Register Licenses	3-11
Using the Licensing Procedure	3-12
Continuing the Procedure	3-13
Choosing Descriptive Help Text	3-13
Beginning the Installation	3-13
Selecting Default Values	3-13
Completing the Installation	3-13
Booting the New System Disk	3-15
Introduction	3-15
Preparing to Boot the New System Disk	3-15
How to Boot the New System Disk	3-15
Joining a VMScluster	3-16
Introduction	3-16
Getting Started	3-16
CI Only VMScluster	3-17
DSSI Only VMScluster	3-18
Local Area or Mixed Interconnect VMScluster	3-19
Running AUTOGEN	3-20
How AUTOGEN Works	3-20
AUTOGEN Messages	3-20
Rebooting the System	3-21
Overview	3-21
Responding to the Prompt	3-21
How to Reboot	3-21
Logging in to the SYSTEM Account	3-22
What to Do Next	3-22

4 After Installing the OpenVMS AXP Operating System

Overview	4-2
Registering Your Licenses	4-3
Introduction	4-3
For More Information	4-3
Backing Up Your System Disk	4-4
Introduction	4-4
How to Back Up the System Disk	4-4
When to Back Up the System Disk	4-4
For More Information	4-4
Customizing the System	4-5
Introduction	4-5
For More Information	4-5
Configuring and Starting DECnet for OpenVMS AXP Software	4-6
Decompressing the System Libraries	4-7
Introduction	4-7
Determining Disk Space	4-7
Methods of Using LIBDECOMP.COM	4-7
Responding to LIBDECOMP.COM Prompts	4-8
Using LIBDECOMP.COM Interactively	4-8
Using LIBDECOMP.COM in Batch	4-9
Installing Layered Products	4-10

Overview	4-10
DECwindows Support	4-10
Backing Up the Customized System Disk	4-11
Introduction	4-11
How to Back Up the Customized System Disk	4-11
For More Information	4-11
Configuring a Multihead System	4-12
Definition	4-12
Introduction	4-12
How to Set Up the System	4-12
For More Information	4-12
Running AUTOGEN	4-13
Introduction	4-13
When to Run AUTOGEN	4-13
Modifying Parameters	4-13
For More Information	4-13
Postinstallation Checklist	4-14

5 Before Upgrading a Shadowed System Disk

Preupgrade Tasks for a Volume Shadowing Environment	5-2
Overview	5-2
Creating a Nonshadowed Target Disk	5-2
Erasing Shadowing Information	5-2
Changing the Label	5-3
Setting the Boot Device	5-3
Where to Go Next	5-3

6 Before Upgrading the OpenVMS AXP Operating System

Overview	6-2
Where to Find More Information	6-2
Cautions and Restrictions	6-3
Introduction	6-3
Upgrading a Shadowed System Disk	6-3
System Parameters	6-3
Files and Directories	6-3
Licenses and Layered Products	6-3
Upgrading a VMScluster Environment	6-3
Backing Up the System Disk	6-4
Introduction	6-4
How to Back Up the System Disk	6-4
For More Information	6-4
Preparing the System Disk	6-5
Overview	6-5
Examining the System Disk	6-5
Checking the Size of the System Disk	6-5
Verifying System Parameters	6-5
Shutting Down the System	6-7
Overview	6-7
Shutting Down a Standalone System	6-7
Shutting Down in a Cluster with a Single System Disk	6-7
Shutting Down in a Cluster with Multiple System Disks	6-8
Preupgrade Checklist	6-9

7 Upgrading the OpenVMS AXP Operating System

Booting the Distribution Compact Disc	7-2
Introduction	7-2
Booting from the Local Drive	7-2
Booting from the InfoServer	7-2
Beginning the Upgrade	7-5
Introduction	7-5
Selecting the Upgrade Option	7-5
Specifying the Target Disk	7-6
Specifying the Volume Label	7-6
Upgrading the Operating System	7-6
Completing the Upgrade	7-7
Performing Postshutdown Tasks	7-7
What to Do Next	7-8

8 After Upgrading a Shadowed System Disk

Enabling Volume Shadowing on the Upgraded System	8-2
Introduction	8-2
How to Enable Volume Shadowing	8-2
Booting Other Nodes from the Upgraded Disk	8-3
Introduction	8-3
Enabling Volume Shadowing	8-3
Booting the Nodes	8-3
What to Do Next	8-3

9 After Upgrading the OpenVMS AXP Operating System

Overview	9-2
Registering New Licenses	9-3
Introduction	9-3
Where to Find More Information	9-3
Examining the AUTOGEN Report File	9-4
Introduction	9-4
Interpreting the Report File	9-4
Modifying the System Parameters File	9-5
Introduction	9-5
System File Sizes	9-5
VMScluster Parameters	9-5
Examining Your Command Procedures	9-6
Introduction	9-6
New Version of WELCOME.TXT	9-6
Site-Specific Files	9-6
Decompressing the System Libraries	9-7
Introduction	9-7
Determining Disk Space	9-7
Methods of Using LIBDECOMP.COM	9-7
Responding to LIBDECOMP.COM Prompts	9-7
Using LIBDECOMP.COM Interactively	9-8
Using LIBDECOMP.COM in Batch	9-8
Customizing DECwindows Software	9-9
Introduction	9-9
Where to Find More Information	9-9
Reinstalling Layered Products	9-10

Introduction	9-10
Where to Find More Information	9-10
Backing Up the Customized System Disk	9-11
Introduction	9-11
How to Back Up the Customized System Disk	9-11
For More Information	9-11
Running AUTOGEN	9-12
Introduction	9-12
Running After the Upgrade	9-12
Running Weekly	9-12
Where to Find More Information	9-12
Performing Postupgrade Volume Shadowing Tasks	9-13
Postupgrade Checklist	9-14

10 Customizing Your System for DECwindows Support

Overview	10-2
Summary of Tasks	10-2
Customizing the Server Startup	10-3
Enabling Connect and Disconnect Messages	10-3
Startup Procedure Assumptions	10-3
How to Override Incorrect Assumptions	10-3
Using DEC TCP/IP Services for OpenVMS with DECwindows	10-8
Introduction	10-8
For More Information	10-8
Using Other Transports with DECwindows	10-9
Introduction	10-9
Writing a Transport Interface	10-9
Installing the Transport Interface Image	10-9

A Halt, Boot, and Shutdown Procedures

Overview	A-2
Halting the System	A-3
Introduction	A-3
How to Halt Your AXP Computer	A-3
Booting the Distribution Compact Disc	A-4
Introduction	A-4
Booting from the Local Drive	A-4
Booting from the InfoServer	A-4
Booting Manually from the System Disk	A-7
Introduction	A-7
How to Boot Manually	A-7
Performing a Conversational Boot	A-8
Introduction	A-8
How to Perform a Conversational Boot	A-8
Where to Find More Information	A-10
Setting the System for Automatic Booting	A-11
Introduction	A-11
When Systems Can Boot Automatically	A-11
How to Boot Automatically	A-11
Setting and Showing Boot Devices	A-13
Introduction	A-13
Setting the Boot Device	A-13

Showing the Boot Device	A-13
Cancelling the Boot Device	A-13
Setting Boot Parameters	A-14
Introduction	A-14
List of Valid Parameters	A-14
How to Enter the SET BOOT_OSFLAGS Command	A-14
Displaying Parameters	A-15
Booting with Minimum Startup	A-16
Introduction	A-16
How to Boot with Minimum Startup	A-16
Booting with the XDelta Utility (XDELTA)	A-17
Introduction	A-17
Boot Command Qualifier Values	A-17
How to Boot with XDELTA	A-17
For More Information	A-17
Booting from a Different Directory	A-18
Introduction	A-18
How to Boot from a Different Directory	A-18
Booting from An HSC	A-19
Introduction	A-19
How to Boot from an HSC	A-19
Booting with a PMAD TURBOchannel Adapter	A-20
Introduction	A-20
How to Boot	A-20
Booting with a PMAZB TURBOchannel Adapter	A-21
Introduction	A-21
Displaying Devices	A-21
How to Boot	A-21
How Adapters are Identified	A-22
Example	A-22
If the System Does Not Boot	A-23
Introduction	A-23
For Hardware Problems	A-23
For Software Problems	A-23
Booting in an Emergency	A-24
Introduction	A-24
Booting with Default System Parameters	A-24
Booting Without Startup and Login Procedures	A-25
Booting Without the User Authorization File	A-26
Using the Writeboot Utility	A-29
Introduction	A-29
Invoking WRITEBOOT	A-29
Shutting Down the System	A-30
Introduction	A-30
Orderly Shutdown	A-30
Emergency Shutdown with OPCCRASH.EXE	A-30
Emergency Shutdown with CRASH Commands	A-31
Troubleshooting	A-32
Introduction	A-32
Detecting System Problems	A-32

B Backup Procedures

Overview	B-2
Introduction	B-2
Why You Should Back Up the System Disk	B-2
Suggested Procedures	B-2
Backing Up the System Disk	B-3
Getting Started	B-3
Entering the BACKUP Command	B-3
What to Do next	B-4
Restoring the System Disk	B-5
Getting Started	B-5
Entering the BACKUP Command	B-5
What to Do next	B-5

C License Management Notes

Registering Licenses	C-2
Introduction	C-2
Using the License Unit Requirement Table (LURT)	C-2
License Management Facility (LMF) Notes	C-4
Restrictions	C-5
Where to Find More Information	C-6

D Installing on a Dual-Host DSSI VMScluster System

Overview	D-2
Introduction	D-2
Where to Find More Information	D-2
Configuring as a Pair of Boot Servers	D-3
Configuring as a New Two-Node Cluster	D-4
Adding the Dual-Host System to an Existing Cluster	D-5

Glossary

Index

Tables

3-1	Prompts for CI VMScluster Configuration	3-17
3-2	Prompts for DSSI VMScluster Configuration	3-18
3-3	Prompts for Local Area or Mixed Interconnect VMScluster Configuration	3-19
10-1	DECwindows Keymap	10-4
A-1	SYSGEN Commands Used in the SYSBOOT Procedure	A-9
A-2	Emergency Boot Procedures	A-24
C-1	License Unit Requirement Table (LURT)	C-3

Preface

- Introduction** This manual contains installation, upgrade, and operations information for AXP computers that run OpenVMS AXP operating system software.
- Who Should Use this Manual** This manual is intended for anyone responsible for installing or upgrading the OpenVMS AXP operating system and for the attendant startup, shutdown, and backup operations required on AXP computers running this software.
- When to Use this Manual** If you received factory installed software (FIS) with your AXP computer, refer to that user documentation first to start up your system. Otherwise, use this manual if you need to install or upgrade the OpenVMS AXP operating system software yourself or if you need to perform certain startup, shutdown, or backup operations.
- How this Manual Is Organized** This manual is organized as follows:
- Chapter 1 provides preliminary information you should review before performing any installation or upgrade.
 - Chapter 2 provides information you need to know before installing the operating system in a VMScluster environment.
 - Chapter 3 describes how to install the operating system.
 - Chapter 4 describes the tasks you need to perform after installing the operating system.
 - Chapter 5 provides information you need to know before upgrading a system disk in a volume shadowing environment.
 - Chapter 6 describes how to prepare your system for an upgrade.
 - Chapter 7 describes how to upgrade the operating system.
 - Chapter 8 describes tasks you need to perform after you upgrade in a volume shadowing environment.
 - Chapter 9 describes tasks you need to perform after an upgrade.
 - Chapter 10 describes the tasks you must perform to customize your system for DECwindows support.

- Appendix A contains instructions for halting the system, booting the distribution compact disc 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 backup and restore the system disk.
- Appendix C contains supplementary information about registering licenses.
- Appendix D provides information about installing the operating system on a dual-host VMScluster system.
- The Glossary defines key terms used in this manual.

Required Documents

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

- All cover letters included with your kit.
- The release notes, which provides important supplementary information about the OpenVMS AXP operating system.
- *VMScluster Systems for OpenVMS* (if you plan to install your system in a VMScluster environment).
- The hardware manuals that are supplied with your AXP computer. These manuals provide detailed information about your system hardware, including the operation of the system unit, the drives, and the monitor.

Additional Documents

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

- *A Comparison of System Management on OpenVMS AXP and OpenVMS VAX*, which explains similarities and differences between managing OpenVMS AXP and OpenVMS VAX systems. If you have been responsible for installation, upgrade, and related management operations on OpenVMS VAX systems, you should review that manual before performing similar operations on your OpenVMS AXP system.
- *The OpenVMS License Management Utility Manual*, which contains detailed information about registering your software licenses.
- *The OpenVMS System Manager's Manual* and the *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 AXP system.

- *DECnet for OpenVMS Guide to Networking*, which contains detailed information about using the DECnet for OpenVMS AXP software.
- *Volume Shadowing for OpenVMS*, which you might need if you are installing or upgrading the operating system on a shadowed system disk.

Conventions Used in this Manual

In this manual, every use of OpenVMS AXP means the OpenVMS AXP operating system.

In this manual, every use of DECwindows and DECwindows Motif refers to DECwindows Motif for OpenVMS software.

The following conventions are also used in this manual:

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.

Return

In examples, a key name enclosed in a box indicates that you press a key on the keyboard. (In text, a key name is not enclosed in a box.)

.
. .
.

Vertical ellipsis points indicate 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, brackets indicate optional elements. You can choose one, none, or all of the options. (Brackets are not optional, however, in the syntax of a directory name in an OpenVMS file specification or in the syntax of a substring specification in an assignment statement.)

boldface text

Boldface text represents the introduction of a new term or the name of an argument, an attribute, or a reason (user action that triggers a callback).

Boldface text is also used to show user input in Bookreader versions of the manual.

italic text

Italic text emphasizes important information and indicates complete titles of manuals and variables. Variables include information that varies in system messages (Internal error *number*), in command lines (*/PRODUCER=name*), and in command parameters in text (where *device-name* contains up to five alphanumeric characters).

UPPERCASE TEXT

Uppercase text indicates a command, the name of a routine, the name of a file, or the abbreviation for a system privilege.

A hyphen in code examples indicates that additional arguments to the request are provided on the line that follows.

numbers

All numbers in text are assumed to be decimal unless otherwise noted. Nondecimal radices—binary, octal, or hexadecimal—are explicitly indicated.

Getting Started

Overview

Introduction

This chapter defines key terms and describes preliminary procedures you must perform before an installation or upgrade.

Key Terms

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

Term	Definition
Distribution compact disc	The compact disc containing the OpenVMS AXP operating system. This software is supplied in a format that the computer cannot use until you perform an installation or upgrade.
Hierarchical Storage Controller (HSC) device	A self-contained, intelligent, mass storage subsystem that lets computers in a VMScLuster environment share disks. The disk on which you install or upgrade the operating system can be connected to an HSC drive. (Supported on DEC 7000 and DEC 10000 series AXP computers only.)
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).
Local drive	A drive, such as an RRD42 compact disc drive, that is connected directly to an AXP computer. If you have a standalone AXP computer, it is likely that all drives connected to the system are local drives.
Source drive	The drive that holds the distribution compact disc during the upgrade or installation.
System disk	The disk that contains (or will contain) the OpenVMS AXP operating system in a usable format. The installation or upgrade procedure converts the OpenVMS AXP operating system to this usable format when transferring the software from the distribution compact disc to the system disk.
Target drive	The drive that holds the system disk during the upgrade or installation.

Examining Software and Hardware Components

Introduction

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

- Be sure the hardware has been installed and checked for proper operation. For detailed information, see the hardware manuals you received with your AXP 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

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

Distribution Compact Disc

Included in your kit is the OpenVMS AXP distribution compact disc, which you use to install or upgrade the operating system, or to perform operations such as backing up the system disk. The compact disc is labeled as follows:

Compact Disc Sticker: OpenVMS™ AXP™
 Operating System
 Software and Documentation

Volume Label: AXPVMS061FT4

Note: The *volume label* is the machine-readable name that the OpenVMS AXP operating system uses to refer to a compact disc. Therefore, during an installation or upgrade, the system displays the volume label in messages, not what is printed on the sticker affixed to the compact disc.

Required PALcode

If your computer console does not have a specific minimum version of the Privileged Architecture Library code (PALcode), you may not be able to boot your system during the installation or upgrade procedure. Digital recommends, therefore, that you do the following before performing an installation or upgrade:

1. At the console prompt (>>>) on your running AXP system, enter the SHOW CONFIGURATION command (or SHOW PAL command on DEC 7000 and DEC 10000 AXP series systems). The system display will indicate which version of PALcode your computer is running.
2. Refer to the most recent OpenVMS AXP operating system cover letter or release notes, or contact your Digital Services representative, to determine whether your system is running the required or recommended minimum version of PALcode.
3. If the PALcode is *below* the required or recommended minimum, upgrade your console by either following the directions contained in the hardware manuals that came with your AXP computer or contacting your Digital Services representative.

Caution:

- If you do not upgrade your console to the *required* minimum PALcode, you will receive a fatal error message similar to the following when you attempt to boot the distribution compact disc:

```
APB-F-PALREV, PALcode revision 5.15 is below required minimum of 5.25
UNABLE TO CONTINUE
```

- If the PALcode is below the *recommended* minimum, you will receive a warning message similar to the following:

```
APB-W-PALREV, PALcode revision 5.25 is below recommended minimum of 5.39
```

Although you will still be able to boot your system, contact your Digital Services representative about upgrading your console to the recommended minimum version of the PALcode before installing or upgrading the operating 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 compact disk drive, the device name is similar to the following:

```
DKA400:
```

- When the source drive is a compact disk 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`

where:

- *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

- When the target drive is a disk connected to an HSC drive (DEC 7000 and DEC 10000 series AXP systems only), the device name is similar to the following:

`DUA20.14.0.2.0`

where:

- *DU* is the device code of the boot device
- *A* is the boot device controller designation
- *20* is the unit number of the boot device
- *14* is the HSC controller node number for the boot device
- *0* is the channel number
- *2* is the XMI node number
- *0* is the I/O channel number

Using the Distribution Compact Disc

Using the Menu

The OpenVMS AXP operating system distribution compact disc includes a menu-driven command procedure that allows you to easily upgrade or install the operating system and to perform related operations such as backing up the system disk. This command procedure starts automatically when you boot the OpenVMS AXP distribution compact disc, displaying a menu from which you 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
- Shutdown the system

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.

Sample Menu Display

Following is a sample display of the menu:

```
Installing required known files...
Configuring devices...
*****
You can install or upgrade the OpenVMS AXP operating system.
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) Install or upgrade OpenVMS AXP Version T6.1-FT4
    2) Execute DCL commands and procedures
    3) Shut down this system

Enter CHOICE or "?" to repeat menu: (1/2/3/?)
*****
```

How the Install or Upgrade Option Works

When you choose the install or upgrade option (1) from the menu, the system asks whether you want to preserve or initialize the system disk. For example:

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

Specifying the 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 OpenVMS AXP operating system is installed.

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

- If your AXP computer is new (it has never had any version of the operating system running on it, including factory installed software (FIS)).
- If your AXP computer is running a version of the OpenVMS AXP 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 create a new system disk but keep the old one (if you want to alternate between the two).
- If you are running the OpenVMS AXP 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. You can either restore the system disk to its original directory structure, or you can reinstall the operating system.

