
VMS Upgrade and Installation Supplement: VAXstation 3100, 4000 and MicroVAX 3100 Series

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This document supplements the current version of the *VMS Upgrade and Installation Manual* with information specific to VAXstation 3100, 4000 and MicroVAX 3100 series computers. This information includes startup, shutdown, and backup procedures.

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Preface

This supplement contains installation and upgrade information specific to VAXstation 3100, 4000 and MicroVAX 3100 series computers. Use it in conjunction with the *VMS Upgrade and Installation Manual*.

Important

If you received factory installed software (VMS FIS) with your computer, refer to that user documentation first for information about starting up your system. If you subsequently need to upgrade or install the VMS operating system, use the supplied VMS 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 *VMS 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 *VMS Upgrade and Installation Manual* directs you to do so.
 5. Store this supplement and the *VMS Upgrade and Installation Manual* in the binder that contains the *VMS Release Notes*.
-

Intended Audience

This supplement is intended for anyone responsible for installing or upgrading the VMS operating system on a VAXstation 3100, 4000 or MicroVAX 3100 series computer.

Document Structure

This manual is organized as follows:

- Chapter 1 describes some of the tasks you need to perform when you install the VMS operating system from either a tape or compact disc drive.
- Chapter 2 contains instructions for starting up the system. It also describes system shutdown procedures.
- Chapter 3 describes backup procedures you should perform on a regular basis.
- Appendix A contains notes about specific devices you might use with your computer.
- The Glossary defines key terms used in this manual.

Associated Documents

You should have the following documents:

- The *VMS Upgrade and Installation Manual*, which is your primary source of upgrade and installation information. Use the *VMS Upgrade and Installation Manual* in conjunction with the *VMS Upgrade and Installation Supplement: VAXstation 3100, 4000 and MicroVAX 3100 Series* when you are performing an installation or an upgrade.
- The *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 *VMS Delta/XDelta Utility Manual*, which provides information about booting the system with the XDelta Utility.
- The hardware manuals that are supplied with your MicroVAX or VAXstation computer. These manuals provide detailed information about your system hardware, including the operation of the system unit, the disk, tape, and compact disc drives, and the monitor.

If you received a VMS distribution compact disc (CD), read the documents supplied with that as well.

Conventions

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.
.	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, brackets indicate that whatever is enclosed within the brackets is optional; you can select none, one, or all of the choices. (Brackets are not, however, optional in the syntax of a directory name in a file specification or in the syntax of a substring specification in an assignment statement.)
red ink	Red ink indicates information that you must enter from the keyboard or a screen object that you must choose or click on. For online versions of the book, user input is shown in bold .
boldface text	Boldface text represents the introduction of a new term. Boldface text is also used to show user input in online versions of the book.
UPPERCASE TEXT	Uppercase letters indicate that you must enter a command (for example, enter OPEN/READ), or they indicate the name of a routine, the name of a file, the name of a file protection code, or the abbreviation for a system privilege.

-
numbers

Hyphens in coding examples indicate that additional arguments to the request are provided on the line that follows.

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

Installing the VMS Operating System

If you received factory installed software (VMS FIS) with your computer, refer to that user documentation first for information about starting up your system; otherwise, start any VMS installation or upgrade by following the instructions in the current version of the *VMS Upgrade and Installation Manual*, your primary source for step-by-step upgrade and installation procedures. The *VMS Upgrade and Installation Manual* will direct you to this chapter for installation information that is specific to VAXstation 3100, 4000 and MicroVAX 3100 series computers. This information includes the following:

- Turning on the system (Section 1.1.1)
- Adding an alternate console terminal (Section 1.1.2)
- Determining device names (Section 1.1.3)
- Booting standalone BACKUP (Section 1.2)
- Booting the new system disk (Section 1.3)

Note

Screen displays and examples in this manual depict the installation of Version 5.5 of the VMS operating system. Your screen displays reflect the version that you are installing.

1.1 Before Installing the VMS Operating System

The following sections describe operations you must be familiar with before you install the VMS operating system. These include turning on the system and determining device names.

Note

Before proceeding further, make sure you are familiar with the location and operation of the hardware components that comprise your system (for example, the tape, disk, or compact disc drive, the monitor or terminal, and the corresponding switches and buttons for each component), as described in the hardware manuals you received with your computer.

Installing the VMS Operating System

1.1 Before Installing the VMS Operating System

1.1.1 Turning On the System

The following steps describe how to turn on the system:

1. Turn on the monitor.
2. Turn on your tape, disk, or compact disc drive.
3. Turn on any other optional drives that you have. (Turn the power switch to the 1 (on) position.)
4. Turn the power switch on the system unit to the 1 (on) position.

After a few minutes, your system will generate a self-test display on the screen. This display differs depending on your model, as follows:

- VAXstation 4000 series systems and some MicroVAX 3100 series systems generate a display similar to the following:

```
KA45-A V1.0-2F7-V4.1
08-00-2B-26-39-DD
8MB
```

```
>>> | 1
```

During the self-test, the screen displays a reverse video bar that moves from left to right across the screen until it reaches the vertical bar (1), which indicates that the self-test has completed. The console-mode prompt (>>>) is then displayed. If the system detects a problem during the self-test, an error message will be displayed beneath the reverse video bar, followed by the console-mode prompt (>>>). If the system encounters a severe problem such that the console-mode prompt (>>>) does not appear on the screen, refer to the troubleshooting and testing sections of the hardware manual supplied with your system.

- Other VAXstation and MicroVAX 3100 series systems generate a display similar to the following:

```
F...E...D...C...B...A...9...8...7...6...5...4...3...2...1...
>>>
```

If the console-mode prompt (>>>) does not appear on the screen, press the Halt button. If the system does not power up properly (for example, if you receive the message “?84 FAIL”), refer to the troubleshooting and testing sections of the hardware manual supplied with your system.

