
Educational Services



Hardware Operations Guide
for VMS Systems

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About This Guide

This guide has been developed to help students who have to translate their classroom experience on one system to their practical tasks of dealing with other systems. It collects in one place important information about basic system tasks, such as booting, console operation, and installation of the VMS operating system software, as they are performed on the various VAX systems.

Intended Audience

This guide will be used by students attending the VMS for Operators and System and Network Management I courses. It may be included in other courses, as needed.

Scope and Structure

This guide describes the control panels and console subsystems for different VAX systems. It also describes the booting and backup procedures for these VAX systems. In some cases it also describes the system configuration. The following VAX systems are described:

- Chapter 1, VAX 9000
- Chapter 2, VAX 8820, 8830, 8840
- Chapter 3, VAX 8600, 8650
- Chapter 4, VAX 8530, 8550, 8810, 8820-N
- Chapter 5, VAX 8200, 8300
- Chapter 6, VAX 6000
- Chapter 7, VAX-11/780, VAX-11/785
- Chapter 8, VAX-11/750
- Chapter 9, MicroVAX 3400, 3600, 3900
- Chapter 10, VAXstation 3520, 3540
- Chapter 11, VAXstation, MicroVAX 3100
- Chapter 12, VAXstation, MicroVAX 2000
- Chapter 13, VAXstation II, II/GPX, MicroVAX II
- Chapter 14, Peripherals

Related Documents

Some of the information collected here was taken from the user guide for each VAX system. The rest of the information was taken from the following Upgrade and Installation Manuals:

Table 1 Upgrade and Installation Supplements

Manual Titles	Order Number
VMS Upgrade and Installation Supplement VAX 9000 Series	AA-PBK8A-TE
VMS Upgrade and Installation Supplement VAX 8820, 8830, 8840	AA-LB37B-TE
VMS Upgrade and Installation Supplement VAX 8600, 8650	AA-LB27B-TE
VMS Upgrade and Installation Supplement VAX 8530, 8550, 8810(8700), 8820-N(8800)	AA-LB26B-TE
VMS Upgrade and Installation Supplement VAX 8200, 8250, 8300, 8350	AA-LB28B-TE
VMS Upgrade and Installation Supplement VAX 6000 series	AA-LB36C-TE
VMS Upgrade and Installation Supplement VAX-11/780, VAX-11/785	AA-LB29B-TE
VMS Upgrade and Installation Supplement VAX-11/750	AA-LB30B-TE
VMS Installation and Operations MicroVAX, VAXstation, and VAXserver 3400, 3600, 3900 Series	AA-LB35B-TE
VMS Upgrade and Installation Supplement VAXstation 3520, 3540	AA-NC52B-TE
VMS Installation and Operations VAXstation 3100, MicroVAX 3100 Series	AA-NY74B-TE
VMS Upgrade and Installation Supplement VAXstation 2000, MicroVAX 2000	
VMS Installation and Operations VAXstation II, II/GPX, and MicroVAX II	AA-LB32B-TE

1

VAX 9000 System

1.1 Model 400 System Configurations

1.1.1 System Cabinet Overview

The VAX 9000 model 400 — a mainframe computer — is a cost-effective, high-performance system available in standalone and cluster-ready configurations (Figure 1-1). The CPU may have an optional vector processor installed, forming an integrated scalar-vector processor pair that optimizes vector processing performance. A large portion of the system hardware is devoted to error detection, correction, and isolation to ensure high reliability and availability for all applications.

All model 400 systems implement the VAX architecture, continuing software compatibility with other VAX systems.

1.1.2 Physical Layout

Basic system hardware organization is shown in Figure 1-2. It consists of the following major subsystems:

- CPU
- System control unit (SCU)
- Main memory
- I/O
- Service processor unit (SPU) and scan
- Power

Figure 1-1 VAX 9000 Model 400 System

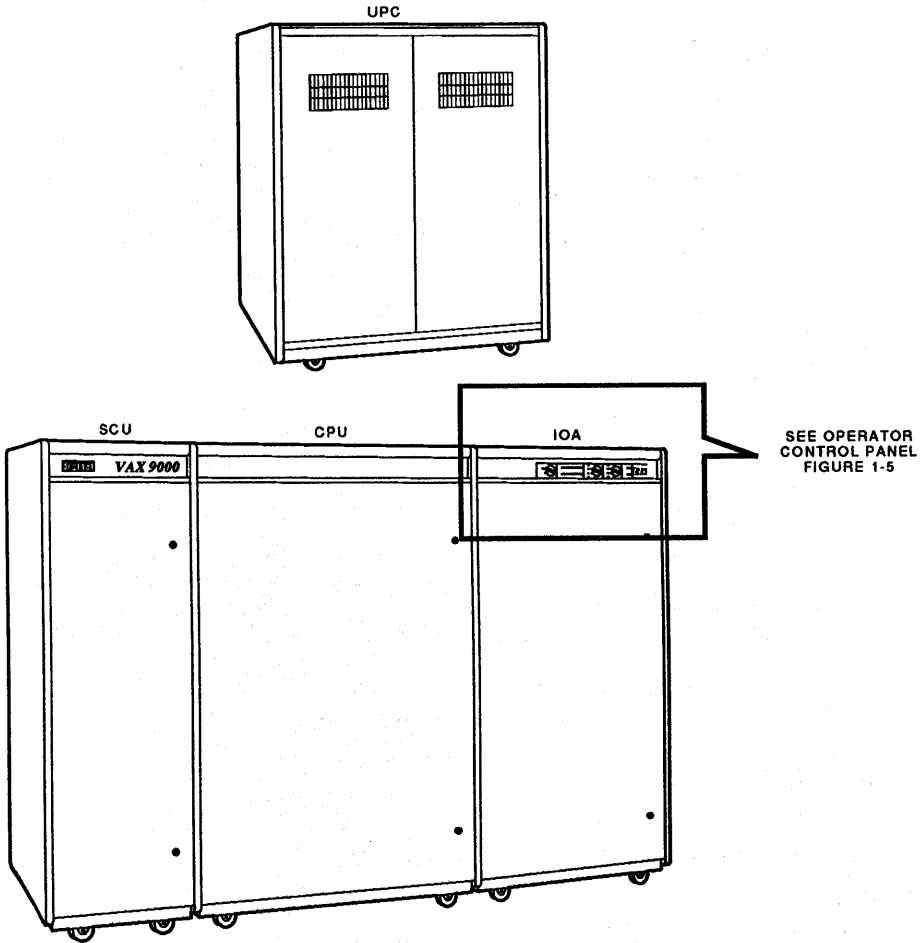
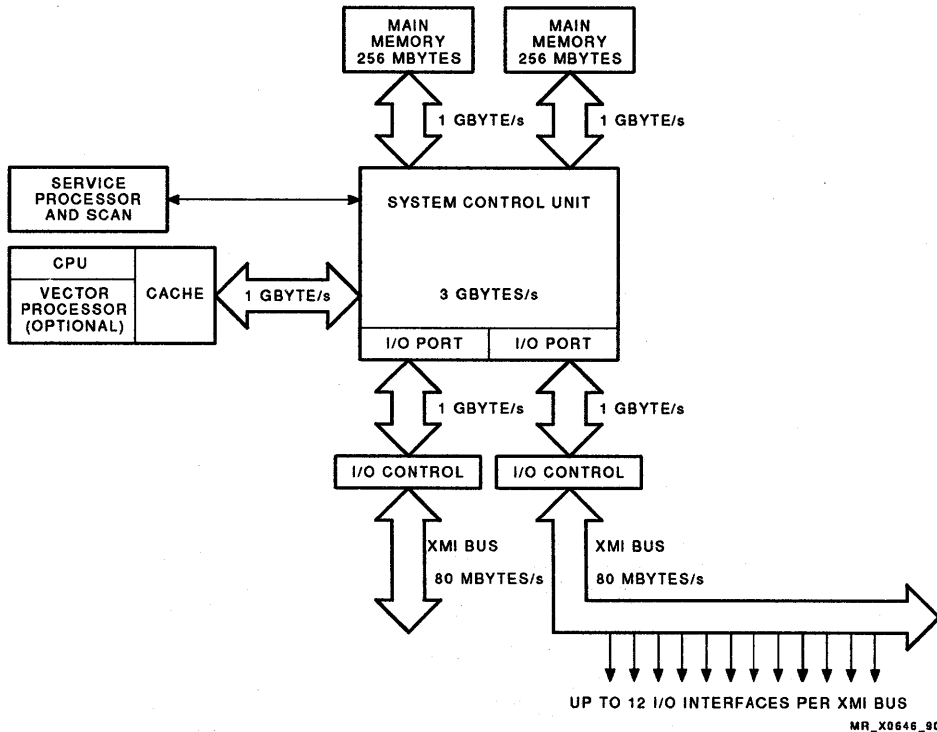


Figure 1-2 Model 400 System Organization



1.1.3 I/O Bus Configuration

The I/O subsystem uses the XMI bus as the primary I/O bus. The XMI card cage has 14 slots to satisfy the I/O adapter and device controller requirements for the system. A DEMNA controller is installed for connection to the Ethernet. A KDM70 controller is installed for connection to local disks and tapes in standalone configurations.

For cluster-ready configurations, a CIXCD adapter is installed for connection to a star coupler. Also available is a DWMBB adapter for connecting to a VAXBI bus and its supported devices and adapters.

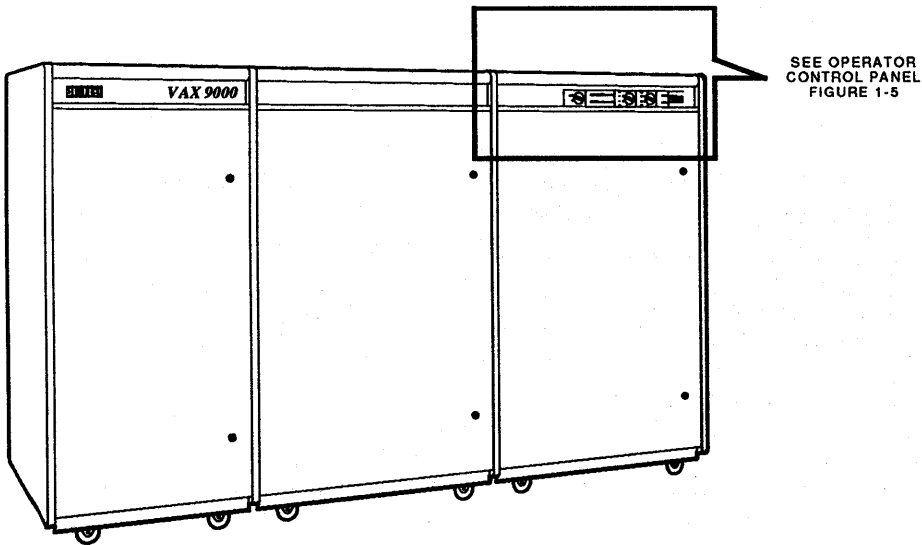
1.2 Model 200 System Configurations

1.2.1 System Cabinet Overview

The VAX 9000 model 200 — a mainframe computer — is a low-cost, high-performance system available in standalone and cluster-ready configurations (Figure 1-3). The CPU may have an optional vector processor installed, forming an integrated scalar-vector processor pair that optimizes vector processing performance. A large proportion of the system hardware is devoted to error detection, correction, and isolation to ensure high reliability and availability for all applications.

The model 200 implements the VAX architecture, continuing software compatibility with other VAX systems.

Figure 1-3 VAX 9000 Model 200 System

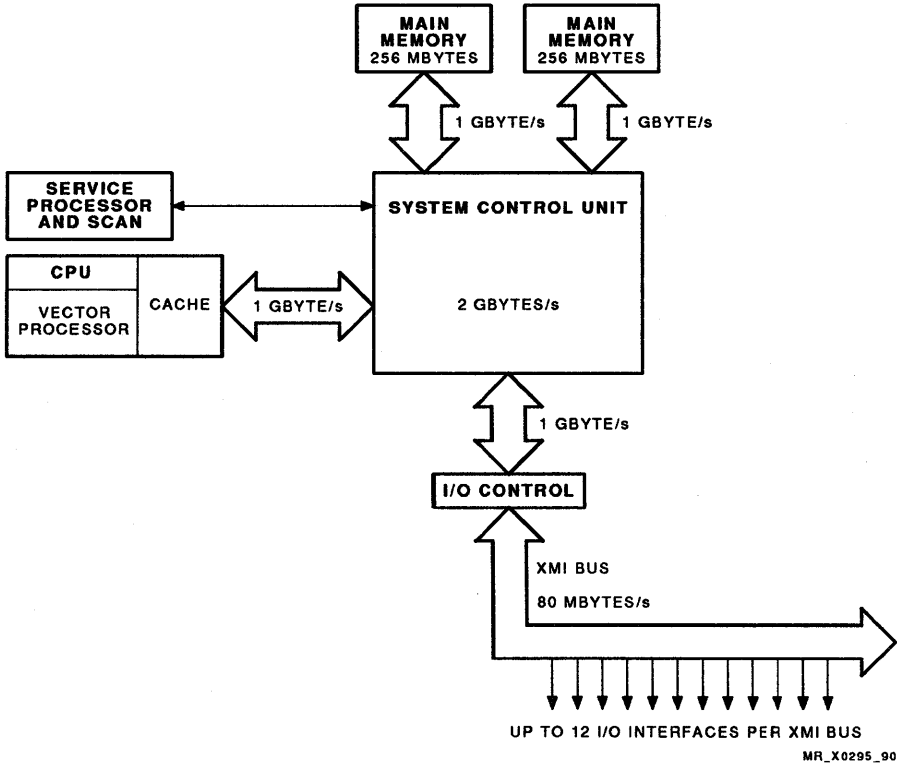


1.2.2 Physical Layout

System hardware organization is shown in Figure 1-4. It consists of the following major subsystems:

- CPU
- System control unit (SCU)
- Main memory
- I/O
- Service processor and scan
- Power

Figure 1-4 Model 200 System Organization



1.2.3 I/O Bus Configuration

The I/O subsystem uses the XMI bus as the primary I/O bus. The XMI card cage has 12 slots to satisfy the I/O adapter and device controller requirements for the system. A DEMNA controller is installed for connection to Ethernet. A KDM70 controller is installed for connection to local disks and tapes in standalone configurations.

For cluster-ready configurations, a CIXCD adapter is installed for connection to a star coupler. Also available is a DWMBB adapter for connecting to a VAXBI bus and its supported devices and adapters.

1.3 Operator Control Panel

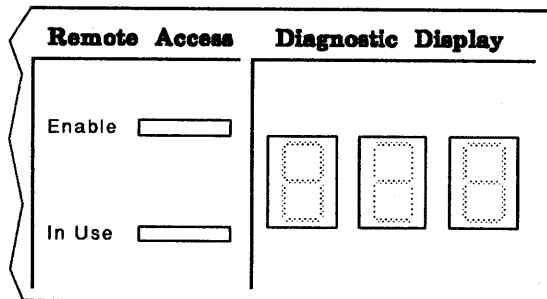
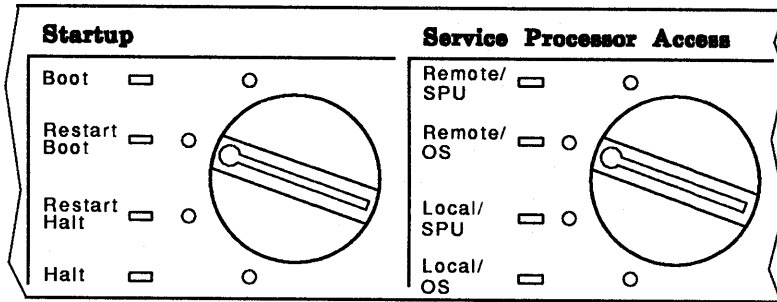
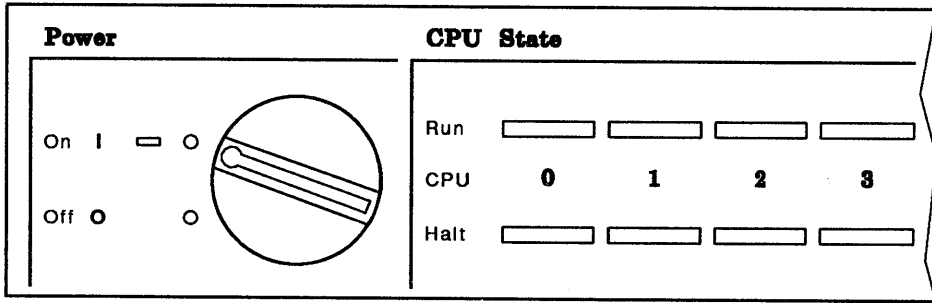
1.3.1 Keyswitches

The operator control panel, shown in Figure 1-5, is on the front of the system I/O cabinet.

The panel has three keyswitches:

- Power**
- Startup**
- Service Processor Access**

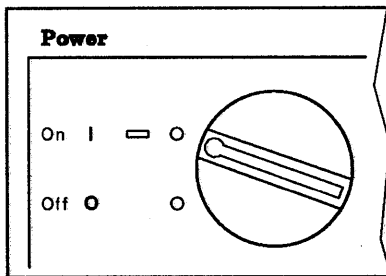
Figure 1-5 Operator Control Panel



1.3.2 Power Keyswitch

The Power keyswitch is used to start the system power-up or power-down sequence. Additionally, with power switched on, this Keyswitch enables the optional battery backup unit (BBU) to turn on if utility power input to the system is lost.

Figure 1-6 Power Keyswitch



ZKO-050-000093-05-DG

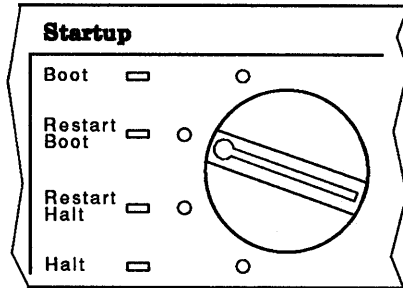
1.3.3 Startup Keyswitch

The four-position Startup keyswitch determines whether the system halts, starts, or restarts after the following events:

- Power is turned on.
- Power is restored after a power failure.
- An error halt condition is detected.

If the system does not start or restart for any reason (for example, one keyswitch setting leaves the system halted after power-up), the console terminal is placed in console I/O mode so that the operator can communicate with the service processor by means of console commands. Keyswitch positions are as follows:

Figure 1-7 Startup Keyswitch



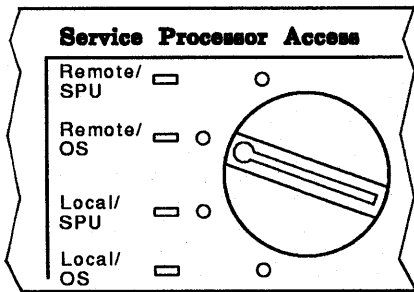
ZKO-050-000093-08-06

Keyswitch Position	Action
Boot	When power is applied or an error halt occurs, the system attempts a boot operation. If the boot fails, the console terminal enters console I/O mode.
Restart Boot	When power is applied or an error halt occurs, the system attempts to restart the operating system. If the restart fails, a boot operation is attempted. If the boot fails, the console terminal enters console I/O mode.
Restart Halt	When power is applied or an error halt occurs, the system attempts to restart the operating system. If the restart fails, the console terminal enters console I/O mode.
Halt	When power is applied or an error halt occurs, the system initializes the CPU. The console terminal enters console I/O mode.

1.3.4 Service Processor Access Keyswitch

The four-position Service Processor Access keyswitch places the local console terminal, or both the local and remote terminals, in program I/O (user) mode so that it can communicate with the operating system through the service processor. The keyswitch also allows the local terminal, or both terminals, to communicate directly with the service processor in console I/O mode. (Console commands may be entered by the operator after a **CTRL/P** switches operating modes.) Keyswitch positions are as follows:

Figure 1-8 Service Processor Access Keyswitch



ZKO-050-000093-07-DG

Keyswitch Position	Action
Remote/ SPU	Enables both the local and remote console terminals to communicate with the operating system as user terminals. Also, a [CTRL/P] causes a terminal to enter console I/O mode, enabling communication with the SPU.
Remote/ OS	Enables both the local and remote console terminals to communicate with the operating system as user terminals. A [CTRL/P] passes to the operating system like any other character.
Local/ SPU	Enables the local console terminal to communicate with the operating system as a user terminal. Also, a [CTRL/P] causes the terminal to enter console I/O mode, enabling communication with the SPU. The remote terminal is disabled.
Local/ OS	Enables the local console terminal to communicate with the operating system as a user terminal. A [CTRL/P] passes to the operating system like any other character. The remote terminal is disabled.

1.3.5 Indicators

The panel also has three separate sets of indicators to show hardware states:

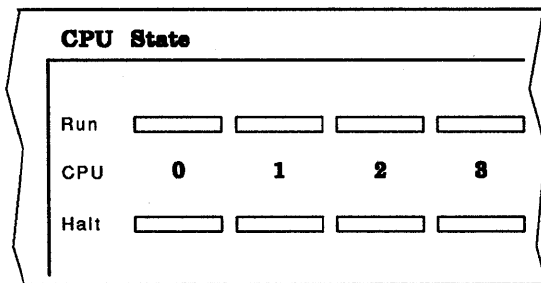
- CPU State
- Remote Access
- Diagnostic Display

The first set of indicators shows the CPU run state. The second shows the state of the remote terminal connection. The third displays information about environmental faults and other system errors if they occur.

1.3.6 CPU State Indicators

The three rows of CPU State indicators show when the CPU in a system has started and is executing instructions. Each row has four indicators, each corresponding to one of four CPU addresses (0 through 3). The indicators are as follows:

Figure 1-9 CPU State Indicators



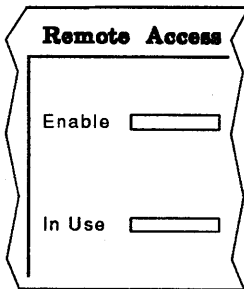
ZKO-050-000093-08-DG

Indicator	Color	Function
Run	Green	Indicates startup is complete and the CPU is executing instructions.
CPU	Green	Indicates the CPU is installed in the system configuration.
Halt	Yellow	Indicates the CPU is halted and is not executing instructions.

1.3.7 Remote Access Indicators

The Remote Access indicators show the state of the remote console terminal as follows:

Figure 1-10 Remote Access Indicators

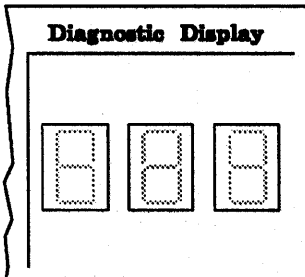


ZKO-050-000093-09-DG

Indicator	Color	Function
Enable	Green	Indicates the remote terminal is enabled.
In Use	Yellow	Indicates the remote terminal line is active.

1.3.8 Diagnostic Display Indicators

The Diagnostic Display indicators show a three-digit error code when power, environmental, and other faults are detected in the system. Conditions checked include cabinet temperatures, voltages, and air flow. Table 1-1 lists diagnostic display error codes, the problems they indicate, and the action you should take. For most faults, notify Digital Customer Services immediately.

Figure 1-11 Diagnostic Display Indicators

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Table 1-1 Diagnostic Display Error Codes

Code	Problem	Action
110-2K0	RIC off-line	Call Customer Services.
2L0	SPU timeout	Call Customer Services.
300	Power loss	Check ac power.
310	Power off (by keyswitch)	None. Normal power off.
320	Maintenance switch	Call Customer Services.
330	Total off (by switch)	Call Customer Services.
340-360	UPC circuit breaker	Check circuit breakers. Call Customer Services.
4xx	Overtemperature (power supply)	Call Customer Services.
5xx	Cabinet temperature fault	Call Customer Services.
6xx	Cabinet air flow fault	Call Customer Services.
7xx	UPC fault	Call Customer Services.
900-90K	Operator-induced shutdown	Call Customer Services.
9xL	Total off (by SPU)	Call Customer Services.
Txx	Total off (other)	Call Customer Services.

1.4 System Operation

1.4.1 Powering Up the System

The system is powered up by turning the Power keyswitch to the On position. (The power-up sequence is shown in Figure 1-12.) For power-up to occur, the main ac circuit breaker on the UPC or the I/O cabinet, if there is no UPC, must be closed.

NOTE

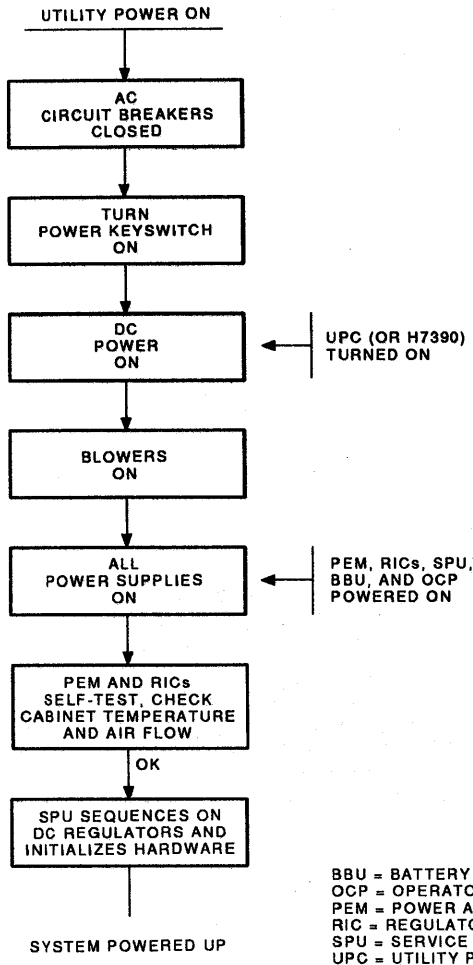
Some system power and environmental faults automatically trip the main ac circuit breaker in the system. If this occurs, call Digital Customer Services. The circuit breaker must be reset manually before the system can be powered on again.

When the Power keyswitch is turned to On, the following occurs:

1. The ac-to-dc converters in the UPC or H7390 PFE turn on, applying dc power (280 Vdc) to the dc voltage regulators and other components in the system cabinets. The regulators do not turn on at this time.
2. The cabinet blowers turn on. The blowers are powered by dc-to-ac converters that can vary their output frequency to regulate air flow through the cabinets.
3. All power supplies turn on, applying power to the SPU, the BBU charging circuits, and the operator control panel. Power is also applied to the power and environmental monitor (PEM) and the regulator intelligence cards (RICs). The PEM is the communications link between the SPU and the RICs. The RICs directly control and monitor the operation of the dc regulators. The RICs also monitor the temperature and air flow sensors in the system.
4. The SPU loads its software from the console disk and executes a command procedure that turns on the dc regulators in the correct sequence and then initializes the hardware. Hardware initialization includes loading the microcode and starting the system clocks.

This completes the power-up sequence.

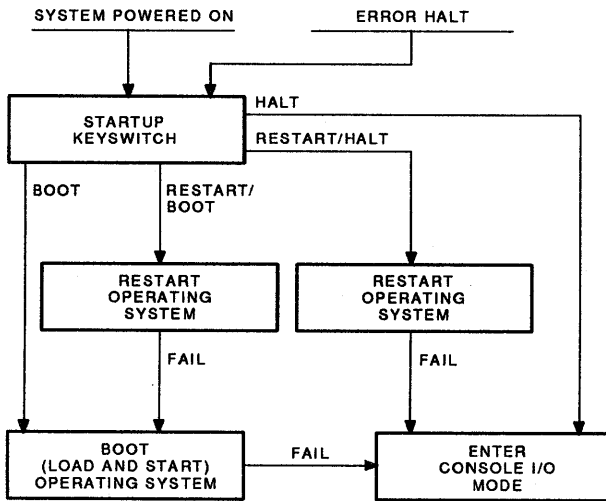
Figure 1-12 Power-Up Sequence



1.4.2 Starting and Restarting the System

The Startup keyswitch determines what happens after power is applied, either after the Power keyswitch is turned on or after utility power is restored after a power outage. The Startup keyswitch also determines what happens if the system halts due to a fatal error condition. The start/restart sequence is shown in Figure 1-13.

Figure 1-13 Start/Restart Sequence



MR_X2144_89

1.4.3 Boot Operation

If the Startup keyswitch is in the Boot position, the SPU automatically executes the default boot sequence after power-up or an error halt. If the boot fails, the console terminal enters console I/O mode.

The default boot sequence is a command procedure, called DEFBOO.CMD, that loads and starts the operating system. It is a nonstop sequence until it completes, at which time the operator can log into the operating system. The default boot sequence can also be invoked by the BOOT console command when the system is halted and the terminal is in console I/O mode. Console commands are also used to create and edit the DEFBOO.CMD command procedure, which is on the console disk. The boot process and related operating procedures are detailed in the VMS documentation set.

1.4.4 Performing a Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want 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 Service Processor Access keyswitch is set to Local/SPU.
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 the Return key:

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

Answer the questions. When the procedure asks if an automatic system 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
```

3. Press Ctrl/P and enter HALT at the console mode prompt.
4. To begin the conversational boot, enter the BOOT command and any applicable qualifiers in the following format:

```
>>> I/K
>>> BOOT /R5:1 [/R3:shadow] [/BI:vaxbi_info] [/XMI:xmi_info] [/NODE:hsc_info] xxxunit_number
```

For example, to perform a conversational boot using DEFBOO.CMD, enter the following commands:

```
>>> I/K
>>> B/R5:1
```

To perform a conversational boot from the SYSD root directory using DEFBOO.CMD, enter the following commands:

```
>>> I/K
>>> B/R5:D0000001
```

1.4.5 Halt Operation

A running system is halted by typing **CTRL/P** at the console terminal and entering a HALT command at the console I/O mode input prompt.