Specifying the PRESERVE Option

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

IF ...	THEN ...
the OpenVMS AXP operating system is <i>not</i> already installed on the target disk,	the following operations take place: <ul style="list-style-type: none">• The OpenVMS AXP operating system is <i>installed</i>.• All other contents of the target disk are retained, or preserved.
the OpenVMS AXP operating system <i>is</i> installed on the target disk,	the OpenVMS AXP operating system is <i>upgraded</i> , as follows: <ul style="list-style-type: none">• Old operating system files and new files are merged or replaced.• All other contents of the target disk are retained, or preserved.

How the DCL Option Works

When you choose the DCL option (2) from the 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 and utilities 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.

The system displays a triple dollar sign prompt (\$\$\$) to distinguish this restricted DCL environment from the full DCL environment (\$) that is available after you boot the system disk. For example:

```
$$$ SHOW DEVICE
```

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

How the Shutdown Option Works

When you choose the shutdown option (3) from the menu, your system shuts down and you are returned to the console prompt (>>>). The system displays a message similar to the following:

```
SYSTEM SHUTDOWN COMPLETE  
>>>
```

**Where to Go
Next**

Now that you have reviewed key terms, examined hardware and software requirements, and learned how to use the menu-driven procedure included on the OpenVMS AXP distribution compact disc, you can do the following:

IF ...	THEN ...
you want to install the operating system in a VMScluster environment,	go to Chapter 2.
you want to install the operating system in a nonclustered environment,	go to Chapter 3.
you want to upgrade a multi-member shadowed system disk,	go to Chapter 5.
you want to upgrade a nonshadowed system disk,	go to Chapter 6.
you want only to back up or restore your system disk,	go to Appendix B.

Preparing to Install in a Cluster Environment

Preparing for a VMScLuster Environment

Introduction

If you are installing the OpenVMS AXP operating system in a VMScLuster environment, you must first have a clear understanding of VMScLusters so you can enter correct information when you are prompted to do so.

Cautions

- Entering incorrect VMScLuster information during the installation might force you to repeat the entire installation procedure.
- If you configure your AXP Version 6.1 system in a cluster that also includes VAX computers, those VAX computers must be running *only* Version 5.5–2 or Version 6.0 of the OpenVMS VAX operating system.

Where to Find More Information

Before installing the operating system in a VMScLuster environment, be sure you review the relevant VMScLuster information, including cautions and restrictions, contained in the following documents:

- Release notes
- The cover letters included with your distribution kit
- If you are installing the operating system in a DSSI cluster environment that includes DEC 4000 series AXP systems, Appendix D of this manual.

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

- *VMScLuster Systems for OpenVMS* (for a complete explanation of VMScLusters)
- Your network or system manager (if that is someone other than yourself)
- *DECnet for OpenVMS Guide to Networking*
- If installing on a dual-host DSSI VMScLuster system using DEC 4000 AXP series computers, the *DEC 4000 AXP DSSI Installation and Troubleshooting Guide*

**VMScLuster
Information
You Will Need**

The following table lists the kinds of VMScLuster information you will need before you begin an installation.

Required Information	Explanation
Type of configuration	Configuration types (CI only, DSSI only, local area, or mixed-interconnect) are distinguished by the interconnect device that the VAX and AXP computers in the VMScLuster 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 AXP operating system. See the <i>DECnet for OpenVMS Guide to Networking</i> for additional information as well.
Allocation class value	<p>During the installation procedure you will be asked for the allocation class value (ALLOCLASS) of the AXP computer on which you are installing the OpenVMS AXP operating system. For example:</p> <p>Enter a value for AXP143 ALLOCLASS parameter: Refer to <i>VMScLuster Systems for OpenVMS</i> for the rules on specifying allocation class values.</p> <p>Note that in a mixed-interconnect VMScLuster environment, the allocation class value cannot be zero if the nodes serve DSSI or CI disks. It must instead be a value between 1 and 255. This is also true for any AXP computer that is connected to a dual-pathed disk.</p> <p>After you enter the allocation class value, the installation procedure uses it to automatically set the value of the ALLOCLASS system parameter.</p>
Whether you want a quorum disk	Refer to <i>VMScLuster Systems for OpenVMS</i> to help you determine whether you want a quorum disk in the cluster.
Location of the page and swap files	On a non-clustered 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 <i>VMScLuster Systems for OpenVMS</i> to help you determine where the page and swap files will be located for the system from which you are installing the OpenVMS AXP operating system software.
Systems that will be MOP 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	<p data-bbox="786 293 1341 400">If you are going to set up either a local area or a mixed-interconnect cluster, use the following rules to determine the cluster group number and password:</p> <ul data-bbox="786 421 1341 576" style="list-style-type: none"><li data-bbox="786 421 1341 476">– Cluster group number—A number in the range from 1 to 4095 or 61440 to 65535.<li data-bbox="786 497 1341 576">– Cluster password—Must be from 1 to 31 alphanumeric characters in length and can include dollar signs (\$) and underscores (_).

Where to Go Next

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

Installing the OpenVMS AXP Operating System

Overview

During the installation procedure, the OpenVMS AXP files are transferred from the distribution compact disc (the source drive) to the system disk (target drive). The following tasks are described in this chapter:

- Booting the distribution compact disc
- Creating the system disk
- Registering licenses
- Booting the system disk
- Joining a VMScluster (optional)
- Running AUTOGEN

Field Test Notes

For this field test version of the operating system, note the following:

- When you install the OpenVMS AXP operating system, you can choose or exclude files by answering YES or NO to the following question:

Do you want all the default values for this product [YES]

However, one exception is that you *must* choose the option that includes IMAGELIB.OLB (Object and Shareable Image Libraries).

- See the release notes for additional information specific to installations.

Booting the Distribution Compact Disc

Introduction

To get started, boot the OpenVMS AXP distribution compact disc either from your local compact disc drive or from a compact disc drive connected to the InfoServer, as described in the following sections.

Booting from the Local Drive

1. Insert the distribution compact disc into the local compact disc drive.
2. At the console prompt (>>>), enter the SHOW DEVICE command so you can identify the name of the compact disc drive (for example, DKA400:)
3. Enter the boot command in the following format:

```
BOOT source-drive -flags 0,0
```

Substitute the device name of the compact disc drive (as listed in the SHOW DEVICE display) for *source-drive*.

For example, if the SHOW DEVICE display lists the device name of your compact disc drive as DKA400, enter the following command and press the Return key:

```
>>> BOOT DKA400 -flags 0,0
```

Booting from the InfoServer

To boot the distribution compact disc using the InfoServer, follow these steps:

1. At the console prompt, enter the following command:

```
>>> B -FL 0,0 -FI APB_061 lan-device-name
```

where:

- *APB_061* is the file name of the APB program used for the initial system load (ISL) boot program.

DEC 4000 Note: On a DEC 4000 series AXP system, you must specify this file name in uppercase.

- *lan-device-name* is the name of the local area network (LAN) device (FDDI or Ethernet) identified with your computer, as listed in the following table. (For more information about these devices, refer to the hardware owner's and operations manuals that you received with your AXP computer.)

AXP Computer	FDDI Device	Ethernet Device
DEC 2000 series	N/A	ERA0
DEC 3000 series	N/A	ESA0
DEC 4000 series	N/A	EZA0
DEC 7000 series	FXA0	EXA0
DEC 10000 series	FXA0	EXA0

FT4 Note: If your DEC 4000 series AXP system is using console firmware prior to version 3.2, enter the command as follows:

```
>>> B -FL 0,0 -start 0 -FI APB_061 EZA0
```

Note: For DEC 3000 series AXP systems equipped with the **PMAD TURBOchannel** adapter, enter the command as follows:

```
>>> B -FL 0,0 -FI APB_061 "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. In the following example, the PMAD TURBOchannel slot number (listed under the "TCINFO" column) is 0:

```
>>> SHOW CONFIG
DEC 3000 - M300
Digital Equipment Corporation
VPP PAL X5.39-80800101/OSF PAL X1.28-80800201 - Built on 18-FEB-1993 11:376

TCINFO      DEVSAM      DEVSTAT
-----      -
          CPU      OK KN16-AA -V2.1-S288-I053-sBL0.7 -DECchip 21064 P3.0
          ASIC      OK
          MEM       OK
          MEM       OK
6
          CXT       OK
5
          NVR       OK
          SCC       OK
          NI        OK
          ISDN      OK
4
          SCSI      OK
0-PMAD-AA    TCO
```

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

Network Initial System Load Function
Version 1.1

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

Enter a function ID value:

Booting the Distribution Compact Disc

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 (AXPVMS061FT4).

A sample display follows:

Enter a function ID value: 3

OPTION ID		OPTION
1	-	Find Services
2	-	Enter known Service Name

Enter an Option ID value: 2

Enter a Known Service Name: AXPVMS061FT4

Creating the System Disk

Selecting the Install Option

After you boot the distribution compact disc, choose the install option (1) from the menu displayed on the screen. The system will then display informational messages similar to the following:

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)

There are two choices for Installation/Upgrade:

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

PRESERVE -- installs or upgrades OpenVMS AXP and retains all other contents of the existing disk.

* NOTE: You cannot install OpenVMS AXP on an existing disk on which OpenVMS VAX or any other operating system is installed.

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

Respond to the prompt as follows:

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

InfoServer Note: If you booted the OpenVMS AXP distribution compact disc from an InfoServer but lose your connection during the installation procedure (the system hangs and pressing Ctrl/Y does not return you to the menu), you must do the following:

IF ...	THEN ...
you previously chose the INITIALIZE option,	do the following: <ol style="list-style-type: none">1. Reboot the OpenVMS AXP distribution compact disc.2. Choose the install option (1) from the menu and perform the installation again, as described in this chapter.
you previously chose the PRESERVE option,	do the following: <ol style="list-style-type: none">1. Reboot the OpenVMS AXP distribution compact disc.2. Restore the backup of your target disk, by using the menu to enter the DCL environment (option 2) and then entering the appropriate BACKUP commands.3. Exit the DCL environment.4. Choose the install option (1) from the menu and perform the installation again, as described in this chapter.

Specifying the Target Disk

The procedure next asks you for the name of the target disk. If you enter `?`, 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 AXP will be installed.

Enter device name for target disk: (? for choices) dka200

Getting DKA200: volume label...

DKA200: is now labeled AXPVMS061FT4

Specifying the Volume Label

The system then prompts you for the volume label and asks if the information is correct. You can use the default or specify a different volume label (12 character limit). After you select the volume label and choose to continue by answering **Yes** to the next prompt, the target disk is initialized and mounted, and page and swap files are created. In the following sample display, the default volume label is used:

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

If you chose the **INITIALIZE** option, the display will look similar to the following:

You have chosen to install VMS on a new disk.

The target system disk, AXPVMS061FT4:, will be initialized.

It will be labeled AXPVMS061FT4.

Any data currently on the target system disk will be lost.

Is this OK? (yes/No) Y

```
Initializing and mounting target ...  
(%MOUNT-I-MOUNTED message is expected.)  
%%MOUNT-I-MOUNTED, AXPVMS061FT4 mounted on _DKA200:  
Creating page and swap files....
```

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; they do not appear on the display.
- Press the Return key after you enter the password.
- After you enter the password, the procedure checks to make sure it meets the requirements for a valid password.

Following is a sample display:

```
You must enter a password for the SYSTEM account.  
  
The passwords must be a minimum of 8 characters in length.  
It will be checked and verified.  
Any passwords that can be guessed easily will not be accepted.
```

```
Password for SYSTEM account:  
Re-enter SYSTEM password for verification:
```

If you get password errors, either because you entered a password incorrectly or because the system determined that the password was too easy for someone to guess, make the necessary corrections before going on to the next section.

Becoming a Cluster Member

The procedure now asks if your system will be part of a cluster. The display is similar to the following:

```
Will this system be a member of a VMScluster? (Yes/No) [No]
```

If you answer Yes, you will be asked a series of questions after you boot the new system disk.

Registering Licenses

Introduction

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

- During the installation (which Digital recommends), by responding to the prompts displayed by the `SYS$UPDATE:VMSLICENSE.COM` procedure.
- After the installation, by using the `LICENSE REGISTER` command or by invoking `SYS$UPDATE:VMSLICENSE.COM`.

Types of OpenVMS AXP Licenses

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

Note: All OpenVMS AXP licenses include the `NO_SHARE` attribute and remain with the initial host computer.

Type of License	Description
Operating System Base License	Grants the right to non-interactive 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 AXP Interactive User Licenses (described next).
Interactive User License	Grants the right to interactive use of the OpenVMS AXP operating system, provided you have previously installed the appropriate OpenVMS AXP Operating System Base License on your AXP computer. These licenses, which are concurrent, are available in any quantity desired or as an unlimited user license. You can add additional 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 <i>OpenVMS License Management Utility Manual</i> .
Symmetric Multiprocessing (SMP) Extension to the Operating System Base License	Upgrades the Operating System Base License and all Interactive User licenses (including Unlimited) to the matching multiprocessing level of your DEC 4000 or DEC 7000 series AXP computer. Because the Symmetric Multiprocessing (SMP) Extension grants all the rights the existing Base and User licenses 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 AXP system to a DEC 7000 Model 630 AXP system), you only need to add an SMP Extension to your existing licenses.

Where to Find More Information

- The sections in this chapter that describe the following:
 - Types of licenses
 - How to use the licensing procedure
- 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 licensing procedure

How to Register Licenses

After you install the OpenVMS AXP operating system, the installation procedure displays the following message:

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

Respond to the prompt as follows:

IF ...	THEN ...
<p>you choose to register your licenses at this time (which Digital recommends),</p>	<p>follow these steps:</p> <ol style="list-style-type: none"> 1. Be sure you review Appendix C and have the <i>OpenVMS License Management Utility Manual</i> 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. Go to the next section.
<p>you choose <i>not</i> to register your licenses at this time,</p>	<p>follow these steps:</p> <ol style="list-style-type: none"> 1. Type N and press the Return key. 2. Go to the next section. 3. After completing the installation, 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.

Enter one of the above choices [1]

1. **Select the appropriate options (beginning with 1, as indicated in the display) 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.**

Continuing the Procedure

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)

If you answer **Yes**, the system will display additional explanatory text with each prompt that you would otherwise obtain by asking for help (by entering ?).

Beginning the Installation

Next, the system displays the following, indicating that the installation procedure is ready to begin:

The following product has been selected:
OpenVMS AXP T6.1

Do you want to continue [YES]

If you are ready to begin the installation, press the Return key. As you respond to the screen displays note that you will be able to view your answers after you have made all your selections and make necessary changes.

Selecting Default Values

Next the system asks if you want all the default values, meaning all the files and subgroups of files that you receive by default with the operating system. If you do not want the default values, the system will prompt you for each group and subgroup of files (note that you must choose the Object and Shareable Image Libraries group). The display is similar to the following:

```
*** DEC AXPVMS VMS T6.1-FT4: VMS Operating System, Version T6.1-FT4
    COPYRIGHT © (c) 24-SEP-1993 -- All rights reserved
    Digital Equipment Corporation
    Do you want all the default values for this product [YES]
    Do you want to view the values [NO]
```

Completing the Installation

When you have answered all the prompts and selected the files you want installed, the system displays the following and then returns you to the menu:

```
%PCSIUI-I-DONEASK, no further questions will be asked
The following product will be installed:
DEC AXPVMS VMS T6.1-FT4
%PCSI-I-VOLINFO, estimated space information for volume AXPVMS061FT4
-PCSI-I-VOLSPC, 265572 required; 811128 available; 545556 net
Portion Done: 10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
The following product has been installed:
DEC AXPVMS VMS T6.1-FT4
```

The installation is now complete.

Continuing the Procedure

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 VMScluster operation.
- o Run AUTOGEN to set system parameters

You can shut down now or continue with other operations.

Process SYSTEM_1 logged out at 4-OCT-1993 14:55:52.16

You can install or upgrade the OpenVMS AXP operating system. 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) Install/Upgrade OpenVMS AXP
- 2) Execute DCL commands and procedures
- 3) Shut down this system

Enter CHOICE or "?" to repeat menu: (1/2/3/?)

If you do not want to perform any other operations prior to booting the new system disk, enter 3 to shut down the system and answer Yes to the shutdown prompt. When the shutdown is complete, the system displays a message similar to the following:

Enter CHOICE or "?" to repeat menu: (1/2/3/?) 3

SYSTEM SHUTDOWN COMPLETE

After you complete the installation and shut down the system, go to the next section to boot the new system disk.

Booting the New System Disk

Introduction

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 (DEC 7000 AXP and DEC 10000 AXP series systems) or by pressing the Halt button (DEC 3000 AXP and DEC 4000 AXP series systems). ¹
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 an HSC (DEC 7000 and DEC 10000 series AXP systems only), the format for specifying that drive is different. For example:

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

For more information about setting and showing the default boot device, see *Setting and Showing Boot Devices*.

How to Boot the New System Disk

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

```
>>> BOOT -FLAG 0,0
```

When the boot is completed, the system displays a message similar to the following:

```
OpenVMS AXP (TM) Operating System, Version T6.1-FT4
```

¹ For more information about halting your AXP computer, see Appendix A.

Joining a VMSCluster

Introduction

If during the installation, you previously answered Yes to the question about joining a VMSCluster, the system now asks a series of questions about your configuration. You might need to refer to *VMSCluster Systems for OpenVMS* to answer these questions.

Getting Started

The system next displays several questions about the configuration of your VMSCluster. Your answers to these questions depend on whether you want to install a CI only, DSSI only, local area, or mixed-interconnect VMSCluster. Before answering these questions, you must determine which type of cluster you want to install. For a complete description of VMSCluster types, see the *VMSCluster Systems for OpenVMS*.

When you are sure what kind of cluster you are creating or joining, go to one of the following three sections to understand which prompts will be displayed, how to respond to them, and what to do next:

- CI Only VMSCluster
- DSSI Only VMSCluster
- Local Area or Mixed Interconnect VMSCluster

**CI Only
VMScluster**

Table 3–1 lists the questions you are asked if you want a CI only VMScluster and suggests typical responses. If you want this type of VMScluster configuration, answer all the questions in Table 3–1 and then go to the next section.

Table 3–1 Prompts for CI VMScluster Configuration

Question	How to Respond
Will this node be a cluster member (Y/N)?	Enter Y.
What is the node's DECnet node name?	Enter the DECnet node name—for example, KRUP. 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. A CI only VMScluster does not use the Ethernet for cluster communications.
Will KRUP be a disk server (Y/N)?	Enter Y if you want local disks to be served to the cluster. Refer to <i>VMScluster Systems for OpenVMS</i> for information on served cluster disks.
Enter a value for KRUP's ALLOCLASS parameter:	If the system is connected to a dual-ported disk, enter the appropriate allocation class value (it must be a value between 1 and 255). Otherwise, enter 0. For information on selecting the ALLOCLASS parameter, see <i>VMScluster Systems for OpenVMS</i> .
Does this cluster contain a quorum disk (Y/N)?	Enter Y or N, depending on your configuration. If you enter Y, the system asks for the name of the quorum disk. Enter the device name of the quorum disk. Refer to the <i>VMScluster Systems for OpenVMS</i> for information on quorum disks.

**DSSI Only
VMScluster**

Table 3–2 lists the questions you are asked if you want a DSSI only cluster and suggests typical responses. If you want this type of VMScluster configuration, answer all the questions in Table 3–2 and then go to the next section.

Table 3–2 Prompts for DSSI VMScluster Configuration

Question	How to Respond
Will this node be a cluster member (Y/N)?	Enter Y.
What is the node's DECnet node name?	Enter the DECnet node name—for example, KRUP. The DECnet node name may be from one to six alphanumeric characters in length and may not 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. A DSSI only VMScluster does not require the Ethernet.
Enter this cluster's group number:	Enter a number in the range from 1 to 4095 or 61440 to 65535.
Enter this cluster's password:	Enter the cluster password. The password must be from 1-31 alphanumeric characters in length and may include dollar signs and underscores.
Reenter this cluster's password for verification:	Reenter the password.
Will KRUP be a disk server (Y/N)?	Enter Y. (Refer to <i>VMScluster Systems for OpenVMS</i> for information on served cluster disks.)
Will KRUP serve RFXx disks (Y)?	Enter Y (if such disks are available to you).
Enter a value for KRUP's ALLOCLASS parameter:	Enter the appropriate allocation class value. The value must be between 1 and 255; you cannot enter 0.
Does this cluster contain a quorum disk (Y/N)?	In most cases, enter Y; then enter the device name of the quorum disk at the next prompt. If you are adding a dual-host DSSI system to an existing cluster (in which case you may not need a quorum disk), you can answer N. Refer to <i>VMScluster Systems for OpenVMS</i> for information on quorum disks.

**Local Area
or Mixed
Interconnect
VMScluster**

Table 3–3 lists the questions you are asked if you want a local area VMScluster or a mixed-interconnect VMScluster (including DSSI systems) and suggests typical responses. If you want this type of VMScluster configuration, answer all the questions in Table 3–3 and then go to the next section.

Table 3–3 Prompts for Local Area or Mixed Interconnect VMScluster Configuration

Question	How to Respond
Will this node be a cluster member (Y/N)?	Enter Y.
What is the node's DECnet node name?	Enter the DECnet node name—for example, KRUP. The DECnet node name may be from 1-6 alphanumeric characters in length and may not 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 Y. The Ethernet is required for cluster (SCS internode) communications in local area and mixed-interconnect VMSclusters.
Enter this cluster's group number:	Enter a number in the range from 1 to 4095 or 61440 to 65535.
Enter this cluster's password:	Enter the cluster password. The password must be from 1-31 alphanumeric characters in length and may include dollar signs and underscores.
Reenter this cluster's password for verification:	Reenter the password.
Will KRUP be a disk server (Y/N)?	Enter Y. In local area and mixed-interconnect VMSclusters, the system disk is always served to the cluster. Refer to <i>VMScluster Systems for OpenVMS</i> for information on served cluster disks.
Will KRUP serve RFxx disks (Y)?	Enter a response appropriate for your DSSI configuration.
Enter a value for KRUP's ALLOCLASS parameter:	Enter the appropriate allocation class value. The allocation class value cannot be zero if the nodes serve DSSI or CI disks. It must instead be a value between 1 and 255.
Does this cluster contain a quorum disk (Y/N)?	Enter Y or N, depending on your configuration. If you enter Y, the system asks for the name of the quorum disk. Enter the device name of the quorum disk. Refer to <i>VMScluster Systems for OpenVMS</i> for information on quorum disks.

Running AUTOGEN

How AUTOGEN Works

The system next runs AUTOGEN to evaluate your hardware configuration and estimate typical workloads. 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, the installation procedure is complete.

AUTOGEN Messages

The installation procedure displays messages similar to the following:

Running AUTOGEN to compute the new SYSGEN parameters ...

```
%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$SYSTEM:SETPARAMS.DAT has been created.
    You may wish to purge this file.
%AUTOGEN-I-END, GENPARAMS phase has successfully completed.
%AUTOGEN-I-BEGIN, GENFILES phase is beginning.
%SYSGEN-I-EXTENDED, DKA200:[SYS0.SYSEXE]PAGEFILE.SYS;1 extended
%SYSGEN-I-EXTENDED, DKA200:[SYS0.SYSEXE]SWAPFILE.SYS;1 extended
%SYSGEN-I-CREATED, SYS$SYSROOT:[SYSEXE]SYSDUMP.DMP;1 created

%AUTOGEN-I-REPORT, AUTOGEN has produced some informational messages which
    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.
%AUTOGEN-I-SYSGEN, parameters modified
%AUTOGEN-I-END, SETPARAMS phase has successfully completed.
```

Rebooting the System

Overview

After AUTOGEN finishes, the system displays a series of messages similar to the following:

The system must shut down and reboot for the installation to complete.

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

- Decompressing the System Libraries
- Configuring DECnet
- Creating additional cluster roots

If the system has been setup with this system disk as the default boot device you can elect to reboot automatically.

Otherwise you will have to reboot manually.

Do you wish to reboot automatically? (Yes/No)

Responding to the Prompt

IF ...	THEN ...
you enter Y (Yes),	the system shuts down and tries to reboot automatically.
you enter N (No),	the system shuts down; you must reboot manually.

How to Reboot

If the system does not reboot automatically, or if you did not choose automatic rebooting, 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
```

After the system reboots, the system displays a message similar to the following:

```
OpenVMS AXP (TM) Operating System, Version T6.1-FT4
```

```
Copyright (c) 1993 Digital Equipment Corporation. All rights reserved.
%STDRV-I-STARTUP, VMS startup begun at 15-JUL-1993 16:24:02.27
```

Rebooting the System

Logging in to the SYSTEM Account

Next, the system displays informational messages and accounting information indicating that your OpenVMS AXP operating system is running. For example:

```
%SET-I-INTSET, login interactive limit = 8, current interactive value = 0
22-OCT-1993 15:40:00.00
SYSTEM      job terminated at 22-OCT-1993 15:40:00.00

Accounting information:
Buffered I/O count:      1427      Peak working set size: 3072
Direct I/O count:       797       Peak page file size:  8448
Page faults:            1530      Mounted volumes:      0
Charged CPU time:      0 00:00:06.88 Elapsed time:      0 00:00:38.23
```

To log in to the SYSTEM account (so you can perform postinstallation tasks), do the following:

1. Press the Return key.

The resulting system display is similar to the following:

```
Welcome to OpenVMS AXP (TM) Operating System, Version T6.1
```

```
Username: SYSTEM
```

```
Password:
```

```
.
.
.
```

```
Welcome to OpenVMS AXP (TM) Operating System, Version T6.1
```

2. Enter your password and press the Return key.

(If you forget the password, follow the instructions in Appendix A for performing an emergency startup.)

What to Do Next

After you have successfully installed the OpenVMS AXP operating system, you must perform certain postinstallation tasks before you can use the system. For complete information, go to Chapter 4.

After Installing the OpenVMS AXP Operating System

Overview

After you have installed the OpenVMS AXP operating system, you need to perform several important tasks to prepare the system for operation. These tasks, described in this chapter in the order in which you perform them, are as follows:

- Registering licenses
- Backing up the system disk
- Customizing the system
- Configuring and starting DECnet for OpenVMS AXP software
- Decompressing the system libraries
- Installing layered products
- Backing up the customized system disk
- Configuring a multihead system
- Running AUTOGEN
- Using the postinstallation checklist

Registering Your Licenses

Introduction

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

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

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

(You can also use the LICENSE REGISTER command.)

For More Information

For information about registering licenses, see the following:

- Registering Licenses
- Appendix C
- *The OpenVMS License Management Utility Manual*

Backing Up Your System Disk

Introduction

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

How to Back Up the System Disk

To back up the system disk, do the following:

1. Shut down the system.
2. Boot the distribution compact disc (locally or from the InfoServer).
3. Use the menu-driven procedure to enter the DCL environment (option 2).
4. Enter backup commands to back up the system disk to supported media.
5. Exit the DCL environment.
6. Shut down the system (option 3).
7. Boot from the system disk.

When to Back Up the System Disk

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

For More Information

For complete information about backup operations, see Appendix B.

Customizing the System

Introduction

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

For More Information

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

1. Appendix A, which explains the different ways to boot and shut down the system.
2. If the computer is part of a VMScluster environment, refer to *VMScluster Systems for OpenVMS* for further information on setting up a cluster.
3. The release notes and *A Comparison of System Management on OpenVMS AXP and OpenVMS VAX*, for notes and restrictions that might be relevant to your customization plans.
4. The *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
5. Configuring and Starting DECnet for OpenVMS AXP Software.
6. Chapter 10, to customize your system for DECwindows support.

Configuring and Starting DECnet for OpenVMS AXP Software

If you plan to run DECnet for OpenVMS AXP software, you must do the following:

1. After you have registered the license for the DECnet for OpenVMS AXP software, execute the interactive command procedure `SYS$MANAGER:NETCONFIG.COM` to automatically configure your system for networking. See the *DECnet for OpenVMS Guide to Networking* for instructions on using `NETCONFIG.COM`.
2. After you start the queue manager (see the *OpenVMS System Manager's Manual*), edit the commands in `SYS$COMMON:[SYSMGR]SYSTARTUP_VMS.COM` that pertain to networking, so that the DECnet for OpenVMS software starts automatically when your system is booted. Choose one of the following commands to start the network and remove the comment delimiter (!) from that command:

```
$! IF F$SEARCH("SYS$SYSTEM:NETACP.EXE") .NES. "" THEN @SYS$MANAGER:STARTNET
$! IF F$SEARCH("SYS$SYSTEM:NETACP.EXE") .NES. "" THEN SUBMIT SYS$MANAGER:STARTNET.COM
```

Both of the previous commands perform the same task. However, the first command executes `STARTNET.COM` and delays further processing until the procedure is completed; the second submits `STARTNET.COM` to a batch queue and continues executing `SYSTARTUP_VMS.COM`.

3. If you plan to run both DECnet for OpenVMS AXP 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 for OpenVMS AXP software or have not yet started it, this command tells the DECwindows software not to wait for the DECnet for OpenVMS AXP software.

Decompressing the System Libraries

- Introduction** Decompressing the system libraries gives the system faster access to them. The decompressed libraries require several thousand additional blocks of disk space for all libraries to be decompressed. You use the LIBDECOMP.COM procedure to decompress the libraries.
- Determining Disk Space** To find out how much disk space you have, enter the following command and press the Return key:
- ```
$ SHOW DEVICE SYSSYSDEVICE
```
- If you have approximately 30,000 free blocks on the disk, you can decompress the libraries. Note that you can decompress only the libraries that are used frequently.
- Methods of Using LIBDECOMP.COM**                      You can use the LIBDECOMP.COM procedure to decompress libraries in three ways:
- Entering a command and responding to prompts from the procedure
  - Entering an interactive command
  - Entering a batch command
- The following three sections describe each method.
- Note:** Before you use the LIBDECOMP.COM procedure, be sure you are logged in to the SYSTEM account.

## Responding to LIBDECOMP.COM Prompts

If you want to decompress libraries by responding to prompts from the LIBDECOMP.COM procedure, do the following:

1. Enter the following command and then press the Return key:

```
$ @SYS$UPDATE:LIBDECOMP.COM
```

The resulting display is similar to the following:

```
VMS Library Decompression Utility

Options:

 1 HELPLIB.HLB 12 EDTHELP.HLB 22 EVE$KEYHELP.HL
 2 STARLET.OLB 13 NCPHELP.HLB 23 UAFHELP.HLB
 3 ACLEDT.HLB 14 SDA.HLB 24 LIB.MLB
 4 ANLRMSHLP.HLB 15 SHWCLHELP.HLB 25 STARLET.MLB
 5 DBG$HELP.HLB 16 SYSGEN.HLB 26 STARLETSD.TLB
 6 DISKQUOTA.HLB 17 ANALAUDIT$HELP 27 DECC$RTLDEF.TL
 7 EDFHLP.HLB 18 SYSMANHELP.HLB 28 VAXCCURSE.OLB
 8 INSTALHLP.HLB 19 TFF$TFUHELP.HL 29 VAXCTRL.OLB
 9 LATCP$HELP.HLB 20 TPUHELP.HLB 30 VAXCRTLD.OLB
10 MAILHELP.HLB 21 EVE$HELP.HLB 31 VAXCRTLT.OL
11 MNRHELP.HLB

or A ALL libraries to be decompressed
 E EXIT this procedure
```

\* Enter letter or number(s) of libraries to be decompressed  
(Separate multiple entries with a comma):

2. Enter the appropriate letter or the numbers of the libraries you want to decompress. (To decompress all libraries, the process takes approximately one half hour.)
3. When you are done, exit the procedure by entering E.

## Using LIBDECOMP.COM Interactively

You can execute LIBDECOMP.COM interactively to decompress up to 8 libraries at a time, by listing the names of the libraries you want to decompress as parameters on the command line.

Be sure to separate the library names with commas and do not include the file extension. For example, to decompress the VAXCTRL.OLB, DISKQUOTA.HLB, and LIB.MLB interactively, enter the following command:

```
$ @SYS$UPDATE:LIBDECOMP VAXCTRL, DISKQUOTA, LIB
```

**Using  
LIBDECOMP.COM  
in Batch**

You can also execute LIBDECOMP.COM in batch to decompress up to 8 libraries at a time, by listing the names of the libraries you want to decompress as parameters on a command line that includes the SUBMIT command.

Be sure to separate the library names with commas and do not include the file extension. For example, to decompress the VAXCTRL.OLB, DISKQUOTA.HLB, and LIB.MLB as a batch job, enter the following command:

```
$ SUBMIT/NOTIFY/PARAMETERS=(VAXCTRL, DISKQUOTA, LIB) -
_ $ SYS$UPDATE:LIBDECOMP
```

**Note:** When you type the command for a batch job, be sure you enclose the list of library names within parentheses.

## Installing Layered Products

### Overview

As you continue your postinstallation tasks by installing layered products, note the following:

- For information about installing layered products in general, see the *OpenVMS System Manager's Manual*. Otherwise, see the documentation that accompanied your layered product.
- Be sure you back up the system disk (described next) after you install all your layered products.

### DECwindows Support

If you selected the DECwindows support that is included on the OpenVMS AXP operating system distribution compact disc, you must still install the separate DECwindows Motif for OpenVMS AXP layered product to obtain complete DECwindows support. See the the most recent DECwindows Motif installation guide for complete information.

## Backing Up the Customized System Disk

### Introduction

After you have installed and customized the OpenVMS AXP operating system to your satisfaction and installed your layered products, you should protect your work by making a backup copy of the system disk before you install your layered products.

### How to Back Up the Customized System Disk

To back up the system disk, do the following:

1. Shut down the system.
2. Boot the distribution compact disc (locally or from the InfoServer).
3. Use the menu-driven procedure to enter the DCL environment (option 2).
4. Enter backup commands to back up the system disk to supported media.
5. Exit the DCL environment.
6. Shut down the system (option 3).
7. Boot from the system disk.

### For More Information

For complete information about backup operations, see Appendix B.

## Configuring a Multihead System

- Definition**                    A multihead configuration consists of a single workstation (such as a DEC 3000 AXP Model 500 system) that supports multiple graphics options. A graphics option consists of a graphics controller and a graphics display interface (monitor).
- Introduction**                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 for OpenVMS AXP server loads this command procedure on startup or restart. This file always configures the console as the primary head, or screen 0. The firmware will always select the lowest device found in the system (that is, the device with the lowest TURBOchannel slot address) as the console device.
- How to Set Up the System**        To set up your system for multihead support, do the following:
1. After installing the DECwindows Motif for OpenVMS AXP software on your system, log on to your system.
  2. Rename the private server setup file by entering the following command:  

```
$ RENAME 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
```
- For More Information**        See Chapter 10 for more information about customizing your DECwindows environment using the `SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM` file.

---

## Running AUTOGEN

### Introduction

When you installed the operating system, the system executed 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, you need to run the AUTOGEN.COM procedure again to properly tune the system.

### When to Run AUTOGEN

1. After 24 hours of operation, run AUTOGEN in feedback mode and reboot the system.
2. Run AUTOGEN again in feedback mode two workdays later, and then reboot the system.
3. Digital recommends that you run AUTOGEN from SAVPARAMS through TESTFILES on a weekly basis thereafter, and examine AGEN\$PARAMS.REPORT to determine the need for additional changes.

### 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:

- 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 that 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

For more information about the MODPARAMS.DAT file and about using AUTOGEN in general, see the *OpenVMS System Manager's Manual*.

---

## Postinstallation Checklist

Use the following checklist to make sure you perform all the necessary postinstallation tasks.

- Register your licenses, if you did not do so during the installation procedure.
- Back up the system disk as a safeguard before customizing the system.
- Customize the system.
- Configure and start the DECnet for OpenVMS AXP software.
- Decompress the system libraries using LIBDECOMP.COM.
- Install layered products.
- Back up the system disk after you have customized it and installed layered products.
- Configure your multihead system (if applicable)
- After the system has been running for at least 24 hours, run AUTOGEN to collect feedback information and modify the MODPARAMS.DAT file if necessary.