1.1.2 Adding an Alternate Console Terminal

If you want a printout of the installation operation, you can attach a printer to the serial port on your computer (see the hardware manual you received with your computer for the specific location of the serial port). If for some reason your terminal or workstation display monitor is not working, you can also attach another terminal to this port to use as the console terminal.

Section 1.1.2.1, Connecting the Alternate Console Terminal to the Serial Port and Section 1.1.2.2, Connecting a Printer to the Alternate Console Terminal describe the two methods you can use to produce a printout of the installation operation. Section 1.1.2.3 describes how to disconnect the alternate console terminal.

Note that, during the course of connecting or disconnecting the alternate console terminal or printer, you might need to refer to the hardware manual that came with your computer model for the location and operation of specific ports, switches, and buttons.

Installing the VMS Operating System

1.1 Before Installing the VMS Operating System

1.1.2.1 Connecting the Alternate Console Terminal to the Serial Port

This section describes how to attach any supported hardcopy or video terminal (but not a workstation display monitor) to the serial port and use it as an alternate console terminal.

1. Determine if the VMS operating system is running.
 - a. If the VMS operating system is not running, go to step 5.
 - b. If the VMS operating system is running, go to step 2.
2. Log in to the SYSTEM account.
3. Enter the following command and press the Return key:

```
$ @SYS$SYSTEM:SHUTDOWN
```
4. 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
```
5. Turn off all expansion boxes.
6. Turn off the power to the monitor and all other peripheral devices such as printers and modems.
7. Turn the On/Off switch on the system unit to off (0).
8. Turn the alternate console switch on the system unit to the on position (the up position or 1). The alternate console switch is located on the front or the back of the system, depending on your model (see the hardware manual that came with your computer). When this switch is turned on, the serial port becomes a terminal port.
9. Attach one end of an RS423 serial line to the serial port of the alternate console terminal. Attach the other end of the RS423 serial line to the serial port on the system unit. There is a picture of a small printer above the serial port.
10. Turn on the alternate console terminal.
11. Check the baud rate on the alternate console terminal. The baud rate should be set to 9600. (For information on checking or setting the baud rate, see the documentation that came with your terminal.)
12. Turn on the expansion box, the monitor, and all other peripheral devices such as printers and modems.
13. Turn on the system unit.
14. If the self-test display and console-mode prompt (>>>) do not appear on the alternate console terminal screen, press the Break key on the alternate console terminal. You can now use the alternate console terminal.

Caution

When you use an alternate console terminal or printer with your system, note the following:

- Do *not* turn off the alternate console terminal while the VMS operating system is running; you might halt the system. If you turn off the alternate console terminal accidentally and halt the system, you can resume your work by turning on the terminal, pressing the

Installing the VMS Operating System

1.1 Before Installing the VMS Operating System

Return key (which should generate the console-mode prompt), and then entering the CONTINUE command.

- If the system does not respond to any commands (that is, it “hangs”) and is connected to a printer, check the status of that printer to make sure it is operating properly. If the printer is not operating properly, it will prevent the system from successfully completing the self-test procedure.

1.1.2.2 Connecting a Printer to the Alternate Console Terminal

If you do not have a hardcopy terminal, you can produce a printout of the installation operation by connecting a printer to an alternate console terminal. For example, if you use a VT220 terminal as the alternate console terminal, you can attach an LA50 printer to the VT220 terminal. (Set up the terminal so that the screen displays are printed.)

To attach a printer to the alternate console terminal, use the following procedure:

1. Turn off all expansion boxes.
2. Turn off the power to the monitor and all other peripheral devices such as printers and modems.
3. Turn off the alternate console terminal.
4. Turn the On/Off switch on the system unit to off (0).
5. Attach one end of a printer cable to the printer port of the alternate console terminal. Attach the other end of the cable to the connector on the printer.
6. Turn on the printer.
7. Make sure the baud rate on the printer meets the requirements of your terminal. (See the documentation that came with your printer and terminal.)
8. Turn on the alternate console terminal.
9. Check the setup on the alternate console terminal to make sure that characters displayed on the terminal screen are printed. For example, on the VT220 you need to enable AUTOPRINT MODE in the primary setup.
10. Turn on the expansion boxes, the monitor, and all other peripheral devices.
11. Turn on the system unit.

1.1.2.3 Disconnecting the Alternate Console Terminal

To disconnect the alternate console terminal, use the following procedure:

1. Determine if the VMS operating system is running.
 - a. If the VMS operating system is not running, go to step 5.
 - b. If the VMS operating system is running, go to step 2.
2. Log in to the SYSTEM account.
3. Enter the following command and press the Return key:

```
$ @SYSS$SYSTEM:SHUTDOWN
```

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1.1 Before Installing the VMS Operating System

4. 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
```
5. Turn the On/Off switch on the system unit and any expansion boxes to the 0 (off) position.
6. If you do not need to physically remove the alternate console terminal from the system, go to step 8.
7. If you need to physically remove the alternate console terminal from the system, turn it off and disconnect the RS423 serial line that attaches the alternate console terminal to the serial port of your system.
8. Turn the alternate console switch to the off (down or 0) position. (If you physically disconnected the alternate console terminal, you can now use the serial port to attach a printer to the system.)
9. Turn on the expansion box, monitor, the tape, disk, and compact disc drives, and any other optional drives.
10. Turn on the system unit.

1.1.3 Determining and Specifying Device Names

Several times during the installation you need to tell the system which drive contains the distribution media and which drive contains the system disk (that is, the fixed disk that you want to be your system disk). You respond by specifying the *device name* for each drive, using the following format:

```
ddciuu
```

where:

- *dd* is the device code that indicates what type of drive you are using. For example, DK is the device code for disk drives and MK is the device code for tape drives.
- *c* is the controller designation.
 - The controller designation on a VAXstation 4000 series system and most VAXstation 3100 series systems is A.
 - The controller designation on the VAXserver 3100 system can be A or B.
- *i* is the SCSI ID (Small Computer System Interface identification number). It can be a decimal number in the range of 0 through 7.
- *uu* is the SCSI logical unit number. It is usually zero.

