OpenVMS VAX Upgrade and Installation Supplement: VAX 8600, 8650

Order Number: AA–PS6UA–TE

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This document supplements the current version of the *Upgrade and Installation Manual* with information specific to the VAX 8600 and VAX 8650 computers. This information includes startup, shutdown, and backup procedures.

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Contents

4 Backup Procedures

Glossary

Index

Figures

Tables

Preface

OpenVMS VAX Upgrade and Installation Supplement: VAX 8600, 8650 contains installation and upgrade information specific to VAX 8600 and VAX 8650 computers. Use it in conjunction with the *Upgrade and Installation Manual*.

IMPORTANT

When you are ready to upgrade, install, or update the VMS operating system, use the supplied documentation as follows:

1. Read all release-specific cover letters (if any) included with your distribution kit.

2. Read the most current version of the *VMS Release Notes*.

3. Consult the *Upgrade and Installation Manual* for the VMS version that you are installing or upgrading to. It is your primary source for step-by-step upgrade and installation procedures.

4. Refer to this supplement for computer-specific information when the *Upgrade and Installation Manual* directs you to do so.

5. Store this supplement and the *Upgrade and Installation Manual* in the binder that contains the *VMS Release Notes*.

Intended Audience

OpenVMS VAX Upgrade and Installation Supplement: VAX 8600, 8650 is intended for anyone responsible for installing or upgrading the VMS operating system on VAX 8600 and VAX 8650 computers.

Document Structure

This manual is organized as follows:

- Chapter 1 describes the parts of the console subsystem that you use during a VMS upgrade or installation.

- Chapter 2 describes some tasks you need to perform when you install the VMS operating system.

- Chapter 3 contains instructions for starting up the system. It also describes system shutdown procedures.

- Chapter 4 describes backup procedures you should perform on a regular basis.

- The Glossary defines key terms used in this manual.

Associated Documents

You must have and be familiar with the contents of the following documents:

- *Upgrade and Installation Manual*, which is your primary source of upgrade and installation information. Use the *Upgrade and Installation Manual* in conjunction with the *OpenVMS VAX Upgrade and Installation Supplement: VAX 8600, 8650* when you are performing an installation or an upgrade.

- *VMS Release Notes*, which provides important information on various aspects of the VMS operating system. You should read the current version of the *VMS Release Notes* before installing, upgrading, or updating the VMS operating system or using your VAX computer.

- The hardware manuals that are supplied with your VAX computer. These manuals provide detailed information on your system hardware.

Conventions

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

The following conventions are 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.
PF1 *x*	A sequence such as PF1 *x* indicates that you must first press and release the key labeled PF1, then press and release 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.)
. . .	A horizontal ellipsis in examples indicates one of the following possibilities:
	• Additional optional arguments in a statement have been omitted.
	• The preceding item or items can be repeated one or more times.
	• Additional parameters, values, or other information can be entered.
. . .	A vertical ellipsis indicates the omission of items from a code example or command format; the items are omitted because they are not important to the topic being discussed.
( )	In format descriptions, parentheses indicate that, if you choose more than one option, you must enclose the choices in parentheses.
[ ]	In 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 a VMS file specification, or in the syntax of a substring specification in an assignment statement.)
{ }	In format descriptions, braces surround a required choice of options; you must choose one of the options listed.

boldface text	Boldface text represents the introduction of a new term or the name of an argument, an attribute, or a reason.
	Boldface text is also used to show user input in online versions of the manual.
italic text	Italic text emphasizes important information, indicates variables, and indicates complete titles of manuals. Italic text also represents information that can vary in system messages (for example, Internal error *number*), command lines (for example, /PRODUCER=*name*), and command parameters in text.
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 radixes—binary, octal, or hexadecimal—are explicitly indicated.
mouse	The term *mouse* refers to any pointing device, such as a mouse, a puck, or a stylus.
MB1, MB2, MB3	MB1 indicates the left mouse button, MB2 indicates the middle mouse button, and MB3 indicates the right mouse button. (The buttons can be redefined by the user.)
PB1, PB2, PB3, PB4	PB1, PB2, PB3, and PB4 indicate buttons on the puck.
SB, SB	SB and SB indicate buttons on the stylus.

1

The Console Subsystem

Before you install or upgrade the VMS operating system, you need to be familiar with the VAX 8600 console subsystem. The console subsystem consists of the following:

- Console terminal
- T–11 microcomputer
- Control panel
- Console disk drive
- Console command language
- Optional remote diagnostic port

In general, use the console subsystem to examine and deposit data in memory or registers, halt the system, and boot the operating system. During an upgrade or installation, use the console subsystem to boot the system and monitor the upgrade installation process.

This chapter describes the parts of the console subsystem you use during a VMS installation or upgrade. For a complete description of the console subsystem, see the hardware manuals supplied with your system.

1.1 Console Terminal

There are two types of console terminals:

- The local console terminal is a hardcopy terminal attached to the system. It prints a log of system activities. Use the local console terminal to control and monitor system operations.

- The remote console terminal is optional. If you purchased one, a Digital diagnostics center uses the remote console terminal (located at the diagnostics center) to control the system during diagnostic testing.

1.2 Control Panel

The VAX 8600 control panel is located on the front of the computer. The panel consists of four indicator lights and two keylock switches. Figure 1–1 shows the control panel.

Figure 1–1   VAX 8600 Control Panel
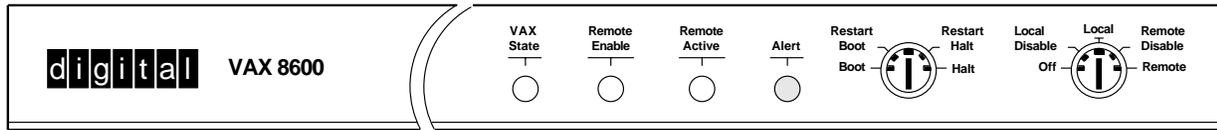
ZK–4025–GE

1.2.1 Indicator Lights

There are four indicator lights on the control panel. The first three indicator lights show the state of the system. The fourth is a warning light that indicates air flow or temperature problems within the cabinet.

Table 1–1 describes the four indicator lights.

Table 1–1   Indicator Lights on the VAX 8600 Control Panel

Light	Meaning
VAX STATE	Blinks green when the CPU is executing instructions.
REMOTE ENABLE	Glows green when the remote diagnostic port access is enabled.
REMOTE ACTIVE	Glows green when the remote console terminal is connected and the remote diagnostic line is active.
ALERT	Glows red when the temperature in the CPU cabinet gets too hot. When the ALERT light glows, the computer sends a warning message to the console terminal. The light blinks when temperature or air flow conditions exceed their extreme limits. When the ALERT light blinks, the system shuts down automatically within one minute unless you correct the problem.[1]

[1]The computer sends a warning message to the console terminal when the temperature in the CPU cabinet gets too hot.

1.2.2 Switches

The control panel has two keylock switches, the TERMINAL CONTROL switch and the RESTART switch. The TERMINAL CONTROL switch is on the right. The RESTART switch is on the left.

1.2.2.1 TERMINAL CONTROL Switch

The TERMINAL CONTROL switch regulates system power and determines how the console subsystem responds to commands from the local and remote console terminals. Table 1–2 describes each TERMINAL CONTROL switch setting. Note that the power supply is turned off only when this switch is set to OFF.

Table 1–2   TERMINAL CONTROL Switch Settings

Setting	Meaning
OFF	Power is turned off.
LOCAL	A Digital diagnostics center cannot use the remote console terminal. You can use the local console terminal in console mode to control the system or in program mode as a user terminal. In program mode, pressing CTRL/P puts the console subsystem in console mode.
LOCAL DISABLE	A Digital diagnostics center cannot use the remote terminal when the switch is set to LOCAL DISABLE. You can use the local console terminal in console mode to control the system. In program mode, pressing CTRL/P has no effect on the system. The system ignores the setting of the RESTART switch and attempts a RESTART/BOOT after a shutdown, power failure, or error halt.
REMOTE	You can use the local console terminal in console or program mode. A Digital diagnostics center can use the remote console terminal in both modes also. Pressing CTRL/P at either the local or remote console terminal puts the console subsystem in console mode. In program mode, command lines typed at the local terminal or the remote terminal and the resulting output are echoed on both terminals.
REMOTE DISABLE	You can use the local console terminal in console mode to control the system or in program mode as a user terminal. In program mode, pressing CTRL/P at the local console terminal puts the console subsystem in console mode. The remote console terminal can also be used as a user terminal. Pressing CTRL/P at the remote console terminal has no effect on the system.

1.2.2.2   RESTART Switch

Setting the RESTART switch determines what happens after any of the following events:

- The power is turned on.

- A power failure occurs, and the battery backup unit did not save the contents of memory.

- The microprogram detects an error halt condition (for example, a HALT instruction executed in kernel mode).

Table 1–3 describes each RESTART switch setting.

Table 1–3   RESTART Switch Settings

Setting	Computer Action
BOOT	Attempts to boot the system using the default boot command procedure.
RESTART/BOOT	Attempts to restart the system by checking the restart parameter block for valid data. If the restart parameter block is invalid, attempts to boot the system using the default boot command procedure.

Table 1–3 (Cont.) RESTART Switch Settings

Setting	Computer Action
HALT	Halts the system and displays the console-mode prompt (>>>) at the console terminal.
RESTART/HALT	Attempts to restart the system by checking the restart parameter block for valid data. If the restart parameter block is invalid, halts the system and displays the console-mode prompt (>>>) at the console terminal.