```
>>> HALT
```

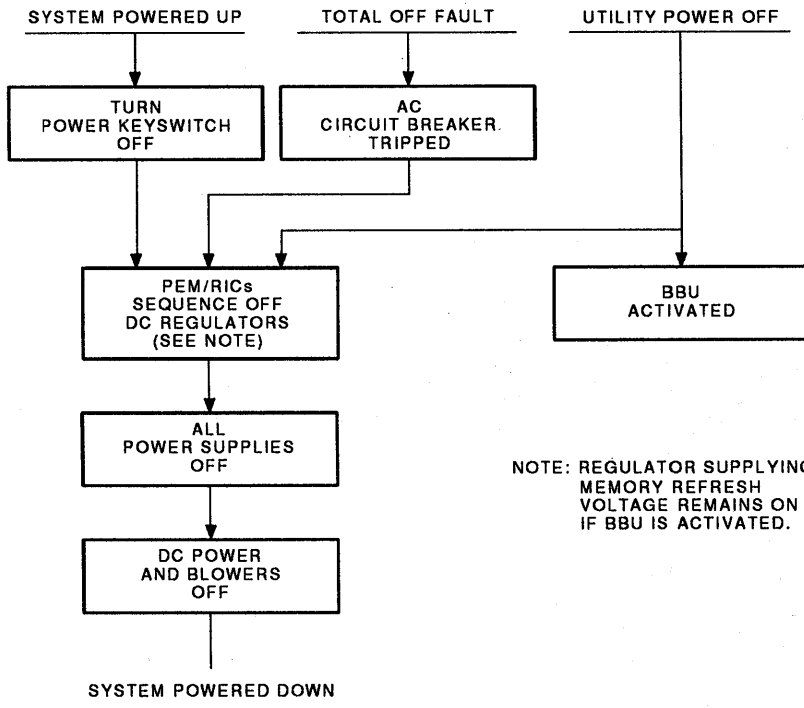
The operating system should first be shut down as described in the VMS documentation set.

1.4.6 Powering Down the System

The system is powered down by turning the Power keyswitch to the Off position. The power-down sequence, the reverse of the power-up sequence, is shown in Figure 1-14. This power-down sequence also takes place when there is a utility power outage. However, with the Power Keyswitch still on, the BBU is activated to maintain valid data in memory during the outage.

As mentioned previously, some system faults can power down the system. A fault such as a high cabinet temperature trips the main ac circuit breaker to power down the system before any hardware damage occurs.

Figure 1-14 Power-Down Sequence



1.5 Console

Before you install or upgrade the VMS operating system on your VAX 9000 system, you need to be familiar with the console subsystem of your VAX computer. The VAX 9000 console subsystem consists of the following:

- MicroVAX II microcomputer
- Console hard disk
- Console tape cartridge drive (not supported by the VMS operating system)
- Console terminal
- Control panel
- Console command language

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

This section describes the console subsystem parts that you use to install the VMS operating system. For a detailed description of the console subsystem, see the hardware manuals supplied with your system.

1.6 Console Terminal

The console terminal is a video or hardcopy terminal attached to the console microcomputer. It displays a log of system activities and has the device name OPA0.

The VAX 9000 system also has a remote diagnostic port. A Digital diagnostics center uses a remote console terminal (located at the diagnostics center) to control the system during diagnostic testing.

During a VMS installation or upgrade, Digital recommends that you use the console terminal to control and monitor system operations. You can keep a record of an installation or upgrade either by using a hardcopy console terminal or by attaching a printer to the console video terminal (if it has this capability).

1.7 Console Commands

1.7.1 Console Command Language

The console, or SPU, command language merges the standard VAX console command language with basic file-system commands to access the entire SPU operating system from one level. Unlike previous VAX systems, the VAX 9000 console command language is not implemented as a program running under another operating system.

The console command language resembles the Digital command language (DCL) in its use of lexical functions, command files, symbols, and logical names. While this provides a high degree of familiarity for the majority of VAX 9000 users, it should be noted that the two languages are not identical.

1.7.2 Command Syntax

Example 1-1 shows the general format for console commands.

Example 1-1 Console Command Format

```
>>> VERB [ /qualifiers ] object [ parameters ] Return
```

- ❶ The verb is the command name and indicates the command action.
- ❷ Qualifiers modify the command action and always begin with a slash (/). Qualifiers are usually optional, as indicated by enclosing them in brackets ([]).
- ❸ The object parameter receives the command action. The object is a required parameter unless a default object parameter is defined for the command.
- ❹ Optional parameters (enclosed in brackets) provide additional command modifiers.
- ❺ Most commands are not executed until Return is pressed. (Examples of command usage do not show the Return key symbol.)

As Examples 1-2 and 1-3 show, the general command format is usually modified to fit specific command requirements.

Example 1-2 shows the COPY command format and a typical COPY command.

Example 1-2 COPY Command Format

```
COPY [/qualifiers] input-file-spec output-file-spec
>>> COPY /NOCONFIRM INPUT.DAT OUTPUT.DAT
      ①      ②      ③      ④
```

- ① COPY is the command verb.
- ② /NOCONFIRM is an optional qualifier specifying that the file is copied as soon as the command is entered; that is, without confirmation.
- ③ INPUT.DAT is the first of two required object parameters, and specifies the file to be copied.
- ④ OUTPUT.DAT is the second of two required object parameters, and specifies the duplicate file. There are no optional parameters for this command.

Example 1-3 shows the SET command format and a typical SET command. Note that in SET and SHOW commands, the qualifier follows the object parameter.

Example 1-3 SET Command Format

```
SET object [/qualifiers] [parameters]
>>> SET BOOTSET /PRIMARY=1 0,1,2
      ①      ②      ③      ④
```

- ① SET is the command verb.
- ② BOOTSET is the object parameter.
- ③ /PRIMARY=1 is the optional qualifier specifying CPU1 as the primary CPU in the boot set.
- ④ The 0, 1, and 2 are required and optional parameters that specify the boot set includes CPU0, CPU1, and CPU2.

1.7.3 Command Descriptions

When the console is in console I/O mode and ready to accept a command, it displays the following input prompt:

```
>>>
```

A command name is usually a verb that describes the action the console is to take. For example:

```
>>> HELP
```

This command displays help information about the console commands and other topics.

Parameters specify the object of a command. The object could be a file or something else, such as an address or data. For example, the object of an EXAMINE command is an address:

```
>>> EXAMINE 1000
```

This command displays the contents of memory address 1000(hex). The default address space is physical (not virtual).

A qualifier modifies the action of the command. Qualifiers are usually optional and preceded by a slash (/). For example, the /VIRTUAL qualifier is used with the EXAMINE command to display a virtual memory address:

```
>>> EXAMINE/VIRTUAL 1000
```

1.7.4 Console Command Language

The console subsystem runs in two modes:

- Program mode — When the console subsystem is in program mode, the VMS operating system is running. In program mode, you can enter Digital command language (DCL) commands, run programs, and receive system messages. See the VMS documentation for more information.
- Console mode — When the console subsystem is in console mode, the console terminal displays the console-mode prompt (>>>). In console mode, you can control and monitor system operations using console mode commands. You can also edit boot command procedures. Table 1-2 describes the most commonly used console commands.

NOTE

In some circumstances, values that you specify for **BOOT** command qualifiers can be overridden by **DEPOSIT** commands in a boot command procedure. For more information, see Section 1.9.2.

The examples in this manual that demonstrate how to use **BOOT** command qualifiers assume that the values on the command line are not being overridden by values in a boot command procedure.

Table 1-2 Commonly Used Console Commands

Command	Qualifiers	Action
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 program mode. During the installation procedure, you can use the abbreviation B for the BOOT command.
	/BI:vaxbi_info	Specifies the BI node number (in hexadecimal) of the node being accessed. Defaults to 0 . You do not need to specify this qualifier if you do not access an XBI or XBI-Plus adapter.
	/NODE:hsc_info	Specifies the computer interconnect (CI) node number (in hexadecimal) of the Hierarchical Storage Controller (HSC) being accessed. You can specify a maximum of two CI node numbers (if two HSCs are available).
	/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.

Table 1-2 (Cont.) Commonly Used Console Commands

Command	Qualifiers	Action
	/R3:shadow	Specifies shadowing information. This qualifier is not required unless you are using Volume Shadowing Phase I. If you are using Volume Shadowing Phase II, you do not need this qualifier, but you do need to set several SYSGEN parameters to use volume shadowing. For more information see the <i>VAX Volume Shadowing Manual</i> and the <i>VMS Volume Shadowing Manual</i> .
	/R5:boot_flags	Deposits a value (in hexadecimal) into R5. This value affects the execution of VMB9AQ.EXE. Using this optional qualifier, you can perform a conversational boot (see Section 1.4.4) or boot from a different system root (see Section 1.9.5).
	/XMI:xmi_info	Specifies the XMI number and the XMI node number (both in hexadecimal) of the node being accessed. Defaults to 0. The hexadecimal number that you specify with this qualifier must be in the format <i>nx</i> , where <i>n</i> is the XMI number and <i>x</i> is the XMI node number.
DEPOSIT		Puts a value in the specified register or memory location. During the installation procedure, you can use the abbreviation D for the DEPOSIT command.
EDIT		Invokes a full screen text editor that is similar to EDT. You can use it to edit console command files.
HALT		Stops the primary CPU.
	/ALL	Stops all CPUs.
	/CPU=<i>n</i>	Stops the specified CPU where <i>n</i> is in the range 0 to 3.
INITIALIZE		Initializes the system.
	/KERNEL	Initializes the scan subsystem and loads the microcode.

Table 1-2 (Cont.) Commonly Used Console Commands

Command	Qualifiers	Action
START <i>n</i>		Continues execution of the boot command procedure at the specified address. Use the command in conjunction with the BOOT/NOSTART command where <i>n</i> is a hexadecimal number.

For more information on the console subsystem and command language, see the VAX 9000 hardware manuals.

1.7.5 Console-Generated Messages

During system operation, error conditions (for example, elevated CPU cabinet temperature) can generate messages on the console terminal. After you boot the VMS operating system, the console subsystem relays these messages to the operator communication manager (OPCOM) to keep system operators informed of these events. These messages are also logged in the operator log file, SYS\$MANAGER:OPERATOR.LOG.

1.7.6 Console-Generated Error Log Entries

During system operation, the console subsystem may generate information about system hardware errors. This information is contained in console-generated error log entries in the system error log file, SYS\$ERRORLOG:ERRLOG.SYS. To view the contents of the error log file, use the Error Log Utility. For more information, see the *VMS Error Log Utility Manual*.

1.8 Console Devices

The console subsystem includes a console hard disk and a console tape cartridge drive. Both of these devices are attached to the console microcomputer.

1.8.1 Console Hard Disk

The console hard disk is an RD54 that contains the boot command files. The console hard disk has the device name CSA1:

You can use Digital command language (DCL) commands to manipulate files on the console hard disk. However, before you can access the console hard disk, you must first use the system generation utility (SYSGEN) to connect the console to the system. For example:

```
$ RUN SYSSYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
$ EDIT CSA1:[USERFILES]DEFBOO.COM
.
.
.
```

NOTE

You cannot use the MOUNT command to mount the console hard disk (CSA1:). After you enter the SYSGEN commands to connect the console to the system, you can enter DCL commands.

1.8.2 Console Tape Cartridge Drive

The console tape cartridge drive is a TK50 drive that you can access from the console level only. The VMS operating system does not support access to the console tape cartridge drive.

1.9 Booting the System

VAX 9000 series computers use boot command procedures. 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 unit number of the drive
- Loads the VMS operating system
- Starts the CPUs

The instructions for booting the system vary for different types of disk controllers. Therefore, each type of disk controller supported by the system has its own boot command procedure. Table 1-3 lists the boot command procedures and the devices they are designed to boot.

Table 1-3 Boot Command Procedures and Abbreviations

Device	Boot Command Procedure	Abbreviation	Function
KDM70	KDMBOO.CMD	KDM	Boots devices attached to a KDM70 controller.
KDB50	KDBBOO.CMD	KDB	Boots devices attached to a KDB50 controller.
HSC-CI	CIBOO.CMD	CI	Boots devices attached to an HSC.
CONSOLE DISK	SABKUPBOO.CMD	SABKUP	Boots the standalone BACKUP image from the console hard disk.

All boot command procedures are located on the console hard disk. The console hard disk has the VMS device name CSA1.

1.9.1 Booting with DEFBOO.CMD

You can boot the system with DEFBOO.CMD by doing any of the following:

- Enter the following commands at the console mode prompt:

```
>>> I/K  
>>> B
```

The system boots using DEFBOO.CMD.

- Set the Startup keyswitch to Restart Boot or Boot. Use the Power keyswitch to turn on system power. The system uses DEFBOO.CMD to automatically boot.
- Set the Startup keyswitch to Restart Boot or Boot. Execute the SHUTDOWN command procedure and specify the auto reboot option. The system uses DEFBOO.CMD to reboot automatically.
- Set the Startup keyswitch to Restart Boot or Boot. If the system shuts down because of a bugcheck, the system uses DEFBOO.CMD to automatically reboot.

The system sometimes uses DEFBOO.CMD when a power failure occurs. If a power failure occurs when the Startup keyswitch is set to Restart Boot or Boot and the contents of memory are lost, the system executes DEFBOO.CMD when it regains power.

If the battery backup unit preserves the contents of memory, and the Startup keyswitch is set to Restart Boot or Restart Halt, the system restarts execution where it was interrupted by the power failure.

1.9.2 Booting Manually

When you boot the system manually, enter the BOOT command in the following format:

```
BOOT [/BI:vaxbi_info] [/NODE:hsc_info] [/NOSTART] [/R3:shadow] [/R5:boot_flags]
[/XMI:xmi_info] xxxunit_number
```

The parameter *xxxunit_number* refers to the abbreviation of the boot command procedure you are using (*xxx*) and the unit number of the drive. For example, if you are booting from an HSC system disk with unit number 30, you would use CI (the abbreviation for CIBOO.CMD) and the unit number 30. This parameter would be CI30. (Table 1-3 lists the abbreviations for boot command procedures.)

Table 1-4 lists the qualifiers to the BOOT command.

NOTE

Values that you specify for BOOT command qualifiers can be overridden by DEPOSIT commands in a boot command procedure. For example, you could set up DEFBOO.CMD to boot from the [SYS0] directory. If you enter the following command, you might expect the system to boot from the [SYSC] directory, but a DEPOSIT R5 command in DEFBOO will override the value you specify on the command line, and the system will boot from the [SYS0] directory:

```
>>> B /R5:C0000000
```

To avoid this, you can boot with the /NOSTART qualifier as follows:

```
>>> B /NOSTART
>>> D R5 C0000000
>>> CONTINUE
```

The examples in this manual that demonstrate how to use BOOT command qualifiers assume that the values on the command line are not being overridden by values in a boot command procedure.

Table 1-4 Boot Command Qualifiers

Qualifiers	Function
<code>/BI:vaxbi_info</code>	Specifies the BI node number (in hexadecimal) of the node being accessed. Defaults to 0. You do not need to specify this qualifier if you do not access an XBI or XBI-Plus adapter.
<code>/NODE:hsc_info</code>	Specifies the CI node number (in hexadecimal) of the HSC being accessed. You can specify a maximum of two CI node numbers (if two HSCs are available). If you deposit two CI node numbers, put the greater number in hexadecimal digits 3 and 2. Put the smaller number in hexadecimal digits 1 and 0.
<code>/NOSTART</code>	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.
<code>/R3:shadow</code>	Specifies shadowing information. This qualifier is not required unless you are using Volume Shadowing Phase I. If you are using Volume Shadowing Phase II, you do not need this qualifier, but you do need to set several SYSGEN parameters to use volume shadowing. For more information see the <i>VAX Volume Shadowing Manual</i> and the <i>VMS Volume Shadowing Manual</i> .
<code>/R5:boot_flags</code>	Deposits a value (in hexadecimal) into R5. This value affects the execution of VMB9AQ.EXE. Using this optional qualifier, you can perform a conversational boot (see Section 1.4.4) or boot from a different system root (see Section 1.9.5).
<code>/XMI:xmi_info</code>	Specifies the XMI number and the XMI node number (both in hexadecimal) of the node being accessed. Defaults to 0. The hexadecimal number that you specify with this qualifier must be in the format <i>xy</i> , where <i>x</i> is the XMI number and <i>y</i> is the XMI node number.

The following examples demonstrate how to boot the system manually for different configurations:

- Suppose you are booting a local system disk named DUC55 attached to a KDB50 controller occupying VAXBI node number 4. The VAXBI is connected to an XBI adapter that occupies XMI node number 3 on XMI number 1. Because you are booting from a local disk to a KDB50 controller, use the boot command procedure KDBBOO.COMD and enter the following commands:

```
>>> I/K
>>> B /BI:4 /XMI:13 KDB55
```

KDB is the abbreviation of the boot command procedure, and 55 is the unit number of the drive. Use the */XMI* and */BI* qualifiers to specify the XMI and VAXBI information.

- Suppose you want to boot from an HSC system disk that has the device name DUA32. The CIBCA adapter occupies VAXBI node number 2. The HSC is CI node number E. The VAXBI is connected to an XBI-Plus adapter that occupies XMI node number 2 on XMI number 0. Because you are booting from an HSC disk, you would use CIBOO.COMD and enter the following commands:

```
>>> I/K
>>> B /BI:2 /XMI:02 /NODE:E CI32
```

CI is the abbreviation of the boot command procedure, and 32 is the unit number of the drive. Again, use the */XMI* and */BI* qualifiers to specify the XMI and VAXBI information. The */NODE* qualifier specifies the CI node number of the HSC.

- Suppose you want to boot from a local disk that has the device name DUA5. The disk is connected to a KDB50 controller on VAXBI node number 0. The VAXBI is connected to an XBI-Plus adapter that occupies XMI node number 0 on XMI number 0. Because you are booting from a KDB50 controller, you would use the boot command procedure KDBBOO.COMD and enter the following commands:

```
>>> I/K
>>> B KDB5
```

In this case you do not need the */BI* and */XMI* qualifiers because the defaults (0) fit the configuration.

- Suppose you want to boot standalone BACKUP on the console hard disk. Enter the following commands:

```
>>> I/K  
>>> B SABKUP
```

SABKUP is the abbreviation of the boot command procedure *SABKUPBOOT.COMD*. This procedure boots the standalone BACKUP image from the console hard disk. You do not need to specify any qualifiers to the BOOT command.

1.9.3 Creating Default Boot Command Procedures

Instead of specifying lengthy qualifiers to the BOOT command when you boot the system disk, you can create a default boot command procedure (*DEFBOOT.COMD*). One advantage of creating a default boot command procedure is that the system can use it to reboot automatically after a power failure.

To create *DEFBOOT.COMD*, do the following:

1. Make sure the Service Processor Access keyswitch is set to Local/SPU, and the Startup keyswitch is set to Restart Boot.
2. Press Ctrl/P to put the system in console mode.
3. Select the appropriate boot command procedure for your system using Table 1-3. For example, if you are creating an HSC system disk, you need to use the command procedure *CIBOOT.COMD*.
4. Copy the procedure to *DEFBOOT.COMD*. For example, if you are using *CIBOOT.COMD*, enter the following commands:

```
>>> SET DEFAULT [USERFILES]  
>>> COPY CIBOOT.COMD DEFBOOT.COMD
```

5. Determine the XMI and VAXBI information for your configuration by entering the following commands at the console mode prompt:

```
>>> HALT
>>> SHOW CONFIGURATION
```

The system displays configuration information similar to the following:

XJA	①	XMI	②	TYPE	NAME	VERSION	IDENTIFIER	S/N	BASE
00		01+		0C22	KDM70	30F0	(12528)		20080000
00		03+		0C03	DEMNA	0501	(1281)		20180000
00		05+		0C22	KDM70	30F0	(12528)		20280000
00		08+		0C22	KDM70	30F0	(12528)		20400000
00		0A-		1001	XJA	0001	(1)		20500000
00		0D+		2002	DWMBB	0001	(1)		20680000
00		0E+		0C05	CIXCD	8E20	(36384)		20700000

XBI	BI	③	TYPE	NAME	VERSION	IDENTIFIER	S/N	BASE
0D	00+		010E	KDB50	131C	(4892)		22000000
0D	02+		2107	DWMBB-B	0000	(0)		22004000
0D	05-		0101	DRB32	0004	(4)		2200A000
0D	06-		0101	DRB32	0004	(4)		2200C000
0D	07+		410F	DEBNA	0250	(592)		2200E000

From this display, you can determine the following information:

- ① The XMI number
 - ② The XMI node number
 - ③ The VAXBI node number (if applicable)
6. Edit DEFBOO.COMD by entering the following command:

```
>>> EDIT DEFBOO.COMD
```

This command invokes a full-screen editor similar to EDT. As shown in the following steps, you must use this editor to make sure that DEFBOO.COMD deposits the correct values in R1, R2, R3, and R5 immediately after the line that deposits a value in R0. These registers must identify the XMI, CI, disk unit information, and system root for your system.

- a. Make sure that register 1 (R1) identifies the XMI number, XMI node number, and BI node number of the system disk controller (in hexadecimal). The hexadecimal value you deposit in R1 should have the following format:

`nxb`

where:

- The digit *n* represents the XMI number, and can be a hexadecimal number in the range 0 to 3.
- The digit *x* represents the XMI node number, and can be a hexadecimal number in the range 0 to F.
- The digit *b* represents the VAXBI node number, and can be a hexadecimal number in the range 0 to F. If you do not access an XBI or XBI-Plus adapter, this digit should be 0.

For example, suppose the system disk is connected to a KDM70 controller, and this controller occupies XMI node number 3 on XMI number 1. The leftmost digit of the R1 value would be 1 (XMI number). The middle digit would be 3 (XMI node number). Because you do not access an XBI or XBI-Plus adapter, the rightmost digit would be 0. You would change DEFBOO.CMD to deposit the value 130 in R1 as follows:

```
DEPOSIT R1 130
```

Or, suppose the system disk is connected to a KDB50 controller, and this controller occupies VAXBI node number 2. The VAXBI is connected to an XBI that occupies XMI node number 5 on XMI number 0. The leftmost digit of the R1 value would be 0 (XMI number). The middle digit would be 5 (XMI node number), and the rightmost digit would be 2. You would change DEFBOO.CMD to deposit the value 052 in R1 as follows:

```
DEPOSIT R1 052
```

- b. If the system disk is on an HSC, make sure R2 contains the CI node number of the HSC (in hexadecimal). For example, if the HSC occupies CI node number 4, you would change DEFBOO.CMD to deposit the value 4 in R2 as follows:

```
DEPOSIT R2 4
```

NOTE

If the drive holding the system disk is attached to two HSCs, deposit both CI 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 9 (hexadecimal 9) and the other is node number 10 (hexadecimal A), you would change DEFBOO.CMD to deposit the value 0A09 in R2 as follows:

```
DEPOSIT R2 0A09
```

- c. Make sure that R3 contains the unit number of the disk (in hexadecimal). For example, if the number on the unit plug of the system disk is 123, you would change DEFBOO.CMD to deposit the value in R3 as follows:
- ```
DEPOSIT R3 %D123
```
- d. If you are booting from a root other than SYS0, make sure that R5 contains the correct system root that you want to boot from. For example, if you are booting from SYSC on the system disk, you would change DEFBOO.CMD to deposit the value C0000000 in R5 as follows:
- ```
DEPOSIT R5 C0000000
```
7. Exit from the editor by pressing Ctrl/Z.
8. You can now use DEFBOO.CMD to boot the system as described in Section 1.9.1.

1.9.4 Performing a Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want to stop the boot process before it completes. The boot process stops after it loads `SYSS$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 Service Processor Access keyswitch is set to Local/SPU.
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 the Return key:

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

Answer the questions. When the procedure asks if an automatic system 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
```

- Press `Ctrl/P` and enter `HALT` at the console mode prompt.
- To begin the conversational boot, enter the `BOOT` command and any applicable qualifiers in the following format:

```
>>> I/K
>>> BOOT /R5:1 [/R3:shadow] [/BI:vaxbi_info] [/XMI:xmi_info] [/NODE:hsc_info]
      xxxunit_number
```

For an explanation of BOOT command qualifiers, see Table 1-4.

For example, to perform a conversational boot using DEFBOO.CMD, enter the following commands:

```
>>> I/K
>>> B/R5:1
```

To perform a conversational boot from the SYSD root directory using DEFBOO.CMD, enter the following commands:

```
>>> I/K
>>> B/R5:D0000001
```

1.9.5 Booting from a Different Directory Root on the System Disk

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

1. Make sure the Service Processor Access keyswitch is set to Local/SPU.
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 the Return key:

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

Answer the questions. 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 to put the system in console mode.
4. Enter the BOOT command and any applicable qualifiers. For example, suppose you want to use DEFBOO to boot from SYSC on the system disk. You would enter the following commands:

```
>>> I/K
>>> B/R5:C0000000
```

If the system does not boot, do the following:

- Confirm that you are booting from the correct system root.
- Enter the **SHOW CONFIGURATION** console command to verify that **DEFBOO.COMD** contains the correct information for your configuration. For more information about setting up **DEFBOO.COMD**, see Section 1.9.3.

1.9.6 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 might be required to boot from the [SYSF] directory using **DEFBOO.COMD** (which you should have created before the upgrade). To boot from [SYSF], do the following:

1. Make sure the Service Processor Access keyswitch is set to Local/SPU.
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 the Return key:

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

Answer the questions. 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** to put the system in console mode.
4. Enter the following commands:

```
>>> I/K  
>>> B/NOSTART  
>>> D R5 F0000000  
>>> CONTINUE
```

5. Assuming you set up **DEFBOO.COMD** properly, the system will boot from the [SYSF] directory on the system disk, and continue with the upgrade procedure.

If the system does not boot, enter the **SHOW CONFIGURATION** console command, and verify that **DEFBOO.COMD** contains the correct information for your configuration.

1.9.7 Orderly Shutdown with SHUTDOWN.COM

To use the SHUTDOWN command procedure, log in to the SYSTEM account, enter the following command, and press the Return key:

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

The procedure displays questions that you must answer to complete the shutdown.

To halt the system after the procedure completes, set the Service Processor Access keyswitch to Local/SPU, press Ctrl/P, and enter the HALT command.

1.9.8 Emergency Shutdown with CRASH

NOTE

Use this emergency shutdown procedure when the system is hung and you cannot log in to the SYSTEM account to use SHUTDOWN or OPCCRASH.

To force your VAX computer to fail, do the following:

1. Make sure the Service Processor Access keyswitch is set to Local/SPU.
2. Press Ctrl/P.
3. Enter the following command:

```
>>> @[USERFILES]CRASH
```

The system displays a fatal bugcheck message, and other messages, similar to the following:

```
**** FATAL BUG CHECK, VERSION = 5.4 INVEXCEPTN, Exception while above ASTDEL
or on interrupt stack

CRASH CPU: 02          PRIMARY CPU: 02

ACTIVE/AVAILABLE CUP MASKS: 00000016/00000016

CURRENT PROCESS = NULL

REGISTER DUMP
RO = 0000001F
.
.
.
**** MEMORY DUMP COMPLETE....
>>>
```

4. After the system reboots, you can examine the dump file. Log in to the SYSTEM account.
5. Enter the following commands. Press the Return key after each one:

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

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

1.10 Backup Procedures

Use standalone BACKUP to make a complete backup of the system disk. Standalone BACKUP is a version of the VMS 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. Back up the system disk to a magnetic tape or another disk. Then restore the files to the original system disk. Files are stored contiguously on the restored system disk.

This section describes the following procedures:

- Booting and updating standalone BACKUP from the console hard disk (Section 1.10.1.1 and Section 1.10.1.2)
- Installing and booting standalone BACKUP on the system disk (Section 1.10.1.3 and Section 1.10.1.4)

1.10.1 Using Standalone BACKUP

For the VAX 9000 series, standalone BACKUP exists on the console hard disk. When you upgrade to a new version of the VMS operating system, you should update your version of standalone BACKUP. For more information on updating your copy of standalone BACKUP, see Section 1.10.1.2.

1.10.1.1 Booting Standalone BACKUP from the Console Hard Disk

To boot the copy of standalone BACKUP on the console hard disk, enter the following commands at the console prompt:

```
>>> I/K
>>> B SABKUP
```

The boot command procedure SABKUPBOO.CMD boots standalone BACKUP from the console hard disk.

1.10.1.2 Updating Standalone BACKUP on the Console Hard Disk

After a VMS upgrade or update, you should update your copy of standalone BACKUP on the console hard disk. To update standalone BACKUP, do the following:

1. Log in to the SYSTEM account.
2. Enter the following command:

```
$ @SYS$UPDATE:STABACKIT CSA1:
```

The procedure creates a new standalone BACKUP image named SYS\$SYSTEM:SABKUP.IMA, and copies it to the console disk directory [USERFILES]. This process can take as long as 15 minutes.

1.10.1.3 Installing Standalone BACKUP on the System Disk

In addition to maintaining a copy of standalone BACKUP on the console hard 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 SYSSYSDEVICE:
```

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 1.10.1.4.

1.10.1.4 Booting Standalone BACKUP from the System Disk

To boot standalone BACKUP from the system disk, follow these steps:

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

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

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

Answer the questions that the procedure displays. When the procedure asks if an automatic system boot 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
```

2. Press Ctrl/P to halt the system.
3. Enter the BOOT command and any applicable qualifiers in the following format:

```
>>> I/K  
>>> BOOT /R5:E0000000 [/R3:shadow] [/BI:vaxbi_info] [/XMI:xmi_info]  
      [/NODE:hsc_info] xxxunit_number
```

For an explanation of BOOT command qualifiers, see Table 1-4.

4. Standalone BACKUP displays the following message:

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

5. 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-JUN-1990 12:01
```

6. 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.

7. 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 12:04:43.11
$
```


2

VAX 8820, 8830, 8840 Systems

2.1 Console Subsystem

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

- MicroVAX II microcomputer with console control panel
- Console terminal and optional printer
- Console software
- Console fixed disk drive
- Console tape cartridge drive

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

This section describes the parts of the console subsystem that you use to install the VMS operating system. For a complete description of the console subsystem, see the console user's guide.

NOTE

The console prompts in the examples in this section display CPU 0 as the current CPU.

2.2 Console Terminal

The console terminal is the video terminal attached to the console microcomputer. It has the device name OPA0. The console terminal is the only terminal on the system that can execute all the console commands. Use it to control and monitor system operations.

A Digital diagnostics center uses a **remote console terminal** (located at the diagnostics center) to control system operations during diagnostic testing. A remote console terminal has the device name OPA5. It can execute a subset of the console commands.

During the VMS installation and upgrade procedures, Digital recommends that you keep track of system operations by doing the following:

- Save the information in a console log file
- Send the information to a printer

The console terminal can keep a record of system operations in a **console log file**. Information that has scrolled off the terminal screen is stored in a console log file. When you want a console log file, enter the following command and press the Return key:

```
PS-CIO-0> ENABLE LOG
```

When you no longer want a log file, enter the following command and press Return:

```
PS-CIO-0> DISABLE LOG
```

Another way to keep track of system operations is to attach a printer to the console subsystem. The printer can then record the terminal display. To send the terminal display to the printer, enter the following command and press Return:

```
PS-CIO-0> ENABLE PRINTER
```

To stop sending the terminal display to the printer, enter the following command and press Return:

```
PS-CIO-0> DISABLE PRINTER
```


2.3 Console Prompt

The prompt on the console terminal conveys information about the state of the system. Table 2-1 lists the prompts that might be displayed during the VMS installation procedure.

Table 2-1 Console Prompt

Prompt	Meaning
PS-HW-n> ¹	Power to the system is turned on, but the microcode is not loaded and the system is not initialized.
PS-CIO-n> ¹	Power to the system is turned on, microcode is loaded, and the system is initialized.
PS-OS-n> ¹	The VMS operating system is running, but the console has control.
PCON-SPAWN>	The console software is interpreting DCL commands.
\$	The VMS operating system is running.

¹The n in the prompt represents the CPU that is the current CPU. For example, if the prompt ends with a 0, CPU 0 is the current CPU. If the prompt ends with a 1, CPU 1 is the current CPU.

You can enter some console commands only at certain prompts. For example, enter the HALT command only when PS-OS-0> is displayed.

Other commands are valid at several different prompts. For example, you can enter the COPY command at any of the following prompts:

```
PS-HW-0>
PS-CIO-0>
PCON-SPAWN>
$
```

The console user's guide contains complete information on console commands and tells when you can use them. The manual lists only the commands you might need to install or upgrade the VMS operating system. The commands are shown with the prompt that will most likely be displayed during installation.

2.4 Console Commands

Unlike some other VAX computers, this one does not have a control panel to set power, auto boot, and auto restart functions. Use the console commands to control all functions. The console commands let you perform the following tasks:

- Turn on the system
- Boot the system
- Obtain information on the operational state of the CPUs and other system components
- Dictate how the system reacts to initial booting, shutdowns, and restarts

Table 2-2 describes some of the commonly used commands.

For more information on the console commands, see the console user's guide.