---

**Before Upgrading a Shadowed System Disk**

---

## Preupgrade Tasks for a Volume Shadowing Environment

### Overview

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 multi-member 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 may want to use a *copy* of the system disk as your target disk. *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

Change one of your existing shadowed system disks to a nonshadowed disk as follows:

1. Shut down all systems booted to the 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 -FL 0,1 DKA400
```
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.

### Erasing Shadowing Information

After you have created a nonshadowed system disk to use as your target disk for the upgrade and logged in to the system, enter the MOUNT/OVERRIDE=SHADOW\_MEMBERSHIP command on the target disk to erase the shadowing information on the storage control block (SCB) of the disk. Do not mount the disk for systemwide or clusterwide access; omit the /SYSTEM and /CLUSTER qualifiers on the MOUNT command line.

**Changing the Label**

Use the DCL command `SET VOLUME/LABEL=volume-label device-spec[:]` to change the label on the upgrade disk. (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 VMScluster systems, ensure that the volume label is a unique name across the cluster.

**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 VMScluster system. The following example shows how you can 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 (see Appendix A for more information).

**Where to Go Next**

Now that you have created a nonshadowed system disk that you can use for the upgrade, go to Chapter 6 to perform additional preupgrade procedures.

---

## **Before Upgrading the OpenVMS AXP Operating System**

## Overview

This chapter describes which tasks you should perform prior to beginning an upgrade. Tasks described in this chapter include:

- Reviewing cautions and restrictions
- Backing up the current system disk
- Preparing the system disk for the upgrade
- Shutting down the system
- Using the preupgrade checklist

### Where to Find More Information

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

- The release notes
- *VMScluster Systems for OpenVMS*, if you are upgrading a VMScluster environment
- *OpenVMS System Manager's Manual*, for information about using AUTOGEN, modifying the system parameters file (MODPARAMS.DAT), and related operations
- *OpenVMS System Management Utilities Reference Manual*, for information about using system management utilities such as SYSMAN and ANALYZE/DISK\_STRUCTURE
- *OpenVMS AXP Guide to System Security*, for information about reestablishing your security environment after the upgrade

---

## Cautions and Restrictions

### Introduction

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.

### Upgrading a Shadowed System Disk

You cannot upgrade a shadowed system disk. If your system disk is part of a shadow set, you must create a nonshadowed system disk before beginning the upgrade. For more information, see Chapter 5.

### System Parameters

If you made system parameter changes using the SYSGEN or SYSMAN utilities, but did not make those changes in MODPARAMS.DAT as well, those settings will be lost after you perform the upgrade.

### Files and Directories

- If you choose not to install optional OpenVMS AXP software during the upgrade, the upgrade procedure removes existing files for those components from the system disk.
- If you have changed directories 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 Version 6.1 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 had previously set up. For more information about creating and maintaining a secure environment, see the *OpenVMS AXP Guide to System Security*.

### Licenses and Layered Products

Note the following:

- 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 AXP license and layered product licenses intact. You will not need to reinstall these licenses after you upgrade.

### Upgrading a VMScluster Environment

If you are upgrading in a cluster that also includes VAX systems, those VAX systems must be running *only* Version 5.5–2 or Version 6.0 of the VMS operating system.

---

## Backing Up the System Disk

### Introduction

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

**Note:** If you do not have a removable system disk, back up your system disk to tape and restore the backup copy to the system disk. This eliminates disk fragmentation on the system disk and creates contiguous free disk blocks required for the upgrade.

### How to Back Up the System Disk

To back up the system disk, do the following:

1. Shut down the system.
2. Boot the distribution compact disc (locally or from the InfoServer).
3. Use the menu-driven procedure to enter the DCL environment (option 2).
4. Enter backup commands to back up the system disk to supported media.
5. Exit the DCL environment.
6. Shut down the system (option 3).
7. Boot from the system disk (or the backup copy).

### For More Information

For complete information about backup operations, see Appendix B.

---

## Preparing the System Disk

### Overview

The following sections describe how to prepare the system disk for the upgrade in both a clustered and nonclustered environment. The operations include the following:

- Examining the system disk
- Checking the size of 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 *OpenVMS System Management Utilities Reference Manual* 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 Size of the System Disk

Check the system disk to make sure there is enough room for the upgrade. To determine if you have enough room, enter the following command:

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

To upgrade the OpenVMS AXP *required* files, you need between 63,000 (the minimum) and 160,000 free blocks on the system disk, depending on how many optional components you have and how many you add during the upgrade.

### Verifying System Parameters

Verify (and modify if necessary) system parameters, described as follows. (If necessary, see the *OpenVMS System Manager's Manual* for more information about modifying system parameters.). Any system parameters that you modified and *did not* enter in `SYS$SYSTEM:MODPARAMS.DAT` are lost during the upgrade. To retain these parameters, enter their names in `SYS$SYSTEM:MODPARAMS.DAT` and the value that AUTOGEN needs to add to the default minimum value. (When AUTOGEN runs after the upgrade, it uses the values in `SYS$SYSTEM:MODPARAMS.DAT`.)

## Preparing the System Disk

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

```
ADD_GBLPAGES=128
```

---

## Shutting Down the System

### Overview

The following sections describe how to shut down a system depending on how it is configured, as follows:

- Standalone system (not part of a VMSccluster environment)
- A single disk system in a VMSccluster environment
- A multiple disk system in a VMSccluster environment

### Shutting Down a Standalone System

If your system is a standalone system (not part of a VMSccluster environment), shut down the system as follows:

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 end of this chapter to verify that you have performed the necessary tasks; then go to Chapter 7 to begin the upgrade procedure.

### Shutting Down in a Cluster with a Single System Disk

If you are upgrading in a VMSccluster environment that has a single system disk, shut down the system as follows:

1. Log in locally to the SYSTEM account.
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 (DEC 7000 AXP and DEC 10000 AXP series systems) or by pressing the Halt button (DEC 3000 AXP and DEC 4000 AXP series systems).<sup>1</sup>
6. Go to the checklist at the end of this chapter to verify that you have performed the necessary tasks; then go to Chapter 7 to begin the upgrade procedure.

---

<sup>1</sup> See Appendix A for more information about how to halt your AXP computer.

## Shutting Down in a Cluster with Multiple System Disks

If you are upgrading in a VMScluster environment with multiple system disks and want to keep the rest of the cluster running, shut down the system as follows:

1. Log in to any node where the disk you are upgrading is mounted as a *data* disk, rather than as the *system* disk.
2. 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.

3. 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 where it is not the system disk. Note that if the value listed in the Trans Count field is less than 50, the disk is not mounted as a system disk on that system; a much larger value (for example, 300) indicates that the disk most likely is the system disk.

4. If the disk is not properly dismounted, use the SYSMAN utility to dismount the disk; otherwise exit from the SYSMAN utility.
5. Shut down all nodes that boot from the system disk you are upgrading, including the node from which you will perform the upgrade. Enter the following command on each node:  

```
$ @SYS$SYSTEM:SHUTDOWN
```
6. When the procedure asks if an automatic system reboot should be performed, enter N (No) and press the Return key.
7. Choose the REMOVE\_NODE option.
8. After the shutdown procedure is finished, go to the checklist at the end of this chapter to verify that you have performed the necessary tasks; then go to Chapter 7 to begin the upgrade procedure.

---

## Preupgrade Checklist

Use the following checklist to make sure you have performed all the tasks before beginning the upgrade.

- Review all cover letters and the release notes.
- Review all cautions and notes.
- If your system disk is part of a shadow set, create a nonshadowed system disk to upgrade (described in the Chapter 5).
- Set up your system to record the upgrade procedure on either a hardcopy terminal or a printer attached to the console terminal. 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 upgrade. For information on how to record the procedure, see the hardware manuals that came with your AXP computer.
- Make a backup copy of the system disk.
- Examine and repair (if necessary) the system disk using the `ANALYZE/DISK_STRUCTURE` command.
- Be sure the system disk has at least 63,000 free blocks.
- Verify system parameters.
- If you are upgrading in a VMScluster with multiple system disks, be sure that the system disk you are upgrading is *not* mounted as a data disk on any nodes that will not be shut down.
- Shut down the system from which you will perform the upgrade. If you are upgrading a VMScluster, shut down all systems that boot from the system disk you are upgrading.
- After you complete the tasks in this checklist, go to Chapter 7 to begin the upgrade procedure.

---

**Upgrading the OpenVMS AXP Operating System**

---

## Booting the Distribution Compact Disc

### Introduction

To get started, boot the OpenVMS AXP distribution compact disc either from your local compact disc drive or from a compact disc drive connected to the InfoServer, as described in the following sections.

### Booting from the Local Drive

1. Insert the distribution compact disc into the local compact disc drive.
2. At the console prompt (>>>), enter the SHOW DEVICE command so you can identify the name of the compact disc drive (for example, DKA400:)
3. Enter the boot command in the following format:

```
BOOT source-drive -flags 0,0
```

Substitute the device name of the compact disc drive (as listed in the SHOW DEVICE display) for *source-drive*.

For example, if the SHOW DEVICE display lists the device name of your compact disc drive as DKA400, enter the following command and press the Return key:

```
>>> BOOT DKA400 -flags 0,0
```

### Booting from the InfoServer

To boot the distribution compact disc using the InfoServer, follow these steps:

1. At the console prompt, enter the following command:

```
>>> B -FL 0,0 -FI APB_061 lan-device-name
```

where:

- *APB\_061* is the file name of the APB program used for the initial system load (ISL) boot program.

**DEC 4000 Note:** On a DEC 4000 series AXP system, you must specify this file name in uppercase.

- *lan-device-name* is the name of the local area network (LAN) device (FDDI or Ethernet) identified with your computer, as listed in the following table. (For more information about these devices, refer to the hardware owner's and operations manuals that you received with your AXP computer.)

| AXP Computer     | FDDI Device | Ethernet Device |
|------------------|-------------|-----------------|
| DEC 2000 series  | –           | ERA0            |
| DEC 3000 series  | N/A         | ESA0            |
| DEC 4000 series  | N/A         | EZA0            |
| DEC 7000 series  | FXA0        | EXA0            |
| DEC 10000 series | FXA0        | EXA0            |

**FT4 Note:** If your DEC 4000 series AXP system is using console firmware prior to version 3.2, enter the command as follows:

```
>>> B -FL 0,0 -start 0 -FI APB_061 EZA0
```

**Note:** For DEC 3000 series AXP systems equipped with the PMAD TURBOchannel adapter, enter the command as follows:

```
>>> B -FL 0,0 -FI APB_061 "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. In the following example, the PMAD TURBOchannel slot number (listed under the "TCINFO" column) is 0:

```
>>> SHOW CONFIG
DEC 3000 - M300
Digital Equipment Corporation
VPP PAL X5.39-80800101/OSF PAL X1.28-80800201 - Built on 18-FEB-1993 11:376

TCINFO DEVSAM DEVSTAT
----- -
 CPU OK KN16-AA -V2.1-S288-I053-sBL0.7 -DECchip 21064 P3.0
 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
```

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

```
Network Initial System Load Function
Version 1.1
```

## Booting the Distribution Compact Disc

| FUNCTION<br>ID |   | FUNCTION       |
|----------------|---|----------------|
| 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 (AXPVMS061FT4).

A sample display follows:

Enter a function ID value: 3

| OPTION<br>ID |   | OPTION                   |
|--------------|---|--------------------------|
| 1            | - | Find Services            |
| 2            | - | Enter known Service Name |

Enter an Option ID value: 2

Enter a Known Service Name: AXPVMS061FT4

---

## Beginning the Upgrade

### Introduction

This section describes how to use the menu to begin the upgrade procedure.

**Note:** When upgrading to the FT4 version of the OpenVMS AXP operating system, you can choose or exclude files by answering YES or NO to the following question:

Do you want all the default values for this product [YES]

However, one exception is that you must choose the option that includes IMAGELIB.OLB (Object and Shareable Image Libraries).

### Selecting the Upgrade Option

After you boot the distribution compact disc, choose the upgrade option (1) from the menu displayed on the screen. The system will then display informational messages similar to the following:

```

```

```
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)
```

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

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

```
PRESERVE -- installs or upgrades OpenVMS AXP and retains
 all other contents of the existing disk.
```

```
* NOTE: You cannot install OpenVMS AXP on an existing 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).**

**InfoServer Note:** If you booted the OpenVMS AXP distribution compact disc from an InfoServer but lose your connection during the upgrade procedure (the system hangs and pressing Ctrl/Y does not return you to the menu), you must do the following:

1. Reboot the OpenVMS AXP distribution compact disc.
2. Restore the backup of your target disk, by using the menu to enter the DCL environment (option 2) and then entering the appropriate BACKUP commands.
3. Exit the DCL environment.

4. Perform the upgrade again, by choosing the upgrade option (1) from the menu and following the procedures described in this chapter.

### Specifying the Target Disk

Next, the procedure asks you for the name of the target disk. If you enter ?, 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 AXP will be installed.

Enter device name for target disk: (? for choices) dka200

Getting DKA200: volume label...
%MOUNT-I-MOUNTED, AXPVMS061FT4 mounted on _DKA200:

OpenVMS AXP will be upgraded on DKA200:.

DKA200: is now labeled AXPVMS061FT4.
```

### Specifying the Volume Label

Next, the system prompts you for the volume label and then asks if the information is correct. You can use the default or specify a different volume label (12 character limit). After you select the volume label and choose to continue by answering Yes to the next prompt, the target disk is initialized and mounted, and page and swap files are created. In the following sample display, the default volume label is used:

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

Next, answer whether you want brief or detailed descriptions with each system prompt. Then go to the next section.

### Upgrading the Operating System

As you begin the upgrade procedure, the system display is similar to the following:

```
OpenVMS AXP V1.5 will be registered to ensure a correct upgrade.

The following product will be registered:
DEC AXPVMS VMS V1.5
Portion Done: 10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
The following product has been registered:
DEC AXPVMS VMS V1.5

The following product has been selected:
OpenVMS AXP T6.1

Do you want to continue [YES]
```

If you are ready to begin the upgrade, press the Return key. As you respond to the screen displays and prompts during the installation, note that you will be able to view your answers and make necessary changes after you have made all your selections.

## Completing the Upgrade

When you have answered all the prompts and selected the files you want installed, answer Yes to the following prompt to complete the upgrade:

```
Are you satisfied with your answers [YES]
```

The system displays the following information:

- Notification that the upgrade has been completed.
- Information about running AUTOGEN.
- The menu.

The display is similar to the following:

```
%PCSIUI-I-DONEASK, no further questions will be asked
The following product will be installed:
OpenVMS AXP T6.1
%PCSI-I-VOLINFO, estimated space information for volume AXPVMS061FT4
-PCSI-I-VOLSPC, 238926 required; 826782 available; 587856 net

Percent Done: 13%...23%...33%...43%...53%...63%...73%...83%...93%...100%
The following product has been installed:
OpenVMS AXP T6.1
```

The upgrade is now complete.

When the newly upgraded system is first booted, a special startup procedure will be run. This procedure will run AUTOGEN to set system parameters

You can shut down now or continue with other operations.

```
Process SYSTEM_1 logged out at 21-SEP-1993 18:07:58.26
```

```

```

If you do not want to perform any other operations prior to booting the upgraded disk, shut down the system by choosing the shutdown option (3) from the menu For example:

You can install or upgrade the OpenVMS AXP operating system. 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) Install/Upgrade OpenVMS AXP
- 2) Execute DCL commands and procedures
- 3) Shut down this system

```
Enter CHOICE or "?" to repeat menu: (1/2/3/?)3
```

```
SYSTEM SHUTDOWN COMPLETE
```

## Performing Postshutdown Tasks

After the system shuts down, perform the following tasks:

1. In a VMSccluster environment, if you have more than one system disk, repeat the upgrade process for each system disk in the cluster, beginning with the preupgrade tasks described Chapter 6. When you finish upgrading all of the system disks, go to the next step.
2. Reboot the system. (In a VMSccluster environment, reboot each upgraded system.)

## Beginning the Upgrade

**After the system reboots, the procedure displays the following message:**

OpenVMS AXP (TM) Operating System, Version T6.1-FT4

Copyright (c) 1993 Digital Equipment Corporation. All rights reserved.

%STDRV-I-STARTUP, VMS startup begun at 15-JUL-1993 16:24:02.27

3. **After the procedure displays informational messages and accounting information, press the Return key and log in to your system.**

### What to Do Next

After you have successfully completed the upgrade, you need to perform specific postupgrade procedures.

| <b>IF ...</b>                                                   | <b>THEN ...</b>  |
|-----------------------------------------------------------------|------------------|
| you are upgrading in a volume shadowing environment,            | go to Chapter 8. |
| you are <i>not</i> upgrading in a volume shadowing environment, | go to Chapter 9. |

---

**After Upgrading a Shadowed System Disk**

---

## Enabling Volume Shadowing on the Upgraded System

### Introduction

If you are upgrading a disk that was part of a shadow set, you previously dissolved the shadow set so you could perform the upgrade on a nonshadowed disk. Now that the upgrade is complete and the upgraded node has finished running AUTOGEN, you can enable shadowing on that disk using the steps described in this section.

### How to Enable Volume Shadowing

To enable volume shadowing, perform the following steps:

1. Invoke the OpenVMS System Generation utility (SYSGEN) by entering the following command:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> USE CURRENT
SYSGEN>
```

The `USE CURRENT` command initializes the SYSGEN work area with the source information from the current system parameter file on disk. (To find out the current value of system parameters, use the `SHOW` command [for example, `SHOW SHADOWING`] to see the current system parameter values as well as the minimum, maximum, and default values of the parameters.)

If the system disk is to be a shadow set, set the system parameter `SHADOW_SYS_DISK` to 1, and set the `SHADOW_SYS_UNIT` parameter to the unit number of the virtual unit, as follows (assume the system disk virtual unit is DSA54):

```
SYSGEN> SET SHADOW_SYS_DISK 1
SYSGEN> SET SHADOW_SYS_UNIT 54
SYSGEN> WRITE CURRENT
```

Type `EXIT` or press `Ctrl/Z` to exit from the SYSGEN utility and return to the DCL command level.

2. To ensure that volume shadowing is enabled each time AUTOGEN executes, edit the `SYS$SYSTEM:MODPARAMS.DAT` file to set the shadowing parameters.

For VMScluster systems, set system parameters in `MODPARAMS.DAT` on each node that uses volume shadowing. (See *Volume Shadowing for OpenVMS* for more information about setting volume shadowing parameters in the `MODPARAMS.DAT` file.)

3. Shut down the system on which you performed the upgrade and reboot.

---

## Booting Other Nodes from the Upgraded Disk

### Introduction

If other nodes in a VMScLuster boot from the upgraded disk, the OpenVMS upgrade procedure automatically upgrades and runs AUTOGEN on each node when it is booted. This section describes steps you must follow to enable volume shadowing for each node and to then boot those nodes from the upgraded system disk.

### Enabling Volume Shadowing

For each node to be booted from the upgraded disk, you must edit SYS\$SYSTEM:ALPHAVMSSYS.PAR and SYS\$SYSTEM:MODPARAMS.DAT to enable system disk shadowing.

Be sure SHADOWING is set to 2 and then set SHADOW\_SYS\_DISK to 1, and SHADOW\_SYS\_UNIT to the unit number of the system disk virtual unit.

Remember to modify the files on the upgraded disk, not on the preupgrade system disk.

### Booting the Nodes

1. Set the nodes to boot from the upgraded disk. (See Appendix A for information about showing and setting boot devices.)
2. Boot each node. With shadowing enabled in each node's ALPHAVMSSYS.PAR file on the upgraded disk, the node will be able to boot from the shadowed (upgraded) system disk.

### What to Do Next

Once you have successfully upgraded the system, go to Chapter 9 to perform additional postupgrade tasks.

---

**After Upgrading the OpenVMS AXP Operating System**

---

## Overview

After you upgrade the OpenVMS AXP operating system, you need to perform several important tasks before you can use the system. These tasks, described in the order in which you perform them, are as follows:

- Registering new licenses
- Examining the AUTOGEN report file
- Modifying the system parameters file (MODPARAMS.DAT)
- Examining your command procedures
- Decompressing the system libraries
- Backing up the system disk
- Reinstalling layered products
- Running AUTOGEN
- Performing postupgrade volume shadowing tasks (if applicable)

**Volume Shadowing Note:** If you upgraded the system disk in a volume shadowing environment, be sure you have first performed the postupgrade tasks described in Chapter 8 before you perform the additional postupgrade tasks described here.

---

## Registering New Licenses

### Introduction

If you need to register new OpenVMS AXP or layered product licenses, you can do so by entering the following command:

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

You can also use the **LICENSE REGISTER** command.

### Where to Find More Information

For information about registering licenses, see the following:

- Registering Licenses
- Appendix C
- *The OpenVMS License Management Utility Manual*

---

## Examining the AUTOGEN Report File

### Introduction

When AUTOGEN runs, it writes informational and, if necessary, warning messages to the file `SYSS$SYSTEM:AGEN$PARAMS.REPORT`. You should examine the contents of this report file.

### Interpreting the Report File

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

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

For more information on `AGEN$PARAMS.REPORT`, see the *OpenVMS System Manager's Manual*.

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 about modifying the sizes of the `PAGE`, `SWAP`, and `DUMP` files, see the next section.

---

## Modifying the System Parameters File

### Introduction

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`. Modify the parameters in the new file as necessary. The following two 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 workloads or configurations, you can specify different sizes for these files by performing the following steps:

1. Log into 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 *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems*) and repeat step 1 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
```

### VMScluster Parameters

If you are upgrading a VMScluster, note the following:

- You must update the `MODPARAMS.DAT` file for each AXP computer that boots from the system disk.
- 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 AXP computers in the cluster and each has one `VOTE`, the value is five.
- As you reboot each AXP computer, `AUTOGEN` runs automatically. The cluster forms when you have booted enough computers to attain cluster quorum.