_____ **Note** _____

If the TERMINAL CONTROL switch is in the LOCAL DISABLE position, the system ignores the RESTART switch setting and assumes that it is in the RESTART/BOOT position.

_____

1.3 Console Disk Drive

The console subsystem has an RL02 disk drive, referred to as the *console disk drive*. It has the device name CSA1. The console disk drive holds the console RL02, which contains the command procedures that *boot* or load the operating system from the system disk into memory. The console disk drive is also used to do the following tasks:

- Install updates.

- Install optional software products.

- Boot standalone BACKUP.

- Store boot command procedures (for more information on boot command procedures, see Chapter 3).

1.3.1 Inserting an RL02 Disk

To insert an RL02 disk into the console disk drive, use the following procedure:

1. Press the lid release bar and raise the lid.

2. Grasp the handle on the disk with one hand and lift the disk.

3. Support the base of the protective cover with your other hand, and raise the handle so it is perpendicular to the disk.

4. Using your thumb, push the handle slide to the left. Lift the handle. The disk disengages from the protective cover.

5. Lift the disk away from the protective cover and place the disk in the drive with the handle recess facing the back of the drive.

6. Rotate the handle slightly to make sure the disk is properly seated in the drive.

7. Gently lower the handle to a horizontal position to lock the disk in place.

8. Place the protective cover in the drive so that the cover rests on top of the disk.

9. Close the lid.

10. Spin up the drive.

1.3.2 Removing an RL02 Disk

To remove an RL02 disk from the console disk drive, use the following procedure:

1. Spin down the drive.

2. Press the lid release bar and raise the lid.

3. Remove the protective cover from the drive.

4. While supporting the base of the protective cover with your palm, use the thumb of your other hand to push the handle slide to the left and raise the handle. The disk disengages from the drive.

5. Lift the disk out of the drive and place the disk in the protective cover.

6. Lower the handle to lock the disk to the protective cover.

1.4 Console Command Language

The console subsystem runs in two different modes, console mode and program mode.

- Console mode—When the console subsystem is in console mode, the console-mode prompt (>>>) is displayed on the console terminal. In console mode, you can control and monitor system operations using console mode commands.

- Program mode—When the console subsystem is in program mode, the VMS operating system is running. In program mode, you can enter DCL commands, run programs, and receive system messages. Table 1–4 describes the most commonly used console mode commands.

Table 1–4   Commonly Used Console Mode Commands

Command	Definition
BOOT	Executes a command procedure that loads a VAX software program into memory. The command procedure transfers control to the program and puts the console subsystem in the program mode. During the installation procedure, use the abbreviation, B, for the BOOT command.
BOOT/NOSTART	Stops the boot operation after the boot command procedure executes. This command lets you deposit values in registers before transferring control to the primary boot program with the START command.
DEPOSIT	Puts a value in the specified register or memory location. During the installation procedure, use the abbreviation, D, for the DEPOSIT command.
HALT	Stops the CPU.
START nnnn	Continues execution of the boot command procedure at the specified address. Use this command in conjunction with the BOOT/NOSTART command.

For more information on the console subsystem and command language, see the hardware manuals supplied with your VAX computer.

2

Installing the VMS Operating System

The *Upgrade and Installation Manual* is your primary source for step-by-step upgrade and installation procedures. Start any VMS installation or upgrade by following the instructions in the *Upgrade and Installation Manual*.

Refer to this chapter for installation information specific to the VAX 8600 and 8650 computers, such as the following:

- Determining device names
- Turning on the system
- Booting standalone BACKUP
- Booting the new system disk

---------------------------------- **Note** ----------------------------------

The screen displays and examples in this manual depict the installation of VMS Version 5.4. Your screen displays reflect the version that you are installing.

If you are installing the VMS operating system on a VAX computer that is part of a VAXcluster environment, read the *VMScluster Systems for OpenVMS*.

2.1 Before Installing VMS

Before you install the VMS operating system, you must determine the device names for the drive that contains the distribution media and the drive that contains the system disk. A device name has the following format:

ddcu

where:

- *dd* is the *device code*. The device code tells what type of device you are using.

- *c* is the *controller designation*. A controller designation can be one of the alphabetic letters A through Z. The controller designation, along with the unit number, identifies the location of the device.

- *u* is the *unit number*. A unit number can be a decimal number in the range of 0 to *n*.[1] The unit number, along with the controller designation, identifies the location of the device.

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[1] The first drive on a controller is usually assigned a unit number of 0, the next drive is assigned a unit number of 1, and so on. The range is determined by the bus that supports the device. For example, MASSBUS disks can have unit numbers in the range of 0 to 7. UDA disks can have unit numbers in the range of 0 to 254.

_____ **Note** _____

The only part of the name you can readily modify is the unit number.
The device code is fixed, and the controller designation is made when the
hardware is installed.

_____

For example, DUA1 could be the device name for an RA81 drive. *DU* is the
device code for an RA81 drive. *A* names the controller (the controller provides the
interface between the processor and the drive). *1* is the unit number.

If a drive is connected to an HSC device, precede the device name with the name
of the HSC and a dollar sign ($). For example:

```
TROUT$DUA0
```

TROUT is the name of the HSC device, and DUA0 is the device name of an RA82
drive that is connected to it.

Table 2–1 lists the device codes for the different drives that can be part of a
VAX 8600 system. Note that for some drives, the device code is different when
it is part of a device name. For example, the device code used in a device name
for an RP07 drive is DR. However, when you boot from an RP07 drive, the device
code is DB.

Table 2–1   Device Codes for the VAX 8600

Device	Used in a Device Name	Used in a Boot Name
Console drive (RL02)	CSA1	CS1
RA60 disk drive	DJ	DU
RA70, RA80, RA81, and RA82 disk drives	DU	DU
RM03, RM05, RM80, and RP07 disk drives	DR	DB
RP05 and RP06 disk drives	DB	DB
TA78, TA79, TA81/TA81-PLUS and TU81/TU81-PLUS magnetic tape drives	MU	–
TE16, TU45, and TU77 magnetic tape drives	MT	–
TS11 and TU80 magnetic tape drives	MS	–
TU78 magnetic tape drive	MF	–

You can use any of the disk drives (except the console disk drive) to hold the
system disk. When choosing a system disk, you need to be aware of the capacity
of the disk as well as the size of the VMS operating system. Keep in mind that
a system disk in a VAXcluster environment needs more space for the operating
system than a system disk for a standalone system.

Before you begin the installation procedure, make sure you know the device
names for both the drive that will hold the distribution media and the drive that
will hold the system disk.

Return to the *Upgrade and Installation Manual* to continue with the installation.

2.2 Turning On the System

This procedure assumes the system is not turned on when you start the installation. The following steps describe turning the system on and setting the switches on the processor control panel.

1. Turn on the console terminal.

2. Check the console disk drive in the console subsystem. Make sure the console RL02 is in the drive.

3. From the OFF position, set the TERMINAL CONTROL switch to LOCAL.

4. Set the RESTART CONTROL switch to HALT. The console program boots into memory and displays a message.

5. Return to the *Upgrade and Installation Manual* to continue with the installation.

2.3 Booting Standalone BACKUP

This section describes the steps for booting standalone BACKUP. Standalone BACKUP lets you transfer the VMS *required* save set from the distribution tape to your system disk. You need the RL02 disk from the distribution kit that is labeled as follows:

Paper Label[1]	Volume Label[2]
VMS V5.n RL02 S/A BKUP	STANDBACKUP

[1]A paper label is the label affixed to a disk.

[2]A volume label is the name the VMS operating system uses to refer to a disk. During the installation, the procedure displays the volume label, not the paper label, in messages.

Booting standalone BACKUP takes approximately 15 minutes.

1. To boot standalone BACKUP, enter the following command and press Return:

   ```
   >>> B CS1
   ```

2. The procedure displays the following message:

   ```
        G 0E 00000200
   ```

   ```
   Please remove the volume "8600/8650 Console" from the console device.

   Insert the first standalone system volume and enter "YES" when ready:
   ```

3. Remove the console RL02 and insert the RL02 disk labeled VAX/VMS V5.4
   S/A BKUP RL02. When you are ready to continue, type Y and press Return.
   The procedure displays the following message:

   ```
   Resuming load operation on volume 'STANDBACKUP', please stand by...

   VAX/VMS Version V5.4 Major version id = 1 Minor version id = 0
   ```

4. The procedure might ask you for the date and time. Enter the date and time
   using the 24-hour clock format and press Return. For example:

   ```
   PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-JUN-1990 15:00
   ```

5. The procedure displays a list of the local devices on your system and, if you
   have them, HSC and MSCP-served devices. For example:

   ```
   Available device  MINE$DUA0:    device type RA81
   Available device  MINE$DJA3:    device type RA60
      .
      .
      .
   ```

   Check the list of devices. If the list is incomplete, make sure that all the
   drives are properly connected to the system. See your hardware manuals for
   details.

6. When standalone BACKUP finishes booting, it displays an identification
   message followed by the dollar sign prompt ($):

   ```
   %BACKUP-I-IDENT, Standalone BACKUP V5.4; the date is 19-JUN-1990 15:05
   $
   ```

   ───────────────────────── **Note** ─────────────────────────

   Do not remove the standalone BACKUP disk from the console disk drive
   until directed to do so.