The following are examples of device names:

```
DKA100      A fixed disk with a SCSI ID number of 1
MKA200      A tape with a SCSI ID number of 2
```

Note the following:

- When the SCSI ID number is 0, the device name is DKA0 or MKA0.
- The device name for the RX23 diskette drive might not follow the previously described device naming convention. It might be referred to as DUciuu instead of DKciuu.

Installing the VMS Operating System

1.1 Before Installing the VMS Operating System

To display the device names of the disk and tape drives on your system, enter the **SHOW DEVICE** command at the console-mode prompt (>>>). For example:

```
>>> SHOW DEVICE
```

VMS/VMB	ULTRIX	ADDR	DEVTYP	NUMBYTES	RM/FX	WP	DEVNAM	REVISION
ESAO	SEO	08-00-2B-07-A7-B6						
DKA0	RZ0	A/0/0/00	RODISK		RM	WP	RRD40	250E
DKA400	RZ4	A/4/0/00	DISK	209.81MB	FX		RZ24	1D18
MKA500	TZ5	A/5/0/00	TAPE	RM			
...HOST ID...		A/6	INITR					

Each column of the display provides information as follows:

VMS/VMB	The device name used by the VMS operating system and VMB (the primary boot program that allows access to the system disk)
ULTRIX	The device name for an ULTRIX operating system device (this column is displayed on VAXstation and MicroVAX 3100 series systems only)
ADDR	The address of the device, where the first letter indicates whether the device resides on Bus A or Bus B; the first number indicates the SCSI ID (Small Computer Systems Interface identification number), and the last two numbers are always both zero
DEVTYP	The type of device (RO stands for a read-only compact disc drive; INITR identifies the SCSI host system)
NUMBYTES	The capacity of the drive in bytes, when this information is available
RM/FX	Indicates whether the drive is removable (RM) or fixed (FX)
WP	Indicates if the drive is write-protected, when this information is available
DEVNAM	Indicates the device name, when this information is available
REVISION	Indicates the version of the device on the system, when this information is available

1.1.4 Preparing the System Disk

Prepare the fixed disk you use during the installation as follows:

1. If your system has more than one fixed disk, decide which one you want to be the system disk.
2. Enter the **SHOW DEVICE** command at the console-mode prompt (>>>) to display the device names for the system disk and the drive that will hold the distribution kit (either a tape cartridge drive or a compact disc drive).

Notes

Large-memory systems require extra disk space for page and swap files. If you install the VMS operating system and all of the DECwindows options on a single disk for a system with 16 Megabytes or more of memory, it might be necessary to move the page and swap files to a different disk.

The VAXstation 3100, 4000 and MicroVAX 3100 series cannot be part of a CI only VAXcluster environment.

To continue with the preinstallation procedure, including preparing for a VAXcluster environment, return to the *VMS Upgrade and Installation Manual*.

1.2 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 kit to your system disk. The method you use to boot standalone BACKUP depends on the type of distribution kit you have.

- For a tape cartridge kit, follow the instructions in Section 1.2.1.
- For a compact disc kit, follow the instructions in Section 1.2.2.

1.2.1 Tape Cartridge Kit

When you have a tape cartridge distribution kit, you boot standalone BACKUP from a tape cartridge with a label similar to the following:

Paper Label ¹	Volume Label ²
VAX/VMS V5.5 BIN TK50 S/A BKUP & DECWINDOWS	DECW55

¹A paper label is the label affixed to a tape cartridge.

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

Boot standalone BACKUP (which takes approximately 20 minutes) as follows:

1. Insert the tape cartridge containing standalone BACKUP into the drive.
2. Enter the `SHOW DEVICE` command at the console-mode prompt (`>>>`) and examine the list of devices to determine the device name of the tape drive you are using.
 - The device name for a TK50 tape cartridge drive is usually either `MKA500` or `MKB500`.
 - The device name for the TZ30 drive is usually `MKA500`.
3. After you determine what the correct device name is for the tape drive, enter a command in the following format and press the Return key:

```
BOOT MKciuu
```

For example:

```
>>> BOOT MKA500
```

Ignore any error messages that are similar to the following:

```
%SYSGEN-I-OPENIN, error opening SYS$$SYSROOT:[SYSEXE]VEDRIVER.EXE; as input  
%SYSGEN-E-FNF, file not found
```

Such messages about missing drivers might be displayed during the installation.

Next, standalone BACKUP displays the following message:

```
VAX/VMS Version V5.5 Major version id = 1 Minor version id = 0
```

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

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-NOV-1991 15:00
```

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1.2 Booting Standalone BACKUP

The procedure displays a list of the local devices on your system. For example:

```
Available device MKA500:      device type TK50
Available device DKA100:      device type RRD40
.
.
.
```

5. Examine 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.

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

```
%BACKUP-I-IDENT, Stand-alone BACKUP V5.5; the date is 19-NOV-1991 15:05
$
```

To create the system disk, return to the *VMS Upgrade and Installation Manual*.

1.2.2 Compact Disc Kit

When you have a compact disc distribution kit, you boot standalone BACKUP from the compact disc with a label similar to the following:

CD Label ¹	Volume Label ²
VAX/VMS V5.5	VMS055

¹The CD label is printed on the compact disc.

²A volume label is the name the VMS operating system uses to refer to a compact disc. During the installation, the procedure displays the volume label, not the CD label, in messages.

Booting standalone BACKUP takes approximately 3 minutes.

1. Insert the distribution compact disc into the drive.
2. Enter a command in the following format:

```
BOOT source-drive
```

Substitute the device name of the compact disc drive for *source-drive*. (If you do not know the device name, enter the SHOW DEVICE command at the console-mode prompt (>>>)) before entering the BOOT command.)

For example, if the compact disc drive has the device name DKA100, enter the following command and press the Return key:

```
>>> BOOT DKA100
```

Ignore any error messages similar to the following:

```
%SYSGEN-I-OPENIN, error opening SYSSYSROOT:[SYSEXE]VEDRIVER.EXE; as input
%SYSGEN-E-FNF, file not found
```

Such messages about missing drivers might be displayed during the installation.

Standalone BACKUP then displays the following message:

```
VAX/VMS Version V5.5 Major version id = 1 Minor version id = 0
```


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1.2 Booting Standalone BACKUP

3. Next, the procedure asks for the date and time. Enter the date and time using the 24-hour clock format and press the Return key. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-NOV-1991 15:00
```

The procedure then displays a list of the local devices on your system. For example:

```
Available device MKA500:    device type TK50
Available device DKA100:    device type RRD40
.
.
.
```

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

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

```
%BACKUP-I-IDENT, Stand-alone BACKUP V5.5; the date is 19-NOV-1991 15:00
$
```

To create the system disk, return to the *VMS Upgrade and Installation Manual*.

1.3 Booting the New System Disk

As a result of the BACKUP command you enter to start an installation, the *required* save set of the VMS operating system is transferred to the system disk. You know the *required* save set is on the new system disk when you see the following display:

```
%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 15 minutes later, the procedure displays the following message:

```
%BACKUP-I-PROCDONE, Operation completed. Processing finished at 16-NOV-1991 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 online and ready.
Enter "YES" to continue:
```

To continue the installation, stop the system and boot the system disk, as follows:

1. Press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer).
2. Enter the SET BOOT command in the following format:

```
SET BOOT target-drive
```

Substitute the device name of the system disk for *target-drive*. The SET BOOT command tells the procedure 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 BOOT DKA400
```

For more information about setting and showing the default boot device, see Section 2.1.2.

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1.3 Booting the New System Disk

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

```
>>> BOOT
```

4. When the boot is complete, the procedure displays some messages and asks for the date and time. Enter the date and time using the 24-hour clock format and press the Return key. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-NOV-1991 16:00
```

To complete the installation, return to the *VMS Upgrade and Installation Manual*.

Startup and Shutdown Procedures

This chapter contains information about the following:

- Overview of booting the system
- Methods of booting the system
- Methods of shutting down the system
- Troubleshooting

2.1 Overview of Booting

Booting or **bootstrapping** is the process of loading system software into the processor's main memory. The VAXstation 3100, 4000 and MicroVAX 3100 series use an internal memory device to boot the VMS operating system from the system disk into memory. The boot process consists of the following steps:

1. You enter the **BOOT** command. The boot procedure deposits information in the general purpose registers.
2. **VMB**, the primary boot program, is loaded from read-only memory (ROM) into main memory. **VMB** 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 then 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 **SYS\$MANAGER:SYSTARTUP_V5.COM**. The current values of **SYSGEN** parameters are written back to **VAXVMSSYS.PAR**.
8. The boot process finishes, and you can log in to the VMS operating system.

You can boot the VAXstation 3100, 4000 or MicroVAX 3100 series system manually or you can set the system to boot automatically, as described in the following sections.

Startup and Shutdown Procedures

2.1 Overview of Booting

2.1.1 Booting the System Manually from the System Disk

To manually boot the VMS operating system from the system disk, use the following procedure:

1. Determine if the VMS operating system is running.
 - a. If the VMS operating system is not running, go to step 5.
 - b. If the VMS operating system is running, go to step 2.
2. Log in to the SYSTEM account.
3. Enter the following command and press the Return key:

```
$ @SYSS$SYSTEM:SHUTDOWN
```

4. 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
```

5. Press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer).
6. 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
```

For more information about device names, see Section 1.1.3.

7. After the system boots, it displays the following message:

```
VAX/VMS Version V5.5 19-NOV-1991 15:00
```

```
The VAX/VMS system is now executing the system startup procedure.
```

```
The VAX/VMS 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-NOV-1991 15:00:00.00
```

2.1.2 Using the SET BOOT and SHOW BOOT Commands

There are two commands you can use at the console-mode prompt (>>>) to set, display, and cancel the drive from which you want the system to boot.

Use the SET BOOT command to tell the system which drive you want to boot from (that drive becomes the default boot device). Enter the SET BOOT command in the following format:

```
SET BOOT device-name
```

Startup and Shutdown Procedures

2.1 Overview of Booting

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:

```
>>> SET BOOT 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
```

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

```
>>> SHOW BOOT
```

To cancel the drive specified in the last SET BOOT command, enter the following command and press the Return key:

```
>>> SET BOOT
```

If you have not used the SET BOOT command to set the drive to boot from and you enter the BOOT command without specifying a device name, the system will ask you for a device name. If you do not enter a device name within 30 seconds, the system boots from the network device, ESA0.

2.1.3 Setting the System for Automatic Booting

The VAXstation 3100, 4000 and MicroVAX 3100 series can boot automatically from a designated boot device, which by default is the network device, ESA0. When you installed the VMS operating system, you designated the system disk as the default boot device. Section 2.1.2 describes how to change the default boot device.

These VAX 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

To set the system to boot automatically, do the following:

1. Determine if the VMS operating system is running.
 - a. If the VMS operating system is not running, go to step 5.
 - b. If the VMS operating system is running, go to step 2.
2. Log in to the SYSTEM account.
3. Enter the following command and press the Return key:

```
$ @SYSSYSTEM:SHUTDOWN
```

Startup and Shutdown Procedures

2.1 Overview of Booting

4. 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
```

5. Press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer).
6. Enter the following command to show whether the system has been set to boot automatically:

```
>>> SHOW HALT
```

The system displays a value of 2 or 3, which are defined as follows:

- 2 If the power comes on or the system halts under program control, the system attempts to reboot from the default boot device.
- 3 When power comes on to the system or the system halts under program control, it displays the console-mode prompt (>>>) and does not attempt to reboot. The system reboots automatically only if you enter Y during the shutdown procedure when you are asked if an automatic reboot should be performed.