---

## Examining Your Command Procedures

- Introduction** This section describes how the upgrade procedure affects command procedures.
- New Version of WELCOME.TXT** The upgrade procedure places a new version of WELCOME.TXT on your system disk. If your system uses a site-specific version of this file, you must modify the new version of the file with your changes.
- Site-Specific Files** The upgrade procedure restores the site-specific versions of the following files located in the [VMS\$COMMON] directory:
- ```
[SYSMGR] LOGIN.COM  
[SYSMGR] SYLOGIN.COM  
[SYSMGR] SYSTARTUP_VMS.COM  
[SYSMGR] SYCONFIG.COM  
[SYSMGR] SYSECURITY.COM  
[SYSMGR] SYSHUTDOWN.COM  
[SYSMGR] SYPAGSWPFILES.COM  
[SYSMGR] SYLOGICALS.COM  
[SYSMGR] TFF$SYSTARTUP.COM  
[SYSMGR] LAT$SYSTARTUP.COM  
[SYS$STARTUP] ESS$LAST_STARTUP.DAT
```
- The procedure temporarily changes the file extensions of these restored files to .COM_SITE_SPECIFIC. After the upgrade procedure completes, the files are renamed with their original file extensions. (Note, however, that other files may be renamed permanently with the file extension .COM_OLD_VMS\$UPG.)
- These site-specific files remain as your most current versions in the [SYSCOMMON] directory because the files supplied by Digital during the upgrade receive lower version numbers when they are copied to this directory. Therefore, purging the directory will delete the files supplied by Digital and not your site-specific versions.
- The upgrade procedure provides 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.

Decompressing the System Libraries

Introduction

Decompressing the system libraries gives the system faster access to them. The decompressed libraries require several thousand additional blocks of disk space for all libraries to be decompressed. You use the LIBDECOMP.COM procedure to decompress the libraries.

Determining Disk Space

To find out how much disk space you have, enter the following command and press the Return key:

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

If you have approximately 30,000 free blocks on the disk, you can decompress the libraries. Note that you can decompress only the libraries that are used frequently.

Methods of Using LIBDECOMP.COM

You can use the LIBDECOMP.COM procedure to decompress libraries in three ways:

- Entering a command and responding to prompts from the procedure
- Entering an interactive command
- Entering a batch command

The following three sections describe each method.

Note: Before you use the LIBDECOMP.COM procedure, be sure you are logged in to the SYSTEM account.

Responding to LIBDECOMP.COM Prompts

If you want to decompress libraries by responding to prompts from the LIBDECOMP.COM procedure, do the following:

1. Enter the following command and then press the Return key:

```
$ @SYS$UPDATE:LIBDECOMP.COM
```

The resulting display is similar to the following:

```

                                VMS Library Decompression Utility

Options:

 1 HELPLIB.HLB                12 EDTHELP.HLB                22 EVE$KEYHELP.HL
 2 STARLET.OLB                13 NCPHELP.HLB               23 UAFHELP.HLB
 3 ACLEDT.HLB                 14 SDA.HLB                   24 LIB.MLB
 4 ANLRMSHLP.HLB             15 SHWCLHELP.HLB            25 STARLET.MLB
 5 DBG$HELP.HLB              16 SYSGEN.HLB                26 STARLETSD.TLB
 6 DISKQUOTA.HLB             17 ANALAUDIT$HELP           27 DECC$RTLDEF.TL
 7 EDFHLP.HLB                 18 SYSMANHELP.HLB           28 VAXCCURSE.OLB
 8 INSTALHLP.HLB             19 TFF$TFUHELP.HL           29 VAXCRTL.OLB
 9 LATCP$HELP.HLB           20 TPUHELP.HLB               30 VAXCRTLD.OLB
10 MAILHELP.HLB              21 EVE$HELP.HLB              31 VAXCRTLT.OL
11 MNRHELP.HLB

or  A  ALL libraries to be decompressed
     E  EXIT this procedure

```

Decompressing the System Libraries

* Enter letter or number(s) of libraries to be decompressed
(Separate multiple entries with a comma):

2. Enter the appropriate letter or the numbers of the libraries you want to decompress. (To decompress all libraries, the process takes approximately one half hour.)

Using LIBDECOMP.COM Interactively

You can execute LIBDECOMP.COM interactively to decompress up to 8 libraries at a time, by listing the names of the libraries you want to decompress as parameters on the command line.

Be sure to separate the library names with commas and do not include the file extension. For example, to decompress the VAXCTRL.OLB, DISKQUOTA.HLB, and LIB.MLB interactively, enter the following command:

```
$ @SYS$UPDATE:LIBDECOMP VAXCTRL, DISKQUOTA, LIB
```

Using LIBDECOMP.COM in Batch

You can also execute LIBDECOMP.COM in batch to decompress up to 8 libraries at a time, by listing the names of the libraries you want to decompress as parameters on a command line that includes the SUBMIT command.

Be sure to separate the library names with commas and do not include the file extension. For example, to decompress the VAXCTRL.OLB, DISKQUOTA.HLB, and LIB.MLB as a batch job, enter the following command:

```
$ SUBMIT/NOTIFY/PARAMETERS=(VAXCTRL, DISKQUOTA, LIB)-  
_ $ SYS$UPDATE:LIBDECOMP
```

Note: When you type the command for a batch job, be sure you enclose the list of library names within parentheses.

Customizing DECwindows Software

Introduction

If you have installed DECwindows software, there are several steps that you must take to customize the DECwindows environment.

Where to Find More Information

See Chapter 10 for procedures to customize your DECwindows software.

After you finish customizing DECwindows software, return to this chapter to complete the postupgrade procedures.

Reinstalling Layered Products

Introduction

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.

Where to Find More Information

For more information, refer to the following:

- The release notes and the installation documents for each layered product, to determine if any of your layered products need to be reinstalled
- The *OpenVMS System Manager's Manual*, for more information about installing layered products

Backing Up the Customized System Disk

Introduction

After you have upgraded and customized the OpenVMS AXP operating system to your satisfaction and installed layered products, you should protect your work by making a backup copy of the system disk before you install your layered products.

How to Back Up the Customized System Disk

To back up the system disk, do the following:

1. Shut down the system.
2. Boot the distribution compact disc (locally or from the InfoServer).
3. Use the menu-driven procedure to enter the DCL environment (option 2).
4. Enter backup commands to back up the system disk to supported media.
5. Exit the DCL environment.
6. Shut down the system (option 3).
7. Boot from the system disk.

For More Information

For complete information about backup operations, see Appendix B.

Running AUTOGEN

Introduction

You must run AUTOGEN periodically after you perform an upgrade. This section describes how often you should run AUTOGEN and what it does.

Running After the Upgrade

After 24 hours of operation, run AUTOGEN in FEEDBACK mode and reboot the system. Run AUTOGEN in this way again two workdays later.

Running Weekly

AUTOGEN sets the values of system parameters and the sizes of the page and swap files according to the system's workload. Digital recommends that you run AUTOGEN from SAVPARAMS through TESTFILES on a weekly basis and examine AGEN\$PARAMS.REPORT to determine the need for additional changes.

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.

Where to Find More Information

For more information about the MODPARAMS.DAT file and about using AUTOGEN in general, see the *OpenVMS System Manager's Manual*.

Performing Postupgrade Volume Shadowing Tasks

Chapter 8 describes the tasks you need to perform after upgrading in a volume shadowing environment. After you complete those tasks and the additional postupgrade tasks described in this chapter, you need to do the following:

1. Mount additional shadow set members into the shadow set as follows:
 - a. Enter the `SHOW DEVICE D` command to display a list of disks available on your system. For example:

```
$ SHOW DEVICE D
```

Device Name	Device Status	Error Count	Volume Label	Free Blocks	Trans Count	Mnt Cnt
DSA54:	Mounted	0	SHADOWDISK	53420	100	1
\$11\$DKB100: (NODE1)	Online	0	SCRATCH			
\$11\$DKB200: (NODE1)	ShadowSetMember	0	AXPVMS061FT4	918150	1	31

- b. To add an additional disk to the shadow set, enter the command in the following format:

```
$ MOUNT/CONFIRM/SYSTEM DSA $n$ : /SHADOW=(upgraded-disk:, new-member:) volume-label
```

where:

- *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.

Note: When you add a disk to the shadow set, the contents of that disk is replaced by the contents of the shadowed system disk you upgraded. Specifying the `/CONFIRM` qualifier reminds you of this fact, confirming that you are specifying the correct name of a scratch disk that either is blank or contains files you no longer need.

- *volume-label* is the volume label of the shadowed system disk you just upgraded.

The following is an example of this operation:

```
$ MOUNT/CONFIRM/SYSTEM DSA54: /SHADOW=($11$DKB200:,$11$DKB100:) AXPVMS061FT4
```

```
%MOUNT-F-SHDWCOPYREQ, shadow copy required
Virtual Unit - DSA54 Volume label AXPVMS061FT4
  Member                Volume label Owner UIC
  $11$DKB100: (NODE1)   SCRATCH      [100,100]
Allow FULL shadow copy on the above member(s)? [N]: YES
```

2. After the volume shadowing copy operation has completed, back up your new system disk shadow set, using the procedures described in *Volume Shadowing for OpenVMS*.

Postupgrade Checklist

Use the following checklist to make sure you have performed all the necessary tasks:

- Examine AUTOGEN output stored in the file AGEN\$PARAMS.REPORT.
- Examine MODPARAMS.DAT.
- Examine the command procedure templates supplied with the OpenVMS AXP Version 6.1 operating system.
- Decompress the system libraries using LIBDECOMP.COM.
- Customize DECwindows software (described in Chapter 10).
- Install layered products (if necessary).
- Back up the system disk.
- Run AUTOGEN.
- In a volume shadowing environment, mount additional shadow set members into the shadow set and back up the new system disk shadow set.

Customizing Your System for DECwindows Support

Overview

This chapter describes the tasks you must perform to customize your system for DECwindows support. The DECwindows components provided on the OpenVMS AXP Version 1.5 kit supply DECwindows base support and workstation support files. If you have not installed these DECwindows components on your system, skip this chapter.

Note: The OpenVMS AXP operating system does not include the entire DECwindows product. To get full DECwindows support, you must also install the separate DECwindows Motif for OpenVMS AXP layered product, which supports both the Motif and XUI environments.

Summary of Tasks

Depending on your configuration, DECwindows customization tasks include the following:

- Customizing the server startup
- Using the Transmission Control Protocol/Internet Protocol (TCP/IP) as a DECwindows transport
- Using transports with DECwindows other than those supplied by Digital

Customizing the Server Startup

Enabling Connect and Disconnect Messages

By default, the DECwindows server does not log successful connect and disconnect messages to the DECW\$SERVER_#_ERROR.LOG file. To enable these messages, define the symbol DECW\$SERVER_CONNECT_LOG in the DECW\$PRIVATE_SERVER_SETUP.COM file to be "T" and restart the server. Note that abnormal or unsuccessful connect/disconnect messages are still logged by the server.

Startup Procedure Assumptions

The startup command procedures automatically determine most of the configuration variables for the DECwindows display server. However, there are items that the command procedures cannot determine, so they make the following assumptions:

- The startup procedures assume that you have a 100 dots/inch monitor (such as a VRT19-DA).
- The startup procedures assume that you have a North American keyboard layout (you have an LK401-AA keyboard).
- The startup procedures assume that the server will use only DECnet for OpenVMS software and local transports.

How to Override Incorrect Assumptions

If any of these assumptions are incorrect, you must override them as follows:

1. Make a copy of the file SYS\$MANAGER:DECW\$PRIVATE_SERVER_SETUP.TEMPLATE and rename it to a .COM file type. The comments in this file show how to customize individual workstations by adding a section of DCL commands for each workstation. You can also add DCL commands to the common section of the server startup file. By doing this, you ensure that the customizations you make affect all workstations that use the server startup file.
2. If you want the text on your screen to display in a smaller font (75 dots/inch instead of 100 dots/inch), add the following line:


```
$ DECW$SERVER_DENSITY == 75
```
3. To override the default keyboard layout, determine the correct name from the model number of your LK401 keyboard, as follows:
 - a. Turn the keyboard upside down, and look for a label which specifies the model number. The model number should be in a format similar to LK401-xx.

The model number may also be listed as simply LK401. In this case, the information you need is in another part of the label where there will be a number that has the following format:

nn-nnnnn-xx.

- b. Use the *xx* suffix of this number to choose a keymap name from Table 10–1. The table is arranged based on the dialect that each keyboard is designed for. Choose the keymap ending in *_DP* for the data processing keyboard layout, or the keymap ending in *_TW* for the typewriter layout.

Table 10–1 DECwindows Keymap

Dialect	Model	DECwindows Keymap Name
Austrian/German	LK201-(AG,LG,BG,MG)	AUSTRIAN_GERMAN_LK201LG_DP AUSTRIAN_GERMAN_LK201LG_TW
	LK201-(NG,PG)	AUSTRIAN_GERMAN_LK201NG_DP AUSTRIAN_GERMAN_LK201NG_TW
	LK401-(AG)	AUSTRIAN_GERMAN_LK401AG_TW
Belgian/French	LK201-(AP,LP,BP,MP)	BELGIAN_FRENCH_LK201LP_DP BELGIAN_FRENCH_LK201LP_TW
Belgian/French	LK401-(AP)	BELGIAN_FRENCH_LK401AP_DP BELGIAN_FRENCH_LK401AP_TW
British	LK201-(AE,LE,BE,ME)	BRITISH_LK201LE_DP BRITISH_LK201LE_TW
British	LK401-(AA,PA)	BRITISH_LK401AA_DP BRITISH_LK401AA_TW
Canadian/French	LK201-(AC,LC,BC,MC)	CANADIAN_FRENCH_LK201LC_DP CANADIAN_FRENCH_LK201LC_TW
Canadian/French	LK401-(AC,LC,BC,MC)	CANADIAN_FRENCH_LK401AC_DP CANADIAN_FRENCH_LK401AC_TW
Danish	LK201-(AD,LD,BD,MD)	DANISH_LK201LD_DP DANISH_LK201LD_TW
	LK201-(ED,RD,FD)	DANISH_LK201RD_DP DANISH_LK201RD_TW
Danish	LK401-(AD,LD,BD,MD)	DANISH_LK401AD_DP

(continued on next page)

Table 10–1 (Cont.) DECwindows Keymap

Dialect	Model	DECwindows Keymap Name
		DANISH_LK401AD_TW
Dutch	LK201-(AH,LH,BH,MH)	DUTCH_LK201LH_DP
		DUTCH_LK201LH_TW
		DUTCH_LK201NH
	LK401-(NH,PH)	DUTCH_LK401AH
Finnish	LK201-(AF,LF,BF,MF)	FINNISH_LK201LF_DP
		FINNISH_LK201LF_TW
		FINNISH_LK201NX_DP
	LK201-(NX,PX)	FINNISH_LK201NX_TW
Finnish	LK401-(AF,LF,BF,MF)	FINNISH_LK401AF_DP
		FINNISH_LK401AF_TW
Flemish	LK201-(AB,LB,BB,MB)	FLEMISH_LK201LB_DP
		FLEMISH_LK201LB_TW
Flemish	LK401-(AB,LB,BB,MB)	FLEMISH_LK401AB_DP
		FLEMISH_LK401AB_TW
Icelandic	LK201-(AU,LU,BU,MU)	ICELANDIC_LK201LU_DP
		ICELANDIC_LK201LU_TW
Italian	LK201-(AI,LI,BI,MI)	ITALIAN_LK201LI_DP
		ITALIAN_LK201LI_TW
Italian	LK401-(AI,LI,BI,MI)	ITALIAN_LK401AI_DP
		ITALIAN_LK401AI_TW
North American	LK201-(AA,LA,BA,MA)	NORTH_AMERICAN_LK201LA
North American	LK401-(AA,LA,BA,MA)	NORTH_AMERICAN_LK401AA
Norwegian	LK201-(AN,LN,BN,MN)	NORWEGIAN_LK201LN_DP
		NORWEGIAN_LK201LN_TW
		NORWEGIAN_LK201RN_DP
	LK201-(EN,RN,FN)	NORWEGIAN_LK201RN_TW
Norwegian	LK401-(AN,LN,BN,MN)	NORWEGIAN_LK401AN_DP
		NORWEGIAN_LK401AN_TW
Portuguese	LK201-(AV,LV,BV,MV)	PORTUGUESE_LK201LV
Portuguese	LK401-(AV,LV,BV,MV)	PORTUGUESE_LK401AV

(continued on next page)

Table 10–1 (Cont.) DECwindows Keymap

Dialect	Model	DECwindows Keymap Name
Spanish	LK201-(AS,LS,BS,MS)	SPANISH_LK201LS_DP
		SPANISH_LK201LS_TW
Spanish	LK401-(AS,LS,BS,MS)	SPANISH_LK401AS_DP
		SPANISH_LK401AS_TW
Swedish	LK201- (AM,LM,BM,MM)	SWEDISH_LK201LM_DP
		SWEDISH_LK201LM_TW
		LK201-(NM,PM)
Swedish	LK401- (AM,LM,BM,MM)	SWEDISH_LK201NM_DP
		SWEDISH_LK201NM_TW
		SWEDISH_LK401AM_DP
Swiss/French	LK201-(AK,LK,BK,MK)	SWEDISH_LK401AM_TW
		SWISS_FRENCH_LK201LK_DP
Swiss/French	LK401-(AK,LK,BK,MK)	SWISS_FRENCH_LK201LK_TW
		SWISS_FRENCH_LK401AK_DP
Swiss/German	LK201-(AL,LL,BL,ML)	SWISS_FRENCH_LK401AK_TW
		SWISS_GERMAN_LK201LL_DP
Swiss/German	LK401-(AL,LL,BL,ML)	SWISS_GERMAN_LK201LL_TW
		SWISS_GERMAN_LK401AL_DP
Combined US /UK	LK201-(EE,RE,PE)	SWISS_GERMAN_LK401AL_TW
		UK_LK201RE
Combined US /UK	LK401-(EE,RE,PE)	US_LK201RE
		UK_LK401AA
		US_LK401AA

- c. After you choose a keymap name, modify the server startup file. For example, to change the keyboard layout to a Dutch typewriter layout, add the following line to the server startup file:

```
$ DECW$DEFAULT_KEYBOARD_MAP == "DUTCH_LK201LH_TW"
```

Add a line similar to this for each workstation that does not have a North American keyboard layout, or add it to the common section for all workstations (if all the workstations use the same keyboard layout).