   ──

7. Return to the *Upgrade and Installation Manual* to continue with the
   installation.

2.4 Booting the New System Disk

As a result of the BACKUP command you enter to start an installation, the
required save set from the distribution media is transferred to your system disk.
During this process, the procedure displays the following message:

```
%BACKUP-I-STARTVERIFY, starting verification pass
```

This message indicates that the *required* save set has been transferred to the
system disk and the files are being checked for errors. Approximately 25 minutes
later the procedure displays the following message:

```
%BACKUP-I-PROCDONE, Operation completed. Processing finished at 19-APR-1990 15:45
If you do not want to perform another standalone BACKUP operation,
use the console to halt the system.

If you do want to perform another standalone BACKUP operation,
ensure the standalone application volume is online and ready.
Enter "YES" to continue:
```

To continue the installation, boot the new system disk. If you have a local system disk, follow the instructions in Section 2.4.1. If you have an HSC system disk, skip to the instructions in Section 2.4.2.

---------- **Note** ----------

If the system does not boot, a hardware or software problem might exist. Refer to Section 3.1.8 for a description of the symptoms of hardware and software problems and the actions you can take to correct these problems.

2.4.1 Local System Boot

To boot the new local system disk, do the following:

1. Press CTRL/P to put the system in console mode. The system displays the following message:

   ```
   ?MCP-I-CPSRUN, CPU is still running
   ```

2. At the console-mode prompt (>>>), enter HALT to stop the processor. The system displays a message similar to the following:

   ```
   CPU stopped, INVOKED BY CONSOLE (CSM code 11)
   PC 80163CFF
   ```

3. Remove the RL02 disk labeled VAX/VMS V5.4 S/A BKUP RL02 and insert the console RL02 in the console disk drive. Wait for the READY light on the drive to glow before continuing.

4. To boot the system disk, use the BOOT command in the following format:

   ```
   >>> B ddu
   ```

   Substitute the boot name of the *target-drive* for **ddu**. For a list of device codes that you use in a boot name, see Table 2–1.

   For example, suppose the system disk is on an RA80 drive and the unit number is 1. Enter the following command and press Return:

   ```
   >>> B DU1
   ```

   Booting the system takes approximately 3 minutes.

5. When the boot is complete, the procedure displays some messages and asks you for the date and time. Enter the date and time using the 24-hour clock format and press Return.

6. Return to the *Upgrade and Installation Manual* to continue with the installation.

2.4.2 HSC System Boot

To boot the new HSC system disk, do the following:

1. Press CTRL/P to put the system in console mode. The system displays the following message:

   ```
   ?MCP-I-CPSRUN, CPU is still running
   ```

2. At the console-mode prompt (>>>), enter HALT to stop the processor. The system displays a message similar to the following:

    ```
    CPU stopped, INVOKED BY CONSOLE (CSM code 11)
    PC 80163CFF
    ```

3. Remove the RL02 disk labeled VAX/VMS V5.4 S/A BKUP RL02 and insert the console RL02 in the console disk drive. Wait for the READY light on the drive to glow before continuing.

4. Boot the system disk. Use the following procedure to boot a system disk on an HSC drive. Note that all numeric entries are made using hexadecimal notation.

    a. Enter the following command and press Return:

        ```
        >>> SET QUIET OFF
        ```

        This command lets you see the lines of the boot command procedure as they execute.

    b. Enter the following command and press Return:

        ```
        >>> BOOT/NOSTART CIBOO.COM
        ```

        CIBOO executes and deposits values in the processor registers.

    c. After CIBOO finishes, look at the DEPOSIT commands that it executed. You might need to change the values in some of the registers to fit your configuration.

        _____ **Note** _____

        After you install the VMS operating system, you can create default boot command procedures that deposit the proper values (see Section 3.1.3). During the installation you must use the BOOT/NOSTART command and manually deposit the correct values.

        _____

        If the HSC node number of your processor is not the value that CIBOO deposited, you need to change the value in register 2 (R2) using the following format:

        ```
        >>> D R2 node-number
        ```

        For example, if the HSC is node number 12 (hexadecimal C), enter the following command and press Return:

        ```
        >>> D R2 C
        ```

        _____ **Note** _____

        If the drive holding the system disk is accessible to two HSCs, deposit both node numbers. Put the greater number in digits 3 and 2. Put the lesser number in digits 1 and 0. For example, if one HSC is node number 18 (hexadecimal 12) and the other is node number 10 (hexadecimal A), enter the following command and press Return:

        ```
        >>> D R2 120A
        ```

        _____

d. If the unit number of the drive holding the system disk is not the value that CIBOO deposited, you need to change the value in register 3 (R3) using the following format:

```
>>> D R3 unit-number
```

For example, if the drive holding the system disk is unit number 21 (hexadecimal 15), enter the following command and press Return:

```
>>> D R3 15
```

e. After you deposit the proper values, look for the value displayed by the EXAMINE SP command when CIBOO executed. The console display should look similar to the following:

```
>>> FIND/MEMORY
>>> EXAMINE SP
        G 0E 00000200
>>> LOAD/START:@ VMB
>>> START @
```

f. Enter the START command in the following format:

```
>>> START xxx
```

where *xxx* is the value displayed in response to the EXAMINE SP command when CIBOO executed.

For example, suppose your console display was the same as the one in step e. Enter the following command and press Return:

```
>>> START 200
```

Booting the system takes approximately 3 minutes.

5. When the boot is complete, the procedure displays some messages and asks you for the date and time. Enter the date and time using the 24-hour clock format and press Return.

6. Return to the *Upgrade and Installation Manual* to continue with the installation.

3

Startup and Shutdown Procedures

During a VMS installation or upgrade, your system will shut down and reboot several times. Although the installation and upgrade procedures usually can perform these tasks automatically, you might need to manually shut down or reboot your system. Also, you will occasionally need to reboot the system during normal operation. This chapter describes different ways to boot and shut down the system.

3.1 Booting the System

The VAX 8600 uses boot command procedures to boot the VMS operating system from the system disk into memory. A boot command procedure does the following:

- Sets up the system environment

- Deposits values in registers

- Tells the system what type of drive the system disk is on as well as the controller designation and the unit number of the drive

- Loads the VMS operating system into memory

- Starts the CPU

The instructions for booting the system vary slightly for different types of drives. Therefore, there is a boot command procedure for each type of drive that the computer supports.

For example, you can boot an RA81 drive that has a unit number of 0 with the boot command procedure DU0BOO.COM (assuming the controller designation is A). If the drive has a unit number of 1, use the boot command procedure DU1BOO.COM. Use CIBOO.COM to boot from a system disk on an HSC drive.

All boot command procedures are located on the console RL02. The console RL02 must be in the console disk drive (CSA1) whenever you boot the system.

A typical boot consists of the following steps:

1. You enter the BOOT command. The specified boot command procedure deposits information in the general purpose registers.

2. VMB.EXE, the primary boot program, is loaded from the boot block on the system disk into memory. VMB.EXE is a program that allows access to the system disk. VMB locates SYS$SYSTEM:SYSBOOT.EXE on the system disk and loads it into memory.

3. SYSBOOT.EXE loads the SYSGEN parameters stored in SYS$SYSTEM:VAXVMSSYS.PAR and checks the conversational boot flag. If the flag is set, the procedure stops and displays the SYSBOOT> prompt. If the flag is not set, SYSBOOT loads the VMS executive into memory and transfers control to the VMS executive.

4. When the VMS executive finishes, it executes the SWAPPER process.

5. The SWAPPER creates the SYSINIT process.

6. SYSINIT creates the STARTUP process.

7. STARTUP executes SYS$SYSTEM:STARTUP.COM (unless you indicated another file at the SYSBOOT> prompt) and SYSTARTUP_V5.COM. The current values of SYSGEN parameters are written back to VAXVMSSYS.PAR.

8. The boot process finishes and you can log into the VMS operating system.

─────────────────────── **Note** ───────────────────────

If you plan to boot from a UDA50-supported device, keep the following restrictions in mind when you configure the system:

- Each UNIBUS up to (but not including) the one that supports the system disk must have exactly one UDA50. Each UNIBUS from the system disk upwards can have up to the legally allowable number of UDA50s.

- You can boot only from the first UDA50 on a UNIBUS (that is, the one with the fixed CSR and vector).

──

3.1.1 Booting from a Local Drive

Follow these steps to boot the system from a local drive:

1. Make sure the console RL02 is in the console disk drive (CSA1) and the TERMINAL CONTROL switch is set to LOCAL.

2. If the VMS operating system is not running, go to step 3.

   If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press Return:

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

   The system displays a series of questions, which you should answer to complete the shutdown. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure, is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE -- USE CONSOLE TO HALT SYSTEM
   ```

3. Press CTRL/P. At the prompt, enter the HALT command and press Return:

   ```
   >>> HALT
   ```

4. Enter the BOOT command followed by the boot name of the drive that holds the system disk. The format for a boot name is as follows:

   ddu

   where:

   - *dd* is the device code (with some drives the device code is different when it is part of a boot name. Table 3–1 lists the device codes to use in boot names)

   - *u* is the unit number

   For example, suppose the system disk is an RA80 disk drive (device code DU) and has a unit number of 0. Enter the following command and press Return:

   ```
   >>> B DU0
   ```

Table 3–1 Device Codes for Disks on a VAX 8600

Device	Used in a Boot Name
RA60, RA80, RA81, and RA82 disk drives	DU
RK07 disk drive	DM
RM03, RM05, RM80, RP05, RP06, and RP07 disk drives	DB

You also can set up default boot command procedures so that the system automatically boots from a particular drive. To create default boot command procedures, see Section 3.1.3.

3.1.2 Booting from an HSC Drive

To boot from a system disk on an HSC drive, use the following procedure. Note that all numeric entries are made in hexadecimal notation.

1. Make sure the console RL02 is in the console drive (CSA1) and the TERMINAL CONTROL switch is set to LOCAL.

2. If the VMS operating system is not running, go to step 3.

   If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press Return:

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

   The system displays a series of questions, which you should answer to complete the shutdown. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE -- USE CONSOLE TO HALT SYSTEM
   ```

3. Press CTRL/P. At the prompt, enter the HALT command and press Return:

   ```
   >>> HALT
   ```

4. Enter the following command and press Return:

   ```
   >>> SET QUIET OFF
   ```

   This command lets you see the lines of the boot command procedure as they execute.