7. Enter the SET HALT command if you want to change the automatic booting behavior. The following example changes the value to 3.

```
>>> SET HALT 3
```

2.1.4 Booting from [SYSF] During an Upgrade

In the future, you might want to upgrade to the most recent version of the VMS operating system. During the upgrade procedure you must boot from the [SYSF] root directory. To boot from [SYSF], enter the BOOT command in the following format and press the Return key:

```
B/R5:F0000000 [device-name]
```

Substitute the device name of the system disk for *device-name*.

For example, to boot from [SYSF] on a drive with a device name of DKA400, enter the following command and press the Return key:

```
>>> B/R5:F0000000 DKA400
```

2.1.5 Booting from a Different Directory

By default, the VMS operating system is installed in the system root directory named [SYS0]. However, you can use the VMSKITBLD procedure to add a copy of the VMS operating system to another system root directory (as long as it is *not* on your system disk) and then boot the system from that directory. For example, to boot from root [SYS3] on a disk that is not your system disk, enter the following command and press the Return key:

```
>>> B/R5:30000000 DKA200
```

2.1.6 Performing a Conversational Boot

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

- Examine system parameter values
- Change system parameter values
- Specify another parameter file
- Specify another system startup command procedure
- Select the default system parameter file if you modified system parameters to values that render the system unbootable
- Specify a minimum startup

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

1. Determine if the VMS operating system is running.
 - a. If the VMS operating system is not running, go to step 5.
 - b. If the VMS operating system is running, go to step 2.
2. Log in to the SYSTEM account.
3. Enter the following command and press the Return key:

```
$ @SYSSYSTEM:SHUTDOWN
```
4. 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
```
5. Press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer).
6. To begin the conversational boot, enter the BOOT command in the following format:

```
B/R5:00000001 [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:

```
>>> B/R5:00000001 DKA400
```

If you do not specify a device name, the system boots from the boot device specified by the last SET BOOT command.
7. At the SYSBOOT> prompt, you can enter any of the SYSGEN commands listed in Table 2–1. For more information about these SYSGEN commands, see the *VMS System Generation Utility Manual*.

Startup and Shutdown Procedures

2.1 Overview of Booting

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

Table 2-1 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.

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

- You can enter the following SET command to set a new value for the SYSGEN parameter WSMAX to 512. The CONTINUE command completes 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-NOV-1991 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 system parameter values:

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

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

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

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

- Starts the processes that control error logging, the job controller, and the operator's log
- Installs known images

Startup and Shutdown Procedures

2.1 Overview of Booting

3. Defines the number of interactive users as eight
4. Logs off

Note that because this procedure does not invoke `SYS$SYSTEM:STARTUP.COM` (which in turn invokes `SYS$MANAGER::SYCONFIG.COM`), it does not autoconfigure the system's peripheral devices.

The value of `STARTUP_P1` is saved and affects future boot operations. After the operating system boots, you can log in to the `SYSTEM` account and 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
```

2.1.7 Booting with the XDelta Utility

The XDelta Utility (XDELTA) is a debugging tool that system programmers use. To use XDELTA, you need to boot the system in a specific way. For information about booting with XDELTA, see the *VMS Delta/XDelta Utility Manual*. (Also check the current version of the *VMS Release Notes*.)

2.1.8 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. An example of a hardware problem is a read error on a disk or tape cartridge drive. If you suspect a hardware problem, do the following:

1. Consult the hardware manual for your VAX computer.
2. Contact Digital Services.

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

```
SYSTEM  job terminated at 19-NOV-1991 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 box. Turn it back on and try to reboot.
2. Perform a conversational boot using default `SYSGEN` parameters as described in Section 2.1.6. If the system boots, run the `AUTOGEN` procedure. For more information about the `AUTOGEN` procedure, see the *Guide to Setting Up a VMS System*.

2.2 Shutting Down the System

Before you shut down the operating system, decide if you want it to reboot automatically or if you want to enter console-mode commands after the shutdown completes.

If you want the system to reboot automatically after the shutdown, see Section 2.1.3.

Startup and Shutdown Procedures

2.2 Shutting Down the System

You can perform the following three types of shutdown operations:

- An orderly shutdown with SYS\$SYSTEM:SHUTDOWN.COM (Section 2.2.1)
- An emergency shutdown with OPCCRASH.EXE (Section 2.2.2)
- An emergency shutdown with CRASH commands (Section 2.2.3)

2.2.1 Orderly Shutdown with SYS\$SYSTEM:SHUTDOWN.COM

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, press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer).

For more information about the SHUTDOWN.COM command procedure, see the *Guide to Setting Up a VMS System*.

2.2.2 Emergency Shutdown with the OPCCRASH.EXE Program

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, press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer).

For more information about the OPCCRASH program, see the *Guide to Setting Up a VMS System*.

2.2.3 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. Press the Halt button.
2. To examine processor registers, enter the following commands and press the Return key:

```
>>> E/N:F R0  
>>> E PSL
```

The system displays the contents of the registers. Write these values down if you want to save information about the state of the system.

Startup and Shutdown Procedures

2.2 Shutting Down the System

3. Enter the following commands and press the Return key:

```
>>> D PC FFFFFFFF
>>> D PSL 041F0000
```

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 *VMS System Dump Analyzer Utility Manual*.