4. To add support for the Transmission Control Protocol/Internet Protocol (TCP/IP) transport using the DEC TCP/IP Services for OpenVMS product, add the following line:

```
$ DECW$SERVER_TRANSPORTS == "DECNET,LOCAL,TCPIP"
```

Add this line to the section for each workstation that will be using TCP/IP, or add it to the common section for all workstations.

To include support for other transports, add the last part of the transport image name to the list of transports. For example, suppose you want to add support for a customer-written transport that has the following image name:

```
SYS$SHARE:DECW_TRANSPORT_FOO
```

You would add the following line:

```
$ DECW$SERVER_TRANSPORTS == "DECNET,LOCAL,FOO"
```

5. Reboot the workstations for which you customized the server startup.
6. Customize security as described in the *Using DECwindows Motif for OpenVMS*.

After you start the server, a per-server logical name table is created on your system, but is not added to the default logical name table search lists.

Using DEC TCP/IP Services for OpenVMS with DECwindows

Introduction

DECwindows contains support for the TCP/IP transport. This support requires DEC TCP/IP Services for OpenVMS, a Digital layered product. Before you can use DECwindows TCP/IP transport interface, you must install DEC TCP/IP Services for OpenVMS.

Note the following as well:

- Other vendors' implementation of TCP/IP transports use different call interfaces. For this reason, DECwindows support for TCP/IP is compatible only with DEC TCP/IP Services for OpenVMS.
- You can conserve memory and process slots by configuring DEC TCP/IP Services for OpenVMS software for the minimum DECwindows requirement to support the X protocol. DECwindows only requires that INET_ACP be running. DECwindows does not require that the NFS server, the FTPD server, or the remote terminal servers be running.

For More Information

For more information about TCP/IP concepts, see the *DEC TCP/IP Services for OpenVMS System Management Guide*.

For information on how to configure the UCX software, see the *DEC TCP/IP Services for VMS Installation and Configuration Guide*.

Using Other Transports with DECwindows

Introduction

DECwindows supports DECnet for OpenVMS, local, and TCP/IP transports. However, you can use other transports with DECwindows by writing a DECwindows transport interface layer. Digital will likely supply new transports for various layered products, and third-party vendors can also supply new transports, such as other TCP/IP transports.

Writing a Transport Interface

For information about writing a transport interface, see the *VMS DECwindows Transport Manual*.

The transport interface image's file name must have the following format where *name* is the unique transport name:

DECW\$TRANSPORT_name (for transports supplied by Digital)
DECW_TRANSPORT_name (for customer-written transports)

Installing the Transport Interface Image

Install the image as a protected image in the SYS\$SHARE directory (as defined by an executive mode logical name). Digital recommends that you install the image by adding the following line to SYS\$MANAGER:SYSTARTUP_VMS.COM:

```
$ INSTALL CREATE SYS$SHARE:DECW_TRANSPORT_name/OPEN/SHARED/HEADER_RESIDENT/PROTECTED
```

You can also include this command in a startup file that SYSTARTUP_VMS calls.

To use this transport with the DECwindows server, customize the server startup as described in the Customizing the Server Startup section of this chapter.

Halt, Boot, and Shutdown Procedures

Overview

This chapter contains information about the following:

- Halting the system
- How to boot the distribution compact disc
- Methods of booting the system
- Setting boot parameters
- Using the Writeboot utility
- Methods of shutting down the system
- Troubleshooting

Halting the System

Introduction

During the course of installation, upgrade, and related system operations, you might need to halt your AXP system, either by pressing the Halt button or entering Ctrl/P at the console prompt (>>>). How you halt your system differs slightly on certain AXP computers.

How to Halt Your AXP Computer

The following table summarizes the ways you can halt specific AXP computers.

AXP Computer	How to Halt
DEC 2000 series	One of the following: <ul style="list-style-type: none"> • Press the Halt button. • Press Ctrl/P (not from the graphics monitor).
DEC 3000 series	One of the following: <ul style="list-style-type: none"> • Press the Halt button (if you want to continue without rebooting or if the graphics monitor is serving as the console). • Press Ctrl/P (only on an alternate console prior to rebooting).
DEC 4000 series	One of the following: <ul style="list-style-type: none"> • 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 <i>n</i> to enable this key combination, where <i>n</i> can be 6 (enables the Break key and Ctrl/P) or 2 (enables Ctrl/P but disables the Break key).
DEC 7000 series	Press Ctrl/P.
DEC 10000 series	Press Ctrl/P.

Booting the Distribution Compact Disc

Introduction

If you need to boot the OpenVMS AXP distribution compact disc, 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

1. Insert the distribution compact disc into the local compact disk drive.
2. At the console prompt (`>>>`), enter the `SHOW DEVICE` command so you can identify the name of the compact disc drive (for example, `DKA400`):
3. Enter the boot command in the following format:

```
BOOT source-drive -flags 0,0
```

Substitute the device name of the compact disc drive (as listed in the `SHOW DEVICE` display) for *source-drive*.

For example, if the `SHOW DEVICE` display lists the device name of your compact disc drive as `DKA400`, enter the following command and press the Return key:

```
>>> BOOT DKA400 -flags 0,0
```

Booting from the InfoServer

To boot the distribution compact disc using the InfoServer, follow these steps:

1. At the console prompt, enter the following command:

```
>>> B -FL 0,0 -FI APB_061 lan-device-name
```

where:

- *APB_061* is the file name of the APB program used for the initial system load (ISL) boot program.
DEC 4000 Note: On a DEC 4000 series AXP system, you must specify this file name in uppercase.
- *lan-device-name* is the name of the local area network (LAN) device (FDDI or Ethernet) identified with your computer, as listed in the following table. (For more information about these devices, refer to the hardware owner's and operations manuals that you received with your AXP computer.)

AXP Computer	FDDI Device	Ethernet Device
DEC 2000 series	—	ERA0
DEC 3000 series	N/A	ESA0
DEC 4000 series	N/A	EZA0
DEC 7000 series	FXA0	EXA0
DEC 10000 series	FXA0	EXA0

FT4 Note: If your DEC 4000 series AXP system is using console firmware prior to version 3.2, enter the command as follows:

```
>>> B -FL 0,0 -start 0 -FI APB_061 EZA0
```

Note: For DEC 3000 series AXP systems equipped with the PMAD TURBOchannel adapter, enter the command as follows:

```
>>> B -FL 0,0 -FI APB_061 "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. In the following example, the PMAD TURBOchannel slot number (listed under the "TCINFO" column) is 0:

```
>>> SHOW CONFIG
DEC 3000 - M300
Digital Equipment Corporation
VPP PAL X5.39-80800101/OSF PAL X1.28-80800201 - Built on 18-FEB-1993 11:376

TCINFO      DEVNAM      DEVSTAT
-----      -
          CPU      OK KN16-AA -V2.1-S288-I053-sBL0.7 -DECchip 21064 P3.0
          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
```

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

```
Network Initial System Load Function
Version 1.1
```

FUNCTION ID		FUNCTION
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 (AXPVMS061FT4).

A sample display follows:

Enter a function ID value: 3

OPTION ID		OPTION
1	-	Find Services
2	-	Enter known Service Name

Enter an Option ID value: 2

Enter a Known Service Name: AXPVMS061FT4

Booting Manually from the System Disk

Introduction

This section describes how to manually boot the OpenVMS AXP operating system from the system disk.

How to Boot Manually

IF ...	THEN ...
the OpenVMS AXP operating system is running,	go to step 1.
the OpenVMS AXP operating system is <i>not</i> running,	go to 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 -- USE CONSOLE TO HALT SYSTEM
```
4. Halt the system by entering Ctrl/P (DEC 7000 AXP and DEC 10000 AXP systems) or by pressing the Halt button (DEC 3000 AXP and DEC 4000 AXP systems). ¹
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
```
6. After the system boots, it displays the following message:

```
OpenVMS  AXP Operating System, Version V1.5 19-OCT-1993 15:00
The OpenVMS  AXP system is now executing the system startup procedure.
The OpenVMS  AXP system is now executing the site-specific startup commands.
%SET-I-INTSET, login interactive limit=64, current interactive value = 0
SYSTEM      job terminated at 19-OCT-1993 15:00:00.00
```

¹ See the section titled Halting the System for more information about how to halt your AXP computer.

Performing a Conversational Boot

Introduction

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

How to Perform a Conversational Boot

There are several ways to perform a conversational boot. The following procedure is the most direct:

IF ...	THEN ...
the OpenVMS AXP operating system is running,	go to step 1.
the OpenVMS AXP operating system is <i>not</i> running,	go to 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 -- USE CONSOLE TO HALT SYSTEM`
4. Halt the system by entering `Ctrl/P` (DEC 7000 AXP and DEC 10000 AXP systems) or by pressing the Halt button (DEC 3000 AXP and DEC 4000 AXP systems).¹

¹ See the section titled `Halting the System` for more information about how to halt your AXP computer.

- To begin the conversational boot, enter the BOOT command in the following format:

```
B -FL 0,1 [device-name]
```

Substitute the device name of the drive from which you want to boot for *device-name*. For example, if the system disk has a device name of DKA400, enter the following command and press the Return key:

```
>>> BOOT -FL 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.

- 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 *OpenVMS System Management Utilities Reference Manual*.
- 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 <i>parameter-name</i>	Establishes the value of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW [<i>parameter</i>]	Displays active, current, default, maximum, and minimum values for specific parameters. (Use qualifiers to display characteristics of parameters grouped by categories.)
USE [<i>file-spec</i>]	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.

Performing a Conversational Boot

Where to Find More Information

For examples of using conversational booting, see the sections titled **Booting with Minimum Startup** and **Booting in an Emergency**.

Setting the System for Automatic Booting

Introduction

The AXP computers can boot automatically from a designated boot device. When you installed the OpenVMS AXP operating system, you designated the system disk as the default boot device. The section titled *Setting and Showing Boot Devices* describes how to change the default boot device.

When Systems Can Boot Automatically

AXP 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

How to Boot Automatically

IF ...	THEN ...
the OpenVMS AXP operating system is running,	go to step 1.
the OpenVMS AXP operating system is <i>not</i> running,	go to 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 -- USE CONSOLE TO HALT SYSTEM
```
4. Halt the system by entering **Ctrl/P** (DEC 7000 AXP and DEC 10000 AXP systems) or by pressing the **Halt** button (DEC 3000 AXP and DEC 4000 AXP systems). ¹
5. Enter the following command to show whether the system has been set to boot automatically:

```
>>> SHOW AUTO_ACTION
```

¹ See the section titled *Halting the System* for more information about how to halt your AXP computer.

Setting the System for Automatic Booting

The system displays one of the following:

- Restart
 - Boot
 - Halt
6. 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
```
 7. After you set this variable, you should 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

Introduction

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, you should set the operating system boot parameters as well using the `SET BOOT_OSFLAGS` command.

Setting the Boot Device

At the console-mode 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 AXP 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.

Showing the Boot Device

Use the `SHOW BOOTDEF_DEV` command to find out what drive was specified in the last `SET BOOT` command. For example:

```
>>> SHOW BOOTDEF_DEV
```

Cancelling the Boot Device

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 AXP series systems.

Setting Boot Parameters

Introduction

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.

List of Valid Parameters

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.
10000	Displays extensive, detailed debug messages during the boot process.
20000	Displays selected user-oriented messages during the boot process.

How to Enter the SET BOOT_OSFLAGS Command

The following examples show how to use the SET BOOT_OSFLAGS command:

- The following command specifies the root directory as 0 and the parameter 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 0, which sets the system (for example, the second host in a dual-host DSSI VMScluster system) 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 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
```

Displaying Parameters

To display the parameters you have just set, use the SHOW BOOT_OSFLAGS command. For example:

```
>>> SHOW BOOT_OSFLAGS  
BOOT_OSFLAGS = 0,20007
```

Booting with Minimum Startup

Introduction

In special 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 that because this procedure bypasses specific startup operations, it does not autoconfigure the system's peripheral devices.

How to Boot with Minimum Startup

1. Perform a conversational boot by entering the following command at the console prompt:

```
>>> BOOT -FL 0,1 [device-name]
```
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)

Introduction

The XDelta utility (XDELTA) is a debugging tool that system programmers use. The procedure for booting all AXP systems with XDELTA is the same.

Boot Command Qualifier Values

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, 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

How to Boot with XDELTA

The following is an example of booting with XDELTA from the console prompt:

```
>>> BOOT -FL 0,7
```

For More Information

For more information about using XDELTA, see the *OpenVMS Delta/XDelta Debugger Manual*.

Booting from a Different Directory

Introduction

By default, the OpenVMS AXP operating system is installed in the system root directory named [SYS0]. However, you can use the VMSKITBLD procedure to add a copy of the OpenVMS AXP operating system to another unused system root directory on the same system disk and then boot the system from that directory.

Note: In a VMScluster environment, use the `SYS$MANAGER:CLUSTER_CONFIG.COM` procedure to add a copy of the operating system to the root directory, instead of the VMSKITBLD procedure.

See the *OpenVMS System Manager's Manual* for more information about using the VMSKITBLD and CLUSTER_CONFIG.COM procedures.

How to Boot from a Different Directory

After you have used the VMSKITBLD procedure to add a copy of the operating system to a different directory, you can boot from that directory (for example, [SYS3]) by entering the BOOT command as follows and pressing the Return key:

```
>>> BOOT -FL 3,0 DKA200
```

Booting from An HSC

Introduction

On DEC 7000 and DEC 10000 series AXP systems, you can boot from disks connected to an HSC, using the format described in this section. See the Software Product Description and the hardware manuals that came with your computer for more information about devices that your system supports.

How to Boot from an HSC

On DEC 7000 and DEC 10000 series AXP systems, enter the boot command as follows:

```
>>> BOOT DUA20.14.0.2.0
```

where (for this example):

- *du* is the device code of the boot device
- *a* is the boot device controller designation
- *20* is the unit number of the boot device
- *14* is the HSC controller node number for the boot device
- *0* is the channel number
- *2* is the XMI node number
- *0* is the I/O channel number

Booting with a PMAD TURBOchannel Adapter

Introduction The PMAD TURBOchannel adapter is an adapter that connects a DEC 3000 series AXP computer (with the TURBOchannel option) to the Ethernet in a InfoServer or VMScluster environment.

How to Boot To boot from a device connected to a PMAD adapter, enter the boot command as follows,:

```
>>> b "x/ESA0"
```

The value for *x* is the PMAD TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. In the following example, the PMAD TURBOchannel slot number (listed under the "TCINFO" column) is 0:

```
>>> SHOW CONFIG
DEC 3000 - M300
Digital Equipment Corporation
VPP PAL X5.39-80800101/OSF PAL X1.28-80800201 - Built on 18-FEB-1993 11:376

TCINFO       DEVNAM       DEVSTAT
-----
              CPU       OK KN16-AA -V2.1-S288-I053-sBL0.7 -DECchip 21064 P3.0
              ASIC       OK
              MEM        OK
6
              CXT        OK
5
              NVR        OK
              SCC        OK
              NI         OK
              ISDN       OK
4
              SCSI       OK
0-PMAD-AA     TC0
```

Booting with a PMAZB TURBOchannel Adapter

Introduction

The PMAZB TURBOchannel adapter is an adapter that is software-compatible with the integrated SCSI ports on DEC 3000 AXP series systems.

The DEC 3000 AXP 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 adapter is installed in the TURBOchannel, the SHOW CONFIGURATION command displays the "PMAZB-AA" string, the TURBOchannel slot number, and the device status.

The DEC 3000 AXP series consoles also implement the SHOW DEVICE command, which displays information about the devices in the system. Since the integrated SCSI adapter is built into every DEC 3000 AXP 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 SCSI ports.

Displaying Devices

To make the console display the devices connected to the PMAZB SCSI ports, enter the following command at the console prompt, where *X* is the TURBOchannel slot number in which the PMAZB adapter is installed:

```
>>> test tcX cnfg
```

This command displays the devices that are connected to each SCSI port of the PMAZB adapter. The device controller letters are either A or B, based upon the PMAZB ports to which the devices are connected. Do not confuse these devices with any DKAxxx or DKBxxx devices displayed by the SHOW DEVICE command, which shows SCSI devices on the integrated SCSI ports only.

How to Boot

To boot from a device connected to a PMAZB adapter, enter the boot command as follows:

```
>>> b "X/dkYzzz"
```

In the example, the following conventions are used:

- *X* is the TURBOchannel slot number in which the PMAZB adapter is installed.
- *Y* is either A or B, depending on the SCSI port of the PMAZB adapter that contains the boot device.
- *zzz* is the SCSI unit number of the boot device.

How Adapters are Identified

The OpenVMS AXP operating system does not distinguish between the PMAZB 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 AXP system with no TURBOchannel options installed, the OpenVMS AXP 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). In this case, note the following:

- The OpenVMS AXP SCSI device naming matches the console SCSI device naming. However, if a PMAZB adapter is installed in the TURBOchannel, the operating system names the PMAZB SCSI ports PKA0 and PKB0 and the devices connected to the ports inherit the controller letter from the port controller letter (A or B).
- The OpenVMS AXP SCSI device naming matches the console SCSI device naming. However, if a PMAZB adapter is installed in the TURBOchannel, the operating system names the PMAZB 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).

If the System Does Not Boot

Introduction

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 AXP computer.
2. Contact Digital Services.

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 19-OCT-1993 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.
3. If the system boots, run the AUTOGEN procedure. For more information about the AUTOGEN procedure, see the *OpenVMS System Manager's Manual*.

Booting in an Emergency

Introduction

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 prevent 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.² The default values allow you to boot the system temporarily, in order to correct the problem.

The Procedure

1. Perform a conversational boot by entering the following command at the console prompt:

```
>>> BOOT -FL 0,1 [device-name]
```

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
```

² In most cases, Digital recommends that you use AUTOGEN to modify system parameters. In special 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 *OpenVMS System Manager's Manual*.

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 *OpenVMS System Manager's Manual*.
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, bypass the startup and login procedures. The startup and login procedures provided by Digital 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.

The Procedure

1. Perform a conversational boot by entering the following command at the console prompt:

```
>>> BOOT -FL 0,1 [device-name]
```
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 UAF.

Invoke a text editor to correct the 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 Digital 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:).