5. Enter the following command and press Return:

   ```
   >>> BOOT/NOSTART CIBOO.COM
   ```

   CIBOO executes and deposits values in the computer registers.

6. After CIBOO finishes, look at the DEPOSIT commands that it executed. You might need to change the values in some of the registers to fit your configuration.

   If the HSC node number of your computer is not the value that CIBOO deposited, you need to change the value in register 2 (R2) using the following format:

   ```
   >>> D R2 node-number
   ```

   For example, if the HSC is node number 12 (hexadecimal C), enter the following command and press Return:

   ```
   >>> D R2 C
   ```

   ─────────────────────────── **Note** ───────────────────────────

   If the drive holding the system disk is accessible to two HSCs, deposit both node numbers. Put the greater number in digits 3 and 2. Put the lesser number in digits 1 and 0. For example, if one HSC is node number 18 (hexadecimal 12) and the other is node number 10 (hexadecimal A), enter the following command and press Return:

   ```
   >>> D R2 120A
   ```

   ──

7. If the unit number of the drive holding the system disk is not the value that CIBOO deposited, you need to change the value in register 3 (R3) using the following format:

   ```
   >>> D R3 unit-number
   ```

   For example, if the drive holding the system disk is unit number 21 (hexadecimal 15), enter the following command and press Return:

   ```
   >>> D R3 15
   ```

8. After you deposit the proper values, look for the value displayed by the EXAMINE SP command when CIBOO executed. The console display should look similar to the following:

   ```
   >>> FIND/MEMORY
   >>> EXAMINE SP
           G 0E 00000200
   >>> LOAD/START:@ VMB
   >>> START @
   ```

9. Enter the START command in the following format:

   ```
   >>> START xxx
   ```

   where *xxx* is the value displayed in response to the EXAMINE SP command when CIBOO executed.

   For example, suppose your console display was the same as the one in step e. Enter the following command and press Return:

   ```
   >>> START 200
   ```

You also can set up default boot command procedures so that the system automatically boots from a particular drive. By creating default boot command procedures, you avoid correcting information that CIBOO deposits each time you boot. For more information, see Section 3.1.3.

3.1.3 Creating Default Boot Command Procedures

To boot the system, you can enter the BOOT command and specify the boot name for a particular drive. You also can create default boot command procedures that boot the system automatically. There are two default boot command procedures: DEFBOO.COM and DEFGEN.COM.

DEFBOO.COM is the nonstop boot procedure. When you boot with DEFBOO.COM, you have no control over the system until the boot process has finished. Use DEFGEN.COM, the conversational boot procedure, when you want to interrupt the boot process and change system parameters.

DEFGEN.COM and DEFBOO.COM do not exist on the console RL02. However, Digital provides boot command procedures that you can edit and rename using the following procedure.

_____ **Note** _____

This procedure assumes that the VMS operating system is running and you are logged into the SYSTEM account.

_____

1. Make sure the console RL02 is in the console disk drive (CSA1) and the TERMINAL CONTROL switch is set to LOCAL.

2. To connect the console drive to the system, enter the following commands and press Return after each one:

    ```
    $ RUN SYS$SYSTEM:SYSGEN
    SYSGEN> CONNECT CONSOLE
    SYSGEN> EXIT
    ```

3. Use the Exchange Utility to display a list of boot command procedures on the console RL02. Boot command procedures are the files that start with either CI or D and have a file type of COM. Enter the following command and press Return:

    ```
    $ EXCHANGE DIRECTORY CSA1:CI*.COM,D*.COM
    ```

    The Exchange Utility displays a list of boot command procedures. For example:

    ```
    DUABOO.COM
    DUAGEN.COM
    CIBOO.COM
    CIGEN.COM
        .
        .
        .
    ```

4. If the system disk is on an HSC drive, copy and edit CIBOO.COM and CIGEN.COM.

    If the system disk is on a local drive, look for the files whose first two letters match the device code of the drive holding the system disk. For example, if the system disk is on an RA82 drive, find the file names that begin with DU (DU is the device code for an RA82 disk drive).

If the third character in the file name is a number, it stands for the unit number of a drive with a controller designation of A. For example, DU1BOO.COM boots an RA82 disk drive with a controller designation of A and a unit number of 1.

If the third character in the file name is a letter, it stands for the controller designation. There is no corresponding unit number. For example, DUCBOO.COM boots an RA82 disk drive with a controller designation of C.

5. Use the Exchange Utility to copy the appropriate files from the console RL02 to your current directory on the system disk. Enter the COPY command in the following format:

```
$ EXCHANGE COPY CSA1:filename.COM *
```

Substitute the name of the boot command procedure for *filename*. For example, to make a copy of CIBOO.COM and CIGEN.COM, enter the following commands and press Return after each one:

```
$ EXCHANGE COPY CSA1:CIBOO.COM *
$ EXCHANGE COPY CSA1:CIGEN.COM *
```

6. If the third character of the file name is a number, go to step 7.

If the file name starts with CI or if the third character of the file name is a letter, edit the file as follows:

a. Make sure the file contains a command that deposits the unit number of the drive holding the system disk in register 3 (R3). Use hexadecimal notation and make sure the command line is not commented out. For example, suppose the system disk is on an RP07 disk drive with a controller designation of C and a unit number of 3. After you copy DBCBOO.COM and DBCGEN.COM, make sure both files contain the following line:

```
DEPOSIT R3 00000003     !DISK DRIVE UNIT NUMBER
```

Suppose the system disk is on an HSC-based RA60 disk drive with a unit number of 2. After you copy CIBOO.COM and CIGEN.COM, make sure both files contain the following line:

```
DEPOSIT R3 00000002     !DISK DRIVE UNIT NUMBER
```

b. If you copied CIBOO.COM and CIGEN.COM, make sure both files contain a command that deposits the HSC node number in register 2 (R2). Make sure the command line is not commented out. Use the following format:

```
DEPOSIT R2 node-number
```

Substitute a hexadecimal value between 0 and F for *node-number*. For example, if the HSC is node number 12 (hexadecimal C), add the following command:

```
DEPOSIT R2 C
```

_____ Note _____

If the drive holding the system disk is attached to two HSC controllers, deposit both node numbers in register 2 (R2). Put the greater number in hexadecimal digits 3 and 2. Put the smaller number in digits 1 and 0. For example, if one HSC is node number 18 (hexadecimal 12) and the other is node number 10 (hexadecimal A), use the following command:

```
DEPOSIT R2 120A
```

_____

7. Rename the files. Enter the RENAME command in the following format:

```
$ RENAME filename.COM DEFBOO.COM
$ RENAME filename.COM DEFGEN.COM
```

Substitute the file name of the boot command procedure for *filename*. For example, to rename CIBOO.COM and CIGEN.COM, enter the following commands and press Return after each one:

```
$ RENAME CIBOO.COM DEFBOO.COM
$ RENAME CIGEN.COM DEFGEN.COM
```

8. Use the Exchange Utility to copy DEFBOO.COM and DEFGEN.COM to the console RL02. Enter the following commands and press Return after each one:

```
$ EXCHANGE COPY DEFBOO.COM CSA1:*
$ EXCHANGE COPY DEFGEN.COM CSA1:*
```

9. When you are finished, enter the following command and press Return:

```
$ DISMOUNT CSA1
```

10. To secure the console RL02 from unauthorized access, you must enter the following command and press Return:

```
$ MOUNT/FOREIGN/SYSTEM/NOWRITE/NOASSIST CSA1:
```

Now you can use DEFBOO.COM and DEFGEN.COM to boot the VMS operating system, as described in the following sections.

3.1.3.1 Booting with DEFBOO.COM

You can cause the system to boot using DEFBOO.COM when you do any of the following:

- Set the RESTART switch to RESTART/BOOT or BOOT. Use the TERMINAL CONTROL switch to turn on system power. The system uses DEFBOO.COM to boot automatically.

- Set the RESTART switch to RESTART/BOOT or BOOT. Execute the SHUTDOWN command procedure and specify the auto reboot option. The system uses DEFBOO.COM to reboot automatically.

- Set the RESTART switch to RESTART/BOOT or BOOT. If the system shuts down because of a bugcheck, the system uses DEFBOO.COM to reboot automatically.

- Enter the following command and press Return:

```
>>> B
```

The system boots using DEFBOO.COM.

The system sometimes uses DEFBOO.COM when a power failure occurs. If a power failure occurs when the RESTART switch is set to RESTART/ BOOT or BOOT and the contents of memory are lost, the system executes DEFBOO.COM when it regains power.