2.3 Troubleshooting

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 Section 2.1.1, or let it reboot automatically as explained in Section 2.1.3.
- If the system stops responding to your commands (that is, the system “hangs”), there is a possible failure in a system software or hardware component or a possible power failure.
- If the system exhibits erratic behavior (it does not respond according to specifications), it indicates a possible failure in a system software or hardware component.

To determine if the failure is a system problem, 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.

Startup and Shutdown Procedures

2.3 Troubleshooting

If the system is hung, press the Halt button and reboot without a normal shutdown.

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

Backup Procedures

Use standalone BACKUP to make a complete backup of the system disk. Standalone BACKUP is a subset of the VMS Backup Utility (BACKUP) 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/IMAGE command creates a copy on which files are stored contiguously.

This chapter describes the following procedures:

- Installing and booting standalone BACKUP using the system disk (Sections 3.1.1 and 3.1.2)
- Installing and booting standalone BACKUP using a tape cartridge (Sections 3.1.3 and 3.1.4)
- Booting standalone BACKUP from a compact disc (Section 3.1.5)
- Backing up and restoring the system disk (Sections 3.2 and 3.3)

3.1 Using Standalone BACKUP

The VMS Backup Utility lets you create and restore backup copies of files, directories, and user disks. Because the VMS 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 VMS 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.

Backup Procedures

3.1 Using Standalone BACKUP

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, a tape cartridge, or any other media that the system can boot from. Digital recommends that you keep standalone BACKUP on your system disk and on a tape cartridge.

Usually, you boot standalone BACKUP from the system disk because it saves time. However, if the system disk becomes damaged, you will need to boot standalone BACKUP from the VMS distribution compact disc or from a tape cartridge (either the one you received as part of your distribution kit or a copy you made yourself).

3.1.1 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] on the system disk, use the following procedure:

1. Log in to the SYSTEM account.
2. Enter the following command and press the Return key:

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

The procedure places the files in the directories [SYSE.SYSEXEXE] 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. To boot standalone BACKUP from the system disk, go to Section 3.1.2.

3.1.2 Booting Standalone BACKUP from the System Disk

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

1. Determine if the VMS operating system is running.
 - a. If the VMS operating system is not running, go to step 5.
 - b. If the VMS operating system is running, go to step 2.
2. Log in to the SYSTEM account.
3. Enter the following command and press the Return key:

```
$ @SYS$SYSTEM:SHUTDOWN
```
4. 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
```
5. Press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer).

Backup Procedures

3.1 Using Standalone BACKUP

6. Enter the BOOT command in the following format:

```
B/R5:E0000000 device-name
```

Substitute the device name of the system disk for *device-name*. (For more information about device names, see Section 1.1.3.) For example, if the system disk has a device name of DKA400, enter the following command and press the Return key (note that the characters in the example are zeros, not the letter O:)

```
>>> B/R5:E0000000 DKA400
```

Standalone BACKUP displays the following message:

```
VAX/VMS Version V5.5 Major version id = 1 Minor version id = 0
```

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

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-NOV-1991 15:00
```

The procedure displays a list of the local devices on your system. For example:

```
Available device MKA500:    device type TK50
Available device DKA100:    device type RRD40
.
.
.
```

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.

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

```
%BACKUP-I-IDENT, Standalone BACKUP V5.5; the date is 19-NOV-1991 15:10
$
```

To make a backup copy of the system disk, go to Section 3.2.

To restore the system disk, go to Section 3.3.

3.1.3 Installing Standalone BACKUP on a Tape Cartridge

If your system has a tape cartridge drive, Digital recommends that you keep standalone BACKUP on a tape cartridge in case the system disk becomes damaged. To install standalone BACKUP on a tape cartridge, use the following procedure:

Note

You should have standalone BACKUP on the tape cartridge 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 tape cartridge. Write the name on the paper label. For example, you would use the name S/A BKUP V5.5 TK50 to build a Version 5.5 kit. Insert the label into the label slot.
2. Write-enable the tape cartridge.

Backup Procedures

3.1 Using Standalone BACKUP

3. Insert the tape cartridge labeled S/A BKUP BKUP V5.5 TK50 into the drive.
4. Log in to the SYSTEM account.
5. Enter the SHOW DEVICES command at the system prompt (\$). Use the ensuing display to determine whether the device name for the TK50 tape cartridge drive on your system is MKA500 or MKB500. You will need to supply that device name when you are prompted for the name of the target device. MKA500 is used as the device name in the examples for this section.

6. Enter the following command and press the Return key:

```
$ @SYSSUPDATE:STABACKIT
```

7. The procedure asks you for the name of the target device. Type MKA500 (or MKB500) and press the Return key. For example:

```
Enter the name of the device on which to build the kit: MKA500
```

```
.
```

```
Please place the scratch tape cartridge in drive _MKA500:  
This volume will receive the volume label SYSTEM.
```

```
Enter "YES" when ready:
```

8. When you are ready to continue, type Y (for YES) and press the Return key.
The system displays verification messages informing you that files are being copied. After standalone BACKUP is installed, the procedure then displays a message similar to the following:

```
Ending time 19-NOV-1991 16:44:29.90  
Starting time 19-NOV-1991 16:30:39.05
```

```
The Kit is complete.
```

```
$
```

9. Remove the tape cartridge labeled S/A BKUP V5.5 TK50 from the tape cartridge drive.
10. Write-protect the tape cartridge and store it in a safe place.