Table 2-2 Console Commands

Command	Meaning
BOOT	Boots the system. During the installation procedure you can use the abbreviation B for the BOOT command. The following example uses the boot command procedure DEFBOO.CMD to boot the system: PS-CIO-0> B
DEPOSIT	Puts a value in the specified register or memory location. For example, the following command puts a 0 in register 2 (R2): PS-CIO-0> DEPOSIT R2 0

Table 2-2 (Cont.) Console Commands

Command	Meaning
ENABLE/DISABLE AUTO BOOT	<p>In combination with AUTO RESTART, determines how the system reacts after one of the following events:</p> <ul style="list-style-type: none"> • The system is initialized • A power failure occurs • An error halt after a restart attempt fails <p>For example, the following commands cause the system to reboot automatically after any of the preceding events:</p> <pre>PS-HW-0> DISABLE AUTO RESTART PS-HW-0> ENABLE AUTO BOOT</pre> <p>The following command prevents the system from automatically rebooting after any of the preceding events:</p> <pre>PS-HW-0> DISABLE AUTO BOOT</pre>
ENABLE/DISABLE AUTO POWERON	<p>Determines what happens when power is restored after a power failure. For example, the following command automatically supplies power to the CPU when power is restored after a power failure:</p> <pre>PS-HW-0> ENABLE AUTO POWERON</pre> <p>The following command prevents the automatic supply of power to the CPU when power is restored after a power failure:</p> <pre>PS-HW-0> DISABLE AUTO POWERON</pre>
ENABLE/DISABLE AUTO REBOOT	<p>Determines whether the console executes the boot command procedure DEFBOO.COM after you execute SHUTDOWN.COM and ask for an automatic system reboot. It also causes or prevents automatic system reboot after a system crash.</p>

Table 2-2 (Cont.) Console Commands

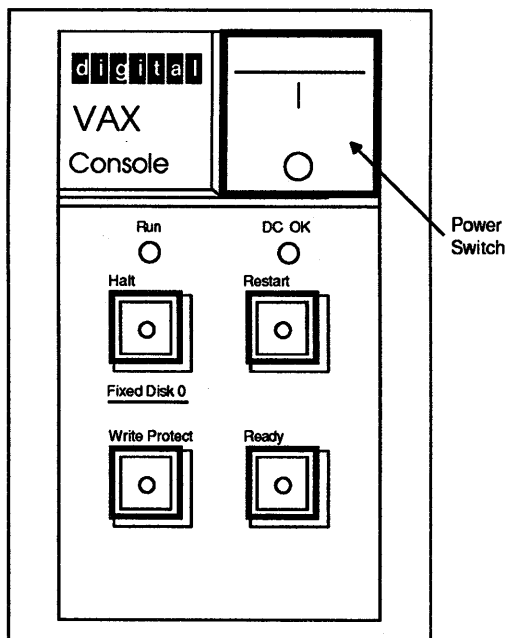
Command	Meaning
ENABLE/DISABLE AUTO RESTART	<p>In combination with AUTO BOOT, determines what happens after a power failure or an error halt. For example, the following command causes automatic restart after a power failure or an error halt:</p> <pre>PS-HW-0> ENABLE AUTO RESTART</pre> <p>The following command prevents automatic restart after a power failure or an error halt:</p> <pre>PS-HW-0> DISABLE AUTO RESTART</pre> <p>AUTO RESTART takes precedence over AUTO BOOT. If AUTO RESTART and AUTO BOOT are both enabled, the system first tries to restart. If that fails, the system tries to reboot.</p>
HALT	<p>Halts the execution of macroinstructions in the specified CPU. Use the HALT command to stop a CPU. For example, the following command stops CPU 0:</p> <pre>PS-OS-0> HALT</pre>
POWER	<p>Changes the state of the power system. For example, the following command turns power on for the entire system (except for the environmental monitoring module [EMM], which is already on):</p> <pre>PS-HW-0> POWER ON</pre> <p>The following command turns power off for all components of the system except the EMM and memory. The contents of memory are preserved.</p> <pre>PS-HW-0> POWER STANDBY</pre> <p>The following command turns power off for the entire system except the EMM (the only time power is off to the EMM is when a power disruption occurs or the circuit breaker that controls power to the system is tripped):</p> <pre>PS-HW-0> POWER OFF</pre>

Table 2-2 (Cont.) Console Commands

Command	Meaning
SHOW CPU	Displays information about the CPUs. For example, the following command displays information about all the CPUs:
	PS-HW-0> SHOW CPU/ALL

2.5 Console Control Panel

Figure 2-1 shows the control panel for the MicroVAX II console subsystem.

Figure 2-1 Control Panel on the Console Subsystem

ZK-7446-GE

Table 2-3 explains the functions of the buttons and lights on the control panel.

Table 2-3 Controls and Indicator Lights on the Control Panel

Control/Indicator Light	Description
Power switch	Turns the ac power on. This rocker switch is labeled 1/0 (on/off). The orange light glows when power is on.
Run light	Glowes green when the console subsystem is running.
DC OK light	Glowes green if all dc voltages are present and within proper tolerance levels.
Halt button	Stops the console subsystem. When you push the Halt button in, it glowes red and stays in. Releasing the Halt button, by pressing it again, causes the console subsystem to display the >>> prompt.
Restart button	Stops the console subsystem and runs the ROM-based diagnostics for the console subsystem.
Write Protect button	Controls writing to the console fixed disk. When pushed in, the button glowes red and the disk is write-protected. Only the console software has write access to the console fixed disk.
Ready button	Controls writing to or reading from the console fixed disk. When the button is pushed in, the disk is protected from reading or writing. When the button is released, the button glowes green; the disk is available for reading and writing. The Ready button flashes when data is read from or written to the fixed disk.

2.6 Console Fixed Disk

The console fixed disk contains an application program called the **console software**, which runs the console subsystem. When you use the console software, refer to the console fixed disk as DUA0. Otherwise, refer to the console fixed disk as CSA3. You cannot write to the console fixed disk when you are logged in to the VMS operating system on the VAX 8820, 8830, or 8840 computer.

2.7 Booting with DEFBOO.CMD

The most direct way to boot the system is to enter the **BOOT** command and press the Return key.

To boot the system with DEFBOO.CMD, use the following procedure:

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

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

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

Answer the questions. 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
```

2. Press **Ctrl/P**. At the **PS-OS-0>** prompt, enter the following command and press Return:

```
PS-OS-0> HALT/CPU=ALL
```

3. At the **PS-CIO-0>** prompt, enter the following command and press Return:

```
PS-CIO-0> B
```

2.8 Booting the System

Booting is the process of loading system software into memory. The 8820 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 controller the system disk is on 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 each type of controller. There is a boot command procedure for each type of controller that the system supports.

For example, the boot command procedure BCIBOO.COMD lets you boot from disk drives connected to a CIBCI or CIBCA controller. All boot command procedures are stored on the console fixed disk (CSA3).

By setting certain SYSGEN parameters, you can control how many CPUs are activated at boot time and the characteristics of a multiprocessing system. In a multiprocessing system, the primary CPU is always booted. By default, all available CPUs are also booted. If you want to change this, you can set the SYSGEN parameter SMP_CPUS to tell the system which secondary CPUs to boot. For information on SYSGEN parameters that affect multiprocessing, see the *VMS System Generation Utility Manual*.

2.8.1 Booting from Another System Disk

To boot the system from a system disk other than the one specified in DEFBOO.COMD, use the following procedure:

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

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

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

Answer the questions. 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
```

2. Press Ctrl/P. At the PS-OS-0> prompt, enter the following command and press Return:

```
PS-OS-0> HALT/CPU=ALL
```

3. At the PS-CIO-0> prompt, enter the BOOT command in the following format:

```
PS-CIO-0> B dddn
```

Substitute BCI or BDA for *ddd*. Substitute the unit number of the drive holding the system disk for *n*.

For example, suppose the system disk is on a CIBCI-controlled drive and the unit number is 6. Enter the following command and press Return:

```
PS-CIO-0> B BCI6
```

2.8.2 Conversational Boot

A conversational boot is most commonly used in research and development environments for experimentation and during software upgrades. Perform a conversational boot when you want 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 way:

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

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

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

Answer the questions. 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
```

2. Press `Ctrl/P`. At the `PS-OS-0>` prompt, enter the following command and press Return:

```
PS-OS-0> HALT/CPU=ALL
```

3. At the `PS-CIO-0>` prompt, enter the following command and press Return:

```
PS-CIO-0> B/R5=1
```

This command uses DEFBOO.CMD and deposits 1 in register 5 (R5). When R5 contains 1, the boot process stops at the SYSBOOT> prompt.

If you want to boot from a drive other than the one specified in DEFBOO.CMD, enter the BOOT command in the following format:

```
PS-CIO-0> B dddn /R5=1
```

Substitute BCI or BDA for *ddd*. Substitute the unit number of the drive holding the system disk for *n*. The /R5=1 qualifier deposits 1 in register 5 (R5).

For example, suppose the system disk is on a CIBCI-controlled drive and the unit number is 2. Enter the following command and press Return:

```
PS-CIO-0> B BCI2 /R5=1
```

This command tells the console to boot with BCIBOO.CMD, deposit 2 in register 3 (R3), and deposit 1 in register 5 (R5).

At the SYSBOOT> prompt, you can enter any of the SYSGEN commands.

2.8.3 Booting from a Different Directory on the System Disk

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

To boot the system from a directory other than [SYS0], use the following procedure:

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

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

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

Answer the questions. 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
```

2. Press Ctrl/P. At the PS-OS-0> prompt, enter the following command and press Return:

```
PS-OS-0> HALT/CPU=ALL
```

3. At the PS-CIO-0> prompt, enter the BOOT command in the following format:

```
PS-CIO-0> B dddn /R5=root_directory
```

Substitute BCI or BDA for *ddd*. Substitute the unit number of the drive holding the system disk for *n*. Use *root_directory* to identify the root from which you want to boot.

For example, suppose the system disk is on a CIBCI-controlled drive, the unit number is 6, and you want to boot from [SYS3]. Enter the following command and press Return:

```
PS-CIO-0> B BCI6 /R5=30000000
```

2.8.4 Booting from [SYSF] During an Upgrade

During the upgrade procedure, you will be instructed to boot the system from the [SYSF] directory.

To boot the system from the [SYSF] directory, use the following procedure:

1. Press Ctrl/P. At the PS-OS-0> prompt, enter the following command and press the Return key:

```
PS-OS-0> HALT/CPU=ALL
```

2. At the PS-CIO-0> prompt, enter the BOOT command in the following format:

```
PS-CIO-0> B dddn /R5=root_directory
```

Substitute BCI or BDA for *ddd*. Substitute the unit number of the drive holding the system disk for *n*. Use *root_directory* to identify the root from which you want to boot.

For example, suppose the system disk is on a CIBCI-controlled drive and the unit number is 6. To boot from the root directory [SYSF], enter the following command and press Return:

```
PS-CIO-0> B BCI6 /R5=f0000000
```

2.8.5 Orderly Shutdown with SHUTDOWN.COM

To use the SHUTDOWN command procedure, log in to the SYSTEM account, enter the following command, and press the Return key:

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

To stop the system after the procedure completes, press Ctrl/P and enter the HALT/CPU=ALL command at the PS-OS-0> prompt.

2.8.6 Emergency Shutdown with CRASH

If OPCCRASH fails, perform an emergency shutdown with CRASH.COM, which is located on the console fixed disk.

NOTE

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

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

1. Press Ctrl/P to stop the system. At the PS-OS-0> prompt, enter the following command and press the Return key:

```
PS-OS-0> HALT/CPU=ALL
```

2. At the PS-CIO-0> prompt, enter the following command and press Return:

```
PS-CIO-0> @CRASH
```

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 to cause an exception condition that sends the contents of memory to the dump file on the system disk. Later you can read the dump file to determine why the system did not respond.

3. CRASH stops the system, displays the contents of the program counter, and displays the console prompt.

If AUTO REBOOT is enabled, the system reboots after CRASH runs. If the system does not automatically reboot, reboot it manually.

4. After the system reboots, you can examine the dump file. To examine the dump file, log in to 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 *VMS System Dump Analyzer Utility Manual*.

2.9 Backup Procedures

Standalone BACKUP makes an exact copy of the system disk. 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 or 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 the 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 and restore your system disk.

This section contains information on the following:

- Installing and booting standalone BACKUP on the system disk
- Backing up and restoring the system disk

2.9.1 Using Standalone BACKUP

Before installing the VMS operating system, you install standalone BACKUP on the console fixed disk. You can also install standalone BACKUP on the system disk or on any other media that your system supports. Usually you boot standalone BACKUP from the system disk because it saves time. However, you need standalone BACKUP on the console fixed disk in case the system disk becomes damaged.

2.9.1.1 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:

```
$ @SYSSUPDATE: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 2.9.1.2.

2.9.1.2 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.CMD.

You can choose any unique name in the form xxxBOO.CMD 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.CMD, name the new file XEFBOO.CMD.

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

1. To make a copy of DEFBOO.COM, enter the following command and press the Return key:

```
PS-CIO-0> COPY DEFBOO.COM XEFBOO.COM
```

2. Enter the following command and press Return:

```
PS-CIO-0> EDIT XEFBOO.COM
```

3. Edit the line that contains the BOOT command so that it specifies the [SYSE] directory. For example:

```
BOOT BCI12 /R5:E0000000
```

4. Exit from the editor to save the modified version of the file.

To boot standalone BACKUP from [SYSE] on the system disk, use the following procedure:

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

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

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

Answer the questions. 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
```

2. Press Ctrl/P. At the PS-OS-0> prompt, enter the following command and press Return:

```
PS-OS-0> HALT/CPU=ALL
```

3. At the PS-CIO-0> prompt, enter the following command and press Return:

```
PS-CIO-0> @XEFBOO
```

4. The procedure asks 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
```

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


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$DJA2:    device type RA60
Available device MINE$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 15:00
$
```

2.9.1.3 Booting Standalone BACKUP from the Console Fixed Disk

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from the console fixed disk.

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

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

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

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

Answer the questions. 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
```

2. Press Ctrl/P. At the PS-OS-0> prompt, enter the following command and press Return:

```
PS-OS-0> HALT/CPU=ALL
```

3. At the PS-CIO-0> prompt, enter the following command and press Return:

```
PS-CIO-0> @CSABOO
```

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

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$DJA2:    device type RA60
Available device MINE$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 15:00
$
```

2.10 Restoring the Console Fixed Disk

If the console fixed disk should become damaged or unusable, restore it using the distribution TK50 tape cartridges that contain the console software and standalone BACKUP. Directions for installing the console software are given in the console user's guide.

3

VAX 8600, 8650 Systems

3.1 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 section 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.

3.2 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.

3.3 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 3-1 shows the control panel.

3.3.1 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.

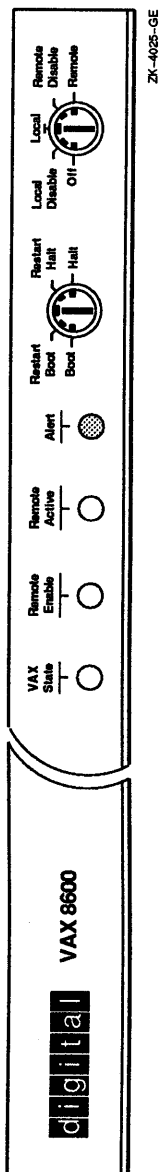
Table 3-1 describes the four indicator lights.

Table 3-1 Indicator Lights on the VAX 8600 Control Panel

Light	Meaning
VAX State	Blinks green when the CPU is executing instructions.
Remote Enable	Glow green when the remote diagnostic port access is enabled.
Remote Active	Glow green when the remote console terminal is connected and the remote diagnostic line is active.
Alert	Glow red when the temperature in the CPU cabinet gets too hot. When the 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 light blinks, the system shuts down automatically within one minute unless you correct the problem. ¹

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

Figure 3-1 VAX 8600 Control Panel



3.3.2 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.

3.3.2.1 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 3-2 describes each **TERMINAL CONTROL** switch setting. Note that the power supply is turned off only when this switch is set to **OFF**.

Table 3-2 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.

Table 3-2 (Cont.) TERMINAL CONTROL Switch Settings

Setting	Meaning
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.

3.3.2.2 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 3-3 describes each RESTART switch setting.

Table 3-3 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.
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.

3.4 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 3-4 describes the most commonly used console mode commands.

Table 3-4 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.

3.5 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.

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).**

3.5.1 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:

```
$ @SYSS$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 3-5 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 3-5 Device Codes for Disks on a VAX 8600

Disk Drive	Used in a Boot Name
RA60, RA80, RA81, and RA82	DU
RK07	DM
RM03, RM05, RM80, RP05, RP06, and RP07	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 3.5.3.

3.5.2 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 0000200
>>> 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 3.5.3.

3.5.3 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.

3.5.3.1 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.

3.5.4 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 3-6. For more information about these SYSGEN commands, see the *VMS System Generation Utility Manual*.
6. When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

Table 3-6 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
$
```

3.5.5 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
```

3.5.6 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
```

3.5.7 Orderly Shutdown with SHUTDOWN.COM

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 (>>>).

3.5.8 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 *VMS System Dump Analyzer Utility Manual*.

3.6 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, 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, 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 section 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 3.6.1.5 describes using **CONSCOPY.COM** to do this.

3.6.1 Using Standalone BACKUP

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.

3.6.1.1 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$UPDATE:STABACKIT SYSS$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 3.6.1.2.

3.6.1.2 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 SYSS$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
$
```

3.6.1.3 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:

```
$ @SYSSUPDATE: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.

3.6.1.4 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 OE 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
$
```

3.6.1.5 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.

4

VAX 8530, 8550, 8810, 8820-N Systems

4.1 Console Subsystem

Before you install or upgrade the VMS operating system, you need to be familiar with the console subsystem. In general, use the console subsystem to examine and deposit data in memory or processor registers, stop the processor, and boot the operating system. During installation, use it to boot the system and monitor the installation process. The console subsystem consists of the following:

- Console terminal and optional printer
- PDP-11 microcomputer
- Console fixed disk drive
- Console dual-diskette drive
- Console command language

This section describes the parts of the console subsystem that you use to install or upgrade the VMS operating system. For a complete description of the console subsystem, see the hardware manuals supplied with your system.

4.2 Console Terminal

The console terminal is the video terminal attached to the console microcomputer. It is named OPA0. The console terminal is the only terminal on the system that can execute all the console mode commands. Use it to control and monitor system operations. You can also set up logical console terminals.

A Digital diagnostics center uses a *remote console terminal* (located at the diagnostics center) to control system operations during diagnostic testing. A remote console terminal is named OPA5. It can execute a subset of the console commands.

During the VMS installation procedure, Digital recommends that you keep track of system operations. There are two ways to keep track of system operations:

- View the console log file on the terminal
- Send the information to a printer

The console terminal keeps a record of system operations in a *console log file*. For example, information that has scrolled off the terminal screen is stored in the console log file. To view the contents of this file, enter the SHOW LOGFILE command.¹ You can then use the following commands and key combinations to move through the console log file:

- PREV SCREEN — Enables you to move up in the file
- NEXT SCREEN — Enables you to move down in the file
- Arrow keys — Move the cursor in the indicated direction
- Ctrl/C — Enables you to exit from the log file and return to console mode

Another way to keep track of system operations is to attach a printer to the console subsystem. The printer can then record the terminal display. To send the terminal display to the printer, enter the following command and press Return:

```
>>> ENABLE PRINTER
```

To stop sending the terminal display to the printer, enter the following command and press Return:

```
>>> DISABLE PRINTER
```

¹ On a VAX 8820-N (8800) processor, the SHOW LOGFILE command displays the log file for the CPU that the terminal is currently connected to.

4.3 Console Fixed Disk Drive

The console fixed disk is the primary storage device for the console subsystem. It contains the console software and is referred to as CSA3. The VMS operating system has only read access to the console fixed disk. The operating system of the console microcomputer (P/OS) has full access.

4.4 Console Dual-Diskette Drive

The console dual-diskette drive is the secondary storage device for the console subsystem. It consists of two diskette drives on the front of the microcomputer. The diskette drive located on the top (in some models it is on the left) is referred to as CSA1. The diskette drive located on the bottom (in some models it is on the right) is referred to as CSA2. These drives hold the RX50 diskettes that do the following tasks:

- Install updates and optional products
- Install standalone BACKUP

4.5 Console Subsystem Modes

The console subsystem runs in five different modes. Most of the time the system runs in either program mode or console mode.

- **Program mode** — When the console subsystem is in program mode, the VMS operating system is running and the dollar sign prompt (\$) is displayed. In program mode, you can enter DCL commands, run programs, and receive system messages.

You can press Ctrl/P to suspend program mode temporarily and go to console mode. To return to program mode when the CPU is running, enter the SET TERMINAL PROGRAM command. To get back to program mode when the CPU is stopped, enter the CONTINUE command.

- **Console mode** — When the console subsystem is in console mode, the VMS operating system is not running and the console-mode prompt (>>>) is displayed. In console mode, you control and monitor system operations. The CPU can be running or it can be stopped. When the CPU is running, it responds to a limited number of console commands. When the CPU is stopped, it responds to most console commands.

To go from console mode to program mode while the CPU is running, enter the SET TERMINAL PROGRAM command.

From console mode, you can access three other modes. Choose the appropriate mode for the function you want.

- **P/OS-DCL mode** — Used to modify files on the console fixed disk using standard DCL commands. To go to P/OS-DCL mode, enter the EXIT command at the console-mode prompt (>>>). To return to console mode from P/OS-DCL mode, enter the RUN CONTROL command at the P/OS-DCL prompt (\$).
- **P/OS mode** — Used to modify files on the console fixed disk using menu-driven commands. To go to P/OS mode, enter the EXIT command at the P/OS-DCL prompt (\$). A menu item returns you directly to console mode from P/OS mode.
- **Micromonitor mode** — Used to run diagnostics. For more information, see the *Console User's Guide*. To return to console mode from micromonitor mode, enter the EXIT command at the micromonitor prompt (MIC>).

4.6 Console Command Language

The console subsystem on the VAX 8530 system is different from other VAX computers. It does not have a control panel with lights and switches. Use the console command language to control all functions. The console command language lets you do the following tasks:

- Turn on the system
- Boot the system
- Provide information on the operational state of the CPU and other system components
- Dictate how the system reacts to initial booting, shutdowns, and restarts

Table 4-1 describes some of the commonly used commands. You can use these commands when the system is in console mode.

Table 4-1 Console Commands

Command	Definition
BOOT	<p>Boots the system. During the installation procedure use the abbreviation, B, for the BOOT command. The following example uses the boot command procedure DEFBOO.COM to boot the system:</p> <pre>>>> B</pre>
ENABLE/DISABLE AUTO BOOT	<p>In combination with AUTO RESTART, determines how the system reacts after one of the following events:</p> <ul style="list-style-type: none"> • The system is initialized • A power failure occurs • An error halt after a restart attempt fails <p>For example, the following commands cause the system to automatically reboot after any of the events listed above:</p> <pre>>>> DISABLE AUTO RESTART >>> ENABLE AUTO BOOT</pre> <p>The following command prevents the system from automatically rebooting after any of the events listed above:</p> <pre>>>> DISABLE AUTO BOOT</pre>
ENABLE/DISABLE AUTO POWERON	<p>Determines what happens when power is restored after a power failure. For example, the following command automatically applies power to the CPU when power is restored after a power failure.</p> <pre>>>> ENABLE AUTO POWERON</pre> <p>The following command prevents the automatic application of power to the CPU when power is restored after a power failure:</p> <pre>>>> DISABLE AUTO POWERON</pre>

Table 4-1 (Cont.) Console Commands

Command	Definition
ENABLE/DISABLE AUTO RESTART	<p>In combination with AUTO BOOT, determines what happens after a power failure or an error halt. For example, the following command causes automatic restart after a power failure or an error halt:</p> <pre>>>> ENABLE AUTO RESTART</pre> <p>The following command prevents automatic restart after a power failure or an error halt:</p> <pre>>>> DISABLE AUTO RESTART</pre> <p>AUTO RESTART takes precedence over AUTO BOOT. If AUTO RESTART and AUTO BOOT are both enabled, the system first tries to restart. If the system is unable to restart, it tries to reboot.</p>
HALT	<p>Halts the CPU execution of macro instructions. Use the HALT command to stop the CPU, as follows:</p> <pre>>>> HALT</pre> <p>Note that if you halt the system <i>before</i> a boot completes, you must also enter the CLEAR RESTART_FLAGS command to clear the WARM_RESTART and COLD_RESTART flags (see your hardware manuals for more about these commands). For example:</p> <pre>>>> HALT >>> CLEAR RESTART_FLAGS</pre> <p>Clearing these flags prevents the automatic boot and restart procedures from looping indefinitely when you enter the next BOOT command.</p> <p>Do <i>not</i> use the HALT command for a system shutdown.</p>

Table 4-1 (Cont.) Console Commands

Command	Definition
POWER	<p>Changes the state of the power system. For example, the following command turns on power for the entire system (except for the EMM, which is already on):</p> <pre>>>> POWER ON</pre> <p>The following command turns off power for all components of the system except the EMM and memory. The contents of memory are preserved.</p> <pre>>>> POWER STANDBY</pre> <p>The following command turns off power for the entire system except the EMM (the only time power is off for the EMM is when a power disruption occurs or the circuit breaker that controls power to the system is tripped):</p> <pre>>>> POWER OFF</pre>
ENABLE/DISABLE REMOTE CONSOLE	<p>In combination with REMOTE USER, determines the status of a remote console terminal. For example, the following command allows a remote terminal (connected to the communications port of the console) to enter console mode and function as a remote console terminal:</p> <pre>>>> ENABLE REMOTE CONSOLE</pre> <p>The following command prevents a remote terminal connected to the communications port of the console from entering console mode and functioning as a remote console terminal:</p> <pre>>>> DISABLE REMOTE CONSOLE</pre> <p>Disabling the remote console automatically enables the remote user.</p>

Table 4-1 (Cont.) Console Commands

Command	Definition
ENABLE/DISABLE REMOTE USER	Causes a remote console terminal to operate as an ordinary terminal. The terminal cannot enter console mode. Pressing Ctrl/P has no effect.
SHOW CPU	Displays the operational state of the CPU. On a VAX 8820-N (8800) computer, this command displays the operational state of both CPUs.

Table 4-2 lists some commands you can use when the system is in console mode and the CPU is stopped.

Table 4-2 Console Commands Requiring the CPU to Be Stopped

Command	Definition
CONTINUE	Resumes execution of macro instructions and switches the console back to program mode.
DEPOSIT	Puts a value in the specified register or memory location.
EXAMINE	Displays the contents of a specified address.
INITIALIZE	Sets selected and available CPUs or memory to a defined initial state.

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

4.7 Booting the System

Booting is the process of loading system software from the system disk into the processor's memory. The VAX 8530 system 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 controller the system disk is on 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 each type of controller. Therefore, there is a boot command procedure for each type of controller that the system supports.

For example, the boot command procedures BCIBOO.COM, BCIGEN.COM, and BCIXDT.COM let you boot from disk drives connected to a CIBCI or a CIBCA controller. All boot command procedures are stored on the console fixed disk (CSA3). To view the contents of the console fixed disk, enter the DIRECTORY command at the P/OS-DCL prompt.

If you have a VAX 8820-N (8800) computer, you can set certain SYSGEN parameters to control how many CPUs are activated at boot time and the character of the multiprocessing system. In a multiprocessing system, the primary CPU is always booted. By default, all available CPUs are also booted. If you want to change this, you can set the SYSGEN parameter SMP_CPUS to tell the system which secondary CPUs to boot. For information on SYSGEN parameters that affect multiprocessing, see the *VMS System Generation Utility Manual*.

4.7.1 Booting with DEFBOO.COM

The most direct way to boot the system is to type the **BOOT** command and press Return. By default, **DEFBOO.COM** is used to boot the system. To boot the system with **DEFBOO.COM**, use the following procedure:

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

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

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

The procedure displays several questions that you must 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
```

2. Press **Ctrl/P**. At the console-mode prompt (**>>>**), enter the following command and press Return:

```
>>> HALT
```

3. Enter the following command and press Return:

```
>>> B
```


4.7.2 Booting from Another System Disk

To boot the system from a drive other than the one specified in DEFBOO.COM, use the following procedure:

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

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

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

The procedure displays several questions that you must 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
```

2. Press Ctrl/P. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> HALT
```

3. Enter the BOOT command in the following format:

```
>>> B dddn
```

Substitute BCI, BDA, or UDA for *ddd*. Substitute the unit number of the drive holding the system disk for *n*.

For example, suppose the system disk is on a CIBCI controlled drive and the unit number is 6. Enter the following command and press Return:

```
>>> B BCI6
```

4.7.3 Booting from a Different Directory on the System Disk

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

To boot the system from a directory other than [SYS0], use the following procedure:

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

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

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

The procedure displays several questions that you must 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
```

2. Press Ctrl/P. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> HALT
```

3. Enter the BOOT command in the following format:

```
>>> B dddn /R5:nnnnnnnn
```

Substitute BCI, BDA, or UDA for *ddd*. Substitute the unit number of the drive holding the system disk for *n*. Use *nnnnnnnn* to identify the root from which you want to boot.

For example, suppose the system disk is on a CIBCI controlled drive, the unit number is 6, and you want to boot from SYS3. Enter the following command and press Return:

```
>>> B BCI6 /R5:30000000
```

4.7.4 Booting from SYSF During an Upgrade

To boot the system from SYSF, use the following procedure:

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

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

```
$ @SYSSSYSTEM:SHUTDOWN
```

The procedure displays several questions that you must 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
```

2. Press Ctrl/P. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> HALT
```

3. Enter the BOOT command in the following format:

```
>>> B dddn /R5:F0000000
```

Substitute BCI, BDA, or UDA for *ddd*. Substitute the unit number of the drive holding the system disk for *n*.

For example, if you are booting from SYSF and the system disk is on a CIBCI controlled drive and the unit number is 6, enter the following command and press Return:

```
>>> B BCI6 /R5:F0000000
```

4.7.5 Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want 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 two ways to perform a conversational boot. The following procedure is the most direct way:

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

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

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

The procedure displays several questions that you must 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
```

2. Press `Ctrl/P`. At the console-mode prompt (`>>>`), enter the following command and press Return:

```
>>> HALT
```

3. To begin the conversational boot, enter the **BOOT** command in the following format:

```
>>> B dddn /R5:1
```

Substitute **BCI**, **BDA**, or **UDA** for *ddd*. Substitute the unit number of the drive holding the system disk for *n*. The **/R5:1** qualifier deposits one in register 5 (**R5**).

For example, suppose the system disk is on a **CIBCI** controlled drive and the unit number is 2. Enter the following command and press Return:

```
>>> B BCI2/R5:1
```

This command tells the console to boot with **BCIBOO.COM**, deposit 2 in register 3 (**R3**), and deposit one in register 5 (**R5**).

If you want to perform a conversational boot from a root directory other than **SYS0** (**SYS3**, for example), enter the command as follows:

```
>>> B BCI2 /R5:30000001
```

4. At the **SYSBOOT>** prompt, you can enter any of the **SYSGEN** commands. For more information about these **SYSGEN** commands, see the *VMS System Generation Utility Manual*.
5. When you finish using the **SYSGEN** commands, enter the **CONTINUE** command to complete the boot process.

4.7.6 Orderly Shutdown with **SHUTDOWN.COM**

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**.

4.7.7 Emergency Shutdown with CRASH Commands

NOTE

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

The **CRASH** command procedure causes the system to fail, resulting in immediate shutdown. To force your system to fail with **CRASH**, do the following:

1. Press **Ctrl/P** to stop the system. At the console-mode prompt (**>>>**), enter the following command and press **Return**:

```
>>> HALT
```

2. Enter the following command and press **Return**:

```
>>> @CRASH
```

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 to cause an exception condition that sends the contents of memory to the dump file on the system disk. Later you can read the dump file to determine why the system did not respond.

3. **CRASH** halts the system, displays the contents of the program counter, and displays the console-mode prompt (**>>>**).

If **AUTO BOOT** is enabled, the system reboots after **CRASH** runs. If the system does not automatically reboot, enter the **BOOT** command at the console-mode prompt (**>>>**).

4. After the system reboots, you can examine the dump file. To examine the dump file, log in to 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 *VMS System Dump Analyzer Utility Manual*.

4.8 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 section contains information on the following:

- Installing and booting standalone BACKUP on the system disk (Section 4.8.1.1 and Section 4.8.1.2)
- Installing and booting standalone BACKUP on RX50 floppy diskettes (Section 4.8.1.3 and Section 4.8.1.4)

4.8.1 Using Standalone BACKUP

The VMS 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, 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, RX50 floppy diskettes, or any other media that your system supports. Digital recommends that you keep standalone BACKUP on both the system disk and the floppy diskettes. (Although you usually boot standalone BACKUP from the system disk because it saves time, you should also keep a copy of standalone BACKUP on floppy diskettes in case the system disk becomes damaged.)

4.8.1.1 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 in to the SYSTEM account.
2. Enter the following command and press Return:

```
$ @SYSSUPDATE:STABACKIT SYSS$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. Create a boot command procedure that lets you boot standalone BACKUP from [SYSE]. For more information, see Section 4.8.1.2.