If the battery backup unit saves the contents of memory, the system restarts execution where it was interrupted by the power failure.

3.1.4 Booting with DEFGEN.COM—Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot to stop the boot process before it completes. The boot process stops after it loads SYS$SYSTEM:SYSBOOT.EXE and displays the SYSBOOT> prompt. At the SYSBOOT> prompt, you can enter certain SYSGEN commands to do the following:

- Look at system parameter values

- Change system parameter values

- Specify another parameter file

- Specify another system startup command procedure

- Select the default system parameter file if you modified system parameters to values that render the system unbootable

- Specify a minimum startup

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

1. Make sure the console RL02 is in the console disk drive and the TERMINAL CONTROL switch is set to LOCAL.

2. If the VMS operating system is not running, go to step 3.

   If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press Return:

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

   The system displays a series of questions, which you should answer to complete the shutdown. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
   ```

3. Press CTRL/P. At the prompt, enter the HALT command and press Return:

   ```
   >>> HALT
   ```

4. To begin the conversational boot, enter the following command and press Return:

   ```
   >>> @DEFGEN.COM
   ```

5. At the SYSBOOT> prompt, you can enter any of the SYSGEN commands listed in Table 3–2. For more information about these SYSGEN commands, see the *OpenVMS System Management Utilities Reference Manual*.

6. When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

Table 3–2   SYSGEN Commands Used in SYSBOOT

Command	Description
CONTINUE	Resumes the boot procedure.
DISABLE CHECKS	Inhibits checking of parameter values specified with the SET command.
ENABLE CHECKS	Permits checking of parameter values specified with the SET command.
HELP	Displays a summary of the SYSBOOT commands on the terminal screen.
SET parameter-name	Establishes the value of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW [parameter]	Displays active, current, default, maximum, and minimum values for specific parameters. Use qualifiers to display characteristics of parameters grouped by categories.
USE [file-spec]	Specifies a parameter file to be used as a source of values (you must enter the entire file specification, including device and directory; you cannot specify a logical name).

The following examples illustrate some operations you may perform during a conversational boot.

You can enter the following commands to set the SYSGEN parameter WSMAX to 512 and complete the boot process:

```
SYSBOOT> SET WSMAX 512
SYSBOOT> CONTINUE
```

When the VMS operating system displays the following message, the new SYSGEN parameter value becomes active.

```
SYSTEM   job terminated at 19-JUN-1990 15:05:11.01
```

If you modified the system parameters to values that render the system unbootable, enter the following commands to boot using default parameter values:

```
SYSBOOT> USE DEFAULT
SYSBOOT> CONTINUE
```

You also can use the conversational boot to specify a minimum startup. For example, if you want to boot your system and avoid autoconfiguring all your peripheral devices, enter the following command:

```
SYSBOOT> SET STARTUP_P1 "MIN"
```

This command initiates a minimum startup that performs the following sequence of operations:

1. Starts the processes that control error logging, the job controller, and the operator's log

2. Installs known images

3. Defines the number of interactive users as 8

4. Logs off

Because this procedure does not invoke SYSTARTUP_V5.COM, it does not autoconfigure the system's peripheral devices.

The values of STARTUP_P1 is saved and affects future boot operations. After the operating system boots, you can run SYSGEN to reset STARTUP_P1. For example, enter the following commands to reset STARTUP_P1 to its default value (null):

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> USE CURRENT
SYSGEN> SET STARTUP_P1 ""
SYSGEN> WRITE CURRENT
SYSGEN> EXIT
$
```

3.1.5 Booting from a Different Directory on the System Disk

The VMS operating system is installed on the system disk in the system root directory named [SYS0]. You can use VMSKITBLD, described in the *Guide to Setting Up a VMS System*, to add a copy of the VMS operating system to another system root directory on the system disk.

To boot the system from a directory other than [SYS0], create a command procedure named SYnBOO.COM, where *n* stands for the name of the other root directory on the system disk. Follow these steps to create a SYnBOO.COM:

1. Make sure that the console RL02 is in the console drive (CSA1) and the TERMINAL CONTROL switch is set to LOCAL.

2. To connect the console drive, enter the following commands and press Return after each one:

   ```
   $ RUN SYS$SYSTEM:SYSGEN
   SYSGEN> CONNECT CONSOLE
   SYSGEN> EXIT
   ```

3. Use the Exchange Utility to copy the DEFBOO.COM command procedure from the console RL02 to your current directory on the system disk. Enter the following command and press Return:

   ```
   $ EXCHANGE COPY CSA1:DEFBOO.COM *
   ```

4. Edit DEFBOO.COM. Change the command line that deposits a value into register 5 (R5). This line contains the comment *! Use R5 for optional boot control flags [SYSB.]*. The value is a hexadecimal number with 8 bits. For example:

   ```
   DEPOSIT R5 B0000000     ! Use R5 for optional boot control flags [SYSB.]
   ```

   Change the leftmost digit of the value to reflect the name of the root directory from which you want to boot. For example if you want to boot from the directory named [SYSC], change the line as follows:

   ```
   DEPOSIT R5 C0000000     ! Designated root is SYSC
   ```

5. Rename DEFBOO.COM to SYnBOO.COM, where *n* stands for the name of the other system root directory. Use the following format:

   ```
   $ RENAME DEFBOO.COM SYnBOO.COM
   ```

For example, if the directory is named [SYSC], enter the following command and press Return:

```
$ RENAME DEFBOO.COM SYCBOO.COM
```

6. Use the Exchange Utility to copy the SYnBOO.COM to the console RL02. Use the following format:

```
$ EXCHANGE COPY SYnBOO.COM CSA1:SYnBOO.COM
```

For example, if the directory is named [SYSC], enter the following command and press Return:

```
$ EXCHANGE COPY SYCBOO.COM CSA1:SYCBOO.COM
```

7. When you are finished, enter the following command and press Return:

```
$ DISMOUNT CSA1
```

8. To secure the console RL02 from unauthorized access, you must enter the following command and press Return:

```
$ MOUNT/FOREIGN/SYSTEM/NOWRITE/NOASSIST CSA1:
```

To boot from a different directory on the system disk, use the following procedure:

1. Make sure the console RL02 is in the console drive (CSA1) and the TERMINAL CONTROL switch is set to LOCAL.

2. If the VMS operating system is not running, go to step 3.

   If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press Return:

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

The system displays a series of questions, which you should answer to complete the shutdown. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

3. Press CTRL/P. At the console-mode prompt (>>>), enter the HALT command and press Return:

```
>>> HALT
```

4. Boot from the other root directory using the command procedure you created. For example, to boot from [SYSC], enter the following command and press Return:

```
>>> B SYC
```

3.1.6 Booting from SYSF During an Upgrade

To boot from [SYSF], create a command procedure named SYFBOO.COM.

To create SYFBOO.COM, use the following procedure:

1. Make sure that the console RL02 is in the console drive. Make sure the TERMINAL CONTROL switch is set to LOCAL.

2. Log in to the SYSTEM account.

3. To connect the console drive, enter the following commands and press Return after each one:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

4. Use the Exchange Utility to copy DEFBOO.COM from the console media to your current directory on the system disk as follows:

```
$ EXCHANGE COPY CSA1:DEFBOO.COM *
```

5. Edit DEFBOO.COM. Change the line that deposits a value in register 5 (R5). This line contains the comment *!Use R5 for optional boot control flags [SYSB.]*. The value is a hexadecimal number with eight digits. For example:

```
DEPOSIT R5 10000000    !Use R5 for optional boot control flags [SYSB.]
```

Change the leftmost digit of the value to reflect the name of the root directory from which you want to boot. For example, to boot from [SYSF], change the line as follows:

```
DEPOSIT R5 F0000000    !Use R5 for optional boot control flags [SYSB.]
```

6. Rename DEFBOO.COM to SYFBOO.COM, as follows:

```
$ RENAME DEFBOO.COM SYFBOO.COM
```

7. Use the Exchange Utility to copy SYFBOO.COM to the console media. Enter a command similar to the following:

```
$ EXCHANGE COPY SYFBOO.COM CSA1:SYFBOO.COM
```

8. When you are finished, enter a command similar to the following and press Return:

```
$ DISMOUNT CSA1
```

9. To secure the console media from unauthorized access, you must enter a command similar to the following and press Return:

```
$ MOUNT/FOREIGN/SYSTEM/NOWRITE/NOASSIST CSA1
```

To boot from [SYSF] during an upgrade, use the following procedure:

1. Make sure the console RL02 is in the console drive. Make sure the TERMINAL CONTROL switch is set to LOCAL.

2. Press CTRL/P and enter the HALT command at the console-mode prompt (>>>):

```
>>> HALT
```

3. Use SYFBOO.COM to boot from [SYSF]. Enter the following command and press Return:

```
>>> B SYF
```

3.1.7 Booting with XDELTA

XDELTA is a debugging tool that system programmers use. To use XDELTA, you need to boot the system in a special way. For information on booting with XDELTA, see the *OpenVMS Delta/XDelta Debugger Manual*.