The Procedure

1. Perform a conversational boot by entering the following command at the console prompt:


```
>>> BOOT -FL 0,1 [device-name]
```
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 SYSS$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 *OpenVMS System Management Utilities Reference Manual*.
8. Enter the following commands to invoke **SYSMAN** and clear the **UAFALTERNATE** system parameter you set in step 2:


```
$ RUN SYSS$SYSTEM:SYSMAN
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SET UAFALTERNATE 0
```

In most cases, Digital recommends that you use AUTOGEN to modify system parameters. However, since 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: 
Password: 
Password: 
$ 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
```

Using the Writeboot Utility

Introduction

The Writeboot utility (WRITEBOOT.EXE) is copied to your system disk during the installation procedure. It allows you to create a bootable AXP system disk from one that was originally created by one of the following methods:

- A nonimage backup of an AXP system disk (possibly corrupting the boot block)
- A nonimage restore of an AXP system disk from an image save set

The Writeboot utility also allows you to rewrite the boot block of an AXP system disk to point to a new version of the AXP primary bootstrap file (APB.EXE) that you have previously copied to the disk. (Note that the file must be contiguous.)

Invoking WRITEBOOT

To invoke the Writeboot utility, issue the following command:

```
$ RUN SYS$SYSTEM:WRITEBOOT
```

The utility prompts you as follows:

```
Update VAX portion of boot block (default is Y):
```

```
Update AXP portion of boot block (default is Y):
```

Answer N (No) to the VAX prompt. If you answer Y (Yes) to update the AXP boot block, the utility prompts you for the AXP boot file:

```
Enter AXP boot file:
```

Specify “dev:[VMS\$COMMON.SYSEXEXE]APB.EXE” in response to this prompt, where *dev*: indicates the device on which the system disk is mounted.

Shutting Down the System

Introduction

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
- An emergency shutdown with OPCCRASH.EXE
- An emergency shutdown with CRASH commands

If you want the system to reboot automatically after the shutdown, see the section titled *Setting the System for Automatic Booting*.

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
```

To halt the system after the procedure completes, enter Ctrl/P (DEC 7000 AXP and DEC 10000 AXP systems) or by pressing the Halt button (DEC 3000 AXP and DEC 4000 AXP systems). ¹

For more information about the SHUTDOWN.COM command procedure, see the *OpenVMS System Manager's Manual*.

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
```

To halt the system after the program completes, enter Ctrl/P (DEC 7000 AXP and DEC 10000 AXP systems) or by pressing the Halt button (DEC 3000 AXP and DEC 4000 AXP systems). ¹

For more information about the OPCCRASH program, see the *OpenVMS System Manager's Manual*.

¹ See the section titled *Halting the System* for more information about how to halt your AXP computer.

Emergency Shutdown with CRASH Commands

Note: Use CRASH commands only if the system is hung and you cannot log in to the SYSTEM account to use the SHUTDOWN.COM procedure or the OPCCRASH.EXE program.

To force your processor to fail, do the following:

1. Halt the system by entering Ctrl/P (DEC 7000 AXP and DEC 10000 AXP systems) or by pressing the Halt button (DEC 3000 AXP and DEC 4000 AXP systems).¹
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 these values down 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 AXP System Dump Analyzer Utility Manual*.

¹ See the section titled Halting the System for more information about how to halt your AXP computer.

Troubleshooting

Introduction

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 the section titled *Booting Manually from the System Disk*, or let it reboot automatically as explained in the section titled *Setting the System for Automatic Booting*.
- 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.

Detecting System Problems

To determine if the failure is a system problem, do the following:

- Make sure that you did not press the F1 key (the Hold Screen key). The Hold Screen light goes on when you press either the Hold Screen key (F1) or Ctrl/S.
- Press 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 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.

Usually, you can force an exit from a hung program by pressing Ctrl/Y. When you press Ctrl/Y, any work performed by the program and not saved on disk is lost.

If the system is hung, halt it by entering Ctrl/P (DEC 7000 AXP and DEC 10000 AXP systems) or by pressing the Halt button (DEC 3000 AXP and DEC 4000 AXP systems). ¹

If you have a problem with the system, note in detail the sequence of events that caused the problem and notify Digital Services.

¹ See the section titled *Halting the System* for more information about how to halt your AXP computer.

B

Backup Procedures

Overview

This appendix describes how to back up and restore the system disk.

Introduction

The menu-driven command procedure included on your distribution compact disc creates an environment from which you can perform basic backup and restore operations on the system disk. (Note, however, that if you attempt to perform other operations, certain OpenVMS commands and utilities will not function as expected.)

Why You Should Back Up the System Disk

You should back up the system disk for the following reasons:

- In case a problem occurs during an OpenVMS AXP upgrade or update, or during the installation of other software products. *Before* you attempt any of these procedures, you should back up the system disk. If a problem occurs, you can restore the backup copy of the system disk.
- To prevent loss of system files if they are accidentally deleted. *After* you install or upgrade the OpenVMS AXP operating system or any other software products, you should back up the system disk. If a system file is deleted and renders the system disk inoperable, you can restore the backup copy and continue to use the system.
- In case the drive that holds the system disk malfunctions. If you have a backup copy of the OpenVMS AXP operating system, you can restore it to a functioning disk and continue to use the system.
- To eliminate disk fragmentation, which happens when files are stored noncontiguously on the disk. The `BACKUP/IMAGE` command creates a copy on which files are stored contiguously.

Suggested Procedures

- If you are performing an upgrade and do not have a removable system disk, back up your system disk to tape and restore the backup copy to the system disk. This eliminates disk fragmentation on the system disk and creates contiguous free disk blocks required for the upgrade.
- Store the backup tapes in a safe place.
- If you have a VMScluster environment with more than one system disk, make 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.

Backing Up the System Disk

Getting Started

Before you can back up the system disk, must do the following:

1. If in a VMScluster environment, dismount the system disk from all systems in the cluster which 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 distribution compact disc locally or from the InfoServer (as described in Appendix A).
4. Choose option 2 from the menu to enter the DCL environment.
5. 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).

You are now ready to enter the BACKUP command, described next.

Entering the BACKUP Command

Back up the system disk by entering the BACKUP command in the following format:

```
$ BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

where:

- *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.

The following example uses the BACKUP command to make a backup disk. You can use a backup disk as a system disk.

```
$ BACKUP/IMAGE/VERIFY DKA400: DKA300:
```

Note: The BACKUP command creates a system disk that includes a set of volume parameters provided by Digital, including a CLUSTER_SIZE (disk access scheme) of 3. (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. However, 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 *OpenVMS System Manager's Manual* and the *OpenVMS System Management Utilities Reference Manual*, and see the description of the INITIALIZE and BACKUP commands in the *OpenVMS DCL Dictionary*.

**What to Do
next**

After you complete the backup operation, do the following:

1. Enter the LOGOUT command to exit from the DCL environment and return to the menu.
2. Choose the shutdown option (3).
3. After the shutdown completes, boot from the system disk.

Restoring the System Disk

Getting Started

Before you can restore the system disk, you must do the following:

1. Shut down the system.
2. Boot the distribution compact disc locally or from the InfoServer (as described in Appendix A).
3. Choose option 2 from the menu to enter the DCL environment.
4. 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).

You are now ready to enter the BACKUP command, described next.

Entering the BACKUP Command

Enter the BACKUP command in the following format:

```
$ BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

where:

- *source-drive* is the device holding the files you want to restore.
- *target-drive* is the destination.

The following example uses the BACKUP command to restore the system disk from a backup disk:

```
$ BACKUP/IMAGE/VERIFY DKA300: DKA400:
```

What to Do next

After you complete the restore operation, do the following:

1. Enter the LOGOUT command to exit from the DCL environment and return to the menu.
2. Choose the shutdown option (3).
3. After the shutdown completes, boot from the system disk.

C

License Management Notes

Registering Licenses

Introduction

This appendix contains information that supplements the license instructions in this manual and in the *OpenVMS License Management Utility Manual*.

After you install the OpenVMS AXP operating system, you must register OpenVMS AXP licenses, which let you use the OpenVMS AXP operating system. You must also register the licenses for the OpenVMS AXP layered products you have purchased, such as DECnet for OpenVMS. (Note that after an upgrade, however, you do not have to reregister licenses for the OpenVMS AXP operating system or for the layered products.) To register a license, you need to obtain a Product Authorization Key (PAK). A PAK is a printed document provided by Digital Equipment Corporation that contains the appropriate information to authorize access to software on an AXP computer (or in a VMScluster environment). You can obtain a PAK from a Digital representative in much the same way as you obtain software.

Using the License Unit Requirement Table (LURT)

Many PAKs contain a table name in the availability or activity fields. This name refers to a column in the License Unit Requirement Table (LURT), which is shown in Table C-1. The seven lettered columns (A through G) in the LURT indicate the number of license units required for each processor listed in the System Marketing Model column. Column H refers to layered products you may choose to register as well. For example, if your PAK specifies *availability = A*, you would require 50 license units to load the license on a DEC 3000 AXP Model 500 series computer, or 500 license units to load the license on a DEC 7000 AXP 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.

Table C-1 License Unit Requirement Table (LURT)

System Marketing Model	License Types by Code							
	OpenVMS							AXP LP
	A	B	C	D	E	F	G	H
DEC 3000-300	15	NA	NA	NA	NA	NA	NA	1050
DEC 3000-300L	15	NA	NA	NA	NA	NA	NA	1050
DEC 3000-400	20	NA	NA	NA	NA	NA	NA	1050
DEC 3000-400S	20	NA	NA	NA	NA	NA	NA	1050
DEC 3000-500	50	NA	NA	NA	NA	NA	NA	1100
DEC 3000-500S	50	NA	NA	NA	NA	NA	NA	1100
DEC 3000-500X	50	NA	NA	NA	NA	NA	NA	1100
DEC 4000-610	300	NA	NA	NA	NA	NA	NA	1150
DEC 4000-620	400	NA	NA	NA	NA	NA	NA	1200
DEC 7000-610	500	NA	NA	NA	NA	NA	NA	1200
DEC 7000-620	600	NA	NA	NA	NA	NA	NA	1250
DEC 7000-630	700	NA	NA	NA	NA	NA	NA	1250
DEC 7000-640	800	NA	NA	NA	NA	NA	NA	1250
DEC 10000-610	800	NA	NA	NA	NA	NA	NA	1250
DEC 10000-620	900	NA	NA	NA	NA	NA	NA	1300
DEC 10000-630	1000	NA	NA	NA	NA	NA	NA	1300
DEC 10000-640	1100	NA	NA	NA	NA	NA	NA	1300

Key to License Type Codes and Values

A—OpenVMS AXP Unlimited or Base
 B—N/A
 C—N/A
 D—N/A
 E—N/A
 F—N/A
 G—N/A
 H—AXP Layered Products
 NA—Not applicable

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 AXP 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 AXP 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 Digital 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 from the `SYLOGICALS.COM` command procedure.

- Each OpenVMS AXP find 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 AXP operating system. An OpenVMS AXP 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 AXP computers. However, they can safely reside in a license database (LDB) shared by both VAX and AXP systems.
- Because the LMF for AXP systems is capable of handling all types of PAKs, including those for VAX systems, Digital recommends that you perform your LDB tasks using the AXP LMF.
- Availability PAKs for VAX systems (availability PAKs without the ALPHA option) will not load on AXP systems. Only those availability PAKs containing the ALPHA option will load on AXP 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 AXP 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 AXP availability PAKs look disabled to a VAX system. Never use the DELETE /STATUS=DISABLED command from a VAX system on an LDB that contains AXP PAKs. If you do, all AXP PAKs will be deleted.
- With the exception of the DELETE/STATUS=DISABLED command, if you inadvertently use one of the LICENSE commands listed above on an AXP PAK while using a VAX system, the PAK and the database will probably not be adversely affected. Repeat the command using LMF running on an AXP system, and the PAK should return to a valid state.
- If you neglect to repeat the command using LMF on an AXP system, the AXP system will be mostly unaffected. At worst, an AXP PAK that you intended to disable will remain enabled. Only the AXP LMF can disable an AXP PAK.

However, if you attempt to use any of the commands listed above on a PAK located in an LDB that is shared with a VAX system, the following serious problems may result:

- Because AXP PAKs look disabled to a VAX system, they are normally ignored at load time by VAX systems. However, if one of the commands listed above is entered from a VAX system and the PAK information is not set to a valid state by an AXP system, there is a chance the VAX system will attempt to load the AXP PAK. Since 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 may 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 AXP systems are inaccessible for any reason, use your VAX system to disable the AXP PAK. This prevents your VAX system from attempting to load the AXP PAK.

Where to Find More Information

For additional License information, see the release notes and the *OpenVMS License Management Utility Manual*.

D

Installing on a Dual-Host DSSI VMScCluster System

Overview

Introduction

A dual-host DSSI VMScLuster system is a type of VMScLuster configuration that includes two computers (for example, DEC 4000 series AXP systems), connected by a single DSSI bus, and as many as six RF-series and TF-series drives. Because an RF-series disk or TF-series tape is simultaneously accessible to both computers, the system performs as well as a pair of high-availability boot servers in local area VAXcluster environments. For example, if an RF-series disk is configured as the system disk for both the boot servers and the satellites, the cluster can tolerate the failure of either boot server.

An additional benefit of a dual-host system is that it is a cost-effective two-node cluster that can be easily expanded.

You can configure the system for cluster operation in several ways:

- As a pair of boot servers for a new local area cluster to which you add satellites
- As a two-node cluster to which you do not currently intend to add satellites
- As a pair of boot servers that you want to add to an existing cluster

Setup procedures options are described in the following sections. Before setting up your system, note the following:

- If you are setting up a DSSI cluster between a VAX computer and a DEC 4000 series AXP computer, the host ID must be different from the host ID of the VAX computer. See the DSSI manuals for more information.

Where to Find More Information

See the following for additional information:

- The release notes
- The owner's manuals that came with your AXP computer and the *DEC 4000 AXP DSSI Installation and Troubleshooting Guide*, for information about the following:
 - Assigning DSSI bus IDs
 - Setting host to DSSI disks
 - Configuring DSSI parameters
 - Booting DSSI devices

Configuring as a Pair of Boot Servers

To set up a dual-host VMScLuster system as a pair of boot servers for a new local area cluster, follow these steps:

1. Install the operating system as described in Chapter 3.
 - a. When responding to the configuration questions, answer Y (for Yes) when the installation procedure asks if RF-series disks will be served (if such disks are available to you).
 - b. Answer Y when asked if the cluster contains a quorum disk, and then specify the device name for the quorum disk. (Note that you can use the system disk as the quorum disk to simplify system management operations.)
2. Follow the instructions in the *VMScLuster Systems for OpenVMS* to customize the system.
3. Enable the computer as a boot server using the command procedure `SYS$MANAGER:CLUSTER_CONFIG.COM`. Follow the instructions in *VMScLuster Systems for OpenVMS*.
4. Add the second computer as a boot server using `CLUSTER_CONFIG.COM`. Be sure to answer Y when asked whether the cluster contains a quorum disk and to specify (when prompted) a system root directory for the second computer that is different from the system root directory used for the first computer (the default directory used by the operating system installation procedure is [SYS0]).
5. Use the `SET BOOTDEF_DEV` and `SET BOOT_OSFLAGS` commands to specify the system disk and alternate system root directory (assuming the first computer uses [SYS0]) to be used by default when booting; then boot the second computer. In the following example, the second system is set to boot from the [SYS1] root directory on the system disk named DUA0.

```
>>> SET BOOTDEF_DEV DUA0
>>> SET BOOT_OSFLAGS 1,0
>>> BOOT
```

6. Register your cluster licenses for the computers.

Configuring as a New Two-Node Cluster

To set up a dual-host DSSI system as a new two-node VMScluster to which you do not want to add satellites, do the following:

1. Install the operating system as described in Chapter 3.
 - a. When responding to the configuration questions, answer Y (for Yes) when the installation procedure asks if RF-series disks will be served (if such disks are available to you).
 - b. Answer Y when asked if the cluster contains a quorum disk, and then specify the device name for the quorum disk. (Note that you can use the system disk as the quorum disk to simplify system management operations.)

2. Follow the instructions in the *VMScluster Systems for OpenVMS* to customize the system.

3. Add the second computer using CLUSTER_CONFIG.COM but answer N (No) to the questions asking if the computer will be a *satellite* or a *boot server*. (Answer Y for disk server.)

While using CLUSTER_CONFIG.COM, be sure to specify (when prompted) a system root directory for the second computer that is different from the system root directory used for the first computer (the default directory used by the operating system installation procedure is [SYS0]).

4. Use the SET BOOTDEF_DEV and SET BOOT_OSFLAGS commands to specify the system disk and alternate system root directory (assuming the first computer uses [SYS0]) to be used by default when booting; then boot the second computer. In the following example, the second system is set to boot from the [SYS1] root directory on the system disk named DUA0.

```
>>> SET BOOTDEF_DEV DUA0
>>> SET BOOT_OSFLAGS 1,0
>>> BOOT
```

5. Register your cluster licenses for the computers.

If you later decide to add satellites, follow the instructions in *VMScluster Systems for OpenVMS*.

Adding the Dual-Host System to an Existing Cluster

To add a dual-host DSSI system to an existing VMScLuster, follow these steps:

1. Install the operating system as described in Chapter 3.
 - a. When responding to the configuration questions, answer Y (for Yes) when the installation procedure asks if RF-series disks will be served (if such disks are available to you).
 - b. Because each computer will receive a vote, you may determine that you do not need a quorum disk. In that case, answer N when you are asked if the cluster contains a quorum disk. Otherwise, answer Y to that question and specify the device name for the quorum disk. (Note that you can use the system disk as the quorum disk to simplify system management operations.)
2. Follow the instructions in the *VMScLuster Systems for OpenVMS* to customize the system.
3. Enable the computer as a boot server using the command procedure `SYS$MANAGER:CLUSTER_CONFIG.COM`. Follow the instructions in *VMScLuster Systems for OpenVMS*.
4. Add the second computer as a boot server using `CLUSTER_CONFIG.COM`. Be sure to answer Y when asked whether the cluster contains a quorum disk and to specify (when prompted) a system root directory for the second computer that is different from the system root directory used for the first computer (the default directory used by the operating system installation procedure is [SYS0]).
5. Use the `SET BOOTDEF_DEV` and `SET BOOT_OSFLAGS` commands to specify the system disk and alternate system root directory (assuming the first computer uses [SYS0]) to be used by default when booting; then boot the second computer. In the following example, the second system is set to boot from the [SYS1] root directory on the system disk named DUA0.