4.8.1.2 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 [SYSE], use the following procedure. The procedure assumes you are making a copy of DEFBOO.COM and renaming it XEFBOO.COM.

1. Put the console subsystem in P/OS-DCL mode.
2. To make a copy of DEFBOO.COM and rename it XEFBOO.COM, enter the following command and press Return:

```
$ COPY DEFBOO.COM XEFBOO.COM
```

If you have a VAX 8820-N (8800) computer, enter the following command and press Return:

```
$ COPY [8800]DEFBOO.COM [8800]XEFBOO.COM
```

3. Enter the RUN EDT command and press Return. At the EDT> prompt, enter XEFBOO.COM and press Return. For example:

```
$ RUN EDT
EDT> XEFBOO.COM
```

If you have a VAX 8820-N (8800) computer, specify the [8800] directory, as follows:

```
$ RUN EDT
EDT> [8800]XEFBOO.COM
```

The contents of XEFBOO.COM are displayed on the screen.

4. Change the line that contains the BOOT command so that it tells the system to boot from the [SYSE] directory. For example:

```
BOOT BCI12 /R5:E0000000
```

5. When you have finished editing XEFBOO.COM, press Ctrl/Z. At the asterisk prompt (*), enter the EXIT command and press Return. The modified version of XEFBOO.COM is saved and you see the P/OS-DCL prompt (\$).

Use the following procedure to boot standalone BACKUP from [SYSE]:

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

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

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

Answer the questions. 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
```

2. Press Ctrl/P to put the system in console mode.
3. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> HALT
```

4. Enter the following command and press Return:

```
>>> @XEFBOO
```

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

```
VAX/VMS Version V5.4 Major version id = 1 Minor version id = 0  
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-JUN-1990 13:00
```

6. 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$DJA3:    device type RA60  
Available device MINE$DJA2:    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.

7. 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 15:00
$
```

4.8.1.3 Installing Standalone BACKUP on Floppy Diskettes

Digital recommends that you keep standalone BACKUP on floppy diskettes in case the system disk becomes damaged. You should have received standalone BACKUP on floppy diskettes as part of your VMS distribution kit. If the original floppy diskettes become damaged or if you want to make extra copies, use the following procedure:

1. Obtain the required number of RX50 floppy diskettes, based on the number you received with the distribution kit. The procedure will ask you to place those floppy diskettes (five, in this example) successively in the console drive. To keep the floppy diskettes properly labeled and organized during the procedure, affix a paper label to each one and use a soft, felt-tip pen (a hard pencil or ballpoint pen may damage the floppy diskette) to write a name on each label. Label the floppy diskettes as follows, where *n* is the version of the VMS operating system:

```
VMS V5.n S/A BKUP RX50 1/5
VMS V5.n S/A BKUP RX50 2/5
VMS V5.n S/A BKUP RX50 3/5
VMS V5.n S/A BKUP RX50 4/5
VMS V5.n S/A BKUP RX50 5/5
```

A paper label is the label affixed to a diskette. The procedure displays a volume label, not the paper label, in messages. A volume label is the name the VMS operating system uses to refer to a floppy diskette.

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

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

4. The procedure asks you for 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

5. The procedure displays the following messages. Press Return (for YES) after each question.

SYSGEN CONNECT CONSOLE was used to make the console device available.

The standalone kit requires five floppy diskettes. The first four floppy diskettes contain the standalone VMS system files, the last floppy diskette contains the BACKUP application image.

The system kit and the application kit can be built separately.

Do you want to build the system kit? [Yes/No, default Yes]:

Do you want to build the application kit? [Yes/No, default Yes]:

6. The procedure gives you two options that you can use to verify the reliability of the standalone BACKUP kit. First, it asks if you want to use the ANALYZE/MEDIA utility to check for bad blocks on the target floppy diskette. Next, it asks if you want to verify each file that it copies. In this case, neither operation is necessary for RX50 floppy diskettes. Therefore, press Return when the procedure asks the following question:

Do you want to scan for bad blocks? [Yes/No, default No]:

The procedure displays the following message:

Do you want to verify copies? [Yes/No, default No]:

Press Return (for NO). Copy verification is only relevant for tape media.

7. The procedure displays the following messages:

Sysgen parameters for standalone VMS have been placed in file
SYSSYSROOT:

<SYSUPD>

VAXVMS\$SYS.PAR-TEMP-00000084;1

Please place the first system floppy diskette in drive _CSA1:.
This volume will receive the volume label SYSTEM_1.

Enter "YES" when ready:

8. Insert the floppy diskette labeled S/A BKUP RX50 1/5 in the console diskette drive. When you are ready to continue, type Y and press Return.

9. The procedure mounts the floppy diskette, copies a set of system files, and displays a number of informational messages. For example:

```
%MOUNT-I MOUNTED, SYSTEM_1    mounted on _CSA1:
%CREATE-I-CREATED, _CSA1:

<SYS0.SYSEXE>
  created
%CREATE-I-CREATED, _CSA1:

<SYS0.SYS$LDR>
  created
.
.
.
```

10. When the last file is copied, the procedure asks you to insert the next floppy diskette. Remove the floppy diskette labeled S/A BKUP RX50 1/5. Insert the floppy diskette labeled S/A BKUP RX50 2/5. When you are ready to continue, type Y and press Return. For example:

Please place the second system floppy diskette in drive _CSA1:.
This volume will receive the volume label SYSTEM_2.

Enter "YES" when ready: Y

11. Repeat steps 8 through 10 for each floppy diskette until the procedure asks you for the last floppy diskette, as follows:

Please place the application floppy diskette in drive _CSA1:.
This volume will receive the volume label BACKUP.

Enter "YES" when ready: Y

12. Remove the floppy diskette labeled S/A BKUP RX50 4/5. Insert the floppy diskette labeled S/A BKUP RX50 5/5. When you are ready to continue, type Y and press Return.
13. After the files are copied to the last floppy diskette, the procedure displays the following message:

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

14. Remove the floppy diskette labeled S/A BKUP RX50 5/5 from diskette drive CSA1. Insert the console RX50. When you are ready to continue, type Y (for YES) and press Return. When the procedure finishes, it displays the following message:

The kit is complete.

4.8.1.4 Booting Standalone BACKUP from Floppy Diskettes

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from the RX50 floppy diskettes containing standalone BACKUP (either the set you received with your distribution kit or the set you created yourself, as described in Section 4.8.1.3). They are labeled as follows, where x is the total number of floppy diskettes included with your distribution kit and n is the version of the VMS operating system:

Paper Label ¹	Volume Label ²
VMS V5.n S/A BKUP RX50 1/x	SYSTEM_1
VMS V5.n S/A BKUP RX50 2/x	SYSTEM_2
VMS V5.n S/A BKUP RX50 3/x	SYSTEM_3
.	.
.	.
.	.
VMS V5.n S/A BKUP RX50 x/x	BACKUP

¹A paper label is the label affixed to a floppy diskette.

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

Regardless of how many floppy diskettes you need to boot standalone BACKUP, note that the last floppy diskette always has the volume label, *BACKUP*. If, for example, you use five floppy diskettes containing standalone BACKUP, they will be labeled as follows:

Paper Label	Volume Label
VMS V5.n S/A BKUP RX50 1/5	SYSTEM_1
VMS V5.n S/A BKUP RX50 2/5	SYSTEM_2
VMS V5.n S/A BKUP RX50 3/5	SYSTEM_3
VMS V5.n S/A BKUP RX50 4/5	SYSTEM_4
VMS V5.n S/A BKUP RX50 5/5	BACKUP

As you boot standalone BACKUP, you place those floppy diskettes (five, in this example) successively in the console drive, as follows:

1. Insert the floppy diskette labeled S/A BACKUP RX50 1/5 in the CSA1 diskette drive.
2. To boot standalone BACKUP, enter the following command and press Return:

```
>>> @CSBOO
```

The procedure displays the following messages:

```
SET VERIFY  
! CSBOO.COM
```

```
.  
.  
.
```

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

```
Please remove the volume "SYSTEM_1" from the console device.
```

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

3. Remove the S/A BKUP RX50 1/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX50 2/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays the following message:

```
Resuming load operation on volume "SYSTEM_2", please stand by...
```

```
Please remove the volume "SYSTEM_2" from the console device.
```

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

4. Remove the S/A BKUP RX50 2/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX50 3/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays the following message:

```
Resuming load operation on volume "SYSTEM_3", please stand by...
```

5. The procedure asks 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
```

6. The procedure displays the following messages:

Please remove the volume "SYSTEM_3" from the console device.

Insert the next standalone volume and enter "YES" when ready:

- 7. Remove the S/A BKUP RX50 3/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX50 4/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays a message and a list of the local devices on your system and, if you have them, HSC and MSCP served devices. For example:**

```
Available device MINE$DJA3:    device type RA60
Available device MINE$DJA2:    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. The procedure displays the following messages:

Please remove the volume "SYSTEM_4" from the console device.

Insert the standalone application volume and enter "YES" when ready:

- 9. Remove the S/A BKUP RX50 4/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX50 5/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays the following message:**

Resuming load operation on volume "BACKUP", please stand by...

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

```
%BACKUP-I-IDENT, standalone BACKUP V5.n; the date is
19-JUN-1990 15:00
$
```


5

VAX 8200, 8300 Systems

5.1 Console Subsystem

Before you install or upgrade the VMS operating system, you need to be familiar with the VAX 8200, VAX 8250, VAX 8300, and VAX 8350 console subsystems. In general, use the console subsystem to examine and deposit data in memory or processor registers, stop the processor, and start the operating system. During installation, use the console subsystem to start the processor and monitor the process. The console subsystem consists of the following:

- Console terminal
- Control panel
- Console diskette drive
- Console command language

This section each component of the console subsystem.

5.2 Console Terminal

The console terminal is a hardcopy terminal attached to the system. Use it to control and monitor system operations. Because this hardcopy terminal prints a log of processor activities, make sure it always contains enough paper.

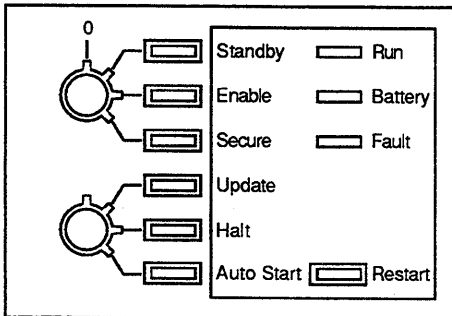
5.3 Control Panel

The VAX 8200, VAX 8250, VAX 8300, and VAX 8350 control panels are nearly identical. The panel is located on the front of the computer and includes the following:

- A 4-position keylock switch
- A 3-position keylock switch
- Three processor indicator lights
- Restart push button

Figure 5-1 illustrates how the switches and lights on VAX 8200, VAX 8250, VAX 8300, and VAX 8350 control panels are labeled.

Figure 5-1 VAX 8200, 8250, 8300, 8350 Control Panel



ZK-7445-GE

5.3.1 Switches

The control panel of a VAX 8200, VAX 8250, VAX 8300, or VAX 8350 computer has the following two keylock switches:

- An upper keylock switch. This switch has four positions. Use it to turn power on and off.
- A lower keylock switch. This switch has three positions. Use it to enable and disable automatic restart after a power failure.

To change a setting, insert a key in the keylock switch and turn it to the appropriate setting. Table 5-1 lists the settings of the upper keylock switches. Table 5-2 lists the settings of the lower keylock switches.

Table 5-1 VAX 8200, 8250, 8300, 8350 Upper Keylock Switch Settings

Setting	Meaning
Off	The upper keylock switch is set in the vertical position; there is no corresponding light. Turns off the power in the entire system, including the battery backup unit.
Standby	When the upper keylock switch is set to <i>Standby</i> , the corresponding indicator light glows red. Turns on the power supply, the blower in the main unit, and system memory.
Enable	When the switch setting is changed from <i>Standby</i> to <i>Enable</i> , the system self-tests run. When the upper keylock switch is set to <i>Enable</i> , the corresponding indicator light glows yellow. Power is supplied to the entire system. You can use the local console terminal in console mode to control the computer. If the lower keylock switch is set to <i>Auto Start</i> , pressing the Restart push button reboots the system.
Secure	When the upper keylock switch is set to <i>Secure</i> , the corresponding indicator light glows green. This setting maintains power to the entire system and is used for normal operation. You cannot use the local console terminal in console mode to control the processor. You cannot reboot the operating system by pressing the Restart push button.

Table 5-2 VAX 8200, 8250, 8300, 8350 Lower Keylock Switch Settings

Setting	Meaning
Update	When the lower keylock switch is set to <i>Update</i> , the corresponding indicator light glows red. You can change data in the Electrically Erasable Programmable Read-Only Memory (EEPROM) using the EEPROM utility.
Halt	When the lower keylock switch is set to <i>Halt</i> , the corresponding indicator light glows yellow. The system halts in console mode. It displays the console-mode prompt (>>>) at the console terminal when power is turned on after a power failure, after an error halt, or after a shutdown. This setting prevents booting of the operating system when power is turned on.
Auto Start	When the lower keylock switch is set to <i>Auto Start</i> , the corresponding indicator light glows green. Use this setting for normal system operation to let the system reboot automatically when power is restored after a power failure, after an error halt, or after a shutdown. If the upper keylock switch is set to <i>Enable</i> , pressing the Restart push button reboots the system.

5.3.2 Indicator Lights

Table 5-3 describes the three indicator lights on the control panel.

Table 5-3 Indicator Lights

Label	Meaning								
Run	Glows when the processor is running and the console subsystem is in program mode.								
Battery	Tells you the condition of the backup battery. <table border="0" style="margin-left: 20px;"> <tr> <td>Steady glow</td> <td>The backup battery is fully charged.</td> </tr> <tr> <td>Slow flashing</td> <td>The backup battery is charging itself.</td> </tr> <tr> <td>Quick flashing</td> <td>The backup battery is supplying power to the system.</td> </tr> <tr> <td>No light</td> <td>The backup battery unit is broken or is not present.</td> </tr> </table>	Steady glow	The backup battery is fully charged.	Slow flashing	The backup battery is charging itself.	Quick flashing	The backup battery is supplying power to the system.	No light	The backup battery unit is broken or is not present.
Steady glow	The backup battery is fully charged.								
Slow flashing	The backup battery is charging itself.								
Quick flashing	The backup battery is supplying power to the system.								
No light	The backup battery unit is broken or is not present.								
Fault	Glows during self-tests and turns off when self-tests complete successfully. If the Fault light continues to glow after self-tests complete, the self-tests have detected a hardware fault. If the Fault light glows after self-tests complete and the VMS operating system boots, the system has detected a failure in a hardware module.								

5.3.3 Restart Push Button

The Restart push button is located on the lower right side of the control panel. Table 5-4 details the functions of the Restart push button, which depend on the positions of the upper and lower keylock switches.

Table 5-4 Restart Push Button Functions

Upper Keylock Switch Setting	Lower Keylock Switch Setting	Restart Button Function
Enable	Autostart	Runs self-test and reboots the VMS operating system
Enable	Update or Halt	Runs self-test
Stand by or Secure	Any position	Does not function

5.4 Console Dual-Diskette Drive

The 8200 have an RX50 dual-diskette drive. The dual-diskette drive is located on the front of the computer.

The dual-diskette drive is vertical on some processors and horizontal on others. On a vertical drive, the left diskette drive is referred to as CSA1, and the right diskette drive as CSA2. On a horizontal drive, the top diskette drive is referred to as CSA1, and the bottom diskette drive as CSA2.

The console dual-diskette drive holds RX50 diskettes. The **console RX50** is the diskette that contains the BOOT58 program. The BOOT58 program *boots*, or loads, the operating system into processor memory. It also is used to do the following tasks:

- Install updates
- Install optional software products
- Boot standalone BACKUP
- Store boot command procedures

When using the console dual-diskette drive shown in Figure 5-2, you should be aware of the following:

- The light below the drive flashes when the floppy diskette is actually moving (being read or written to). If this light is off, the drive is inactive. *Never* attempt to remove a floppy diskette when the light is flashing or glowing; this damages the floppy diskette and might damage the drive.
- The light is off when the drive is empty. The only time you can remove a floppy diskette is when the light is off.

5.4.1 Inserting or Removing a Floppy Diskette

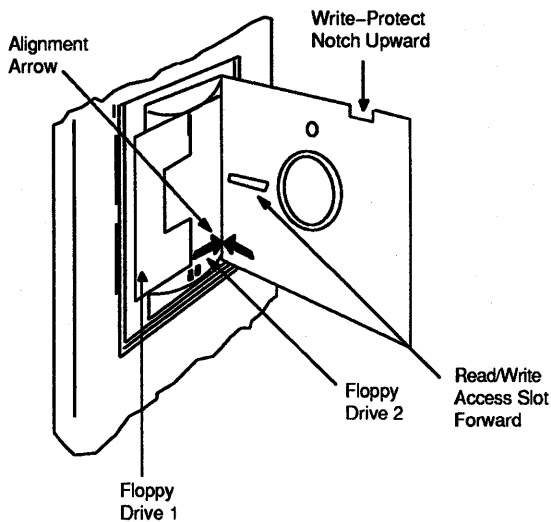
To insert a floppy diskette into console diskette drive CSA2, see Figure 5-2 and follow steps 1 through 6.

To remove a floppy diskette, follow steps 1 through 3.

1. Make sure the diskette drive is inactive. The light below the drive should be off. *Never* attempt to open the diskette drive door if the light is glowing or flashing.
2. Press the outer portion of the right door to open console diskette drive CSA2.

3. If there is a diskette in the drive, remove it gently, taking care not to touch any exposed platter surfaces. Place the diskette in a paper envelope.
4. Remove the diskette to be inserted from its paper envelope; do not touch any exposed platter surfaces.
5. Align the orange arrow on the diskette with the orange bar on the drive. Slide the diskette into the *left-hand side* of the drive. (If the diskette is aligned improperly, the system displays an error message. If the system displays an error message, remove the diskette, realign it, and reinsert it.)
6. Close the diskette drive door.

Figure 5-2 Inserting a Diskette into CSA2



ZK-1680-GE

5.5 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 VMS operating system is not running and the console-mode prompt (>>>) is displayed. The CPU can be running or it can be stopped. When the CPU is running, it responds to a limited number of commands. When the CPU is stopped, it responds to all console-mode commands. To stop the CPU, press Ctrl/P at the console-mode prompt (>>>).

To go from console mode to program mode, boot the VMS operating system).

- **Program mode** — When the console subsystem is in program mode, the VMS operating system is running and the dollar sign prompt (\$) is displayed. You can enter DCL commands, run programs, and receive system messages.

If the VMS operating system is running and you want to go to console mode, follow the shutdown procedure). You also can press Ctrl/P to suspend program mode temporarily and go to console mode. To get back to program mode, enter the CONTINUE command at the console-mode prompt (>>>).

Table 5-5 describes the most commonly used console mode commands.

Table 5-5 Most Commonly Used Console Mode Commands

Command	Definition
BOOT	Executes a console command procedure that loads a VAX software program into memory. The console command procedure then transfers control to the program in memory and puts the console subsystem in program mode. During the installation procedure, use the abbreviation, B, for the BOOT command.
CONTINUE	Changes from console mode to program mode. If the CPU clock is operating when you type the CONTINUE command, the processor restarts execution of the halted program. If the CPU clock is not operating when you type the CONTINUE command, the CPU clock starts as the console subsystem enters program mode.
DEPOSIT	Puts a value in the specified register or memory location. During the installation procedure, use the abbreviation, D, for the DEPOSIT command.
EXAMINE	Displays a value in the specified register or memory location.
HALT	Resets the default console conditions after the processor stops.

5.6 Booting the System

Booting is the process of loading system software from the system disk into the processor's memory. VAX 8200 systems use the BOOT command and boot command procedures to perform this operation.

The method you use to boot a VAX 8200 system depends on whether the system disk is on a local drive or on an HSC drive. If the system disk is on a local drive, the easiest way to boot the system is to do an automatic boot from the drive designated in the EEPROM (Electrically Erasable Programmable Read-Only Memory). If you want to boot from a drive other than the one designated in the EEPROM, you can do a manual boot. In either case, you do not need a boot command procedure. If the boot block on the system disk becomes corrupted, you can use auxiliary boot command procedures that let you boot from a local drive.

If the system disk is on an HSC drive, you use the BOOT58 program and a boot command procedure. You also can create default boot command procedures so that the system boots automatically from a particular drive.

If you have a VAX 8300 or VAX 8350 computer, you can set certain SYSGEN parameters to control how many CPUs are activated at boot time and the character of a multiprocessing system. In a multiprocessing system, the primary CPU is always booted. By default, all available CPUs are booted in a multiprocessing system. If you want to change this, you can set the SYSGEN parameter SMP_CPUS to tell the system which CPU to boot. For information on SYSGEN parameters that affect multiprocessing, see the *VMS System Generation Utility Manual*.

NOTE

If you plan to boot from a UDA50 supported device, you must keep in mind when you configure the system that the maximum unit number that can be booted is 15 (hexadecimal F).

5.6.1 Boot Command Procedures

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 console RX50 contains the BOOT58 program and the boot command procedures. To boot the VMS operating system with a boot command procedure, you must insert the console RX50 in console diskette drive CSA1 and start the BOOT58 program.

To find out what is on the console RX50, use the following procedure:

NOTE

This procedure assumes that you have installed and booted the VMS operating system and are logged in to the SYSTEM account.

1. Make sure that the console RX50 is in console diskette drive CSA1.
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 the boot command procedures on the console RX50. Boot command procedures are files that start with either CI or D and end with either BOO or GEN. The file type is CMD. Enter the following command and press Return:

```
$ EXCHANGE DIR CSA1 C*,D*
```

For example:

```
Directory of RT-11 volume _CSA1:    19-JUN-1990 13:00
```

```
CIBOO.CMD  
CIOGEN.CMD  
CI4GEN.CMD  
C16GEN.CMD  
C18GEN.CMD
```

```
.  
.  
.
```

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

```
$ DISMOUNT CSA1:
```

5. To secure the console RX50 from unauthorized access, you must enter the following command and press Return:

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

Section 5.6.3.4 describes using the BOOT58 program and auxiliary boot command procedures to boot the VMS operating system from a local drive if the boot block on the system disk becomes corrupted. Section 5.6.4 describes using the BOOT58 program and boot command procedures to boot from an HSC drive.

5.6.2 The BOOT58 Program

You can use the BOOT58 program, which is located on the console RX50, to boot the VMS operating system from an HSC drive. You also can use the BOOT58 program to boot the VMS operating system from a local drive when the boot block on the system disk becomes corrupted.

To start the BOOT58 program, enter the following command and press Return:

```
>>> B/R5:800 CSA1
```

The BOOT58> prompt is displayed. Table 5-6 lists the commands that you can enter at the BOOT58> prompt.

Table 5-6 BOOT58 Commands

Command	Function
DEPOSIT [loc-qual] [,size-qual] location value	<p>Deposits a hexadecimal value in the specified location. The location is interpreted according to the location and size qualifiers. The location qualifier can be expressed as follows:</p> <p>/G general register</p> <p>/I internal processor register</p> <p>/P physical memory</p> <p>The size qualifier can be expressed as follows:</p> <p>/B byte</p> <p>/W word</p> <p>/L longword</p> <p>If you do not specify the location or size qualifier, the default values established by a previous command are used.</p>

Table 5-6 (Cont.) BOOT58 Commands

Command	Function
EXAMINE [loc-qual] [,size-qual] location	<p>Displays the contents of the specified location. The location is interpreted according to the location and size qualifiers. The location qualifier can be expressed as follows:</p> <p>/G general register</p> <p>/I internal processor register</p> <p>/P physical memory</p> <p>The size qualifier can be expressed as follows:</p> <p>/B byte</p> <p>/W word</p> <p>/L longword</p> <p>If you do not specify the location or size qualifier, the default values established by a previous command are used.</p>
HELP	<p>Displays the BOOT58 help file at the console terminal. You cannot specify this command within a command procedure.</p>
LOAD file-spec [/START:address]	<p>Loads a file from the boot device into memory, starting at the address specified with the /START qualifier. If you omit the /START qualifier, the file is loaded into memory beginning at the first free address.</p>
START address	<p>Transfers control to the address specified. Use this command with the LOAD command.</p>
@file-spec	<p>Executes the specified command procedure. The file specification for a command procedure cannot have more than six characters. This format is valid only at the BOOT58> prompt. For example:</p> <p>BOOT58> @CIBOO.CMD</p>

Enter the BOOT command or use the @ command to choose a boot command procedure with which to boot the VMS operating system.

5.6.3 Booting from a Local Drive

There are several ways to boot the system from a local drive. You can perform an automatic boot from the default boot device designated in the EEPROM. You also can perform a manual boot. In either case you do not need a boot command procedure.

Create auxiliary boot command procedures after you boot the system the first time. These procedures let you boot from a local drive if the boot block on the system disk becomes corrupted.

5.6.3.1 Automatic Boot

You can boot the VMS operating system automatically from the drive designated in the EEPROM, the default boot device, when you do any of the following:

NOTE

The default boot device must be the local drive, CSA1. To change the designation of the default boot device in the EEPROM, see the hardware documentation for your system.

- Set the upper keylock switch to Enable and the lower keylock switch to Auto Start. Turn on the power. The system boots automatically.
- At the console-mode prompt (>>>), enter the following command and press Return:

 >>> B
- Set the upper keylock switch to Enable and the lower keylock switch to Auto Start. Execute SHUTDOWN.COM and specify the auto reboot option. The system reboots automatically.
- If the upper keylock switch is set to Enable and the lower keylock switch is set to Auto Start when the system shuts down due to a bugcheck, the system reboots automatically.

The system sometimes boots automatically when a power failure occurs. If the upper keylock switch is set to Enable and the lower keylock switch to Auto Start, when a power failure occurs and the contents of memory are lost, the system boots when power is restored.

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

5.6.3.2 Manual Boot

When you want to boot from a drive other than the one designated in the EEPROM, do a manual boot. To perform a manual boot from a local drive, use the following procedure:

1. Make sure the console RX50 is in console diskette drive CSA1.
2. Set the upper keylock switch to Enable and the lower keylock switch to Halt.
3. If the VMS operating system is not running, go to step 4.

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

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

The procedure displays several questions that you must 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
```

4. Press Ctrl/P.
5. 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:

```
>>> B ddnu
```

where:

- *dd* is the device code of the drive
- *n* is the controller's VAXBI node identification number
- *u* is the unit number

The system disk must have a unit number between 0 and 15 (inclusive).

For example, to boot from an RA80 series disk drive with a VAXBI node identification number of 4 and a unit number of 1, enter the following command and press Return:

```
>>> B DU41
```

where:

- B stands for the BOOT command.

- DU41 is the boot name for the RA80 series disk drive. *DU* is the device code for an RA80 series disk drive, 4 is the VAXBI node identification number, and 1 is the unit number.

NOTE

If the boot block on the system disk becomes corrupted, boot from a local drive attached to the KDB50 disk controller using auxiliary boot command procedures. Set up auxiliary boot command procedures after you boot the VMS operating system the first time, so that auxiliary boot command procedures will be available if you need them. Section 5.6.3.3 describes how to set up auxiliary command procedures. Section 5.6.3.4 describes how to use auxiliary boot command procedures.

5.6.3.3 Creating Auxiliary Boot Command Procedures

There are two auxiliary boot command procedures that you can use to boot the VMS operating system from a local drive if the boot block on the system disk becomes corrupted. They are KDBBOO.CMD and KDBBOO.GEN. KDBBOO.CMD is the nonstop boot procedure. When you boot with KDBBOO.CMD, you have no control over the system until the boot process has finished. Use KDBBOO.GEN, the conversational boot procedure, when you want to interrupt the boot process and change system parameters.

KDBBOO.GEN does not exist on the console RX50. To create auxiliary boot command procedures, use the following procedure:

NOTE

This procedure assumes that you have installed and booted the VMS operating system and are logged in to the SYSTEM account.