3.1.8 If the System Does Not Boot

If the system does not boot because a hardware problem occurs, a question
mark (?) usually precedes the error message displayed on the console terminal.
Examples of hardware problems are a read error on a disk drive or a console
diskette, or a machine check error. If you suspect a hardware problem, do the
following:

1. Consult the hardware manual for your VAX computer.

2. Contact the appropriate Digital Customer Service representative.

When the operating system is loaded into memory, a message similar to the
following appears on the console terminal:

```
SYSTEM        job terminated at 19-JUN-1990 15:05:14.00
```

If you do not see this message, a software problem has probably occurred. Do the
following:

1. Try to boot the system again.

2. Place a backup copy of the system disk in another drive and try to boot from
    it.

3.2 Shutting Down the System

You can perform the following three types of shutdown operations:

1. **An orderly shutdown with SYS$SYSTEM:SHUTDOWN.COM**–See
    Section 3.2.1.

2. **An emergency shutdown with OPCCRASH.EXE**–See Section 3.2.2.

3. **An emergency shutdown with CRASH**–See Section 3.2.3.

3.2.1 Orderly Shutdown with SHUTDOWN.COM

SHUTDOWN.COM shuts down the system while performing maintenance
functions such as disabling future logins, stopping the batch and printer
queues, dismounting mounted volumes, and stopping user processes. To use
the SHUTDOWN command procedure, log in to the SYSTEM account, enter the
following command, and press Return:

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

To halt the system after the procedure completes, press CTRL/P and enter the
HALT command at the console-mode prompt (>>>).

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

3.2.2 Emergency Shutdown with OPCCRASH.EXE

If you cannot perform an orderly shutdown with SHUTDOWN.COM, run the
OPCCRASH emergency shutdown program. Enter the following command and
press Return:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

To halt the system after the procedure completes, press CTRL/P and enter the
HALT command at the console-mode prompt (>>>).

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

3.2.3 Emergency Shutdown with CRASH

_____ **Note** _____

Use CRASH only if the system is hung and you cannot log into the
SYSTEM account to use SHUTDOWN.COM or OPCCRASH.

_____

The CRASH command procedure is on the console RL02. CRASH causes the
system to fail, resulting in immediate shutdown. To force your computer to fail
with CRASH, do the following:

1. Make sure the console RL02 is in the console drive (CSA1) and the
    TERMINAL CONTROL switch is set to LOCAL.

2. Press CTRL/P to obtain the console-mode prompt (>>>). Enter the HALT
    command and press Return.

    ```
    >>> HALT
    ```

3. Enter the following command and press Return:

    ```
    >>> @CRASH
    ```

4. CRASH displays a fatal bugcheck message as well as additional messages
    and information. The procedure examines the program counter (PC), the
    processor status longword (PSL), and the stack pointers. It then deposits
    values in the PC and PSL that cause an exception condition that sends the
    contents of memory to a dump file on the system disk. Later you can read the
    dump file to determine why the system did not respond.

5. After the CRASH executes, the system attempts to reboot if the RESTART
    switch is set to the RESTART/BOOT position and the SYSGEN parameter
    BUGREBOOT is set to 1. Otherwise, reboot the system manually by entering
    the BOOT command at the console-mode prompt (>>>). If you do not specify
    a boot name, the system uses DEFBOO.COM.

6. After the system reboots you can examine the dump file. To examine the
    dump file, log into the SYSTEM account. Enter the following commands and
    press Return after each one:

    ```
    $ ANALYZE/CRASH SYS$SYSTEM:SYSDUMP.DMP
    SDA> SHOW CRASH
    ```

    For more information about the System Dump Analyzer (SDA), see the
    OpenVMS VAX System Dump Analyzer Utility Manual.

4

Backup Procedures

Use Standalone BACKUP to make a complete backup of the system disk. Standalone BACKUP is a version of the Backup Utility that runs without the support of the entire VMS operating system.

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

- In case a problem occurs during a VMS 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 VMS 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 VMS 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 command creates a copy on which files are stored contiguously.

  - If the system disk is removable, eliminating disk fragmentation is a one-step process. Use the backup copy as the new system disk. Store the old system disk in a safe place.

  - If your system disk is fixed, back it up to a disk or magnetic tape. Then restore the files to the original system disk.

Digital recommends that you use standalone BACKUP to back up your system disk.

This chapter describes the following procedures:

- Installing and booting standalone BACKUP on the system disk

- Installing and booting standalone BACKUP on an RL02 disk

- Backing up and restoring the system disk

You should also back up the console RL02 in case the original becomes damaged. Section 4.4 describes using CONSCOPY.COM to do this.

4.1 Using Standalone BACKUP

The Backup Utility lets you create and restore backup copies of files, directories, and user disks. Because the Backup Utility copies only what is on the disk and ignores sections of any open files contained in memory, you should use it to back up user disks, not the system disk. If you use the Backup Utility to back up the system disk, the portions of the files that were in memory, and data about files not yet written back to the disk (cache), will not be recorded on the resulting backup copy.

Use Standalone BACKUP to make a complete backup of the system disk. Standalone BACKUP is a version of the Backup Utility that runs without the support of the entire VMS operating system. Before you use standalone BACKUP, you must shut down the VMS operating system. The shutdown procedure sends the contents of the caches back to the disk and closes any open files. By shutting the system down and using standalone BACKUP, you can make an exact copy of the system disk.

You can keep standalone BACKUP on the system disk, an RL02 disk, or any other media that your system supports. Digital recommends that you keep standalone BACKUP on your system disk and on an RL02 disk. Usually, you boot standalone BACKUP from the system disk because it saves time. However, you need to keep a copy of standalone BACKUP on an RL02 disk in case the system disk becomes damaged. You received standalone BACKUP on an RL02 disk as part of the distribution kit.

4.1.1 Installing Standalone BACKUP on the System Disk

You can install standalone BACKUP in any available root directory on the system disk from [SYS1] to [SYSE]. However, Digital has established [SYSE] as the standard directory for standalone BACKUP.

To install standalone BACKUP in [SYSE], use the following procedure:

1. Log into the SYSTEM account.

2. Enter the following command and press Return:

   ```
   $ @SYS$UPDATE:STABACKIT SYS$SYSDEVICE:
   ```

   The procedure places the files in the directories [SYSE.SYSEXE] and [SYSE.SYS$LDR] on the system disk. It lists the files as they are copied. When the procedure finishes, it displays the following message:

   ```
   The kit is complete.
   ```

3. Create a boot command procedure that lets you boot standalone BACKUP from [SYSE]. For more information, see Section 4.1.2.

4.1.2 Booting Standalone BACKUP from the System Disk

You need a special boot command procedure to boot standalone BACKUP from the system disk. Digital recommends that you modify an existing boot command procedure. Ideally, this should be the default boot command procedure, DEFBOO.COM.

You can choose any unique name in the form xxxBOO.COM for the command procedure you create. However, Digital suggests you use an existing file name, and change the first letter to an X. For example, if you use a copy of DEFBOO.COM, name the new file XEFBOO.COM.

To create a boot command procedure that boots standalone BACKUP from the [SYSE] root, use the following procedure. The procedure assumes you are using a copy of DEFBOO.COM and renaming it XEFBOO.COM.

1. Make sure the console RL02 is in the console drive (CSA1).

2. Log in to the SYSTEM account.

3. To connect the console drive to the system, enter the following commands and press Return after each one:

   ```
   $ RUN SYS$SYSTEM:SYSGEN
   SYSGEN> CONNECT CONSOLE
   SYSGEN> EXIT
   ```

4. Use the EXCHANGE Utility to copy DEFBOO.COM to the current directory on the system disk. Enter the following command and press Return:

   ```
   $ EXCHANGE COPY CSA1:DEFBOO.COM XEFBOO.COM
   ```

5. Edit XEFBOO.COM. Change the line that deposits a value in register 5 (R5). Change the leftmost digit so that it specifies the [SYSE] directory. For example:

   ```
   DEPOSIT R5 E0000000    ! Designated root is SYSE
   ```

6. Exit from the text editor to save the modified version of the file.

7. To copy XEFBOO.COM back to the console RL02, enter the following command and press Return:

   ```
   $ EXCHANGE COPY XEFBOO.COM CSA1:*.*
   ```

8. When you are finished, enter the following command and press Return:

   ```
   $ DISMOUNT CSA1
   ```

9. To secure the console RL02 from unauthorized access, you must enter the following command and press Return:

   ```
   $ MOUNT/FOREIGN/SYSTEM/NOWRITE/NOASSIST CSA1:
   ```

After you copy XEFBOO.COM to the console RL02, you can use it to boot standalone BACKUP from the system disk.