3.1.4 Booting Standalone BACKUP from a Tape Cartridge

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from a tape cartridge. Booting standalone BACKUP from a tape cartridge takes approximately 20 minutes. You need a tape cartridge that contains standalone BACKUP (either the distribution tape cartridge or one that you created). To boot standalone BACKUP from a tape cartridge, use the following procedure:

1. Determine if the VMS operating system is running.
 - a. If the VMS operating system is not running, go to step 5.
 - b. If the VMS operating system is running, go to step 2.
2. Log in to the SYSTEM account.
3. Enter the following command and press the Return key:

```
$ @SYSS$SYSTEM:SHUTDOWN
```
4. Answer the questions displayed by the system. When the procedure asks if an automatic reboot should be performed, press the Return key for NO.

Backup Procedures

3.1 Using Standalone BACKUP

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

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

5. Press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer).
6. Insert the tape cartridge that contains standalone BACKUP into the drive.
7. Enter the following command at the console-mode prompt (>>>) and press the Return key. (For information about specifying device names, see Section 1.1.3.) For example:

```
>>> B MKA500
```

Standalone BACKUP displays the following message:

```
VAX/VMS Version V5.5 Major version id = 1 Minor version id = 0
```

8. The procedure asks you for the date and time. Enter the date and time using the 24-hour clock format and press the Return key. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-NOV-1991 15:00
```

The procedure displays a list of the local devices on your system. For example:

```
Available device MKA500:    device type TK50
Available device DKA100:    device type RRD40
.
.
.
```

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

```
%BACKUP-I-IDENT, standalone BACKUP V5.5; the date is 19-NOV-1991 15:50
$
```

9. Remove the tape cartridge containing standalone BACKUP from the tape cartridge drive.

To make a backup copy of the system disk, go to Section 3.2.

To restore the system disk, go to Section 3.3.

3.1.5 Booting Standalone BACKUP from a Compact Disc

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from the original compact disc you received as the VMS operating system distribution media. Use the following procedure:

1. Determine if the VMS operating system is running.
 - a. If the VMS operating system is not running, go to step 5.
 - b. If the VMS operating system is running, go to step 2.
2. Log in to the SYSTEM account.
3. Enter the following command and press the Return key:

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

Backup Procedures

3.1 Using Standalone BACKUP

4. 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
```

5. Press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer).
6. Insert the VMS operating system distribution compact disc into the drive.
7. Enter the following command at the console-mode prompt (>>>) and press the Return key. (For information about specifying device names, see Section 1.1.3.) For example:

```
>>> BOOT DKA100
```

Standalone BACKUP displays the following message:

```
VAX/VMS Version V5.5 Major version id = 1 Minor version id = 0
```

8. The procedure asks you for the date and time. Enter the date and time using the 24-hour clock format and press the Return key. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-NOV-1991 15:00
```

The procedure displays a list of the local devices on your system. For example:

```
Available device MKA500:    device type TK50
Available device DKA100:    device type RRD40
.
.
.
```

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

```
%BACKUP-I-IDENT, standalone BACKUP V5.5; the date is 19-NOV-1991 15:50
$
```

To make a backup copy of the system disk, go to Section 3.2.

To restore the system disk, go to Section 3.3.

3.2 Backing Up the System Disk

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

1. Decide whether you want to back up the system disk to another fixed disk or to a tape cartridge. If you are using a tape cartridge, obtain a scratch tape cartridge that you can use for the backup copy. A scratch tape cartridge is a tape cartridge that is either blank or contains files that you no longer need.
2. If you are using a tape cartridge, write-enable it. To write-enable a tape cartridge, slide the write-protect switch away from the tape cartridge label. Insert the tape cartridge into the tape cartridge drive.
3. Determine the device names of the drive holding the system disk and the drive holding the backup disk or tape cartridge. Enter the SHOW DEVICE command at the console-mode prompt (>>>).

Backup Procedures

3.2 Backing Up the System Disk

4. Boot standalone BACKUP as described in either Section 3.1.2 (from the system disk), Section 3.1.4 (from a tape cartridge), or Section 3.1.5 (from a compact disc).

Note

Before the standalone BACKUP operation begins, the target disk is initialized, erasing all data currently stored on that disk.

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

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

```
$ BACKUP/IMAGE/VERIFY source-drive: MKA500: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 cartridge.
- *saveset.BCK* is the name of the save set. The name should reflect the contents of the backup tape and can have up to 17 characters.
- *volume-label* is the volume label of the tape cartridge in the tape cartridge drive. If the tape cartridge has been initialized already, use the same volume label that was assigned by the INITIALIZE command. If the tape cartridge 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 DKA400: DKA300:
```

The following example uses the BACKUP command to make a backup tape cartridge. The contents of a backup tape cartridge have to be restored to a disk before you can use them. For more information, see Section 3.3.

```
$ BACKUP/IMAGE/VERIFY DKA400: MKA500:DEC_31_1991.BCK/REWIND/LABEL=SYSDSK
```

The procedure displays the following message:

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

6. If you are backing up the system disk to another disk, go to step 8.
7. To back up the system disk to a tape cartridge:
 - If the contents of the system disk fit on one tape cartridge, remove the backup tape cartridge from the drive. Label the tape COMPLETE SYSTEM BACKUP and include the date. Then, go to step 8.
 - If the contents of the system disk requires more than one tape cartridge, the procedure displays the following messages:

```
%BACKUP-I-RESUME, Resuming operation on volume 2
```

```
%BACKUP-I-READYWRITE, Mount volume 2 on _MKA500: for writing  
Enter "YES" when ready.
```

Backup Procedures

3.2 Backing Up the System Disk

Perform the following steps:

- a. Remove the backup tape cartridge from the drive.
- b. Label it COMPLETE SYSTEM BACKUP, number it, and include the date.
- c. Write-protect the tape cartridge.
- d. Write-enable another scratch tape cartridge and insert it into the drive.
- e. When you are ready to continue, type Y (for YES) and press the Return key. The procedure displays the following message:

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

Each time the procedure displays a mount request, you must repeat steps a through e.

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