1. Make sure the console RX50 is in console diskette drive CSA1.
2. To connect the console drive to the system, enter the following commands and press Return after each one:

```
$ RUN SYSSYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

3. Use the Exchange Utility to copy KDBBOO.CMD from the console RX50 to your current directory on the system disk. Enter the following command and press Return:

```
$ EXCHANGE COPY CSA1:KDBBOO.CMD *.*
```

4. Edit KDBBOO.CMD. Enter the following command and press Return:

```
$ EDIT KDBBOO.CMD
```

KDBBOO.CMD contains the following text:

```
! KDBBOO.CMD : Boot command file to boot a VAX 8200 from a KDB50
! disk bypassing the boot block (i.e. utilizing the boot
! block and VMB.EXE from the RX50 console device.)
!
! Note: "n", "u", and "r" represent single hexadecimal characters
!
!
D/G 0 21          ! KDB50 Device Type Code
!D/G 1 n          ! n = VAXBI node number of KDB50
!D/G 3 u          ! u = Disk drive unit number
!D/G 5 r0000000  ! r = number of system root directory
D/G E 200
LOAD VMB.EXE/START:200
START 200
```

- a. Delete the comment character (!) that appears before the D/G 1 command and replace *n* with the VAXBI node identification number of the local drive.
 - b. Delete the comment character (!) that appears before the D/G 3 command and replace *u* with the unit number of the local drive.
 - c. Delete the comment character (!) that appears before the D/G 5 command and replace *r* with the number of the correct root directory from which to boot. By default, the VMS operating system is in SYS0.
 - d. Exit from the editor to save the modified version of the file.
5. To make a copy of KDBBOO.CMD named KDBBOO.GEN, enter the following command and press Return:

```
$ COPY KDBBOO.CMD KDBBOO.GEN
```

6. Edit KDBBOO.GEN. Enter the following command and press Return:

```
$ EDIT KDBBOO.GEN
```

- a. In the first line of the command procedure, change the name KDBBOO.CMD to KDBBOO.GEN.
 - b. Delete the comment character (!) that appears before the D/G 5 command and replace *r* with the number of the correct root directory from which to boot. By default, the VMS operating system is in SYS0. Replace the final zero of *r0000000* with the number 1. The command should read D/G 5 r0000001. This command instructs the system to perform a conversational boot.
 - c. Exit from the editor to save the modified version of the file.
7. Use the Exchange Utility to copy KDBBOO.CMD and KDBBOO.GEN to the console RX50. Enter the following commands and press Return after each one:

```
$ EXCHANGE COPY KDBBOO.CMD CSA1:KDBBOO.CMD  
$ EXCHANGE COPY KDBBOO.GEN CSA1:KDBBOO.GEN
```

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

```
$ DISMOUNT CSA1:
```

9. To secure the console RX50 from unauthorized access, you must enter the following command and press Return:

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

Now you can use KDBBOO.CMD and KDBBOO.GEN to boot the VMS operating system from a local drive, as described in Section 5.6.3.4, when the boot block on the system disk becomes corrupted.

5.6.3.4 Using Auxiliary Boot Command Procedures

You should boot the VMS operating system using an auxiliary boot command procedure when the boot block on the local system disk becomes corrupted. To boot using an auxiliary boot command procedure, use the following procedure:

1. Make sure the console RX50 is in console diskette drive CSA1.
2. Set the upper keylock switch to Enable and the lower keylock switch to Halt.
3. To start the BOOT58 program, enter the following command and press Return:

```
>>> B/R5:800 CSA1
```

4. *To perform a nonstop boot*, enter the following command and press Return:

```
BOOT58> @KDBBOO.CMD
```

The system performs a nonstop boot using the boot block on the console RX50 and boots from the system disk designated in the KDBBOO.CMD command procedure.

To perform a conversational boot, enter the following command and press Return:

```
BOOT58> @KDBBOO.GEN
```

The system performs a conversational boot using the boot block on the console RX50. The SYSBOOT> prompt appears on the console terminal. At the SYSBOOT> prompt, you can enter certain SYSGEN commands to change system parameters. When you finish using the SYSGEN commands, you enter the CONTINUE command to complete the boot process. For complete information about a conversational boot, see Section 5.6.5.

After booting with an auxiliary boot command procedure, use the Writeboot utility to write a new boot block to the system disk. Section 5.6.3.5 describes writing a new boot block on a local system disk.

5.6.3.5 Writing a New Boot Block on a Local System Disk

This section discusses using the Writeboot utility (WRITEBOOT) to write a boot block on a local system disk.

NOTE

The LOG_IO privilege is required to use WRITEBOOT.

To write a boot block on the local system disk, do the following:

1. Use an auxiliary boot command procedure to boot the VMS operating system.
2. To start the WRITEBOOT utility, enter the following command and press Return:

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

The procedure displays the following message:

```
Target system device (and boot file if not VMB.EXE):?
```

3. Enter the device name of the system disk on which you want to rewrite the boot block. If you want to use a boot file other than SYS\$SYSTEM:VMB.EXE, provide the full file specification, including device and directory.

For example, suppose your system disk is an RA80 disk that has controller designation A and unit number 0. Enter the following and press Return:

```
Target system device (and boot file if not VMB.EXE):? DUA0
```

4. The procedure displays the following message:

```
Enter VBN of boot file code (default is one):
```

Press Return to accept the default value.

5. The procedure displays the following message:

```
Enter load address of primary bootstrap in HEX (default is 200):
```

Press Return to accept the default value.

6. The Writeboot utility writes the boot file to the boot block (block 0) of the system disk.

The Writeboot utility may display one or more of the following error messages:

You lack LOG_IO privilege

Explanation: This message means you do not have the correct privilege to use the Writeboot Utility.

You lack READ and/or WRITE access to TARGET DEVICE: DISMOUNT and REMOUNT

Explanation: This message means that access to the target device is limited. Check the Write Protect button on the disk drive.

VBN must be >= 1

Explanation: This message means you cannot specify a zero as the virtual block number (VBN) of the boot file.

5.6.4 Booting from an HSC Drive

The first time you boot the VMS operating system, use the procedure described in Section 5.6.4.1. Then create default boot command procedures, DEFBOO.COM and DEFBOO.GEN, as described in Section 5.6.4.2. Use these boot command procedures to perform subsequent boots as described in Section 5.6.4.3 and Section 5.6.4.4..

5.6.4.1 Using the BOOT58 Program

The first time you boot from a system disk on an HSC drive, use the following procedure. Note that all numeric entries are made using hexadecimal notation.

1. Make sure that the console RX50 is in console diskette drive CSA1.
2. Set the top keylock switch to Enable and the bottom keylock switch to Halt.

3. If the VMS operating system is not running, go to step 4.

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

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

The procedure displays several questions that you must 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
```

4. Determine the following values:
 - a. The VAXBI node number of the CI adapter
 - b. The unit number of the system disk and the node number of the HSC controlling it. If the drive holding the system disk has two HSC controllers, determine both node numbers.
 - c. The system directory from which you will boot the VMS operating system. By default, the VMS operating system is stored in the system directory named SYS0.
5. Press Ctrl/P.
6. To start the BOOT58 program, enter the following command and press Return:

```
>>> B/R5:800 CSA1
```

7. Deposit the VAXBI node number into register 1, using the following format:

```
BOOT58> D/G 1 node-number
```

For example, if the VAXBI is node number 6, enter the following command and press Return:

```
BOOT58> D/G 1 6
```

8. Deposit the HSC node number into register 2, using the following format:

```
BOOT58> D/G 2 node-number
```

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

```
BOOT58> D/G 2 C
```

NOTE

If the drive holding the system disk is accessible to two HSC controllers, deposit both node numbers in register 2. 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 numbered 18 (hexadecimal 12) and the other is numbered 10 (hexadecimal A), enter the following command and press Return:

```
BOOT58> D/G 2 120A
```

9. Deposit the unit number of the drive holding the system disk into register 3, using the following format:

```
BOOT58> D/G 3 unit-number
```

For example, if the drive holding the system disk is unit number 1, enter the following command and press Return:

```
BOOT58> D/G 3 1
```

10. Specify the correct root directory from which to boot. Deposit the number in register 5 using the following format:

```
BOOT58> D/G 5 r0000000
```

For example, if you are booting the VMS operating system from SYS2, enter the following command and press Return:

```
BOOT58> D/G 5 20000000
```

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

```
BOOT58> @CIBOO.COMD
```


5.6.4.2 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.CMD** and **DEFBOO.GEN**.

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

DEFBOO.GEN and **DEFBOO.CMD** do not exist on the console **RX50**. 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 that you are logged in to the SYSTEM account.

1. Make sure the console **RX50** is in console diskette drive **CSA1**.
2. Set the upper keylock switch to **Enable** and the lower keylock switch to **Halt**.
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 display a list of the files on the console **RX50**. Boot command procedures are files that start with either **CI** or **D** and end with either **BOO** or **GEN**. The file type is **CMD**. Enter the following command and press **Return**:

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

5. You can view the contents of a file with the **TYPE** command. For example:

```
$ EXCHANGE TYPE CSA1:DU0BOO.COM
```

6. Use the Exchange utility to copy CIBOO.COMD and CIBOO.GEN to the system disk. Enter the following commands and press Return after each one:

```
$ EXCHANGE COPY CSA1:CIBOO.COMD *.*
$ EXCHANGE COPY CSA1:CIBOO.GEN *.*
```

7. The code in CIBOO.COMD and CIBOO.GEN is nearly identical. CIBOO.COMD contains the following text:

```
!CIBOO.COMD :Boot command file to boot a VAX 8200/8300 from an HSC disk.
!
!
! Note "n", "p" (and "q"), "u", and "r" are single hexadecimal characters
!
D/G 0 20 ! CI Port Device Type Code
!D/G 1 n ! n = CI adapter's VAXBI node number
!D/G 2 p ! Use the HSC controller at CI node p
!D/G 2 0p0q ! Use either the HSC controller at CI nodes p and q
!D/G 3 u ! u = Disk drive unit number
D/G 4 0 ! Boot Block LBN (not used)
!D/G 5 r0000000 ! r = system root [SYSR...], Software boot flags
D/G E 200 ! Address of Working Memory+^X200
LOAD VMB.EXE/START:200 ! Load Primary Bootstrap
START 200 ! Start Primary Bootstrap
```

Only the following line of code is different in CIBOO.GEN:

```
D/G 5 1
```

8. Edit CIBOO.COMD and CIBOO.GEN. Enter the following command and press Return:

```
$ EDIT CIBOO.COMD
```

- Delete the comment character (!) that appears before the D/G 1 command and replace *n* with the VAXBI node number of the CI device.
- If your processor is connected to one HSC controller, delete the comment character (!) that appears before the first D/G 2 command. Replace *p* with the HSC controller number in hexadecimal notation.

If the drive holding the system disk is connected to two HSC controllers, delete the comment character (!) that appears before the second D/G 2 command, replace *p* with the controller number of the first HSC in hexadecimal notation, and replace *q* with the controller number of the second HSC in hexadecimal notation.

- c. Delete the comment character (!) that appears before the D/G 3 command and replace *u* with the unit number of the HSC drive from which you will boot the VMS operating system. Use hexadecimal notation.
 - d. Delete the comment character (!) that appears before the D/G 5 command and replace *r* with the number of the correct root directory from which to boot. By default, the VMS operating system is in SYS0.
 - e. Exit from the editor.
9. Rename the files. Enter the following commands and press Return after each one:

```
$ RENAME CIBOO.COM DEFBOO.COM
$ RENAME CIBOO.GEN DEFBOO.GEN
```

10. Use the Exchange utility to copy DEFBOO.COM and DEFBOO.GEN to the console RX50. Enter the following commands and press Return after each one:

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

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

```
$ DISMOUNT CSA1:
```

12. To secure the console 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 DEFBOO.GEN to boot the VMS operating system as described in Section 5.6.4.3 and Section 5.6.4.4.

If you change the system configuration, use the previous procedure to modify DEFBOO.COM and DEFGEN.COM.

5.6.4.3 Booting with DEFBOO.CMD

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

NOTE

The default boot device must be the local drive, CSA1. To change the designation of the default boot device in the EEPROM, see the hardware documentation for your system.

- Set the upper keylock switch to Enable and the lower keylock switch to Auto Start. Turn on the power. The system uses DEFBOO.CMD to boot automatically.
- Set the upper keylock switch to Enable, the lower keylock switch to Halt. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> B
```

- Set the upper keylock switch to Enable and the lower keylock switch to Auto Start. Execute SHUTDOWN.COM and specify the auto reboot option. The system uses DEFBOO.CMD to reboot automatically.
- If the upper keylock switch is set to Enable and the lower keylock switch is set to Auto Start when the system shuts down due to a bugcheck, the system uses DEFBOO.CMD to reboot automatically.

The system sometimes boots automatically when a power failure occurs. If the upper keylock switch is set to Enable and the lower keylock switch to Auto Start when a power failure occurs and the contents of memory are lost, the system boots when power is restored.

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

5.6.4.4 Booting with DEFBOO.GEN

You can use DEFBOO.GEN to perform a conversational boot from a system disk on an HSC drive. See Section 5.6.5.

5.6.5 Conversational Boot

A conversational boot is used most commonly in research and development environments or during software upgrades. Perform a conversational boot when you want 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

At the `SYSBOOT>` prompt, you can enter any of the `SYSGEN` commands. For more information about these `SYSGEN` commands, see the *VMS System Generation Utility Manual*.

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

5.6.5.1 Local Drive

To perform a conversational boot from a system disk on a local drive, use the following procedure:

1. Make sure the console `RX50` is in console diskette drive `CSA1`.
2. Set the upper keylock switch to `Enable` and the lower keylock switch to `Halt`.

3. If the VMS operating system is not running, go to step 4.

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

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

The procedure displays several questions that you must 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
```

4. Press Ctrl/P.
5. 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:

```
>>> B/R5:1 ddnu
```

where:

- *dd* is the device code of the drive
- *n* is the VAXBI node number
- *u* is the unit number of the drive

The system disk must have a unit number between 0 and 15 (inclusive).

For example, to boot from an RA80-series disk drive with a VAXBI node identification number of 4 and a unit number of 1, enter the following command and press Return:

```
>>> B/R5:1 DU41
```

NOTE

If this command does not boot the VMS operating system from a local drive, the boot block of the system disk may be corrupted. See Section 5.6.3.4 for booting instructions.

5.6.5.2 HSC Drive

To perform a conversational boot from a system disk on an HSC drive, use the following procedure:

1. Make sure the console RX50 is in console diskette drive CSA1.
2. Set the top keylock switch to Enable and the bottom keylock switch to Halt.
3. If the VMS operating system is not running, go to step 4.

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

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

The procedure displays several questions that you must 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
```

4. To start the BOOT58 program, enter the following command and press Return:


```
>>> B/R5:800 CSA1
```
5. To begin the conversational boot, enter the following command and press Return:


```
BOOT58> @DEFBOO.GEN
```
6. At the SYSBOOT> prompt, you can enter any of the SYSGEN commands.

5.6.6 Booting from a Different Directory on the System Disk

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

To boot from a directory other than [SYS0], create a command procedure named SYSnBOO.COM, where *n* stands for the name of the other root directory on the system disk. To create SYSnBOO.COM, use the following procedure:

1. Make sure that the console RX50 is in console diskette drive CSA1.
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 DEFBOO.COM from the console RX50 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 line that deposits a value in register 5. This line contains the comment *! r = system root [SYSR . . .], Software boot flags*. The value is a hexadecimal number with eight digits. For example:

```
D/G/L 5 10000000 ! r = system root [SYSR...], Software boot flags
```

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:

```
D/G/L 5 C0000000
```

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

```
$ RENAME DEFBOO.COM SYSnBOO.COM
```

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

```
$ RENAME DEFBOO.COM SYSCBOO.COM
```


6. Use the Exchange utility to copy SYSnBOO.CMD to the console RX50. Use the following format:

```
$ EXCHANGE COPY SYSnBOO.CMD CSA1:SYSnBOO.CMD
```

For example, if the file name is SYSCBOO.CMD, enter the following command and press Return:

```
$ EXCHANGE COPY SYSCBOO.CMD CSA1:SYSCBOO.CMD
```

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

```
$ DISMOUNT CSA1:
```

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

1. Make sure the console RX50 is in console diskette drive CSA1.
2. Set the upper keylock switch to Enable and the lower keylock switch to Halt.
3. If the VMS operating system is not running, go to step 4.

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

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

The procedure displays several questions that you must 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
```

4. Press Ctrl/P.
5. To start the BOOT58 program, enter the following command and press Return:

```
>>> B/R5:800 CSA1
```

6. Use the command procedure you created to boot from the different directory. For example, to boot from [SYSC], enter the following command and press Return:

```
BOOT58> @ SYSCBOO.CMD
```

5.6.7 Booting from SYSF During an Upgrade

To boot from [SYSF], create and then invoke the command procedure named SYSFBOO.CMD, as follows:

1. Make sure that the console RX50 is in console diskette drive CSA1.
2. To connect the console drive, enter the following commands and press Return after each one:

```
$ RUN SYSSYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

3. Use the Exchange utility to copy DEFBOO.CMD from the console RX50 to your current directory on the system disk. Enter the following command and press Return:

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

4. Edit DEFBOO.CMD. Change the line that deposits a value in register 5. This line contains the comment *! r = system root [SYSR . . .], Software boot flags*. The value is a hexadecimal number with eight digits. For example:

```
D/G/L 5 10000000 ! r = system root [SYSR...], Software boot flags
```

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:

```
D/G/L 5 F0000000
```

5. Rename DEFBOO.CMD to SYSFBOO.CMD, as follows:

```
$ RENAME DEFBOO.CMD SYSFBOO.CMD
```

6. Use the Exchange utility to copy SYSFBOO.CMD to the console RX50. Use the following format:

```
$ EXCHANGE COPY SYSFBOO.CMD CSA1:SYSFBOO.CMD
```

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

```
$ DISMOUNT CSA1:
```

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

1. Make sure the console RX50 is in console diskette drive CSA1.
2. Set the upper keylock switch to Enable and the lower keylock switch to Halt.
3. Press Ctrl/P.
4. To start the BOOT58 program, enter the following command and press Return:

```
>>> B/R5:800 CSA1
```

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

```
BOOT58> @ SYSFBOOT.COM
```

5.6.8 Orderly Shutdown with SHUTDOWN.COM

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.

5.6.9 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 SHUTDOWN or OPCCRASH.

CRASH commands cause the system to fail, resulting in immediate shutdown. To force your VAX 8200 system to fail, use the following procedure (as shown in Example 5-1):

1. Make sure the console RX50 is in console diskette drive CSA1.
2. Set the upper keylock switch to Enable and the lower keylock switch to Halt.
3. Press Ctrl/P. This stops the CPU and displays the program counter (PC).

Example 5-1 Running CRASH on a VAX 8200, 8250, 8300, 8350 System

```
Ctrl/P
?02 External Halt
PC = 801A208D
>>>E/I 0
    I      00000000      7FFE7CE0
>>>E/I 1
    I      00000001      7FFE9D88
>>>E/I 2
    I      00000002      7FFED04E
>>>E/I 3
    I      00000003      0001FAC8
>>>E/I 4
    I      00000004      80631200
>>>E P
    04030004
>>>D P 041F0000
>>>D/G F FFFFFFFF

>>>>C
**** FATAL BUG CHECK, VERSION = V5.4  INVEXCEPTN, Exception while
above ASTDEL or on interrupt stack

    CRASH CPU:  02          PRIMARY CPU:  02

    ACTIVE/AVAILABLE CPU MASKS: 00000016/00000016

    CURRENT PROCESS = NULL

    REGISTER DUMP

    .
    .
    .

    #ABCDEFGHIJK.MN#

    0 1 2 3 4 5 6 7 8 . . B C D E F
    02000000
    ?06          PC = 20090252
    ?42
    ?42          PC = 20090252

>>>
```

4. Enter the following commands and press Return after each one:

```
>>> E/I 0
>>> E/I 1
>>> E/I 2
>>> E/I 3
>>> E/I 4
>>> E P
>>> D P 041F0000
>>> D/G F FFFFFFFF
>>> C
```

CRASH commands display 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 to cause an exception condition that sends the contents of memory to the dump file on the system disk. Later you can read the dump file to determine why the system did not respond.

5. CRASH commands stop the system, display the contents of the program counter, and display the console-mode prompt (>>>).

If you are booting *from a local drive*, and if the upper keylock switch is set to Enable and the lower keylock switch is set to Auto Start, the system reboots.

If you are booting *from an HSC drive*, and if the upper keylock switch is set to Enable and the lower keylock switch is set to Auto Start, the system executes DEFBOO.COMD and reboots.

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

6. After the system reboots, you can examine the dump file. To examine the dump file, 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 *VMS System Dump Analyzer Utility Manual*.

5.7 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 section describes the following procedures:

- Installing and booting standalone BACKUP on the system disk (Section 5.7.1.1 and Section 5.7.1.2)
- Installing and booting standalone BACKUP on RX50 floppy diskettes (Section 5.7.1.3 and Section 5.7.1.4)
- Backing up the console RX50 using CONSCOPY.COM (Section 5.7.1.5)

5.7.1 Using Standalone BACKUP

You can keep standalone BACKUP on the system disk, on RX50 floppy diskettes, or on any other media that the system supports. Digital recommends that you keep standalone BACKUP on both the system disk and the floppy diskettes. (Although you usually boot standalone BACKUP from the system disk because it saves time, you should also keep a copy of standalone BACKUP on floppy diskettes in case the system disk becomes damaged.)

5.7.1.1 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 in to 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 5.7.1.2.

5.7.1.2 Booting Standalone BACKUP from the System Disk

If the system disk is on a local drive, use the following procedure to boot standalone BACKUP from [SYSE]:

1. Set the top keylock switch to ENABLE and the bottom keylock switch to HALT.
2. Make sure the console RX50 is in console diskette drive CSA1.

3. If the VMS operating system is not running, go to step 4.

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

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

The procedure displays several questions that you must answer to complete the shutdown. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure finishes, it displays the following message:

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

4. Press Ctrl/P.
5. Enter the BOOT command in the following format:

```
>>> B/R5:E0000000 [ddnu]
```

where *ddnu* is the boot name of the drive holding the system disk. A boot name has the following format:

```
ddnu
```

where:

- *dd* is the device code of the drive
- *n* is the controller's VAXBI node identification number
- *u* is the unit number

For example, to boot from an RA80 series disk drive with a VAXBI node 4 and unit 1, use the following command:

```
>>> B/R5:E0000000 DU41
```

If you do not specify the boot name of the drive, standalone BACKUP boots from the drive designated in the EEPROM.

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

```
VAX/VMS Version V5.4 Major version id = 1 Minor version id = 0  
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-JUN-1990 13:00
```


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 DJA2    device type RA60
Available device DJA3    device type RA60
```

Check 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.

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 15:00
$
```

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

You can choose any unique name in the form xxxBOO.CMD 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.CMD, name the new file XEFBOO.CMD.

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

1. Make sure the console RX50 is in console diskette 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 SYSS$SYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

4. Use the Exchange utility to copy DEFBOO.CMD to the current directory on the system disk. Enter the following command and press Return:

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

5. Edit XEFBOO.CMD. Change the line that deposits a value in register 5. This line contains the comment *! r = system root [SYSR . . .], Software boot flags*. Change the leftmost digit so that it specifies the SYSE directory. For example:

```
D/G 5 E0000000
```

6. Exit from the editor to save the modified version of the file.
7. To copy XEFBOO.CMD to the console RX50, enter the following command and press Return:

```
$ EXCHANGE COPY XEFBOO.CMD CSA1:XEFBOO.CMD
```

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

```
$ DISMOUNT CSA1
```

After you copy XEFBOO.CMD to the console RX50, you can use it to boot standalone BACKUP from a system disk on an HSC drive. To boot standalone BACKUP from SYSE on an HSC drive, use the following procedure:

1. Make sure the console RX50 is in console diskette drive CSA1.
2. Set the top keylock switch to ENABLE and the bottom keylock switch to HALT.
3. If the VMS operating system is not running, go to step 4.

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

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

The procedure displays several questions that you must answer to complete the shutdown. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure finishes, it displays the following message:

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

4. Press Ctrl/P.
5. To start the BOOT58 program, enter the following command and press Return:

```
>>> B/R5:800 CSA1
```

6. Enter the following command and press Return:

```
BOOT58> @XEFBOO.COMD
```

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

```
VAX/VMS Version V5.4 Major version id = 1 Minor version id = 0  
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-JUN-1990 13:00
```

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 DJA2    device type RA60  
Available device DJA3    device type RA60
```

Check 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.

9. 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 15:00  
$
```

5.7.1.3 Installing Standalone BACKUP on Floppy Diskettes

Digital recommends that you keep standalone BACKUP on floppy diskettes in case the system disk becomes damaged. You should have received standalone BACKUP on floppy diskettes as part of your VMS distribution kit. If the original floppy diskettes become damaged or if you want to make extra copies, use the following procedure:

1. Obtain the required number of RX50 floppy diskettes, based on the number you received with the distribution kit. The procedure will ask you to place those floppy diskettes (five, in this example) successively in the console drive. To keep the floppy diskettes properly labeled and organized during the procedure, affix a paper label to each one and use a soft, felt-tip pen (a hard pencil or ballpoint pen may damage the floppy diskette) to write a name on each label. Label the floppy diskettes as follows, where *n* is the version of the VMS operating system:

```
VMS V5.n S/A BKUP RX50 1/5
VMS V5.n S/A BKUP RX50 2/5
VMS V5.n S/A BKUP RX50 3/5
VMS V5.n S/A BKUP RX50 4/5
VMS V5.n S/A BKUP RX50 5/5
```

A paper label is the label affixed to a diskette. The procedure displays a volume label, not the paper label, in messages. A volume label is the name the VMS operating system uses to refer to a floppy diskette.

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

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

4. The procedure asks you for 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
```

5. The procedure displays the following messages. Press Return (for YES) after each question.

SYSGEN CONNECT CONSOLE was used to make the console device available.

The standalone kit requires five floppy diskettes. The first four floppy diskettes contain the standalone VMS system files, the last floppy diskette contains the BACKUP application image.

The system kit and the application kit can be built separately.

Do you want to build the system kit? [Yes/No, default Yes]:

Do you want to build the application kit? [Yes/No, default Yes]:

6. The procedure gives you two options that you can use to verify the reliability of the standalone BACKUP kit. First, it asks if you want to use the ANALYZE/MEDIA Utility to check for bad blocks on the target floppy diskette. Next, it asks if you want to verify each file that it copies. In this case, neither operation is necessary for RX50 floppy diskettes. Therefore, press Return when the procedure asks the following question:

Do you want to scan for bad blocks? [Yes/No, default No]:

The procedure displays the following message:

Do you want to verify copies? [Yes/No, default No]:

Press Return (for NO). Copy verification is only relevant for tape media.

7. The procedure displays the following messages:

Sysgen parameters for standalone VMS have been placed in file
SYS\$SYSROOT:<SYSUPD>VAXVMSSYS.PAR-TEMP-0000084;1

Please place the first system floppy diskette in drive _CSA1:.
This volume will receive the volume label SYSTEM_1.

Enter "YES" when ready:

8. Insert the floppy diskette labeled S/A BKUP RX50 1/5 in the console diskette drive. When you are ready to continue, type Y and press Return.
9. The procedure mounts the floppy diskette, copies a set of system files, and displays a number of informational messages. For example:

```
%MOUNT-I MOUNTED, SYSTEM_1 mounted on _CSA1:  
%CREATE-I-CREATED, _CSA1:<SYS0.SYSEXEXE> created  
%CREATE-I-CREATED, _CSA1: <SYS0.SYS$LDR> created  
.  
.  
.
```

10. When the last file is copied, the procedure asks you to insert the next floppy diskette. Remove the floppy diskette labeled S/A BKUP RX50 1/5. Insert the floppy diskette labeled S/A BKUP RX50 2/5. When you are ready to continue, type Y and press Return. For example:

```
Please place the second system floppy diskette in drive _CSA1:.  
This volume will receive the volume label SYSTEM_2.
```

Enter "YES" when ready: Y

11. Repeat steps 8 through 10 for each floppy diskette until the procedure asks you for the last floppy diskette, as follows:

```
Please place the application floppy diskette in drive _CSA1:.  
This volume will receive the volume label BACKUP.
```

Enter "YES" when ready: Y

12. Remove the floppy diskette labeled S/A BKUP RX50 4/5. Insert the floppy diskette labeled S/A BKUP RX50 5/5. When you are ready to continue, type Y and press Return.
13. After the files are copied to the last floppy diskette, the procedure displays the following message:

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

14. Remove the floppy diskette labeled S/A BKUP RX50 5/5 from diskette drive CSA1. Insert the console RX50. When you are ready to continue, type Y (for YES) and press Return. When the procedure finishes, it displays the following message.

The kit is complete.

5.7.1.4 Booting Standalone BACKUP from Floppy Diskettes

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from the RX50 floppy diskettes containing standalone BACKUP (either the set you received with your distribution kit or the set you created yourself, as described in Section 5.7.1.3). They are labeled as follows, where *n* is the version of the VMS operating system and *x* is the total number of floppy diskettes included with the distribution kit:

Paper Label ¹	Volume Label ²
VMS V5.n S/A BKUP RX50 1/x	SYSTEM_1
VMS V5.n S/A BKUP RX50 2/x	SYSTEM_2
VMS V5.n S/A BKUP RX50 3/x	SYSTEM_3
.	.
.	.
.	.
VMS V5.n S/A BKUP RX50 x/x	BACKUP

¹A paper label is the label affixed to a floppy diskette.

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

Regardless of how many floppy diskettes you need to boot standalone BACKUP, note that the last floppy diskette always has the volume label, *BACKUP*. If, for example, you use five floppy diskettes containing standalone BACKUP, they will be labeled as follows:

Paper Label	Volume Label
VMS V5.n S/A BKUP RX50 1/5	SYSTEM_1
VMS V5.n S/A BKUP RX50 2/5	SYSTEM_2
VMS V5.n S/A BKUP RX50 3/5	SYSTEM_3
VMS V5.n S/A BKUP RX50 3/5	SYSTEM_4
VMS V5.n S/A BKUP RX50 5/5	BACKUP

As you boot standalone BACKUP, place those floppy diskettes (five, in this example) successively in the console drive, as follows:

1. Make sure the console RX50 is in console diskette drive CSA1.
2. Set the upper keylock switch to ENABLE and the lower keylock switch to HALT.
3. If the VMS operating system is not running, go to step 4.

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

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

The procedure displays several questions that you must 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
```

4. Press Ctrl/P.
5. At the console-mode prompt, start the BOOT58 program. Enter the following command and press Return:

```
>>> B/R5:800 CSA1
```

6. At the BOOT58> prompt enter the following command and press Return:

```
BOOT58> @CSABOO.CMD
```

The procedure displays the following message:

```
Please remove the volume "8200x console" from the console device.  
Insert the first standalone system volume and enter "YES"  
when ready:
```


7. Remove the console RX50 and insert the floppy diskette labeled S/A BKUP RX50 1/4 in console diskette drive CSA1. When you are ready to continue, type Y (for YES) and press Return. The procedure displays the following message:

Resuming load operation on volume 'SYSTEM_1', please stand by...

Approximately 3 minutes later the procedure displays the following message:

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

Please remove the volume "SYSTEM_1" from the console device.

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

8. Remove the S/A BKUP RX50 1/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX50 2/5 in the drive. When you are ready to continue, type Y (for YES) and press Return. The procedure displays the following message:

Resuming load operation on volume "SYSTEM_2", please stand by...

Please remove the volume "SYSTEM_2", from the console device.

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

9. Remove the S/A BKUP RX50 2/5 floppy diskette and insert the diskette labeled S/A BKUP RX50 3/5 in the drive. When you are ready to continue, type Y (for YES) and press Return. The procedure displays the following message:

Resuming load operation on volume "SYSTEM_3", please stand by...

10. The procedure asks 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

11. The procedure displays the following messages:

Please remove the volume "SYSTEM_3" from the console device.
Insert the next standalone volume and enter "YES" when ready:

12. Remove the S/A BKUP RX50 3/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX50 4/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays a message and a list of the local devices on your system and, if you have them, HSC and MSCP served devices. For example:

Available device DJA2 device type RA60
Available device DJA3 device type RA60

Check 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.

13. The procedure displays the following messages:

Please remove the volume "SYSTEM_4" from the console device.

Insert the standalone application volume and enter "YES" when ready:

Remove the S/A BKUP RX50 4/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX50 5/5 in the drive. When you are ready to continue, type Y (for YES) and press Return. The procedure displays the following message:

Resuming load operation on volume "BACKUP", please stand by...

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

```
%BACKUP-I-IDENT, Standalone BACKUP V5.n; the date is 19-JUN-1990 15:00
$
```

15. If you are restoring the system disk, leave the last floppy diskette in the console drive and continue the restore procedure. If you are not restoring the system disk, you may remove the last floppy diskette from the console drive.

5.7.1.5 Backing Up the Console RX50

Make a backup copy of the console RX50 to protect against corruption or loss of the original. First use CONSCOPY.COM to transfer the files on the console RX50 to a directory on the system disk. Then use CONSCOPY.COM to *restore* the files to a new floppy diskette.

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

1. Log in to the SYSTEM account.
2. Make sure the console RX50 is in console diskette drive CSA1.
3. 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 8200]:
```

4. Press Return. 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 RX50?: SAVE
```

6. The procedure asks for the name of the *virtual disk* that you want the files to be saved 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. Make sure you put a colon (:) after the device name. For example:

Enter console device drive (DCU:): CSA1:

9. When the procedure displays the following message, press Return (the console RX50 is in the drive already).

Put your console RX50 into drive _CSA1:, and type Return when ready:

After you press Return, the procedure mounts the console RX50, and uses the Exchange Utility to begin the *save* operation. The procedure displays several EXCHANGE messages, file header information, and a list of the files that are being saved. When the procedure is complete, it displays the following message:

The SAVE of your console floppy is complete.

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

1. Enter the following command and press Return:

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

2. 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 8200]:
```

3. Press Return. 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.

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

Do you want to SAVE or RESTORE your console RX50?: RESTORE

5. The procedure asks for the name of the *virtual disk* from which the files are to be restored. Press Return to select the default (SYS\$DISK:CONSOLE.DSK). For example:

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

6. To verify the operation, press Return in response to the following question:

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

7. The procedure asks for the name of the console drive. Type **CSA1:** and press Return. Make sure you put a colon (:) after the device name. For example:

Enter console device drive (DDCU): CSA1:

8. The procedure displays the following message:

Put your console RX50 into drive _CSA1:,
and type Return when ready:

Remove the console RX50 from console diskette drive CSA1. Insert the new floppy diskette in the drive. When you are ready to continue, press Return.