To boot standalone BACKUP from the system disk, use the following procedure:

1. Make sure the console RL02 is in the console drive (CSA1) and the TERMINAL CONTROL switch is set to LOCAL.

2. If the VMS operating system is not running, go to step 3.

   If the VMS operating system is running, log in to the SYSTEM account. Enter the following command and press Return:

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

   The system displays a series of questions, which you should answer to complete the shutdown. When the procedure asks if an automatic reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE -- USE CONSOLE TO HALT SYSTEM
   ```

3. Press CTRL/P. At the prompt, enter the HALT command and press Return:

   ```
   >>> HALT
   ```

4. Enter the following command and press Return:

   ```
   >>> @XEFBOO
   ```

5. Standalone BACKUP displays the following message:

   ```
   VAX/VMS Version V5.4 Major version id = 1 Minor version id = 0
   ```

6. The procedure might ask you for the date and time. Enter the date and time using the 24-hour clock format and press Return. For example:

   ```
   PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-JUN-1990 15:30
   ```

7. The procedure displays a list of the local devices on your system and, if you have them, HSC and MSCP-served devices. For example:

   ```
   Available device  MINE$DUA0:        device type RA81
   Available device  MINE$DJA3:        device type RA60
      .
      .
      .
   ```

   Check the list of devices. If the list is incomplete, make sure that all the drives are properly connected to the system. See your hardware manuals for details.

8. When standalone BACKUP finishes booting, it displays an identification message followed by the dollar sign ($) prompt:

   ```
   %BACKUP-I-IDENT, Standalone BACKUP V5.4; the date is 19-JUN-1990 15:05
   $
   ```

To make a backup copy of the system disk, go to Section 4.2.

To restore a backup copy of the system disk, go to Section 4.3.

4.1.3 Installing Standalone BACKUP on an RL02 Disk

Digital recommends that you keep standalone BACKUP on an RL02 disk in case the system disk becomes damaged. To install standalone BACKUP on an RL02 disk, use the following procedure. The procedure takes approximately 15 minutes.

Note

You should have standalone BACKUP on the RL02 disk that came with your distribution kit. Use the procedure in this section if your copy of standalone BACKUP becomes damaged, or if you need to make extra copies.

---

1. Obtain one blank RL02 disk. Write STANDALONE BACKUP V5.4 on the paper label on the disk.

2. Log into the SYSTEM account.

3. Remove the console RL02 from the console disk drive. Insert the RL02 labeled STANDALONE BACKUP V5.4.

4. Enter the following command and press Return:

   ```
   $ @SYS$UPDATE:STABACKIT
   ```

5. The procedure asks you the name of the target device. Type CSA1 and press Return. For example:

   ```
   %STABACKIT-I-SYMDEL, all global symbols deleted
   Enter the name of the device on which to build the kit: CSA1
   ```

6. The procedure displays the following message:

   ```
   Do you want to initialize CSA1:? Note that this will erase all
   files currently on the volume.

   It is not necessary to initialize the disk and you would not want to
   initialize if you want to add a kit to an existing Files-11 disk. The
   disk must be a valid Files-11 disk if you wish to skip initializing,
   however.

   Do you want to initialize? [Yes/No, default No]:
   ```

   To accept the default, press Return. To initialize the disk, type Y (for YES).

7. The procedure displays the following message:

   ```
   Enter the new volume label [default STANDBACKUP]:
   ```

   Enter a new volume label or press Return to accept the default.

8. The procedure mounts the RL02 disk and displays a number of informational messages. For example:

   ```
   %MOUNT-I-MOUNTED, STANDBACKUP mounted on _CSA1:
   %CREATE-I-CREATED, _CSA1:<SYS0.SYSEXE> created
   %CREATE-I-CREATED, _CSA1:<SYS0.SYS$LDR> created
      .
      .
      .
   ```

9. After all the files are copied to the RL02 disk, the procedure displays the following message:

   ```
   The console volume will be mounted /NOWRITE for protection.
   Please make sure the original console RL02 is
   in the drive CSA1:.

   Enter "YES" when ready:
   ```

10. Remove the RL02 disk labeled STANDALONE BACKUP V5.4 from the console disk drive and insert the console RL02. When you are ready, type Y (for YES) and press Return.

11. The procedure may display several mount messages. When the procedure finishes, it displays a message similar to the following:

    ```
    Ending time      19-JUN-1990 14:31
    Starting time    19-JUN-1990 14:16

    The kit is complete.
    ```

4.1.4 Booting Standalone BACKUP from an RL02 Disk

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from an RL02 disk. You need an RL02 disk that contains standalone BACKUP (either the one that came with the distribution kit or one that you created). To boot standalone BACKUP from an RL02 disk, use the following procedure:

1. Make sure the console RL02 disk is in the console drive (CSA1).

2. If the VMS operating system is not running, go to step 3.

   If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press Return:

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

   The system displays a series of questions, which you should answer to complete the shutdown. When the procedure asks if an automatic reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE -- USE CONSOLE TO HALT SYSTEM
   ```

3. Press CTRL/P. At the prompt, enter the HALT command and press Return:

   ```
   >>> HALT
   ```

4. To boot standalone BACKUP, enter the following command and press Return:

   ```
   >>> B CS1
   ```

5. The procedure displays the following message:

   ```
           G 0E 00000200


   Please remove the volume "8600/8650 Console" from the console device.

   Insert the first standalone system volume and enter "YES" when ready:
   ```

6. Remove the console RL02 and insert the RL02 disk that contains standalone BACKUP. When you are ready to continue, type Y and press Return. The procedure displays the following message:

```
Resuming load operation on volume 'STANDBACKUP', please stand by...

VAX/VMS Version V5.4 Major version id = 1 Minor version id = 0
```

7. The procedure might ask you for the date and time. Enter the date and time using the 24-hour clock format and press Return. For example:

    ```
    PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-JUN-1990 15:00
    ```

8. The procedure displays a list of the local devices on your system and, if you have them, HSC and MSCP-served devices. For example:

    ```
    Available device  MINE$DUA0:          device type RA81
    Available device  MINE$DJA3:          device type RA60
       .
       .
       .
    ```

    Check the list of devices. If the list is incomplete, make sure that all the drives are properly connected to the system. See your hardware manuals for details.

9. When standalone BACKUP is finished booting, it displays an identification message followed by the dollar sign prompt ($):

    ```
    %BACKUP-I-IDENT, standalone BACKUP V5.4; the date is 19-JUN-1990 15:35
    $
    ```

To make a backup copy of the system disk, go to Section 4.2.

To restore a backup copy of the system disk, go to Section 4.3.

4.2 Backing Up the System Disk

Standalone BACKUP uses a subset of Backup Utility qualifiers to back up and restore your system disk. It is especially important that you understand the functions of the /IMAGE and /PHYSICAL qualifiers to the BACKUP command before using standalone BACKUP.

Qualifier	Function
/IMAGE	Lets you create a functionally equivalent copy of the entire system disk
/PHYSICAL	Copies, saves, restores, or compares the entire system disk in terms of logical blocks, ignoring any file structure

For a complete description of the Backup Utility see the *OpenVMS System Manager's Manual*.

To back up the system disk, use the following procedure:

1. Obtain a scratch disk or tape that you can use for the backup copy. Place it in the appropriate drive. If you are using a tape drive, put it on line. If you are using a disk, spin it up.

2. Write-protect the system disk by pressing the WRITE PROTECT button on the disk drive.

3. Boot standalone BACKUP as described in Section 4.1.2 or Section 4.1.4.

4. Determine the device names of the drive holding your system disk and the drive holding the backup disk or tape. For a list of device codes, see Table 2–1.

5. Enter the BACKUP command in one of the following formats. If you are backing up the system disk to another disk, use the first command. If you are backing up the system disk to a magnetic tape, use the second command.

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

```
$ BACKUP/IMAGE/VERIFY source-drive: target-drive:saveset.BCK/REWIND/LABEL=volume-label
```

where:

- *source-drive* is the location of the files you want to back up. Use the device name of the drive holding the system disk.

- *target-drive* is the destination. Use the device name of the drive holding the backup disk or tape.

- *saveset* is the name of the save set (the name should reflect the contents of the tape and cannot exceed 17 characters in length).

- *volume-label* is the volume label of the tape in the target-drive. If the tape has already been initialized, use the same volume label that was assigned by the INITIALIZE command. If the tape has not been initialized, you can assign a volume label at this time. The volume label can have up to six characters.

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 DUA0: DUA1:
```

The following example uses the BACKUP command to make a backup tape. You must restore the contents of the backup tape to a disk before you can use them. For more information see Section 4.3.

```
$ BACKUP/IMAGE/VERIFY DUA0: MSA0:JUN_19_1990.BCK/REWIND/LABEL=BKUP
```

6. When the procedure is finished, it displays the following message:

```
%BACKUP-I-PROCDONE, Operation completed. Processing finished at 19-JUN-1990 16:10
If you do not want to perform another standalone BACKUP operation,
use the console to halt the system.

If you do want to perform another standalone BACKUP operation,
ensure the standalone application volume is on line and ready.
Enter "YES" to continue:
```

7. Press CTRL/P. At the console-mode prompt (>>>), enter HALT and press Return:

```
>>> HALT
```

8. Reboot the system.

Store the backup copy of the system disk in a safe place.

_____ **Note** _____

The BACKUP command creates a system disk that includes a Digital-
provided set of volume parameters, including a CLUSTER_SIZE (disk
access scheme) of 1. (The CLUSTER_SIZE refers to the way files are
stored on the disk, NOT to VAXclusters.)

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. To prevent the BACKUP command from
reinitializing the target disk, use the /NOINITIALIZE qualifier.

For more information about initializing a disk, see the _OpenVMS System
Manager's Manual._ For more information on the BACKUP command, see
the _OpenVMS System Management Utilities Reference Manual._

4.3 Restoring the System Disk

To restore the system disk, use the following procedure:

1. Write-protect the backup disk or tape.

2. Place the backup disk or tape in the appropriate drive. If you are using a
   tape drive, put it on line. If you are using a disk drive, spin it up.

3. Boot standalone BACKUP as described in Section 4.1.2 or Section 4.1.4.

4. Place a scratch disk in the drive you intend to use for the new system disk.
   Spin it up but do not write-protect it.

5. Determine the device names of the drive holding the system disk and the
   drive holding the backup disk or tape. For a list of device codes see Table 2–1.

6. Enter the BACKUP command in one of the following formats. If you have
   a backup disk, use the first command. If you have a backup tape, use the
   second command.

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

   ```
   $ BACKUP/IMAGE/VERIFY source-drive:saveset.BCK/REWIND target-drive:
   ```

   where:

   - _source-drive_ is the location of the files you want to restore. Use the device
     name of the drive holding the backup disk or tape.

   - _saveset_ is the name of the saveset, if you have a backup tape.

   - _target-drive_ is the destination. Use the device name of the drive holding
     the system disk.

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

   ```
   $ BACKUP/IMAGE/VERIFY DUA1: DUA0:
   ```

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

   ```
   $ BACKUP/IMAGE/VERIFY MSA0:JUN_19_1990.BCK/REWIND DUA0:
   ```

7. When the procedure is finished, it displays the following message:

```
%BACKUP-I-PROCDONE, Operation completed. Processing finished at 19-JUN-1990 15:00
If you do not want to perform another standalone BACKUP operation,
use the console to halt the system.