```
>>> SET BOOTDEF_DEV DUA0
>>> SET BOOT_OSFLAGS 1,0
>>> BOOT
```
6. Register your cluster licenses for the computers.
7. If the existing cluster currently uses a quorum disk, you might want to disable the quorum disk on the active cluster members after adding the new computers to the cluster. Use the `CLUSTER_CONFIG.COM CHANGE` function to do so.

Glossary

This glossary defines key terms in the context of an OpenVMS AXP 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 AXP computer that is part of a local area VMScluster. The boot server is a combination of a MOP server and a disk server for the satellite system disk. See also *satellite node*.

CI only VMScluster

A computer system consisting of a number of AXP computers. It uses only the computer interconnect, or CI, to communicate with other AXP 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 HSC devices. See also *Hierarchical Storage Controller (HSC) device*.

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 that is part of a local area VMScluster. This computer provides an access path to CI, CSSI, and locally-connected disks for other computers that do not have a direct connection.

Hierarchical Storage Controller (HSC) device

A self-contained, intelligent, mass storage subsystem that lets computers in a VMScluster environment share disks.

HSC drive

Any disk or tape drive connected to an HSC device is called an HSC drive. A system disk on an HSC drive can be shared by several computers in a VMScluster 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).

local area VMScluster

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 an RRD42 compact disc drive, that is connected directly to an AXP computer. If you have a standalone AXP computer, it is likely that all drives connected to the system are local drives.

media

Any packaging agent capable of storing computer software. Examples: compact discs, magnetic tapes, floppy diskettes, disk packs, tape cartridges.

mixed interconnect VMScluster

A computer system consisting of a number of computers. It uses computer interconnect (CI), Ethernet, and DSSI adapters to communicate with other computers in the cluster.

MOP server

A computer system running DECnet for OpenVMS AXP that downline loads VMScluster satellites using the DECnet for OpenVMS AXP MOP protocol.

satellite node

A computer that is part of a local area VMScluster. 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 VMScluster.

save set

The format in which the Backup utility stores files. The OpenVMS AXP operating system is shipped in this format.

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 with only one AXP computer.

system disk

The disk that contains or will contain the OpenVMS AXP operating system.

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

The User Environment Test Package, or UETP, is 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 for OpenVMS, and the VMSccluster environment.

VMSccluster environment

A computer system consisting of a number of AXP and VAX computers. There are four types of VMSccluster environments: CI only, DSSI only, local area, and mixed-interconnect.

A

Account
 setting up after an installation, 4-5
AGEN\$PARAMS.REPORT, 4-13
Allocation class
 See also ALLOCLASS parameter
 determining, 2-3
ALLOCLASS parameter, 2-3
 supplying during VMScluster installation,
 3-17
ANALYZE/CRASH command, A-31
ANALYZE/DISK_STRUCTURE utility
 error message, 6-5
 using before an upgrade, 6-5
APB.EXE
 and Writeboot utility, A-29
AUTOGEN, 4-13
 running after an installation, 4-13
 running after an upgrade, 9-12
 running at end of installation, 3-20
AXP computers
 booting failure, A-23
 booting from a different directory, A-18
 booting from an HSC, A-19
 booting in an emergency, A-24
 booting with minimum startup, A-16
 booting with PMAD TURBOchannel
 adapter, A-20
 booting with PMAZB TURBOchannel
 adapter, A-21
 booting with XDELTA, A-17
 cancelling boot device, A-13
 halting, A-3
 performing conversational boot, A-8
 setting boot device, A-13
 setting boot parameters, A-14
 setting for automatic booting, A-11
 showing boot device, A-13
 shutting down, A-30
 troubleshooting procedures, A-32

B

Backing up the system disk, 1-6, 4-11, 9-11,
 B-2
BACKUP command, B-2
Backup procedures
 before an upgrade, 6-4
Boot block
 writing, A-29
Boot command
 qualifiers for XDELTA, A-17
Booting
 automatic, A-11
 cancelling boot device, A-13
 conversational, A-8
 failure, A-23
 from a different directory, A-18
 from an HSC, A-19
 from the InfoServer, 3-3, 7-2, A-4
 in an emergency, A-24
 with default system parameters, A-24
 without startup and login procedures,
 A-25
 without the User Authorization File,
 A-26
 setting boot device, A-13
 setting boot parameters, A-14
 showing boot device, A-13
 with minimum startup, A-16
 with PMAD TURBOchannel adapter,
 A-20
 with PMAZB TURBOchannel, A-21
 with XDELTA, A-17
Booting problems
 fixing by booting with default parameter
 values, A-24
Bugcheck, A-32

C

Checklist
 postinstallation, 4-14
 postupgrade, 9-14
 preupgrade, 6-9

- CI only VMScluster
 - installation questions, 3-17
- Cluster group number
 - rules for creating, 2-3
- Cluster password
 - rules for creating, 2-3
- CLUSTER_SIZE parameter, B-3
- Command procedures
 - checking after upgrade, 9-6
- CONTINUE command, A-9
- CRASH commands, A-31
- Creating a system disk, 3-7
- Ctrl/T, A-32
- Customizing the system, 4-5

D

- DEC 10000 AXP computers.
 - booting failure, A-23
 - booting from a different directory, A-18
 - booting from an HSC, A-19
 - booting in an emergency, A-24
 - booting with minimum startup, A-16
 - booting with XDELTA, A-17
 - cancelling boot device, A-13
 - halting, A-3
 - performing conversational boot, A-8
 - setting boot device, A-13
 - setting boot parameters, A-14
 - setting for automatic booting, A-11
 - showing boot device, A-13
 - shutting down, A-30
 - troubleshooting procedures, A-32
- DEC 2000 AXP computers
 - halting, A-3
- DEC 3000 AXP computers
 - booting failure, A-23
 - booting from a different directory, A-18
 - booting in an emergency, A-24
 - booting with minimum startup, A-16
 - booting with PMAD TURBOchannel adapter, A-20
 - booting with PMAZB TURBOchannel adapter, A-21
 - booting with XDELTA, A-17
 - halting, A-3
 - performing conversational boot, A-8
 - setting boot device, A-13
 - setting boot parameters, A-14
 - setting for automatic booting, A-11
 - showing boot device, A-13
 - shutting down, A-30
 - troubleshooting procedures, A-32
- DEC 4000 AXP computers
 - booting failure, A-23
 - booting from a different directory, A-18
 - booting in an emergency, A-24
 - booting with minimum startup, A-16
- DEC 4000 AXP computers (cont'd)
 - booting with XDELTA, A-17
 - cancelling boot device, A-13
 - dual-host VMScluster systems, D-2
 - halting, A-3
 - in DSSI VMScluster environment, D-2
 - performing conversational boot, A-8
 - setting boot device, A-13
 - setting boot parameters, A-14
 - setting for automatic booting, A-11
 - showing boot device, A-13
 - shutting down, A-30
 - troubleshooting procedures, A-32
- DEC 7000 AXP computers
 - booting failure, A-23
 - booting from a different directory, A-18
 - booting from an HSC, A-19
 - booting in an emergency, A-24
 - booting with minimum startup, A-16
 - booting with XDELTA, A-17
 - cancelling boot device, A-13
 - halting, A-3
 - performing conversational boot, A-8
 - setting boot device, A-13
 - setting boot parameters, A-14
 - setting for automatic booting, A-11
 - showing boot device, A-13
 - shutting down, A-30
 - troubleshooting procedures, A-32
- DEC TCP/IP Services for OpenVMS
 - configuring, 10-8
 - function, 10-8
- DECnet for OpenVMS AXP
 - configuring after an installation, 4-6
 - ignoring during startup, 4-6
 - registering license after installation, 4-3
 - running with DECwindows, 4-6
- DECnet node address, 2-3
 - providing during installation, 3-17
- DECnet node name, 2-3
 - possible values, 3-17
 - providing during installation, 3-17
- Decompressing system libraries, 4-7, 9-7
- DECW\$IGNORE_DECNET logical name, 4-6
- DECwindows
 - customizing, 9-9, 10-2
 - customizing after an upgrade, 9-9
 - customizing the server, 10-3
 - transports, 10-8
 - using customer-written transports, 10-9
- Default system parameters
 - booting with, A-24
- Disk space
 - amount needed for upgrade, 6-5
 - amount needed to decompress libraries, 9-7

Disk space (cont'd)
 amount needed to decompress system
 libraries, 4-7
Documentation comments, sending to Digital,
 iii
DSSI VMScLuster
 installation questions, 3-18
Dual-host VMScLuster
 adding to cluster, D-5
 configuring as two boot servers, D-3
 configuring as two-node cluster, D-4
Dump file
 checking size, 9-5
 modifying size, 9-4

E

Editing startup files, 4-5
Emergency system startup
 with default system parameters, A-24
 without startup and login procedures,
 A-25
 without the UAF, A-26
Errors
 running ANALYZE/DISK_STRUCTURE,
 6-5
EXPECTED_VOTES
 parameter, 9-5

F

Factory installed software (FIS), xiii
Feedback on documentation, sending to
 Digital, iii

H

Halting the system, A-3
Hardware problem
 diagnosing, A-23
HSC
 booting from, A-19
 specifying, 3-15
HSC drive
 definition, 1-2

I

InfoServer
 booting, 3-3, 7-2, A-4
 losing connection, 3-7, 7-5
Installation
 See also Postinstallation tasks,
 Preinstallation tasks
 booting system disk after transferring
 required save set, 3-15
 information needed for VMScLuster, 2-2
 of layered products, 4-10

Installation (cont'd)
 rebooting system, 3-21
 recording, 1-3
 registering licenses, 3-11
 registering OpenVMS AXP license, 3-21
 running AUTOGEN, 3-20
 setting passwords, 3-9
 specifying VMScLuster configuration, 3-16
 stages of, 3-2
Installation procedures
 using the POLYCENTER Software
 Installation utility, 1-6
Installing OpenVMS AXP on a VMScLuster,
 3-16

K

Keyboard layout, 10-3
 customizing, 10-3
 list of, 10-4
Keyboard model number, 10-3
Keymap name
 determining, 10-3

L

Layered products
 effect of upgrade on, 6-3, 9-10
 installing after OpenVMS AXP installation,
 4-10
LIBDECOMP.COM (procedure to decompress
 system libraries), 4-8, 9-7
 running after an upgrade, 9-7
Libraries
 decompressing after an installation, 4-7
LICENSE (License Management utility)
 example of registration, C-2
 license registration procedure, C-2
 using during installation, 3-12
License Management Facility (LMF), C-4
 restrictions, C-5, C-6
License Unit Requirement Table (LURT),
 C-2
Licenses
 See also Product Authorization Key (PAK)
 registering after an upgrade, 9-3
 registering after installation, 4-3
 registering during installation, 3-11
Local Area VMScLuster
 installation questions, 3-19
Log
 keeping of installation, 1-3
Logging in
 when errors in login procedures prevent,
 A-25
 when errors in startup procedures prevent,
 A-25
 when forgotten passwords prevent, A-26

Logical names

UAFALTERNATE, A-26

Login command procedures

booting without, A-25

when errors prevent you from logging in,
A-25

M

Minimum startup, A-16

Mixed-interconnect VMScluster

installation questions, 3-19

MODPARAMS.DAT (parameter file), 4-13,
9-12

modifying for cluster, 9-5

modifying for single system, 9-5

N

NETCONFIG.COM procedure

running after an installation, 4-6

O

OPCCRASH.EXE, A-30

OpenVMS AXP

license

registering during installation, 3-11

save sets

transferring to system disk, 3-7

Output

saving from installation, 1-3

P

Page file

checking size, 9-5

modifying size, 9-4

Password

forgotten, 3-22, A-26

minimum length, 3-9

setting during installation, 3-9

PMAD TURBOchannel adapter

booting system, A-20

PMAZB TURBOchannel adapter

booting system, A-21

POLYCENTER Software Installation utility

installing the operating system, 1-6

upgrading the operating system, 1-6

Postinstallation tasks, 4-1

adjusting system parameters, 4-5

backing up the system disk, 4-4, 4-11

configuring DECnet for OpenVMS AXP,
4-6

customizing DECwindows support

software, 10-2

customizing the system, 4-5

decompressing system libraries, 4-7

Postinstallation tasks (cont'd)

editing startup procedures, 4-5

installing layered products, 4-10

registering licenses, 4-3

setting up user accounts, 4-5

tuning the system with AUTOGEN, 4-13

Postupgrade tasks

backing up system disk, 9-11

changing MODPARAMS.DAT, 9-5

checking system file sizes, 9-5

customizing DECwindows software, 9-9

decompressing system libraries, 9-7

examining command procedure templates,
9-6

modifying size of dump file, 9-4

modifying size of page file, 9-4

modifying size of swap file, 9-4

registering new licenses, 9-3

running AUTOGEN, 9-12

Preinstallation tasks

preparing for a VMScluster environment,
2-2

software and hardware components, 1-3

Preupgrade tasks

analyzing and repairing system disk, 6-5

backing up system disk, 6-4

preparing system disk, 6-5

shutting down system, 6-7

Printer

recording installation on, 1-3

Problems

booting

fixing by booting with default

parameter values, A-24

forgotten password

fixing by booting without the UAF,
A-26

logging in, A-25, A-26

Product Authorization Key (PAK)

registering after an installation, 4-3

registering after an upgrade, 9-3

registering during an installation, 3-11

Q

Queue database

creating, 4-5

Queue manager

starting, 4-5

Quorum

See also VMScluster quorum

Quorum disk

choosing during VMScluster installation,
3-17

R

- Reboot
 - after installation, 3-21
- Recording an installation, 1-3
- Restoring files on the system disk, 1-6
- Restrictions
 - for OpenVMS AXP upgrade, 6-3
 - License Management Facility (LMF), C-5, C-6

S

- Saveset.BCK, B-3
- SDA (System Dump Analyzer), A-31
- Server
 - customizing the DECwindows, 10-3
- SET AUTO_ACTION command, A-12
- SET BOOTDEF_DEV command, A-13
- SET BOOT_OSFLAGS command, A-14
- Setting passwords during an installation, 3-9
- Shadow sets
 - system disk
 - upgrading, 5-2, 8-2
- Shadowed system disk
 - upgrade restriction, 6-3
- SHOW AUTO_ACTION command, A-11
- SHOW BOOTDEF_DEV command, A-13
- SHOW CRASH command, A-31
- Shutdown
 - after installation, 3-21
 - before an upgrade, 6-7, 6-8
- SHUTDOWN.COM, A-30
- Shutting down system, A-30
- Site-specific command procedures
 - restored during upgrade, 9-6
- Source drive, 1-2, 3-2, B-3
- Startup command procedure
 - booting without, A-25
 - when errors prevent you from logging in, A-25
- Startup files
 - editing after an installation, 4-5
- Swap file
 - checking size, 9-5
 - modifying size, 9-4
- SWAPFILES.COM procedure
 - executing to change system file sizes, 9-5
- SYCONFIG.COM procedure
 - editing after an installation, 4-5
- SYLOGICALS.COM procedure
 - editing after an installation, 4-5
- SYLOGIN.COM procedure
 - editing after an installation, 4-5

- SYSBOOT.EXE, A-8
 - commands, A-9
- SYSGEN
 - commands for conversational boot, A-9
- SYSTARTUP_VMS.COM procedure
 - editing after an installation, 4-5
 - editing to control DECnet for OpenVMS AXP, 4-6
- System
 - customizing, 4-5
 - shutting down before upgrade, 6-7
- SYSTEM account
 - forgotten password, 3-22
 - setting password, 3-9
- System disk
 - analyzing and repairing, 6-5
 - backing up, 9-11
 - backing up after an installation, 4-11
 - backing up before an upgrade, 6-4
 - booting after installation, 3-21
 - booting after transferring required save set, 3-15
 - checking amount of free space on, 4-7
 - creating, 3-7
 - free space needed for upgrade, 6-5
 - free space needed to decompress libraries, 4-7
 - preparing for an OpenVMS AXP upgrade, 6-5
 - unique volume label requirement, B-2
 - volume shadowing restriction, 6-3
- System disks
 - upgrading, 5-2
- System Generation utility (SYSGEN)
 - ALLOCLASS parameter, 2-3
 - commands for conversational boot, A-9
- System hang, A-32
- System parameters
 - booting with default, A-24
 - UAFALTERNATE, A-27
 - when incorrect values prevent the system from booting, A-24
- System startup
 - in an emergency
 - with default system parameters, A-24
 - without startup and login procedures, A-25
 - without the UAF, A-26
- SYSUAFALT.DAT file, A-26

T

- Target disk
 - using backup copy for, 6-4
- Target drive, 3-2, B-3

TCP/IP software

See DEC TCP/IP Services for OpenVMS

Transferring save sets to system disk, 3-7

TURBOchannel

booting with PMAD adapter, A-20

booting with PMAZB adapter, A-21

U

UAF (User Authorization File)

booting with alternate, A-26

returning to the default, A-27

UAFALTERNATE logical name, A-26

UAFALTERNATE system parameter, A-27

Upgrade

See also Post-upgrade tasks, Preupgrade tasks, Upgrade procedure

cautions and restrictions, 6-3

disk space requirement, 6-5

effect on layered products, 6-3

in VMScluster environment, 6-3

requirements, 6-9

shadowed disks, 5-2, 8-2

Upgrade procedure

effect on command procedures, 9-6

effect on MODPARAMS.DAT, 9-5

Upgrade procedures

using the POLYCENTER Software

Installation utility, 1-6

V

VMScluster

building, 4-5

information required for OpenVMS AXP

installation, 2-2

label for system disk, B-2

types, 2-2

VMScluster installation, 3-16

choosing quorum disk, 3-17

CI only VMScluster, 3-17

configuring the cluster, 3-16

DSSI, 3-18

local area VMScluster, 3-19

mixed-interconnect VMScluster, 3-19

suggested answers to questions, 3-16

supplying ALLOCLASS parameter, 3-17

VMScluster upgrade, 6-3

Volume label

definition, 1-3

requirement for VMSclusters, B-2

Volume Shadowing

upgrade restriction, 6-3

W

WELCOME.TXT

updating, 9-6

Writeboot utility, A-29

Writing a new boot block, A-29

How to Order Additional Documentation

Technical Support

If you need help deciding which documentation best meets your needs, call 800-DIGITAL (800-344-4825) and press 2 for technical assistance.

Electronic Orders

If you wish to place an order through your account at the Electronic Store, dial 800-234-1998, using a modem set to 2400- or 9600-baud. You must be using a VT terminal or terminal emulator set at 8 bits, no parity. If you need assistance using the Electronic Store, call 800-DIGITAL (800-344-4825) and ask for an Electronic Store specialist.

Telephone and Direct Mail Orders

From	Call	Write
U.S.A.	DECdirect Phone: 800-DIGITAL (800-344-4825) Fax: (603) 884-5597	Digital Equipment Corporation P.O. Box CS2008 Nashua, NH 03061
Puerto Rico	Phone: (809) 781-0505 Fax: (809) 749-8377	Digital Equipment Caribbean, Inc. 3 Digital Plaza, 1st Street Suite 200 Metro Office Park San Juan, Puerto Rico 00920
Canada	Phone: 800-267-6215 Fax: (613) 592-1946	Digital Equipment of Canada Ltd. 100 Herzberg Road Kanata, Ontario, Canada K2K 2A6 Attn: DECdirect Sales
International	_____	Local Digital subsidiary or approved distributor
Internal Orders ¹ (for software documentation)	DTN: 264-3030 (603) 884-3030 Fax: (603) 884-3960	U.S. Software Supply Business Digital Equipment Corporation 10 Cotton Road Nashua, NH 03063-1260
Internal Orders (for hardware documentation)	DTN: 264-3030 (603) 884-3030 Fax: (603) 884-3960	U.S. Software Supply Business Digital Equipment Corporation 10 Cotton Road Nashua, NH 03063-1260

¹Call to request an Internal Software Order Form (EN-01740-07).

Reader's Comments

OpenVMS AXP Version T6.1-FT4
Upgrade and Installation
Manual
AA-Q1Z5B-TE

Your comments and suggestions help us improve the quality of our publications.

Thank you for your assistance.

I rate this manual's:

	Excellent	Good	Fair	Poor
Accuracy (product works as manual says)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Completeness (enough information)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clarity (easy to understand)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organization (structure of subject matter)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Figures (useful)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Examples (useful)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Index (ability to find topic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Page layout (easy to find information)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I would like to see more/less _____

What I like best about this manual is _____

What I like least about this manual is _____

I found the following errors in this manual:

Page	Description
_____	_____
_____	_____
_____	_____
_____	_____

Additional comments or suggestions to improve this manual:

For software manuals, please indicate which version of the software you are using: _____

Name/Title _____ Dept. _____

Company _____ Date _____

Mailing Address _____

Phone _____