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

The RESTORE of your console floppy is complete.

Use the console RX50 that you just created to make sure it works. Treat the original as the backup copy.

6

VAX 6000 System

6.1 Systems Configurations

6.1.1 System Cabinet Overview

The VAX 6000 computer system is designed for growth and can be configured for many different applications. Like other VAX systems, the VAX 6000 system can support many users in a time-sharing environment. This system does the following:

- Supports a full range of VAX applications and operating systems
- Functions as a standalone system, a member of a VAXcluster system, a boot node of a local area VAXcluster system, or as a VAX file server for workstations
- Allows for expansion of processors, memory, and I/O
- Supports scalar processors
- Supports vector processors on 500 and 400 models
- Implements symmetric multiprocessing where all processors have equal access to memory
- Uses a high-bandwidth system bus designed for multiprocessing
- Performs automatic self-test on power-up, reset, reboot, or system initialization

The system cabinet may house a console load device, the XMI card cage (which contains the processors, memories, and I/O adapters), two optional VAXBI card cages, optional disk drives, the control panel switches, status indicators, and restart controls. The console load device is used for installing operating systems, software, and some diagnostics. It may be an Ethernet based compact disk server or an in-cabinet tape drive. The console terminal is used for booting and for system management operations.

6.1.2 System Architecture

A processor node is a single-board scalar processor or a scalar/vector processor pair. The central processor unit (CPU) is comprised of two chips, one of which is a floating-point accelerator. A write-back cache subsystem improves system performance. In a multiprocessing system one scalar processor becomes the boot processor during power-up, and that boot processor loads the operating system and handles communication with the operator console. The other processors become secondary processors and receive system information from the boot processor.

A memory node is one memory module. Memory is a global resource equally accessible by all processors on the XMI. Each memory module may have 32, 64, or 128 Mbytes of memory consisting of ECC and control logic. The memories are automatically interleaved. An optional battery backup unit protects memory in case of power failure. The system supports up to eight memories.

6.1.3 I/O Bus Configuration

The system supports the following adapters: CIXCD, DEC LANcontroller 400 (DEMNA), DWMBB, and the KDM70.

6.2 System Operation

6.2.1 Powering Up the System

Power up the system by pushing in the handle on the H405 power controller. Then monitor the LED indications on the H7206 power and logic unit. The nine LEDs visible through the slot on the H7206 panel provide fault indications for the power regulators and for certain other faults such as overtemperature.

LEDs 2 through 6 are latching and therefore detect momentary faults. These LEDs are reset to Off by cycling the keyswitch to Off then back to Standby or Enable. These LEDs can also be reset by pressing and releasing the reset switch located beneath the LED indicators.

If a LED does not turn off after one of these reset procedures, then you have not corrected the problem that is causing the LED to light.

6.2.2 Boot Operation

The boot program reads the virtual memory boot program (VMB) from the boot device. VMB in turn boots the operating system.

Table 6-1 H7206 Diagnostic LEDs

LED	Condition	Color	Meaning
1	On	Green	+14V bias is okay
2	On	Red	XMI — H7215 fault
3	On	Red	XMI — H7214 fault
4	On	Red	XMI — H7242 fault
5	On	Red	VAXBI — H7215 fault
6	On	Red	VAXBI — H7214 fault
7	On	Red	H7214 or H7242 installed incorrectly
8	On	Red	XMI-1 module in the XMI-2 card cage
9	On	Red	Fault (airflow, interlock, overtemperature)

Table 6-2 Boot Procedure

Step	Procedure
1	You enter BOOT command from the console terminal in console mode. The BOOT command specifies the boot device and the path needed to reach it.
2	System reinitializes and performs self-test.
3	Boot primitive is invoked from console ROM on the boot processor. Boot primitive reads the bootblock from the specified boot device and transfers control to the bootblock.
4	The bootblock contains code and a pointer to VMB. The bootblock loads VMB into the first 256-Kbyte block of available memory.
5	Once VMB is loaded into memory, the bootblock transfers control to VMB, which in turn starts the operating system.

6.3 Console Commands

BOOT	REPEAT	START
CLEAR EXCEPTION	RESTORE EEPROM	STOP
CONTINUE	SAVE EEPROM	TEST
DEPOSIT	SET BOOT	UNJAM
EXAMINE	SET CPU	UPDATE
FIND	SET LANGUAGE	Z
HALT	SET MEMORY	!
HELP	SET TERMINAL	
INITIALIZE	SHOW	

6.3.1 Console Command Language Control Characters

Eleven ASCII control characters have special meaning when you type them on the console terminal running in console mode.

Table 6-3 Console Control Characters

Character	Function
BREAK	Increments the console baud rate, if enabled.
Ctrl/C	Causes the console to abort processing of a command.
Ctrl/O	Causes console to discard output to the console terminal until the next Ctrl/O is entered.
Ctrl/P	In console mode, acts like Ctrl/C . In program mode, causes the boot processor to halt and begin running the console program.
Ctrl/Q	Resumes console output that was suspended with Ctrl/S .
Ctrl/R	Redisplays the current line.
Ctrl/S	Suspends console output on the console terminal until Ctrl/Q is typed.
Ctrl/U	Discards all characters on the current line.
DELETE	Deletes the previously typed character.
ESC	Suppresses any special meaning associated with a given character.
RETURN	Carriage return; ends a command line.

6.3.2 Console Command Language Syntax

The console command language has syntax rules for forming commands. Commands contain up to 80 characters, can be abbreviated, and accept qualifiers. Tabs and spaces are compressed. Numbers are in hexadecimal notation.

Table 6-4 Console Command Language Syntax

Command Parameter	Attribute or Action
Length	80 characters maximum.
Abbreviation	Varies with the command; usually the shortest unique combination of letters.
Multiple adjacent spaces	Treated as a single space.
Multiple adjacent tabs	Treated as a single space.
Qualifier(s)	Can appear after the command keyword or after any symbol or number in the command; are preceded by a slash (/).
Numbers	Most appear in hexadecimal format.
No characters	Treated as a null command; no action taken.

The console program accepts commands up to 80 characters long. This does not include the terminating carriage return or any characters you delete as you enter the command. A command longer than 80 characters causes an error message of the form:

```
?0036 Command too long.
```

You can abbreviate commands and some qualifiers by dropping characters from the end of the word. You must enter the minimum number of characters to identify the keyword unambiguously. In the command reference sections that follow, characters that you can omit appear within square brackets ([]).

Multiple adjacent spaces and tabs are compressed and treated as a single space. The program ignores leading and trailing spaces.

You can use command qualifiers after the command keyword or after any symbol or number in the command.

Most numbers in console commands are in hexadecimal notation. However, the console program does accept decimal notation for console baud rate, register names (R0, R1, and so on), and vector registers.

You can use uppercase or lowercase characters for input. The console program converts all lowercase characters to uppercase.

A command line with no characters is a null command. The console program takes no action and does not issue an error message. The console prompt returns.

6.3.3 BOOT Command Description

The BOOT command syntax is:

```
B[OOT] [/qualifier] [<parameter>]
```

The qualifier includes a variable which is a node number, a value to be loaded into a register, or the name of a file when using the /FILENAME qualifier. A variable is a required argument to the qualifier. If you do not specify a variable, you receive an error message in the form:

```
?0021 Illegal command
```

In the syntax <parameter> can be a string of the form *ddnn*. The variable *dd* is a 2-character mnemonic for the device type (MU for tape, DU or DI for disk, EX or ET for Ethernet, or CSA1 for the in-cabinet console load device), and *nn* is a 1- or 2-digit hexadecimal number for the boot device. The *nn* portion of the boot device is ignored if the /R3 qualifier is used.

You can also use <parameter> as a 1- to 4-character name of a saved boot specification that you have created. Your saved specification needs to supply values for the boot device and other qualifiers, if required. You can override any saved qualifier value by specifying the qualifier with a new value.

If you omit <parameter>, the program uses the default saved boot specification. You define a default saved boot specification by using the reserved name DEFAULT and the SET BOOT command. Use unique names when you name your saved boot specifications. To avoid confusion, choose names for saved boot specifications that are distinct from the actual device names.

When you have successfully specified the command, your console terminal waits while the system initializes itself and performs self-test. When the operating system comes up, your console terminal displays the login banners of the operating system, and your console terminal is then operating in program mode.

6.3.4 Sample Console Session

```

#123456789 0123456789 0123456789 0123456789 012345# ①
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
      A  A  .  .  M  M  M  .  M  V- -P  P  P  P  TYP
      +  +  .  .  +  +  +  .  +  +  +  +  +  +  STF
      .  .  .  .  .  .  .  .  .  .  E  E  E  E  B  BPD
      .  .  .  .  .  .  .  .  .  .  +  +  +  +  +  ETF
      .  .  .  .  .  .  .  .  .  .  E  E  E  E  B  BPD

      .  .  .  .  A4  A3  A2  .  A1  .  .  .  .  ILV
      .  .  .  .  64  64  64  .  64  .  .  .  .  256 Mb

Console = V1.00 RBDs = V1.00  EEPROM = 1.00/1.00  SN = SG01234567

```

```

>>> EX/N:3 RO ③
G 00000000 FFFFFFFF
G 00000001 E0140648
G 00000002 00000000
G 00000003 00000010

```

```

>>> SHOW CONFIGURATION ④

```

	Type	Rev
1+	KA65A	(8080) 0006
2+	KA65A	(8080) 0006
3+	KA65A	(8080) 0006
4+	KA65A	(8080) 0006
5+	FV64A	(0000) 0001
6+	MS65A	(4001) 0084
8+	MS65A	(4001) 0084
9+	MS65A	(4001) 0084
A+	MS65A	(4001) 0084
D+	CIXCD	(0C05) 1652
E+	DEMNA	(0C03) 0601

```

>>> BOOT /XMI:D/R5:70000000/NODE:0E02 DUO ⑤
[self-test results appear]

```

```

* Initializing adapter ⑥
* Specified adapter initialized successfully
* Connecting to boot disk
20018 Specified unit offline - Unit unknown, online to
another controller or port disabled via A, B switches
20006 Halt instruction executed in kernel mode.
PC = E00C2329
PSL = 041F0600
ISP = 000002F0

```

Bootstrap failed due to previous error.

```

>>> BOOT /XMI:D/R5:70000000/NODE:0E02 DUO ⑦
[self-test results appear, then the operating system banner]

```

Sections of the sample console session flagged by the numbered callouts are explained below.

- ① At power-up, the system performs self-test and displays the results.
- ② The TYP line in the sample self-test display indicates that XMI slot 5 is a vector processor attached to the scalar processor at node 4. The dashed lines indicate that the vector processor (V-) and the scalar processor (-P) are paired.
- ③ The console prompt indicates that the terminal is in console mode. Enter an EXAMINE command to examine the contents of register 0 and three additional registers. Output displays the contents for R0, R1, R2, and R3, respectively.
- ④ Enter a SHOW CONFIGURATION command to show the hardware configuration. Operator looks at configuration to find the disk controller to know the correct qualifiers to enter with the BOOT command.

System response indicates devices' XMI node numbers, self-test status, device types, and contents of the revision register of the device.

- ⑤ Enter BOOT command, using the CIXCD adapter at XMI node D to locate the disk (DU0), the boot device, in a VAXcluster. Boots from an HSC controller that is dual-ported at unit numbers 0E and 02 with a system root of SYS7.
- ⑥ System issues status and error messages. An error occurred during connection to the boot disk, so a halt instruction is executed. You may assume an error in specifying the device or in the device itself. In this case, there was no disk pack in the disk drive. Error is corrected.
- ⑦ BOOT command is reissued. The operating system begins to boot and presents its banner to the console terminal.

6.4 Peripheral

If your system configuration includes a remote compact disc (CD) drive, see the chapter on peripherals.

6.5 Console Terminal

The console terminal is a video or hardcopy terminal attached to the system. It displays a log of system activities. Use the console terminal to control and monitor system operations. You can also keep a record of an installation or upgrade either by using a hardcopy console terminal or by attaching a printer to the console video terminal (if it has that capability).

6.6 Control Panel

The control panel is located on the front of the cabinet, in the upper left corner. It consists of the following:

- An upper, 4-position keyswitch
- A lower, 3-position keyswitch
- Six lights that correspond to the settings of the keyswitches
- A Restart button
- Three status indicator lights

6.6.1 Keyswitches

The control panel of a VAX 6000 series computer has the following two key switches:

- An upper keyswitch with four positions. Use it to turn the power on and off.
- A lower keyswitch with three positions. Use it to access the console terminal and to disable or enable automatic restart after a power failure.

To change the setting of a keyswitch, insert the key and turn it to the desired setting. After you select a switch setting, the corresponding light to the right of the switch glows. There is no light for the Off (0) position.

Table 6-5 lists the settings for the upper keyswitches and Table 6-6 lists the settings for the lower key switches.

Table 6-5 Upper Keyswitch Settings

Position	Effect	Light Color
Off	Shuts off all power except to the battery backup.	No light
Standby	Supplies power only to the power supply, blower, and memory. Used for system maintenance.	Red
Enable	Supplies power to the whole system. You can use the console terminal in console mode, or use the Restart button.	Yellow
Secure	Supplies power to the whole system. Used for normal system operation. You cannot use the Restart button or the console terminal in console mode.	Green

Table 6-6 Lower Keyswitch Settings

Position	Effect	Light Color
Update	Displays the console prompt at the console terminal. Used to modify the Electrically Erasable Programmable Read-Only Memory (EEPROM).	Red
Halt	Causes the system to halt rather than restart following a power failure or error halt.	Yellow
Auto Start	Allows the system to reboot automatically after a power failure or error halt.	Green

6.6.2 Restart Button

Depending on the position of the keyswitches, pressing the Restart button boots the system, runs self-tests, or does both. Table 6-7 describes various keyswitch settings and the corresponding function of the Restart button.

NOTE

The upper keyswitch must be in the Enable position for the Restart button to function.

Table 6-7 Restart Button Functions

Upper Keyswitch	Lower Keyswitch	Function
Enable	Auto Start	Runs self-tests. If the system passes the self-test, it reboots.
Enable	Update or Halt	Runs self-tests, halts, and displays the console prompt (>>>).
Standby or Secure	Any position	None.

6.6.3 Status Indicator Lights

There are three status indicator lights on the control panel: Run, Battery, and Fault. Table 6-8 describes the functions of these lights.

Table 6-8 Status Indicator Lights

Light	Color	State	Meaning
Run	Green	On	System is executing operating system instructions.
		Off	System is in console mode or turned off.
Battery	Green	On	Battery backup unit is fully charged.
		Flashing once per second	Battery backup unit is charging.
		Flashing 10 times per second	Battery backup unit is supplying power to the system.
		Off	System either does not have a battery backup unit or is turned off.
Fault	Red	On	Self-test in progress. If this light remains on, there is a hardware fault (see your computer-specific owner's manual).
		Off	Self-test is finished or the system is turned off.

6.7 Console Command Language

The console subsystem runs in two modes: program mode and console mode.

- **Program mode** — In program mode, the VMS operating system controls the console subsystem. The Run light on the control panel glows. In program mode, you can enter DCL commands, run programs, and receive system messages.
- **Console mode** — In console mode, the VMS operating system is not running and the system is halted. (You can halt the system yourself by pressing Ctrl/P). The console terminal displays the console prompt (>>>) and the Run light on the control panel is off. If the upper keyswitch is not set to Secure, you can control and monitor system operations by entering console commands.

Table 6-9 describes the console commands used in this supplement.

Table 6-9 Commonly Used Console Commands

Command	Definition
BOOT	Starts the process that loads system software into memory. Use the abbreviation B for the BOOT command.
DEPOSIT	Puts a value in the specified register or memory location.
EXAMINE	Displays the contents of the specified register or memory location.
SET BOOT	Equates a boot command to a nickname.
SHOW CONFIGURATION	Displays hardware and self-test information about the system.

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

6.8 Booting the System

6.8.1 Booting from a Local Disk Drive

To boot the system from a local disk drive, follow these steps:

1. Enter the BOOT command in the following format:

```
>>> BOOT [/R5:a] /XMI:b /BI:c [/R3:d] DUu
```

Table 6-10 lists the qualifiers to the BOOT command.

Table 6-10 Boot Command Qualifiers (Local Disks)

Qualifier	Function
/R5:a	Deposits a value (<i>a</i>) into R5. This value affects the execution of VMB.EXE. The /R5 qualifier is optional.
/XMI:b	Specifies the XMI node number (<i>b</i>) of the node being accessed. Defaults to the lowest numbered I/O device.
/BI:c	Specifies the BI node number (<i>c</i>) of the node being accessed. Defaults to 0.
/R3:d	Required only if you are using Volume Shadowing phase I (see the <i>VAX Volume Shadowing Manual</i> for more information). If you are using Volume Shadowing phase II, you do not need this qualifier, but you must set several SYSGEN parameters, as described in the <i>VMS Volume Shadowing Manual</i> .
u	Specifies the unit number of the drive holding the system disk.

For example, suppose you want to boot a local disk with a unit number of 1 and your system has the following configuration:

- The disk is connected to the VAXBI at node 2.
- The VAXBI you are using is connected to the XMI at node 3.

Enter the following command and press Return:

```
>>> BOOT/XMI:3/BI:2 DU1
```

6.8.2 Booting from an HSC Disk Drive

To boot the system from an HSC disk drive, use the following procedure:

1. If you have a CIBCA-A adapter and are booting over the CI, insert the console tape cartridge into the console drive.
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
```

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the system shuts down, the procedure displays the following message:

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

3. Press Ctrl/P to put the system in console mode.
4. Enter the BOOT command in the following format:

```
>>> BOOT [/R5:a] /XMI:b /BI:c [/R3:d] /NODE:e DUu
```

Table 6-11 lists the qualifiers to the BOOT command.

Table 6-11 Boot Command Qualifiers (HSC Disks)

Qualifier	Function
/R5:a	Deposits a value (<i>a</i>) into R5. This value affects the execution of VMB.EXE. The /R5 qualifier is optional.
/XMI:b	Specifies the XMI node number (<i>b</i>) of the node being accessed. Defaults to the lowest numbered I/O device.
/BI:c	Specifies the BI node number (<i>c</i>) of the node being accessed and must be used with the /XMI qualifier. Defaults to 0.
/R3:d	Required only if you are using Volume Shadowing phase I (see the <i>VAX Volume Shadowing Manual</i> for more information). If you are using Volume Shadowing phase II, you do not need this qualifier, but you must set several SYSGEN parameters, as described in the <i>VMS Volume Shadowing Manual</i> .
/NODE:e	Specifies the HSC node number (<i>e</i>) of the node being accessed. The HSC node number is hexadecimal. You can specify a maximum of two HSC node numbers (if two HSCs are available).
u	Specifies the unit number of the drive holding the system disk.

For example, suppose you want to boot an HSC disk with a unit number of 1 and your system has the following configuration:

- The disk is connected to the VAXBI at node 2.
- The VAXBI you are using is connected to the XMI at node 3.
- The disk is available to two HSCs, node numbers 0E and 02.

Enter the following command and press Return:

```
>>> BOOT/XMI:3/BI:2/NODE:0E02 DU1
```

Specifying two HSCs gives the system an alternate route in case one is disabled.

6.8.3 Performing a Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want 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. If you have a CIBCA-A adapter and are booting over the CI, insert the console tape cartridge into the console drive.
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
```

Answer the questions. 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 to put the system in console mode.
4. To begin the conversational boot, enter the following command at the console-mode prompt (>>>):

```
>>> BOOT /R5:1 /XMI:a /BI:b [/R3:c] [/NODE:d] DUu
```

where:

- *a* is the XMI node number of the system disk.
 - *b* is the VAXBI node number of the system disk.
 - *c* pertains to Volume Shadowing. This qualifier is required only if you are using Volume Shadowing phase I (see the *VAX Volume Shadowing Manual* for more information). If you are using Volume Shadowing phase II, you do not need this qualifier, but you must set several SYSGEN parameters, as described in the *VMS Volume Shadowing Manual*.
 - *d* is the HSC node number of the node being accessed. The /NODE qualifier is not necessary if you are booting from a local disk. The HSC node number is in hexadecimal. You can deposit a maximum of two HSC node numbers (if two HSCs are available).
 - *u* is the unit number of the drive holding the system disk.
5. When you finish using SYSGEN commands, enter the CONTINUE command to complete the BOOT process.

6.8.4 Automatic Restart

The VMS operating system can restart automatically from the default boot device designated in ROM (read-only memory). This section describes the two types of automatic restarts: warm (Section 6.8.4.1) and cold (Section 6.8.4.2).

To manually restart the system using the Restart button, see Section 6.6.2.

6.8.4.1 Warm Start

If you set the lower keyswitch on your VAX 6000 series console to Auto Start, the system will restart automatically under the following conditions:

- When the system power comes on after a power failure
- After an error halt

This type of automatic restart is known as a *warm start* because the backup battery unit supplies enough power to preserve the contents of memory.

6.8.4.2 Cold Start — Setting a Default Disk

If you shut down your VAX 6000 system and then specify Y at the auto reboot prompt, the system will restart automatically only if you have designated a default boot device prior to the shutdown. This type of automatic restart is known as a *cold start* because the memory is reinitialized before the system reboots.

To specify a default boot device, use the SET BOOT command in the following format:

```
>>> SET BOOT DEFAULT ddu
```

NOTE

To use any SET command, the lower keyswitch must be in the Update position.

For example, if you want the default boot device to be DU0, enter the following and press Return:

```
>>> SET BOOT DEFAULT DU0
```

Because the /XMI and /BI qualifiers are not specified, the system uses their default values.

The next time you boot the system, enter the **BOOT** command and press Return:

```
>>> B
```

The system boots from the device you have designated as the default boot device.

To clear the default designation, enter the following and press Return:

```
>>> SET BOOT DEFAULT
```

For more information on the **SET** command, see the owner's manual you received with your VAX 6000 series computer.

6.8.5 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] directory. To boot from [SYSF], do the following:

1. If you have a CIBCA-A adapter and are booting over the CI, insert the console tape cartridge into the console drive.
2. Press Ctrl/P to put the system in console mode.
3. Enter the **BOOT** command in the following format:

```
>>> BOOT /R5:F0000000 /XMI:a /BI:b [/R3:c] [/NODE:d] DUu
```

where:

- *a* is the XMI node number of the system disk.
- *b* is the VAXBI node number of the system disk.
- *c* pertains to Volume Shadowing. This qualifier is required only if you are using Volume Shadowing phase I (see the *VAX Volume Shadowing Manual* for more information). If you are using Volume Shadowing phase II, you do not need this qualifier, but you must set several SYSGEN parameters, as described in the *VMS Volume Shadowing Manual*.
- *d* is the HSC node number of the node being accessed. The /NODE qualifier is not necessary if you are booting from a local disk. The HSC node number is in hexadecimal. You can deposit a maximum of two HSC node numbers (if two HSCs are available).
- *u* is the unit number of the drive holding the system disk.

For example, suppose you want to boot from [SYSF] on an HSC disk with a unit number of 1 and your system has the following configuration:

- The disk is connected to the VAXBI at node 2.
- The VAXBI you are using is connected to the XMI at node 3.
- The disk is available to two HSCs, node numbers 0E and 02.

Enter the following command and press Return:

```
>>> BOOT/R5:F0000000/XMI:3/BI:2/NODE:0E02 DU1
```

6.8.6 Booting from a Different Directory on the System Disk

The VMS operating system is installed in the system root directory named [SYS0]. You can use VMSKITBLD, as 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 from a different directory on the system disk, use the following procedure:

1. If you have a CIBCA-A adapter and are booting over the CI, insert the console tape cartridge into the console drive.
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
```

Answer the questions. 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 to put the system in console mode.

4. Enter the BOOT command in the following format:

```
>>> BOOT /R5:a0000000 /XMI:b /BI:c [/R3:d] [/NODE:e] DUu
```

where:

- *a* is the name of the root directory from which you want to boot.
- *b* is the XMI node number of the system disk.
- *c* is the VAXBI node number of the system disk.
- *d* pertains to Volume Shadowing. This qualifier is required only if you are using Volume Shadowing phase I (see the *VAX Volume Shadowing Manual* for more information). If you are using Volume Shadowing phase II, you do not need this qualifier, but you must set several SYSGEN parameters, as described in the *VMS Volume Shadowing Manual*.
- *e* is the HSC node number of the node being accessed. The /NODE qualifier is not necessary if you are booting from a local disk. The HSC node number is in hexadecimal. You can deposit a maximum of two HSC node numbers (if two HSCs are available).
- *u* is the unit number of the drive holding the system disk.

For example, suppose you want to boot from [SYSC] on an HSC disk with a unit number of 1 and your system has the following configuration:

- The disk is connected to the VAXBI at node 2.
- The VAXBI you are using is connected to the XMI at node 3.
- The disk is available to two HSCs, node numbers 0E and 02.

Enter the following command and press Return:

```
>>> BOOT/R5:C0000000/XMI:3/BI:2/NODE:0E02 DU1
```

6.8.7 Using SET BOOT

Instead of entering the whole **BOOT** command every time you boot the system, you can equate the command to a "nickname." Nicknames can be up to four characters long. To give a **BOOT** command a nickname, use the **SET BOOT** command in the following format:

```
>>> SET BOOT nickname [boot-parameters]
```

NOTE

To use any SET command, the lower keyswitch must be in the Update position.

For example, suppose you want to assign a nickname to the following **BOOT** command:

```
BOOT/XMI:2/BI:2 DU0
```

Enter the following command and press Return:

```
>>> SET BOOT WORK /XMI:2/BI:2 DU0
```

NOTE

Avoid using nicknames that can be confused with the name of an actual boot device. For example, you would not want to use DU0 as a nickname if there is a drive on the system named DU0.

The next time you need to boot from DU0, enter the following and press Return:

```
>>> BOOT WORK
```

To clear the value of the nickname, enter the following and press Return:

```
>>> SET BOOT nickname
```

For more information on the **SET** command, see the owner's manual for your computer.

6.8.8 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 tape cartridge, or a machine check error. If you suspect a hardware problem, do the following:

- Consult the hardware manual for your VAX computer.
- Contact your Digital Customer Services representative.

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

```
*SET-I-INTSET, login interactive limit=64, current interactive value = 0
19-JUN-1990 15:00:00.00
SYSTEM      job terminated at 19-JUN-1990 15:00:00.00
```

Accounting information:

Buffered I/O count:	133	Peak working set size:	401
Direct I/O count:	12	Peak pagefile size:	2379
Page faults:	325	Mounted volumes:	0
Charged CPU time: 0 00:00:55.23		Elapsed time:	0 00:01:31.24

If the system does not display this message, a software problem might have occurred. If you suspect a software problem, do the following:

- Try booting the system again.
- Place a backup copy of the system disk into another drive and try to boot from it.

6.9 Shutting Down the System

To halt the system after the procedure completes, press Ctrl/P.

6.9.1 Emergency Shutdown with CRASH Commands

NOTE

Use this emergency shutdown procedure only if the system is hung and you cannot log in to **SYSTEM** to use **SHUTDOWN** or **OPCCRASH**.

To force your VAX computer to fail, do the following:

1. Set the upper keyswitch to Enable.
2. Press Ctrl/P to put the system in console mode.
3. Enter the following commands. The system displays a value in response to each of the **EXAMINE** commands. For example:

```
>>> E/I 0
          I      00000000      7FFE7CE0
>>> E/I 1
          I      00000001      7FFE9D88
>>> E/I 2
          I      00000002      7FFED04E
>>> E/I 3
          I      00000003      0001FACB
>>> E/I 4
          I      00000004      80631200
>>> E PSL
04030004
>>> D PSL 041F0000
>>> D PC  FFFFFFFF
```

Depositing these values in the program counter (PC) and the processor status longword (PSL) causes an exception condition that sends the contents of memory to a dump file on the system disk.

4. Enter the following command and press Return:

```
>>> C
```

5. The system displays a fatal bugcheck message, and other messages, similar to the following:

```
**** FATAL BUG CHECK, VERSION = 5.4 INVEXCEPTN, Exception while above ASTDEL  
or on interrupt stack
```

```
CRASH CPU: 02      PRIMARY CPU: 02  
ACTIVE/AVAILABLE CUP MASKS: 00000016/00000016  
CURRENT PROCESS = NULL  
REGISTER DUMP  
R0 = 0000001F  
:  
:  
:
```

```
**** MEMORY DUMP COMPLETE....  
>>>
```

6. If the system does not reboot automatically, reboot it.
7. After the system reboots, you can examine the dump file. Log in to the SYSTEM account.
8. Enter the following commands. 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 *VMS System Dump Analyzer Utility Manual*.

6.10 Backup Procedures

Use standalone BACKUP to make a complete backup of the system disk. Standalone BACKUP is a subset of the VMS 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 and you have more than one disk drive, 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.

This section describes the following:

- Using standalone BACKUP (Section 6.10.1)
- Installing and booting standalone BACKUP using the system disk (Section 6.10.1.1 and Section 6.10.1.2)
- Installing and booting standalone BACKUP using a tape cartridge (Section 6.10.1.3 and Section 6.10.1.4)
- Booting standalone BACKUP from a compact disc (CD) (Section 6.10.1.5)
- Backing up and restoring the system disk.

6.10.1 Using Standalone BACKUP

For VAX 6000 series systems, standalone BACKUP exists on either a tape cartridge or a compact disc, depending on the distribution media you received. Using either of those media, you can install standalone BACKUP on the system disk (which Digital recommends because booting standalone BACKUP from the system disk saves time). However, you should also retain the original compact disc or tape cartridge, or make a copy of standalone BACKUP on another tape cartridge, in case the system disk becomes damaged. The following sections describe standalone BACKUP installation and booting procedures for the system disk, tape cartridge, and compact disc.

6.10.1.1 Installing Standalone BACKUP on the System Disk

Digital has established [SYSE] on the system disk as the default directory for standalone BACKUP. To install standalone BACKUP in [SYSE], use the following procedure:

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

```
$ @SYSSUPDATE:STABACKIT SYSS$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. To boot standalone BACKUP from the system disk, go to Section 6.10.1.2.

6.10.1.2 Booting Standalone BACKUP from the System Disk

To boot standalone BACKUP from the system disk, follow these steps:

1. If your system has a CIBCA-A, insert the console tape cartridge into the console drive.
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:

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

Answer the questions. When the procedure asks if an automatic system boot 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 to halt the system.
4. Enter the BOOT command in the following format:

```
>>> B /R5:E0000000 /XMI:a /BI:b [/NODE=c] DUu
```

where:

- *a* is the XMI node number of the system disk.
- *b* is the VAXBI node number of the system disk.
- *c* is the HSC node number of the node being accessed. You do not need to specify the /NODE qualifier if you are booting from a local disk.
- *u* is the unit number.

5. Standalone BACKUP displays the following message:

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

6. The procedure asks 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
```

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 15:30
$
```

6.10.1.3 Installing Standalone BACKUP on a Tape Cartridge

You should have received standalone BACKUP on the tape cartridge or compact disc included in your distribution kit. Digital recommends that you keep a copy of standalone BACKUP on another tape cartridge in case the system disk, original distribution compact disc, or original distribution tape cartridge becomes damaged, or in case you need to make extra copies. To install standalone BACKUP on a tape cartridge, use the following procedure:

1. Obtain one blank tape cartridge. Write a name on the paper label that identifies the contents of that tape cartridge. For example, you could use the name S/A BKUP V5.4 to indicate that the tape cartridge contains a copy of the Version 5.4 standalone BACKUP kit. Insert the label into the label slot.
2. Make sure the tape cartridge is write-enabled.
3. Insert the tape cartridge into the drive.
4. Log in to the SYSTEM account.
5. Enter the following command and press Return:

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

6. The procedure asks you for the name of the target device. Enter the device name of the tape cartridge drive and press Return. For example:

Enter the name of the device on which to build the kit: MUC6:

7. After you enter the name of the target device, the procedure displays several informational messages and the following message:

```
Please place the scratch tape cartridge in drive _MUC6:  
This volume will receive the volume label SYSTEM.
```

Enter "YES" when ready:

When you are ready to continue, enter Y (for YES) and press Return.