```
%BACKUP-I-PROCDONE, Operation completed. Processing finished at 19-NOV-1991 15:30  
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:
```

Press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer) and then reboot the system.

Store backup tape cartridges in a safe place.

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 VAXcluster 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, see the *Guide to Maintaining a VMS System* and the description of the INITIALIZE command in the *VMS DCL Dictionary*. For more information about the BACKUP command, see the *VMS Backup Utility Manual*.

3.3 Restoring the System Disk

To restore the system disk, use the following procedure:

1. Determine the device names of the drive holding the system disk and the drive holding the backup disk or tape cartridge. Enter the SHOW DEVICE command at the console-mode prompt (>>>).
2. Boot standalone BACKUP as described in Section 3.1.2 (from the system disk), Section 3.1.4 (from a tape cartridge), or Section 3.1.5 (from a compact disc).

Backup Procedures

3.3 Restoring the System Disk

3. If you have a backup tape cartridge, make sure it is write-protected (see in your hardware guide for the location and operation of the correct switch on specific tape cartridges). Insert the tape cartridge into the drive.
4. 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 cartridge, use the second command.

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

```
$ BACKUP/IMAGE/VERIFY MKA500: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 cartridge.
- *target-drive* is the destination. Use the device name of the drive holding the system disk.
- *saveset.BCK* is the name of the save set, if you have a backup tape cartridge.

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

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

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

```
$ BACKUP/IMAGE/VERIFY MKA500:DEC_31_1991.BCK/REWIND DKA400:
```

The procedure displays the following message:

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

5. If you have a backup disk or only one backup tape cartridge, go to step 7.
6. If you have more than one backup tape cartridge, the procedure displays the following message:

```
%BACKUP-I-RESUME, Resuming operation on volume 2
```

```
%BACKUP-I-READYREAD, Mount volume 2 on MKA500: for reading
```

```
Enter "YES" when ready.
```

Remove the first backup tape cartridge from the drive. Insert the next backup tape cartridge into the drive, type Y (for YES), and press the Return key. Each time you receive a mount request, repeat this step.

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

```
%BACKUP-I-PROCDONE, Operation completed. Processing finished at 19-NOV-1991 15:30
```

```
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:
```

Press the Halt button, located either at the front or back of your system depending on the model (see the hardware manual that came with your computer), and then reboot the system.

Device-Specific Notes

This appendix includes supplementary information about specific devices used with VAXstation 3100, 4000 and MicroVAX 3100 series computers.

A.1 Restriction on the Use of the Tape Drive

When you perform a backup operation with either a TK50 or TZ30 tape drive, always use the /VERIFY qualifier with the BACKUP command. If a SCSI bus reset occurs during a backup operation and you did not include /VERIFY, an undetected loss of data could occur.

A.2 Restriction on the Use of the Compact Disc Drive

When you enter the SHOW DEVICE command at the console-mode prompt (>>>), the display might not include information on the compact disc drive you have in an expansion box. If this happens, check the cable from the system box to the drive. Also make sure the power to the drive is turned on. If the problem persists, turn the power to the drive off and then on again. Wait 10 seconds or more before trying the SHOW DEVICE command again. At this time, the compact disc drive should be included in the display.

A.3 Restriction on the Use of a TK50 Expansion Box from a VAXstation 2000 System

The TK50 expansion box (tape drive) used on VAXstation 2000 and MicroVAX 2000 systems is not compatible with the VAXstation 3100, 4000 and MicroVAX 3100 SCSI bus. If you want to use that tape drive with your system, it must be modified by Digital Services. Otherwise, the unit will be left off line and an error will be logged for the drive. Note that the modifications required for operation on the VAXstation 3100, 4000 and MicroVAX 3100 series will make this tape drive inoperable on the VAXstation 2000 and MicroVAX 2000 systems.

A.4 Performance on the TK50 and TZ30 Tape Drives

Good performance on the TK50 and TZ30 tape drives requires that the tapes move continuously; this is called **streaming**. If the tape drive shares a SCSI bus with a number of other drives, it could slow down to the extent that it can no longer stream. This causes poor tape drive performance. To correct the problem, perform backup operations that involve the tape drive during a less busy time of day.

Glossary

This glossary defines key terms used within this manual.

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 server

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

CI only VAXcluster system

A computer system consisting of a number of VAX computers. It uses only the computer interconnect (CI) to communicate with other VAX computers in the cluster. A VAXstation 3100 system cannot be part of a CI only VAXcluster system.

console mode

The mode in which you control the system by entering console-mode commands. In console mode, the VMS operating system is not running.

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.

local area VAXcluster system

A VAX computer that acts as a boot server with 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 computer is referred to as a local drive.

media

A generic term that refers to any packaging agent capable of storing computer software. Examples of media include magnetic tapes, diskettes, disk packs, compact discs (CD), and tape cartridges.

mixed-interconnect VAXcluster system

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

The mode in which 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 system. A satellite node is booted remotely from the system disk of the boot server in the local area VAXcluster system. See also *boot server*.

save set

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

scratch media

The media that is blank or has files that you no longer need. For example, a scratch tape cartridge.

standalone BACKUP

A version of the VMS Backup Utility that is booted into memory. It runs without the control of the VMS operating system.

standalone system

A computer system with only one VAX computer.

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.

VAXcluster environment

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

VAXserver system

A VAX computer that functions primarily as the boot server in a local area VAXcluster system. It also can serve as the batch computer for the cluster. A VAXserver license specifies two users only.

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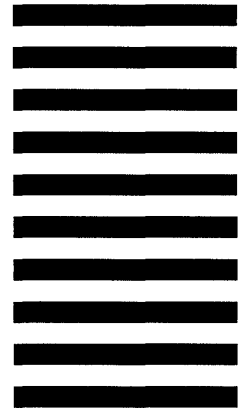
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