If you do want to perform another standalone BACKUP operation,
ensure the standalone application volume is on line and ready.
Enter "YES" to continue:
```

8. Press CTRL/P. At the console-mode prompt (>>>), enter HALT, and press Return:

```
>>> HALT
```

9. Reboot the system.

4.4 Backing Up the Console RL02

Make a backup copy of the console RL02 to protect against corruption or loss of the original. First, use CONSCOPY.COM to transfer the files on the console RL02 to a directory on the system disk. Then use it to *restore* the files on the system disk to a new RL02 disk.

To transfer the console files to the system disk, use the following procedure:

1. Log in to the SYSTEM account.

2. Insert the console RL02 disk in the console drive (CSA1).

3. Enter the following command and press Return:

```
$ @SYS$UPDATE:CONSCOPY
```

The procedure displays the following message:

```
S Y S $ U P D A T E : C O N S C O P Y . C O M

     Save or restore a VMS console medium.

Which CPU kit do you want to build?

   78X, includes 11/780 and 11/785
   8600 includes 8650
   8200 includes 8250, 8300 and 8350

[8600, 8200, 78X, 750 or 730, default 8600]:
```

4. Press Return to accept the default. The procedure displays the following messages:

```
        A SAVE operation involves copying the console medium to
        an RT-11  virtual volume, which is a Files-11 file that
        is an image of the RT-11 console volume.

        A RESTORE operation involves copying the entire contents
        of a virtual volume to a console medium.
```

5. When the procedure asks which operation you want, type SAVE and press Return. For example:

```
        Do you want to SAVE or RESTORE your console RL02?: SAVE
```

6. The procedure asks for the name of the *virtual disk* that you want to save the files on. Press Return to select the default (SYS$DISK:CONSOLE.DSK). For example:

```
        Enter file name of virtual disk [default SYS$DISK:CONSOLE:DSK]:
```

7. To verify the operation, press Return (for YES) in response to the following question:

        Do you want log messages as files are copied? [Y/N, default YES]

8. The procedure asks for the name of the console drive. Type CSA1: and press Return. For example:

        Enter console device drive (DDCU:): CSA1:

9. When the procedure displays the following message, press Return (the console RL02 is already in the drive):

        Put your console RL02 into drive _CSA1:,
        and press Return when ready:

    After you press Return, the procedure mounts the console RL02 and uses the Exchange Utility to begin the *save* operation. The procedure may display several Exchange Utility messages, file header information, and a list of the files being saved. When the procedure is complete, it displays the following message:

        The SAVE of your console RL02 is complete.

To transfer the files that are on the system disk to a new RL02 disk, use the following procedure:

1. Enter the following command and press Return:

        $ @SYS$UPDATE:CONSCOPY

    The procedure displays the following messages:

         S Y S $ U P D A T E : C O N S C O P Y . C O M

            Save or restore a VMS console medium.

        Which CPU kit do you want to build?

           78X, includes 11/780 and 11/785
           8600 includes 8650
           8200 includes 8250, 8300 and 8350

        [8600, 8200, 78X, 750 or 730, default 8600]:

2. Press Return to accept the default. The procedure displays the following messages:

            A SAVE operation involves copying the console medium to
            an RT-11 virtual volume, which is a Files-11 file that
            is an image of the RT-11 console volume.

            A RESTORE operation involves copying the entire contents
            of a virtual volume to a console medium.

3. When the procedure asks which operation you want, type RESTORE and press Return. For example:

        Do you want to SAVE or RESTORE your console RL02?: RESTORE

4. The procedure asks for the name of the *virtual disk* from which you want to restore the files. Press Return to select the default (SYS$DISK:CONSOLE.DSK). For example:

        Enter file name of virtual disk [default SYS$DISK:CONSOLE.DSK]:

5. To verify the operation, press Return (for YES) in response to the following
   question:

   ```
   Do you want log messages as files are copied? [Y/N, default YES]
   ```

6. The procedure asks for the name of the console drive. Type CSA1: and press
   Return. For example:

   ```
   Enter console device drive (DDCU:): CSA1:
   ```

7. The procedure displays the following message:

   ```
   Put your console RL02 into drive _CSA1:,
   and press Return when ready:
   ```

   Remove the console RL02 disk from the console drive. Insert the new RL02
   disk in the drive. Press Return when you are ready to continue.

8. The procedure mounts the RL02 disk and uses the Exchange Utility to
   begin the *restore* operation. The procedure displays several Exchange Utility
   messages, file header information, and a list of the files that are being
   restored. When the procedure is complete, it displays the following message:

   ```
   The RESTORE of your console RL02 is complete.
   ```

   Use the console RL02 that you just created to make sure it works. Treat the
   original as the backup copy.

Glossary

boot or 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 command procedure

A program stored on the console RL02 that is used to boot the VMS operating system from a specified drive. Digital provides a boot command procedure for each device type that the processor supports.

boot name

The abbreviated name of the boot command procedure you use to boot the system.

boot server

A computer that is part of a local area VAXcluster. The boot server in a local area VAXcluster has a system disk that contains cluster common files; other nodes in the cluster (satellite nodes) can access these files. See also satellite node.

CI750

An interface between the memory interconnect (CMI) of the CPU on a VAX–11/750 and the computer interconnect (CI).

CI780

An interface between the synchronous backplane interface (SBI) of the CPU on the VAX–11/780 and VAX 8600 families and the computer interconnect (CI).

computer interconnect

A type of I/O subsystem that links VAX computers to each other and to HSC devices.

console mode

In console mode, you control the system by entering commands at the console terminal. To put the system in console mode, press CTRL/P at the console terminal. Console mode is indicated by the console-mode prompt (>>>) on the monitor screen. See also program mode.

console RL02

The RL02 disk that contains the console program. It is not shipped as part of the VMS distribution kit. The console RL02 is used in the console disk drive (CSA1).

device name

The name you use to identify a device on the system. A device name indicates the device code, controller designation, and unit number.

Hierarchical Storage Controller (HSC) device

A self-contained, intelligent, mass storage subsystem that lets computers in a VAXcluster environment share disks and tapes. Examples of HSC devices are the HSC50 and the HSC70.

HSC drive

Any drive that is connected to an HSC device is referred to as an HSC drive. A system disk on an HSC drive can be shared by several processors in a VAXcluster environment.

local area VAXcluster

Consists of a VAX computer that acts as a boot server and a number of low-end VAX computers that act as satellite nodes. Ethernet connects all of the computers. These computers share a single file system. See also boot server and satellite node.

local drive

Any drive that is connected directly to a VAX computer is referred to as a local drive.

MASSBUS

A high-speed I/O subsystem. Some of the devices that can be connected to the MASSBUS are RM05 disk drives, RP07 disk drives, and TA78 magnetic tape drives.

Mass Storage Control Protocol (MSCP)

The protocol used to communicate between a VAX processor and a disk or tape controller. An MSCP server makes local MASSBUS, UNIBUS, and UDA50 disks accessible to all the nodes in a VAXcluster environment.

media

A generic term that refers to any packaging agent capable of storing computer software. Examples of media are magnetic tapes, floppy diskettes, disk packs, and tape cartridges.

mixed-interconnect VAXcluster

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

program mode

In program mode, the CPU is running and the system is controlled by the VMS operating system. In program mode, you can enter DCL commands, run programs, and receive system messages. See also console mode.

satellite node

A computer that is part of a local area VAXcluster. A satellite node is booted remotely from the system disk of the boot server in the local area VAXcluster. See also boot server.

save set

The format that the Backup Utility stores files in. The VMS operating system is shipped in this format.

scratch media

Media that are blank or have files that you no longer need. For example, a scratch disk.

spin up/spin down

To spin up means to bring a disk drive up to operating speed. To spin down means to bring it to a gradual stop.

standalone BACKUP

A version of the BACKUP utility that runs from memory without the control of the VMS operating system.

system disk

The disk that contains (or will contain) the VMS operating system. A VMS system disk is set up so that most of the VMS files can be shared by several computers. In addition, each computer has its own directory on the system disk that contains its page, swap, and dump files.

UDA50

An intelligent disk drive controller that supports up to four disk drives on the UNIBUS.

UNIBUS

A medium speed I/O subsystem. Some of the devices that can be connected to the UNIBUS are UDA50s, RL02 disk drives, and TU81 magnetic tape drives.

VAXcluster environment

A computer system consisting of a number of highly integrated VAX computers. There are three types of VAXcluster environments: CI-only, local area, and mixed interconnect.

Index