8. The system displays verification messages informing you that files are being copied. When standalone BACKUP is installed, the procedure displays a message similar to the following:

```
Ending time 19-JUN-1990 16:44:29.90  
Starting time 19-JUN-1990 16:30:39.05
```

The Kit is complete.

```
$
```

9. Remove the tape cartridge from the tape cartridge drive.
10. Write-protect the tape cartridge and store it in a safe place.

6.10.1.4 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 15 minutes. You need a tape cartridge that contains standalone BACKUP (either the original distribution tape cartridge or a copy). To boot standalone BACKUP from a tape cartridge, use the following procedure:

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

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

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

Answer the questions. When the procedure asks if an automatic system boot 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
```

2. Press Ctrl/P to halt the system.
3. If your system has a CIBCA-A, insert the console tape cartridge into the console drive.
4. Enter the following command and press Return:

```
>>> B CSA1
```

5. The procedure displays a self-test message similar to the following:

```
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
A  A  .  .  .  M  M  M  M  .  P  P  P  P
O  O  .  .  .  +  +  +  +  .  +  +  +  +  STF
.  .  .  .  .  .  .  .  .  E  E  E  B  BPD
.  .  .  .  .  .  .  .  .  .  +  +  +  +  ETF
.  .  .  .  .  .  .  .  .  E  E  E  B  BPD
.  .  .  .  .  .  .  .  .  .  .  .  .  XBI D -
.  .  .  .  .  .  .  .  .  +  +  .  +  .  XBI E +
.  .  .  .  .  A4 A3 A2 A1 .  .  .  .  ILV
.  .  .  .  .  32 32 32 32 .  .  .  .  128 Mb
```

```
ROM = 1.0  EEPROM = 1.0/1.0  SN = NI0128
```

Loading system software.

Please remove the volume "CONSOL" from the console device.

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

6. If the console tape cartridge is in the console drive, remove it. Insert the tape cartridge that contains standalone BACKUP. When you are ready to continue, enter Y and press Return.

Standalone BACKUP displays a message similar to the following:

```
Resuming load operation on volume 'SYSTEM', please stand by...  
VAX/VMS Version V5.4 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 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 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 15:30  
$
```

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

6.10.1.5 Booting Standalone BACKUP from a Remote Compact Disc

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from a remote compact disc (CD). You will need the distribution compact disc (which contains standalone BACKUP) supplied in your original VMS kit.

NOTE

The following procedure applies *only* to VAX 6000 series computers capable of booting from a remote compact disc drive, such as an Ethernet based InfoServer system equipped with RRD40 compact disc drives. To make sure your VAX 6000 series system has this capability, review all relevant cover letters and the *VMS Release Notes*.

To boot standalone BACKUP from a remote compact disc, use the following procedure:

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

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

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

Answer the questions. When the procedure asks if an automatic system boot 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
```

2. Press Ctrl/P to halt the system.
3. Place the VMS distribution compact disc in the remote compact disc drive (in this case, an RRD40 compact disc drive connected to an Ethernet based InfoServer system). If your system contains a CIBCA-A, make sure the console tape cartridge is in the console drive.
4. Make sure your system is physically connected to the *same* Ethernet cable as the InfoServer.

5. Enter the following command and press Return:

```
>>> SHOW ETHERNET
```

In this example, the system displays information about the Ethernet controllers present on the XMI and VAXBI buses, using the following format:

```
XMI:x BI:y nn-nn-nn-nn-nn
```

where:

- *x* is the XMI node value.
 - *y* is the BI node value.
 - *nn-nn-nn-nn-nn* is the hexadecimal representation of the Ethernet controller's unique address. Keeping a list of each Ethernet address and corresponding processor (CPU) with that address can help you find which systems are generating specific messages.
6. To boot standalone BACKUP on a VAX 6000 series system from across the Ethernet, enter the following command, specifying the XMI and BI values displayed previously by the SHOW ETHERNET command. Then, press Return. For example:

```
>>> BOOT/XMI:D/BI:6/R5:100 ET0
```

Note in the previous example of booting standalone BACKUP that ET0 represents the Ethernet port to the boot device.

```
>>> BOOT/XMI:D/R5:100 EX0
```

7. The procedure displays a self-test message similar to the following:

```
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
A  A  .  .  .  M  M  M  M  .  P  P  P  P  TYP
O  O  .  .  .  +  +  +  +  .  +  +  +  +  STF
.  .  .  .  .  .  .  .  .  .  E  E  E  B  BPD
.  .  .  .  .  .  .  .  .  .  +  +  +  +  ETF
.  .  .  .  .  .  .  .  .  .  E  E  E  B  BPD
.  .  .  .  .  .  .  .  .  .  .  .  .  .  XBI D -
.  .  .  .  .  .  .  .  +  .  +  .  +  .  XBI E +
.  .  .  .  .  A4 A3 A2 A1 .  .  .  .  ILV
.  .  .  .  .  32 32 32 32 .  .  .  .  128 Mb
```

```
ROM0 = 2.00 ROM1 = 2.00 EEPROM = 1.00/1.00 SN = N10128
```

```
Loading system software.
```

(Note that ROM version numbers will be different for VAX 6000 series systems with upgraded console ROMs.)

8. After the system displays its self-test message, it prompts you for a file name, as follows:

Filename:

9. In response to the prompt, enter the following and press Return:

Filename: ISL_IVAX

Several informational console messages are displayed.

10. The system then displays the following:

Ethernet Initial System Load Function

Function ID		Function
1	-	Display Menu
2	-	Help
3	-	Choose Service
4	-	Stop

Enter a function ID value:

This display indicates that the Initial System Load (ISL) image is loaded, which means you can now locate the InfoServer services present on your Ethernet. In this example, the service is the RRD40 compact disc drive (connected internally or externally to the InfoServer).

11. Continue the procedure by entering 3 (for Function ID item number 3, Choose Service) and then pressing Return:

Enter a function ID value: 3

The next display is as follows:

Service options:

```

1 = Find Service
2 = Enter Known Service Name
=>

```

Service options:

```

1 = Find Service
2 = Enter Known Service Name
=>1

```

Working

12. After the ISL image completes its search, the system displays the list of known service names. For example:

```
Servers found:: 1

Service Names Format:
    Service Name
    Server Name
    Ethernet ID

#1
VMS052
DIS_08002b150589
08-00-2b-15-05-89

#2
VMS054
DIS_08002b150589
08-00-2b-15-05-89
Enter a number =>
```

13. To boot standalone BACKUP from the VMS Version 5.4 distribution compact disc, enter 2 and then press Return:

```
Servers found:: 1
.
.
.

#2
VMS054
DIS_08002b150589
08-00-2b-15-05-89
Enter a number =>2
```

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

```
VAX/VMS Version V5.4 Major version id = 1 Minor version id = 0
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-JUN-1990 15:00
```

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

Configuring devices . . .

```
Available device DAD1:           device type RRD40
Available device $DUA0:         device type RA81
Available device MINE$DJJA3:    device type RA60
```

.
.
.

Enter "YES" when all needed devices are available:

Note that DAD1: is the device name of the InfoServer service you are booting from, in this case an RRD40 compact disc (connected to the InfoServer) containing the VMS Version 5.4 distribution compact disc. If that device or other devices fail to appear in the list, make sure that all the drives are properly connected to the system before you enter YES at the prompt. See your hardware manuals for details.

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

```
%BACKUP-I-IDENT, Stand-alone BACKUP V5.4; the date is 19-JUN-1990 15:10
$
```


7

VAX-11/780 and VAX-11/785 Systems

The VAX-11/780, the original high-performance VAX member, has become an industry standard. The VAX-11/785 processor includes the same features as the VAX-11/780 but performance has been increased. Both the VAX-11/780 and the VAX-11/785 are microprogrammed, 32-bit processors that operate with the VMS operating system or with ULTRIX-32 operating system software. The VMS system provides a reliable, high-performance multiuser environment for time-sharing functions, for batch processing, and for realtime applications. The ULTRIX-32 system, a virtual-memory operating system with complete UNIX® functionality, includes demand paging and enhanced performance for applications that require large memory storage.

The central processing unit (CPU) performs the logic and arithmetic operations and controls the transfer of information to devices. It executes a large set of variable-length instructions in native mode, and nonprivileged PDP-11 instructions in compatibility mode. The 32-bit addressing and data capability of the processors permits direct access to four billion bytes of virtual address space. The processor's memory management hardware translates a virtual address to a physical address under operating system control. The processor offers a variety of addressing modes that use the general purpose registers to identify instruction operand locations, including an indexed addressing mode that provides post-indexing capability.

The processor's instruction set includes integral decimal, character string, and floating-point instructions, as well as integer, logical, and bit field instructions. Floating-point instruction execution can be enhanced by an optional floating-point accelerator.

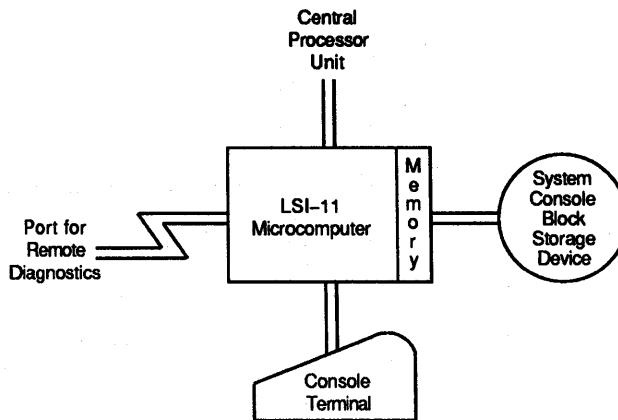
® UNIX is a registered trademark of UNIX System Laboratories, Inc.

7.1 Console Subsystem

The console subsystem consists of the following:

- Console terminal
- LSI-11 microcomputer
- Control panel
- Console diskette drive
- Console command language
- Remote diagnostic port

Figure 7-1 VAX-11/780 and VAX-11/785 Console Subsystem



ZK-0999-GE

7.2 Console Terminal

There are two types of console terminals:

- The Local console terminal is a hardcopy terminal attached to the system that prints a log of computer activities. Use it to control and monitor system operations.
- The remote console terminal is optional. If you purchase one, Digital diagnostics centers use a remote console terminal (located at the diagnostics center) to control system operations during diagnostic testing.

7.3 Control Panel

The VAX-11/780 and VAX-11/785 control panels are identical. The panel is located on the front of the computer and consists of four indicator lights and three switches. Figure 7-2 shows the control panel.

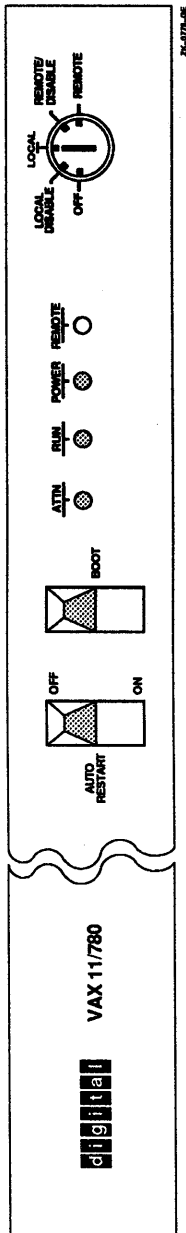
7.3.1 Indicator Lights

Table 7-1 describes the indicator lights on the VAX-11/780 and VAX-11/785 control panels.

Table 7-1 VAX-11/780 and VAX-11/785 Indicator Lights on the Control Panel

Label	Function
Attn	Glows red when the computer is stopped and the console subsystem is in console mode.
Run	Glows green when the computer is running and the console subsystem is in program mode.
Power	Glows green when power is supplied to the computer.
Remote	Glows red when the computer is stopped and the remote diagnostic port is enabled.

Figure 7-2 VAX-11/780 and VAX-11/785 Control Panel



7.3.2 Switches

The control panel has the following switches:

- Auto Restart switch
- Boot switch
- Five-position keylock switch

7.3.2.1 Auto Restart Switch

The Auto Restart switch has the following settings:

- On The system reboots automatically when one of the following events in the list occurs:
- Off The console-mode prompt (>>>) appears on the console terminal when one of the following events in the list occurs:

(The setting of the Auto Restart switch determines what happens after any of the following events:)

- The power is turned on.
- A power failure occurs (if the battery backup unit did not save the contents of memory).
- A shutdown occurs (if you entered Y at the auto-reboot prompt).
- The microprogram detects an error halt condition (for example, a HALT instruction executed in kernel mode).

Set the Auto Restart switch to On during normal system operations.

7.3.2.2 Boot Switch

Push the Boot switch to the On position to boot the system with the default boot command procedure. This spring-loaded switch returns to Off when you release it.

7.3.2.3 Keylock Switch

The five-position keylock switch controls system power and determines how the system responds to commands from local and remote console terminals. Table 7-2 describes each keylock switch setting. Note that the power supply to the system is turned off only when the keylock switch is set to Off.

Table 7-2 Keylock Switch Settings

Setting	Meaning
Off	Power is supplied to the battery backup unit and to the time-of-year clock, but not to the computer.
Local Disable ¹	You cannot use the local console terminal in console mode to control the system. You can use it in program mode as a user terminal. A Digital diagnostics center cannot use the remote console terminal when the switch is set to Local Disable.
Local	You can use the local console terminal in console mode to control the system. You can use it in program mode as a user terminal. A Digital diagnostics center cannot use the remote console terminal when the switch is set to Local.
Remote Disable	A Digital diagnostics center can use the remote console terminal in program mode, but not in console mode. You cannot use the local console terminal.
Remote	A Digital diagnostics center is in control of the system. You cannot use the local console terminal. However, the Digital diagnostics center can enter commands to restore control to the local console terminal.

¹Pressing the Boot switch to On has no effect because BOOT is a console mode command.

7.4 Console Diskette Drive

The console subsystem has a single floppy diskette drive, referred to as the *console diskette drive*. The floppy diskette drive holds RX01 floppy diskettes and is assigned the device name CSA1. The **console RX01** floppy diskette contains the command procedures used to *boot* (load) the operating system from the system disk into computer memory. It also is used to do the following tasks:

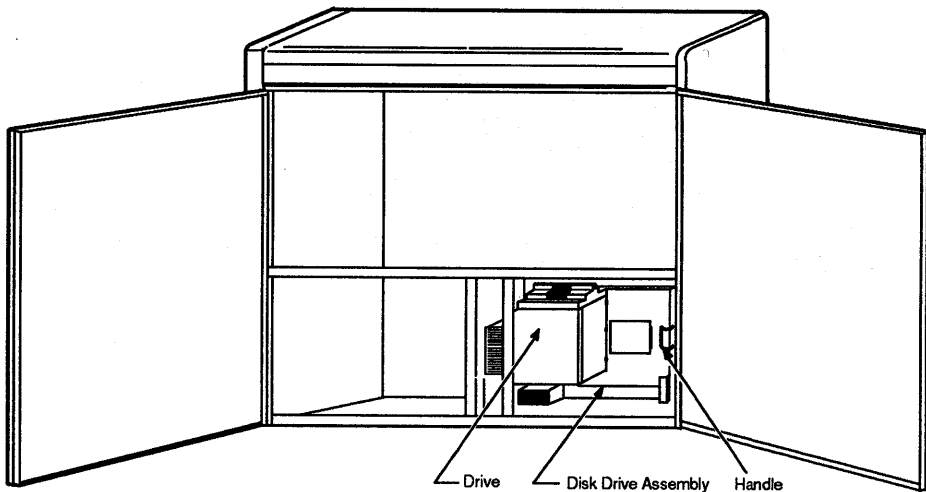
- Install updates
- Install optional software products
- Boot standalone BACKUP

7.4.1 Inserting and Removing a Floppy Diskette

To insert a floppy diskette in the console diskette drive, do the following:

1. Unlatch and open the CPU cabinet doors.
2. The diskette drive assembly is a rectangular, unpainted steel box in the lower right-hand corner of the cabinet. There is a black handle on the right of the drive assembly. Figure 7-3 shows the location of the console diskette drive. Pull the handle to swing out the drive until it is perpendicular to the cabinet. If you do not swing it out far enough, or if you swing it out too far, you will not be able to insert the floppy diskette.
3. Press the black door latch on the top of the diskette drive to unlock the diskette slot cover. The cover will spring open.

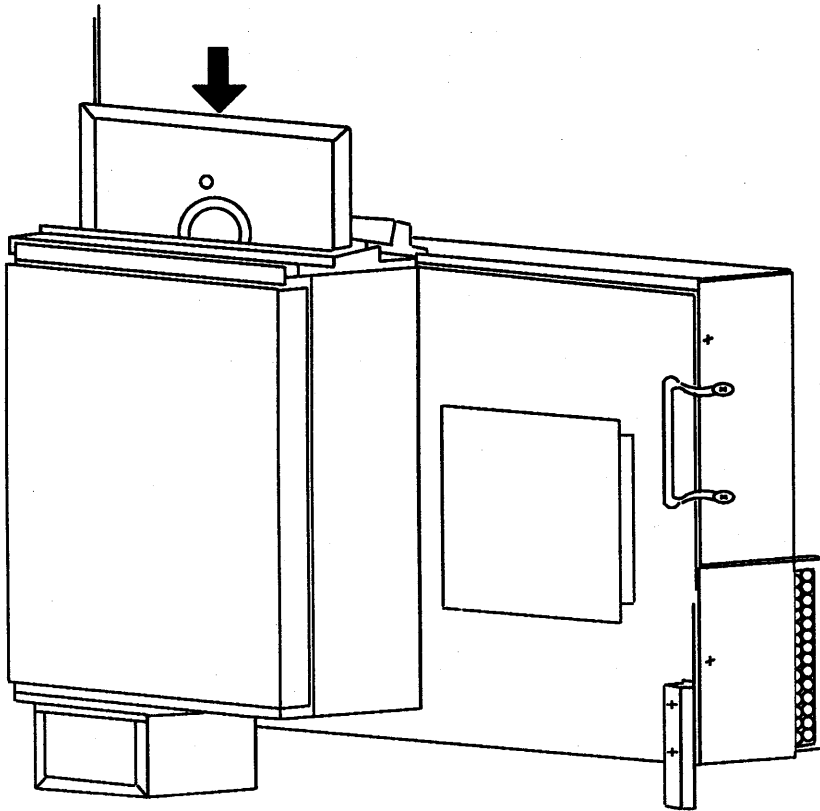
Figure 7-3 Console Diskette Drive



ZK-7437-GE

4. Check the drive to be sure that it is empty. (If a floppy diskette is already in the drive, remove it and place it in a protective paper envelope.) Hold the floppy diskette so that the label is at the top and faces towards the right. The oval slot on the floppy diskette should be at the bottom. Figure 7-4 shows how to insert the floppy diskette in the drive.

Figure 7-4 Inserting a Floppy Diskette



ZK-7438-GE

5. Close the diskette slot cover.
6. Swing the drive assembly back into the cabinet.
7. Close and latch the cabinet doors.

To remove a floppy diskette from the drive, open the diskette slot cover. Lift the floppy diskette firmly but gently out of the drive, taking care not to touch any exposed platter surfaces. Place the floppy diskette in a protective paper envelope.

7.5 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 VMS operating system is not running and the console-mode prompt (>>>) is displayed. The CPU can be running or it can be stopped. When the CPU is running, it responds to a limited number of commands. When the CPU is stopped, it responds to all console mode commands. To stop the CPU, enter the HALT command at the console-mode prompt (>>>).

To go from console mode to program mode, boot the VMS operating system).

- **Program mode** — When the console subsystem is in program mode, the VMS operating system is running and the dollar sign prompt (\$) is displayed. You can enter DCL commands, run programs, and receive system messages.

If the VMS operating system is running and you want to go to console mode, follow the shutdown procedure). You can also press Ctrl/P to suspend program mode temporarily and go to console mode. To get back to program mode, enter the CONTINUE command at the console-mode prompt (>>>).

Table 7-3 describes the console-mode commands you use during the installation procedure.

Table 7-3 Commonly Used Console Mode Commands

Command	Definition
BOOT	Executes a boot command procedure that loads a VAX software program into memory. The boot command procedure transfers control to the program in memory and puts the console subsystem in program mode. During the installation procedure use the abbreviation, B, for the BOOT 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	Completes the execution of the instruction in process and stops the CPU.

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

7.6 Booting the System

Booting is the process of loading system software into memory. The VAX-11/780 and VAX-11/785 computers use 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 RP06 drive that has a unit number of 0 with the boot command procedure DB0BOO.CMD (assuming the controller designation is A). If the drive has a unit number of 1, use the boot command procedure DB1BOO.CMD. Use CIBOO.CMD to boot from a system disk on an HSC drive.

All boot command procedures are located on the console RX01. The console RX01 must be in the console diskette drive (CSA1) whenever you boot the system.

There are some restrictions for booting both a VAX-11/780 and a VAX-11/785.

If you plan to boot from a UDA50 supported disk drive, you must keep in mind the following restrictions 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).

Do *not* enter the following SYSGEN command on a VAX-11/780 computer or a VAX-11/785 computer:

```
SYSGEN> CONNECT OPA1
```

Specifying CONNECT OPA1 on a VAX-11/780 or VAX-11/785 corrupts the console software in such a way that you will not be able to do the following:

- Access the console RX01. Any attempt to access the console RX01 results in an I/O timeout.
- Reboot the system from a system disk on an HSC drive. The system cannot use the access path to the console interface board and displays the following error message:

```
CANNOT FIND CI MICROCODE FILE
```

If you enter the CONNECT OPA1 command by mistake, turn off the power to the console subsystem and reload the software on the console RX01.

The following sections describe how to boot from a local or an HSC drive.

7.6.1 Booting with DEFBOO.CMD

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

- Set the Auto Restart switch to On. Turn on the power. The system uses DEFBOO.CMD to boot automatically.
- Set the keylock switch to Local. At the console-mode prompt (>>>), enter the following command to execute DEFBOO.CMD:

 >>> B
- Set the keylock switch to Local. When you see the console-mode prompt (>>>) displayed on the console terminal, push the Boot switch. The system executes DEFBOO.CMD.
- Set the Auto Restart switch to ON. Execute SHUTDOWN.COM and specify the auto reboot option. The system uses DEFBOO.CMD to reboot automatically.
- If the Auto Restart switch is set to On when the system shuts down due to a bugcheck, the system uses DEFBOO.CMD to reboot automatically.

The system sometimes uses DEFBOO.CMD when a power failure occurs. If the Auto Restart switch is set to On when a power failure occurs and the contents of memory are lost, the system executes DEFBOO.CMD when power is restored.

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

7.6.2 Booting from a Local Drive

To boot from a system disk on a local drive, use the following procedure:

1. Make sure the console RX01 is in the console diskette drive (CSA1) and the keylock 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
```

Answer the questions. 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* for 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 7-4 lists the device codes to use in boot names)
- *u* is the unit number

Table 7-4 Device Codes for VAX-11/780 and VAX-11/785 Disks

Disk Drives	Used in a Boot Name
RA60, RA80, RA81, and RA82	DU
RK07	DM
RM03, RM05, RM80, RP05, RP06, and RP07	DB

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

```
>>> B DU0
```

If you have a VAX-11/785, you can also specify a boot name in one of the following formats:

- *ddc* (*c* is the controller designation)
- *dd*

Depending on the format, there are several rules to follow for a VAX-11/785. These rules are given in Section 7.6.

You can also create default boot command procedures so that the system automatically boots from a particular drive. To create default boot command procedures, see Section 7.6.4.

7.6.3 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 RX01 is in the console diskette drive (CSA1) and the keylock switch is set to Local.
2. Determine the unit number of the system disk and the node number of the HSC controlling it. If the drive holding the system disk has two HSC controllers, determine both node numbers.
3. Deposit the HSC node number 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 hexadecimal 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
```

4. Deposit the unit number of the drive holding the system disk in register 3 (R3). Use the following format:

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

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

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

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

```
>>> @CIBOO.CMD
```

You can also create default boot command procedures so that the system automatically boots from a particular drive. To create default boot command procedures, see Section 7.6.4.

7.6.4 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 can also create default boot command procedures that boot the system automatically. There are two default boot command procedures: **DEFBOO.CMD** and **DEFGEN.CMD**.

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

DEFGEN.CMD and **DEFBOO.CMD** do not exist on the console **RX01**. However, Digital provides boot command procedures that you can edit and rename using the following procedure.

NOTE

This procedure assumes that you have installed and booted the VMS operating system and are logged in to the SYSTEM account.

1. Make sure the console **RX01** is in the console diskette drive (**CSA1**).
2. To connect the console drive to the system, enter the following commands and press Return after each one:

```
$ RUN SYSSYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

3. Use the **Exchange** utility to display a list of the files on the console **RX01**. Boot command procedures are files that start with either **CI** or **D** and end with either **BOO** or **GEN**. The file type is **CMD**. Enter the following command and press Return:

```
$ EXCHANGE DIRECTORY CSA1:C*,D*
```

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

```
DUABOO.CMD      CSABOO.CMD
CIBOO.CMD       CIGEN.CMD
DU1BOO.CMD      DUAGEN.CMD
.
.
```

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

If the system disk is on a local drive, copy and edit 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 RP07 drive, find the file names that begin with DB (DB is the device code for an RP07 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, DB1BOO.CMD boots an RP07 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, DBCBOO.CMD boots an RP07 disk drive with a controller designation of C.

5. Use the Exchange utility to copy the appropriate files from the console RX01 to your current directory on the system disk. Enter the COPY command in the following format:

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

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

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

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. Add a command to deposit the unit number of the drive holding the system disk in register 3 (R3). Use hexadecimal notation.

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.CMD and DBCGEN.CMD, add the following line to both files:

```
DEPOSIT R3 3 !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.CMD and CIGEN.CMD, add the following line to both files:

```
DEPOSIT R3 2 !DISK DRIVE UNIT NUMBER
```

- b. If you copied CIBOO.CMD and CIGEN.CMD, add a command to both files to deposit the HSC node number in register 2 (R2). 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), add the following command:

```
DEPOSIT R2 120A
```

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

```
$ RENAME filename.CMD DEFBOO.CMD
$ RENAME filename.CMD DEFGEN.CMD
```

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

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

8. Use the Exchange utility to copy DEFBOO.CMD and DEFGEN.CMD to the console RX01. Enter the following commands and press Return after each one:

```
$ EXCHANGE COPY DEFBOO.CMD CSA1:DEFBOO.CMD
$ EXCHANGE COPY DEFGEN.CMD CSA1:DEFGEN.CMD
```

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

```
$ DISMOUNT CSA1
```

10. To secure the console RX01 from unauthorized access, you must enter the following command and press Return:

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

Now you can use DEFBOO.CMD and DEFGEN.CMD to boot the VMS operating system, as described in the following sections. If you change the system configuration in the future, use the previous procedure to modify DEFBOO.CMD and DEFGEN.CMD.

7.6.5 Booting with DEFGEN.CMD — Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want 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 RX01 is in the console diskette drive (CSA1) and the keylock 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
```

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

```
>>> @DEFGEN
```

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

7.7 Booting from SYSF During an Upgrade

When you perform a VMS upgrade, you must boot the system from the SYSF directory on the system disk. To boot from [SYSF], create a command procedure named SYSFBOO.CMD.

To create SYSFBOO.CMD, use the following procedure:

NOTE

This procedure assumes that you have installed and booted the VMS operating system and are logged in to the SYSTEM account.

1. Make sure that the console RX01 is in the console diskette drive (CSA1).
2. Log in to the SYSTEM account.
3. To connect the console drive, enter the following commands and press Return after each one:

```
$ RUN SYSSYSTEM:SYSGEN  
SYSGEN> CONNECT CONSOLE  
SYSGEN> EXIT
```

4. Use the Exchange utility to copy DEFBOO.CMD from the console RX01 to your current directory on the system disk. Enter the following command and press Return:

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


5. Edit the line in DEFBOO.COM line that deposits a value in register 5 (R5) as shown in the following code example:

```
DEPOSIT R5 F0000000
```

6. Rename DEFBOO.COM to SYSFBOO.COM as shown in the following code example:

```
$ RENAME DEFBOO.COM SYSFBOO.COM
```

7. Use the Exchange utility to copy SYSFBOO.COM to the console RX01 as shown in the following code example:

```
$ EXCHANGE COPY SYSFBOO.COM CSA1:SYNBOO.COM
```

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

```
$ DISMOUNT CSA1
```

9. To secure the console RX01 from unauthorized access, you must enter the following command and press Return:

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

To boot from the SYSF root, use the following procedure:

1. Make sure the console RX01 is in the console diskette drive (CSA1) and the keylock switch is set to Local.
2. If the VMS operating system is not running, go to step 2.

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

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

Answer the questions. 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. Use the following command to boot from SYSF:

```
>>> B SYSF
```

7.8 Booting from a Different Directory on the System Disk

The VMS operating system is installed on the system disk in the 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 root directory on the system disk.

To boot from a directory other than [SYS0], create a command procedure named SY n BOO.CMD, where n stands for the name of the other root directory on the system disk. To create SY n BOO.CMD, use the following procedure:

1. Make sure that the console RX01 is in the console diskette drive (CSA1).
2. Log in to the SYSTEM account.
3. To connect the console drive, enter the following commands and press Return after each one:

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

4. Use the Exchange utility to copy DEFBOO.CMD from the console RX01 to your current directory on the system disk. Enter the following command and press Return:

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

5. Edit DEFBOO.CMD. Change the line that deposits a value in register 5 (R5). This line contains the comment *!software boot flags*. The value is a hexadecimal number with eight bits. For example:

```
DEPOSIT R5 10000000      !software boot flags
```

Change the left-most 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      !software boot flags
```

6. Rename DEFBOO.CMD to SY n BOO.CMD, where n stands for the name of the other root directory. Use the following format:

```
$ RENAME DEFBOO.CMD SY $n$ BOO.CMD
```

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

```
$ RENAME DEFBOO.COMD SYCBOO.COMD
```

7. Use the Exchange utility to copy SYnBOO.COMD to the console RX01. Use the following format:

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

For example, if the file name is SYCBOO.COMD, enter the following command and press Return:

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

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

```
$ DISMOUNT CSA1
```

9. To secure the console RX01 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 RX01 is in the console diskette drive (CSA1) and the keylock switch is set to Local.
2. If the VMS operating system is not running, go to step 2.

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

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

Answer the questions. 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. Use SYnBOO.CMD to boot from a different directory. For example, to boot from [SYSC], enter the following command and press Return:

```
>>> B SYC
```

7.8.1 Orderly Shutdown with SHUTDOWN.COM

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 (>>>).

7.8.2 Emergency Shutdown with CRASH

NOTE

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

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

1. Make sure the console RX01 is in the console diskette drive (CSA1) and the keylock switch is set to Local.
2. Press Ctrl/P to stop the system. At the console-mode prompt (>>>), enter the HALT command and press Return. For example:

```
>>> HALT
```

3. Enter the following command and press Return:

```
>>> @CRASH
```

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 to cause an exception condition that sends the contents of memory to the dump file on the system disk. Later you can read the dump file to determine why the system did not respond.

4. CRASH halts the system, displays the contents of the program counter, and displays the console-mode prompt (>>>).

If the Auto Restart switch is set to ON, the system reboots after CRASH runs. If the system does not reboot automatically, reboot it manually.

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

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

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

7.9 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 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 the 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.
- 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 of the system 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 you use a fixed (nonremovable) system disk, back it up to a disk or magnetic tape. Then restore the files to the original system disk.
- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on RX01 floppy diskettes
- Backing up and restoring the system disk

You should also make a copy of the console RX01 in case the original becomes damaged. Section 7.9.2 describes using CONSCOPY.COM to do this.

7.9.1 Using Standalone BACKUP

You can keep standalone BACKUP on the system disk, RX01 floppy diskettes, or any other media that your system supports. Digital recommends that you keep standalone BACKUP on the system disk and on floppy diskettes. Usually you boot standalone BACKUP from the system disk because it saves time. However, you need a copy of standalone BACKUP on floppy diskettes in case the system disk becomes damaged. If you have a magnetic tape distribution kit, you received standalone BACKUP on floppy diskettes.

7.9.1.1 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 Return:

```
$ @SYSSUPDATE:STABACKIT SYSSSYSDEVICE:
```

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 7.9.1.2.

7.9.1.2 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.CMD.

You can choose any unique name in the form xxxBOO.CMD 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.CMD, name the new file XEFBOO.CMD.

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

1. Make sure the console RX01 is in the console diskette 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 SYSSYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

4. Use the Exchange utility to copy DEFBOO.CMD to the current directory on the system disk. Enter the following command and press Return:

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

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

```
DEPOSIT R5 E0000000 !DESIGNATED ROOT IS SYSE
```

6. Exit from the editor to save the modified version of the file.
7. To copy XEFBOO.CMD to the console RX01, enter the following command and press Return:

```
$ EXCHANGE COPY XEFBOO.CMD CSA1:XEFBOO.CMD
```

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

```
$ DISMOUNT CSA1
```

9. To secure the console RX01 from unauthorized access, you must enter the following command and press Return:

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

After you copy XEFBOO.COMD to the console RX01, 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 RX01 is in the console diskette drive (CSA1) and the keylock 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:

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

Answer the questions. 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. For example:

```
>>> HALT
```

4. Enter the following command and press Return:

```
>>> @XEFBOO
```

5. 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
```

6. 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$DJA3:    device type RA60  
Available device MINE$DJA2:    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.

7. 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 15:00
$
```

7.9.1.3 Installing Standalone BACKUP on Floppy Diskettes

Digital recommends that you keep standalone BACKUP on floppy diskettes in case the system disk becomes damaged. To install standalone BACKUP on floppy diskettes, use the following procedure. The procedure takes approximately 12 minutes.

NOTE

If you have the VMS magnetic tape distribution kit, you already have standalone BACKUP on floppy diskettes. If the original floppy diskettes become damaged or you want to make extra copies, use this procedure.

1. Obtain five RX01 floppy diskettes. Affix a paper label to each one. Use a felt-tip pen to write a name on each one. Use the following names:

```
S/A BKUP RX01 V5.4 1/5
S/A BKUP RX01 V5.4 2/5
S/A BKUP RX01 V5.4 3/5
S/A BKUP RX01 V5.4 4/5
S/A BKUP RX01 V5.4 5/5
```

A paper label is the label affixed to a diskette. The procedure displays a volume label, not the paper label, in messages. A volume label is the name the VMS operating system uses to refer to a floppy diskette.

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

```
$ @SYSSUPDATE:STABACKIT
```

4. The procedure asks you for 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
```

5. The procedure displays the following messages. Press Return (for YES) after each question.

The standalone kit requires five floppy diskettes. The first four floppy diskettes contain the standalone VMS system files, the last floppy diskette contains the BACKUP application image.

The system kit and the application kit can be built separately.

Do you want to build the system kit? [Yes/No, default Yes]:

Do you want to build the application kit? [Yes/No, default Yes]:

6. The procedure gives you two options that you can use to verify the reliability of the standalone BACKUP kit. It asks if you want to use the ANALYZE/MEDIA utility to check for bad blocks on the target floppy diskette. Using ANALYZE/MEDIA adds 5 minutes to the time it takes the procedure to run.

It also asks if you want to verify each file that it copies. This adds another 5 minutes to the time it takes the procedure to run.

Digital suggests that you type Y and press Return when the procedure asks the following question:

Do you want to scan for bad blocks? [Yes/No, default No]:

The procedure displays the following message:

Do you want to verify copies? [Yes/No, default No]:

Press Return (for NO). Copy verification is only relevant for tape media.

7. The procedure displays the following messages:

```
Sysgen parameters for standalone VMS have been placed in file
SYSSSYSROOT:
```

```
<SYSUPD>
VAXVMS SYS.PAR-TEMP-46E00121;1
```

```
Please place the first system floppy diskette in drive _CSA1:.
This volume will receive the volume label SYSTEM_1.
```

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

8. Insert the floppy diskette labeled S/A BKUP RX01 V5.4 1/5 in the console diskette drive. When you are ready to continue, type Y and press Return.

The procedure displays the following message:

```
Analyzing floppy diskette in _CSA1: for bad blocks . . .
```

If there are not any bad blocks, the procedure displays the following message:

```
%BAD-I-LST00BK, Device _CSA1: contains a total of 494 blocks; 0
defective blocks detected
```

If there are bad blocks, the procedure displays the following message:

```
Please replace the defective floppy diskette cartridge in _CSA1: with
another blank floppy diskette.
```

Discard the floppy diskette with bad blocks. Obtain and label a new floppy diskette and insert it into the console diskette drive.

9. After running ANALYZE/MEDIA, the procedure mounts the floppy diskette, copies a set of system files, and displays a number of informational messages. For example:

```
%MOUNT-I MOUNTED, SYSTEM_1 mounted on _CSA1:
%CREATE-I-CREATED, _CSA1:

<SYS0.SYSEXE>
created
%CREATE-I-CREATED, _CSA1:

<SYS0.SYSSLDR>
created
.
.
.
```

10. When the last file is copied, the procedure asks you to insert the next floppy diskette. Remove the floppy diskette labeled S/A BKUP RX01 V5.4 1/5. Insert the floppy diskette labeled S/A BKUP RX01 V5.4 2/5. When you are ready to continue, type Y and press Return. For example:

```
Please place the second system floppy diskette in drive _CSA1:.
This volume will receive the volume label SYSTEM_2.

Enter "YES" when ready: Y
```

The ANALYZE/MEDIA utility runs as described in the previous step.

11. Repeat steps 8 through 10 for each floppy diskette.
12. After files are copied to the last floppy diskette, the procedure displays the following message:

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

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

13. Remove the floppy diskette labeled S/A BKUP RX01 V5.4 5/5. Insert the console RX01. When you are ready to continue, type Y and press Return. When the procedure finishes, it displays the following message:

The kit is complete.

7.9.1.4 Booting Standalone BACKUP from Floppy Diskettes

If the system disk containing standalone BACKUP becomes unusable, you can boot standalone BACKUP from RX01 floppy diskettes. You need the five floppy diskettes that contain standalone BACKUP. They are labeled as follows:

Paper Label ¹	Volume Label ²
S/A BKUP RX01 V5.4 1/5	SYSTEM_1
S/A BKUP RX01 V5.4 2/5	SYSTEM_2
S/A BKUP RX01 V5.4 3/5	SYSTEM_3
S/A BKUP RX01 V5.4 4/5	SYSTEM_4
S/A BKUP RX01 V5.4 5/5	BACKUP

¹A paper label is a label affixed to a floppy diskette.

²A volume label is the name the VMS operating system uses to refer to a floppy diskette. The procedure displays the volume label, not the paper label, in messages.

The procedure asks you to place the five floppy diskettes containing standalone BACKUP, successively, in the console drive.

1. Make sure the console RX01 is in the console diskette drive and the keylock 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:

```
$ @SYSSYSTEM:SHUTDOWN
```

Answer the questions. 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. For example:

```
>>> HALT
```

4. Enter the following command and press Return:

```
>>> B CS1
```

The procedure displays the following messages:

```
CPU HALTED
  INIT SEQ DONE
  LOAD DONE, 0000A400 BYTES LOADED
```

Notice that the red Attn light goes off, and the green Run light goes on. The procedure displays the following message:

```
Please remove the volume "78X console" from the console device.
Insert the first standalone system volume and enter "YES" when ready:
```

5. Remove the console RX01 and insert the floppy diskette labeled S/A BKUP RX01 V5.4 1/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays the following message:

8:40

```
Resuming load operation on volume "SYSTEM_1", please stand by...
```

Approximately 5 minutes later the procedure displays the following message:

```
Please remove the volume "SYSTEM_1" from the console device.
Insert the next standalone system volume and enter "YES" when ready:
```

6. Remove the S/A BKUP RX01 V5.4 1/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX01 V5.4 2/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays the following message:

8:45
- 8:52

```
Resuming load operation on volume "SYSTEM_2", please stand by...
```

Approximately 1 minute later the procedure displays the following message:

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

```
Please remove the volume "SYSTEM_2" from the console device.
Insert the next standalone system volume and enter "YES" when ready:
```

posted

7. Remove the S/A BKUP RX01 V5.4 2/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX01 V5.4 3/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays the following message:

8:58

Resuming load operation on volume "SYSTEM_3", please stand by...

Approximately 1 minute later the procedure displays the following message:

Please remove the volume "SYSTEM_3" from the console device.
Insert the next standalone system volume and enter "YES" when ready:

- 9:05
8. Remove the S/A BKUP RX01 V5.4 3/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX01 V5.4 4/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays the following message:

Resuming load operation on volume "SYSTEM_4", please stand by...

9. 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

- actually on disk
10. 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 DJA3: device type RA60
Available device DJA2: 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.

11. The procedure displays the following messages:

Please remove the volume "SYSTEM_4" from the console device.
Insert the standalone application volume and enter "YES" when ready:

Remove the S/A BKUP RX01 V5.4 4/5 floppy diskette and insert the floppy diskette labeled S/A BKUP RX01 V5.4 5/5 in the drive. When you are ready to continue, type Y and press Return. The procedure displays the following message:

Resuming load operation on volume "BACKUP", please stand by...

12. 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 15:00
\$

(5)
LEAVE APPLICATION DISKETTE IN FLOPPY DRIVE
UNTIL BACKUP/RESTORE IS COMPLETED!!

BACKUP COMMAND: \$BACKUP/NOASSIST/REWIND/LOG MUAQ: DUAØ.BCK DUAØ:

7.9.2 Backing Up the Console RX01

Make a backup copy of the console RX01 to protect against corruption or loss of the original. First, use CONSCOPY.COM to transfer the files on the console RX01 to a directory on the system disk. Then use CONSCOPY.COM to *restore* the files to a new floppy diskette.

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

1. Make sure the console RX01 is in the console diskette drive (CSA1).
2. Log in to the SYSTEM account.
3. Enter the following command and press Return:

```
$ @SYSSUPDATE:CONSCOPY
```

The procedure displays the following messages:

```
SYSSUPDATE:CONSCOPY.COM
```

```
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 78X]:
```

4. Press Return to accept the default, 78X. 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 floppy?: SAVE
```

6. The procedure asks you for the name of the *virtual disk* that you want the files to be saved 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 RX01 is already in the drive):

Put your console floppy into drive _CSA1:,
and type Return when ready:

After you press Return, the procedure mounts the console RX01 and uses the Exchange utility to begin the *save* operation. The procedure displays several EXCHANGE messages, file header information, and a list of the files that are being saved. When the procedure is complete, it displays the following message:

The SAVE of your console floppy is complete.

To transfer the files that are on the system disk to a new floppy diskette, 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 78X]:
```

2. Press Return to accept the default, 78X. 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 floppy?: RESTORE

4. The procedure asks for the name of the *virtual disk* from which the files are to be restored. 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 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 floppy into drive _CSA1:,
and type Return when ready:

Remove the console RX01 from the console diskette drive. Insert the new floppy diskette in the drive. Press Return when you are ready to continue.

8. The procedure mounts the floppy diskette and uses the Exchange utility to begin the *restore* operation. The procedure displays several **EXCHANGE** 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 floppy is complete.

Use the console RX01 that you just created to make sure it works. Treat the original as the backup copy.

VAX-11/750 System

The 11/750 operates with Digital's intelligent disk controllers to offload the disk management functions from the host processor. The VAX-11/750 is enclosed in a low-height, extended-weight cabinet and implements custom gate-array technology. The gate arrays are bipolar LSI Schottky logic designed by Digital specifically for this system to reduce the number of components to lower power consumption.

8.1 VAX-11/750 Basic System

The basic VAX-11/750 system contains the VAX-11/750 CPU, up to 8 Mbytes of ECC MOS memory, and a TU58 cartridge tape drive as the console load device. A 4-Kbyte bipolar cache memory with parity is included to improve the processor performance. A 1-Kbyte user writable control store (WCS) option provides customers with the capability of executing application-specific microroutines. The execution time of floating-point instructions and some integer instructions can be decreased by adding the FP750 floating-point accelerator option, which mounts within the system cabinet. In addition, the KU750 extended-range G and H floating-point data type option can be added to further enhance floating-point operations. When I/O device expansion is required, the internal UNIBUS expansion can be added.

To increase the mass storage capabilities of the VAX-11/750 system, several disk and tape drive controllers are available and can be included in the system cabinet or in the UNIBUS expansion cabinet. The UDA50 universal disk adapter supports a combination of high-capacity disk drives.

8.2 Console Subsystem

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

- Console terminal
- Computer control panel
- Console tape cassette drive
- Console command language
- Remote diagnostic port

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

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

8.3 Console Terminal

There are two types of console terminals:

- The local console terminal is a hardcopy terminal that prints a log of computer activities. Use it to control and monitor system operations.
- The remote console terminal is optional. If you purchase one, a Digital diagnostics center uses the remote console terminal (located at the diagnostics center) to control system operations during diagnostic testing.

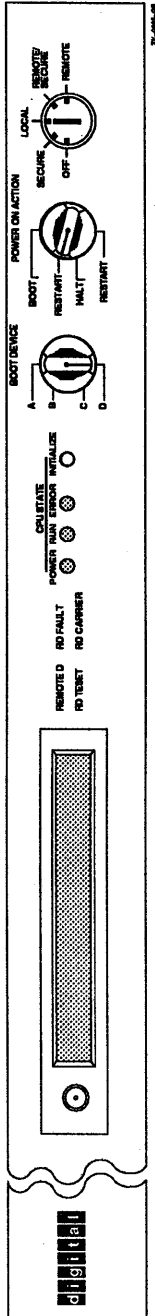
8.4 Control Panel

The VAX-11/750 control panel is located on the front of the computer and consists of the following:

- Seven indicator lights
- Power On Action switch
- Boot Device switch
- Reset button
- Five-position keylock switch
- Tape cassette drive

Figure 8-1 shows the control panel.

Figure 8-1 VAX-11/750 Control Panel



8.4.1 Indicator Lights

There are seven indicator lights on the control panel. The first three indicate the state of the computer. Where applicable, the remaining four indicate the state of the remote diagnostic procedures.

Table 8-1 describes the first three indicator lights on the VAX-11/750 control panel.

Table 8-1 Status Lights on the VAX-11/750

Label	Function
Power	Glows green when power is supplied to the computer.
Run	Glows green when the computer is running.
Error	When dimly lit, the computer is running normally. When brightly lit, the computer has experienced an unrecoverable error. If an error occurs, push the white Reset button to reset the machine. (The Error light remains dimly lit.) If the light is not lit during normal operation, the bulb is probably defective.

If your system has a remote diagnostic read-only memory (ROM), there are four additional lights on the control panel. These lights indicate the state of the remote diagnostic procedures. They are only visible when lit. Table 8-2 describes the remote diagnostic lights on the VAX-11/750 control panel.

Table 8-2 VAX-11/750 Remote Diagnostic Lights

Label	Function
Remote D	Glows green when the keylock switch is in the Remote or the Remote Secure position.
RD Fault	Glows red for 10 seconds when a computer with a remote diagnostic ROM is turned on. This indicates that a self test is in progress. When this light glows red for more than 10 seconds, the remote diagnostic ROM has detected an error in the remote diagnostic module.
RD Test	Glows amber when remote diagnostic tests are in progress.
RD Carrier	Glows green when the remote diagnostic center has established a connection with the console subsystem.

8.4.2 Switches

The control panel has the following switches:

- Power On Action switch
- Boot Device switch
- Five-position keylock switch
- Reset button

8.4.2.1 Power On Action Switch

The Power On Action switch has the following settings:

Boot	Boots the system from the drive selected by the Boot Device switch. This is the setting for normal system operations.
Restart (Boot)	Attempts to restart the system. If the restart fails, boots the system from the drive selected by the Boot Device switch.
Halt	Stops the computer and displays the console-mode prompt (>>>) at the console terminal.
Restart (Halt)	Attempts to restart the system. If the restart fails, stops the computer and displays the console-mode prompt (>>>) at the console terminal.

The setting of the Power On Action switch determines what happens after any of the following events:

- The power is turned on
- A power failure occurs (and the contents of memory are not saved by the battery backup unit).
- A shutdown occurs (if you entered Y at the auto reboot prompt)
- The microprogram detects an error halt condition (for example, a HALT instruction executed in kernel mode)

Set the Power On Action switch to Boot during normal system operations.

8.4.2.2 Boot Device Switch

The setting of the Boot Device switch tells the computer which drive holds the system disk. The computer checks the position of the Boot Device switch and tries to boot from the indicated drive in the following situations:

- When you enter the BOOT command without specifying a device name
- When the system attempts to boot automatically

The Boot Device switch has four positions: A, B, C, and D. In position A the system boots from the console tape cassette drive. Positions B, C, and D indicate the controller designations for the disk controllers attached to your system. Consult your Digital Customer Service representative to determine how these positions correspond to the available disk controllers. The computer assumes that the selected drive has a unit number of zero on the disk controller designated by the Boot Device switch.

If your system disk is on a local disk drive, set the Boot Device switch to the position that corresponds to the controller designation of that drive. If your system disk is connected to an HSC device, set the Boot Device switch to position A.

8.4.2.3 Reset Button

Press the Reset button to shut down and restart the system.

NOTE

In some models this button is labeled INITIALIZE.

The way the system responds depends on the position of the Power On Action switch.

8.4.2.4 Keylock Switch

The five-position keylock switch controls system power and determines how the computer responds to commands from local and remote console terminals. Table 8-3 describes each keylock switch setting.

Table 8-3 Keylock Switch Settings

Setting	Meaning
Off	Power is supplied to the battery backup unit and to the time-of-year clock, but not to the computer.
Secure ¹	You cannot use the local console terminal in console mode to control the computer. You can use it in program mode as a user terminal. Pressing Ctrl/P has no effect. A Digital diagnostics center cannot use the remote console terminal when the switch is set to Secure.
Local	You can use the local console terminal in console mode to control the computer. A Digital diagnostics center cannot use the remote console terminal when the switch is set to LOCAL.
Remote/Secure ¹	You cannot use the local console terminal. A Digital diagnostics center can use the remote console terminal in both console and program mode, but cannot use it for fault isolation.
Remote	A Digital diagnostics center is in control of the remote console terminal. You cannot use the local console terminal. However, the Digital diagnostics center can enter commands to restore control to the local console terminal.

¹Pressing the Reset button has no effect because it executes a console mode command.

8.5 Tape Cassette Drive

The console subsystem has a *console tape cassette drive*. The console subsystem refers to the console tape cassette drive as DDA0. The VMS operating system refers to it as CSA1.

The *console TU58* is the tape cassette that contains the BOOT58 program that is used to *boot*, or load, the operating system into computer memory. It is also used to do the following tasks:

- Install updates
- Install optional software products
- Boot standalone BACKUP
- Store boot command procedures

8.6 Console Command Language

The console subsystem runs in two different modes:

- **Console mode** — When the console subsystem is in console mode, the VMS operating system is not running and the CPU is stopped. The console-mode prompt (>>>) is displayed. In console mode you control and monitor system operations.

To go from console mode to program mode, boot the VMS operating system.

- **Program mode** — When the console subsystem is in program mode, the VMS operating system is running and the dollar sign prompt (\$) is displayed. You can enter DCL commands, run programs, and receive system messages.

If the VMS operating system is running and you want to go to console mode, follow the shutdown procedure.

Table 8-4 describes the console mode commands you use during the installation procedure.

Table 8-4 Commonly Used Console Mode Commands

Command	Definition
BOOT	Executes a boot command procedure that loads a VAX software program into memory. The boot command procedure transfers control to the program in memory and puts the console subsystem in program mode. During the installation procedure use the abbreviation, B, for the BOOT 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 computer and puts it in console mode.

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

8.7 Booting the System

Booting is the process of loading system software into memory.

NOTE

If you plan to boot from a UDA50 supported device, you must keep in mind the following restrictions 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).**
- **The maximum unit number that can be booted is 15 (hexadecimal F).**

8.7.1 Boot Command Procedures

A boot command procedure does the following:

- Sets up the system environment
- Deposits values in registers
- 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 RP07 drive that has a controller designation of A and a unit number of zero with DB0BOO.CMD. Use CIBOO.CMD to boot from a system disk on an HSC drive.

The console TU58 contains both the BOOT58 program and the boot command procedures. To boot the VMS operating system with a boot command procedure, you must place the console TU58 in the console tape cassette drive and start the BOOT58 program.

To find out what is on the console TU58, use the following procedure:

NOTE

This procedure assumes that you have installed and booted the VMS operating system and are logged in to the SYSTEM account.

1. Make sure the console TU58 is in the console tape cassette drive.
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 the boot command procedures on the console TU58. Boot command procedures are files that start with either CI or D and end with either BOO or GEN. The file type is either CMD or null. Enter the following command and press Return:

```
$ EXCHANGE DIRECTORY CSA1:C*,D*
```

For example:

```
Directory of RT-11 volume _SCSA1: 19-JUN-1990 15:00
```

```
CIGEN.
CSABOO.CMD
DBOGEN.
DB1BOO.CMD
DBAGEN.
.
.
.
```

4. You can view the contents of a file with the TYPE command. For example:

```
$ EXCHANGE TYPE CSA1:DB1BOO.CMD
```

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

```
$ DISMOUNT CSA1
```

6. To secure the console TU58 from unauthorized access, you must enter the following command and press Return:

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

Section 8.7.2 describes using the BOOT58 program and boot command procedures to boot from either a local or an HSC drive.

8.7.1.1 Booting with DEFBOO.CMD

As long as the Boot Device switch is set to A, you can cause the system to boot using DEFBOO.CMD from the console TU58 when you do any of the following:

- Set the Power On Action switch to Boot or Restart (Boot). Turn on the power. The system boots automatically.
- Set the keylock switch to Local. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> B
```

- Set the Power On Action switch to Boot or Restart (Boot). Execute the SHUTDOWN procedure and specify the auto reboot option. The system reboots automatically.
- If the Power On Action switch is set to Boot or Restart (Boot) when the system shuts down due to a bugcheck, the system reboots automatically.

If the Power On Action switch is set to Boot or Restart (Boot) when a power failure occurs and the contents of memory are lost, the system reboots when power is restored.

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

NOTE

If the system does not boot automatically under these conditions, the boot block on the system disk might be corrupted.

8.7.2 Using BOOT58 to Boot from a Local or an HSC Drive

You can use the BOOT58 program, located on the console TU58, to boot the VMS operating system from either a local or an HSC drive. In general, after starting the BOOT58 program you enter the @ command followed by the name of the boot command procedure you want to use. Depending on the system configuration, you might also need to use the DEPOSIT command.

To boot with the BOOT58 program, use the following procedure:

1. Make sure the console TU58 is in the console tape cassette drive and the keylock switch is set to Local.
2. Set the Boot Device switch to position A.

3. If the VMS operating system is not running, go to step 4.

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

```
$ @SYSSSYSTEM: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
```

4. Press Ctrl/P.
5. At the console-mode prompt (>>>), start the BOOT58 program. Enter the following command and press Return:

```
>>> B/800 DDA0
```

6. If the system disk is on a local drive, go to step 7.

If the system disk is on an HSC drive, enter the following commands. Note that all numeric entries are made in hexadecimal notation.

- a. At the BOOT58> prompt, deposit the HSC node number into register 2 (R2) using the following format:

```
BOOT58> D/G 2 node-number
```

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

```
BOOT58> D/G 2 C
```

NOTE

If the drive holding the system disk is accessible to two HSCs, deposit both node numbers. Put the greater number in hexadecimal 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:

```
BOOT58> D/G 2 120A
```

- b. Deposit the unit number of the drive holding the system disk into register 3 (R3) using the following format:

```
BOOT58> D/G 3 unit-number
```

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

```
BOOT58> D/G 3 15
```

- c. To boot the system disk, enter the following command and press Return:

```
BOOT58> @CIBOO.COMD
```

You can also set up default boot command procedures so that the system automatically boots from a particular drive. For more information, see Section 8.7.5.1.

7. If the system disk is on a local drive, check the controller designation and do the following:
- a. If the drive holding the system disk has a controller designation of A, enter the BOOT command in the following format:

```
BOOT58> @dduBOO.COMD
```

Substitute the device code of the drive holding the system disk for *dd*. Substitute the unit number of the drive for *u*. For a list of device codes, see Table 8-5.

Table 8-5 Device Codes for VAX-11/750 Disks

Disk Drive	Used to Boot the System
RA60	DU
RA80, RA81, and RA82	DU
RK07	DM
RM03, RM05, RM80, and RP07	DB
RP05 and RP06	DB

For example, suppose the system disk is on an RP06 disk drive that has a controller designation of A and a unit number of 1. Enter the following command and press Return:

```
BOOT58> @DB1BOO.COMD
```


- b. If the drive holding the system disk does not have a controller designation of A, deposit the unit number of the drive in register 3 (R3), as follows:

```
BOOT58> D/G 3 unit-number
```

Substitute a hexadecimal value that represents the unit number of the drive for the *unit-number*. For example, if the drive has a unit number of one, enter the following command and press Return:

```
BOOT58> D/G 3 1
```

Then enter the **BOOT** command in the following format:

```
BOOT58> @ddcB00.CMD
```

Substitute the device code of the drive holding the system disk for *dd*. Substitute the controller designation of the drive for *c*. For a list of device codes, see Table 8-5.

For example, suppose the system disk is on an RP06 disk drive that has a controller designation of C and a unit number of one. Enter the following commands and press Return after each one:

```
BOOT58> D/G 3 1
BOOT58> @DBCBOO.CMD
```

The following example uses the **BOOT58** program to boot from a system disk on an RP07 drive with a controller designation of A and a unit number of zero. Before displaying the **BOOT58** prompt, the VAX-11/750 displays a double percent sign to indicate successful verification of the microcode.

```
>>> B/800 DDA0
%%
BOOT58> @DBOBOO.CMD

!
!   DBO BOOT COMMAND FILE - DBOBOO.CMD
!

D/G 0 0           ! DISK PACK DEVICE TYPE
D/G 1 F28000     ! BASE OF MBA0 ADDRESS SPACE
D/G 2 0          ! ADAPTER UNIT = 0
D/G 3 0          ! CONTROLLER UNIT = 0
D/G 4 0          ! BOOT BLOCK LBN (UNUSED)
D/G 5 0          ! SOFTWARE BOOT FLAGS
D/G E 200        ! ADDRESS OF WORKING MEMORY + ^X200
LOAD VMB.EXE/START:200 ! LOAD PRIMARY BOOTSTRAP
```

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```
START 200                ! START PRIMARY BOOTSTRAP
VMS Version 5.4 19-JUN-1990 15:00:00.00

***** OPCOM, 19-JUN-1990 15:00:00.00 *****
Logfile has been initialized by operator _OPAO:
Logfile is SYS$SYSROOT:[SYSMGR]OPERATOR.LOG;1

%SET-I-INTSET, login interactive limit = 64, Current interactive value = 0
SYSTEM                job terminated at 19-JUN-1990 15:00:00.00
```

8.7.3 BOOT58 Commands

Table 8-6 lists the BOOT58 commands.

Table 8-6 BOOT58 Commands

Command	Function
BOOT [ddcu]	Boots the system from the specified drive. If you omit <i>ddcu</i> , the system boots with DEFBOO.CMD. Note that you cannot specify this command within a command procedure, and you cannot use the name of a command procedure as a command qualifier. This format is valid only at the console-mode prompt >>>. For example: >>> BOOT DUA0
DEPOSIT [loc-qual] [size-qual] location value	Deposits a hexadecimal value in the specified location. The location is interpreted according to the location and size qualifiers. The location qualifier can be expressed as follows: /G general register /I internal register /P physical memory The size qualifier can be expressed as follows: /B byte /W word /L longword If you do not specify the location or size qualifier, the default values established by a previous command are used.

Table 8-6 (Cont.) BOOT58 Commands

Command	Function
EXAMINE [loc-qual] [,size-qual] location	<p>Displays the contents of the specified location. The location is interpreted according to the location and size qualifiers. The location qualifier can be expressed as follows:</p> <p>/G general register</p> <p>/I internal register</p> <p>/P physical memory</p> <p>The size qualifier can be expressed as follows:</p> <p>/B byte</p> <p>/W word</p> <p>/L longword</p> <p>If you do not specify the location or size qualifier, the default values established by a previous command are used.</p>
HELP	Displays the BOOT58 help file at the console terminal. You cannot specify this command within a command procedure.
LOAD file-spec [/START:address]	Loads a file from the boot device into memory, starting at the address specified with the /START qualifier. If you omit the /START qualifier, the file is loaded into memory beginning at the first free address.
START address	Transfers control to the address specified. Use this command with the LOAD command.
@file-spec	Executes the specified command procedure. The file specification for a command procedure cannot have more than six characters. This format is valid only at the BOOT58> prompt. For example:
	BOOT58> @DU1BOO.COMD

8.7.4 Booting from a Local Drive with the Boot Device Switch

The simplest and most common way to boot a VAX-11/750 from a local drive is to use the Boot Device switch. The setting of the Boot Device switch tells the system what drive the system disk is on. The system looks for VMB.EXE, the primary boot program, on the boot block of the disk in that drive.

When you use the Boot Device switch, the system assumes that the unit number of the drive holding the system disk is zero. If the unit number is not zero, you must boot with the BOOT58 program as described in Section 8.7.2.

Set the Boot Device switch to correspond to the disk drive that contains the system disk. Positions B, C, and D correspond to the disk controllers attached to your system. Consult your Digital Customer Service representative to determine how the Boot Device switch positions correspond to the available disk controllers.

As long as the Boot Device switch is set properly, you can cause the system to boot when you do any of the following:

- Set the Power On Action switch to Boot or Restart (Boot). Turn on the power. The system boots automatically.
- Set the keylock switch to Local. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> B
```

- Set the Power On Action switch to Boot or Restart (Boot). Execute the SHUTDOWN procedure and specify the auto reboot option. The system reboots automatically.
- If the Power On Action switch is set to Boot or Restart (Boot) when the system shuts down due to a bugcheck, the system reboots automatically.

If the Power On Action switch is set to Boot or Restart (Boot) when a power failure occurs and the contents of memory are lost, the system reboots when power is restored.

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

NOTE

If the system does not boot automatically under these conditions, the boot block on the system disk might be corrupted.

8.7.5 Booting from an HSC Drive

The first time you boot the VMS operating system, use the procedure described in Section 8.7.2. Then create default command procedures that let you boot automatically. Section 8.7.5.1 explains how to create default boot command procedures. Section 8.7.1.1 explains how to use them.

8.7.5.1 Creating Default Boot Command Procedures

There are two default boot command procedures: DEFBOO.COM and DEFGEN.DEFBOO.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., the conversational boot procedure, when you want to interrupt the boot process and change system parameters.

DEFGEN. and DEFBOO.COM do not exist on the console TU58. However, Digital provides boot command procedures that you can edit and rename using the following procedure.

NOTE

This procedure assumes that you have installed and booted the VMS operating system and are logged in to the SYSTEM account.

1. Make sure the console TU58 is in the console tape cassette drive.
2. To connect the console drive to the system, enter the following commands and press Return after each one:

```
$ RUN SYSSYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

3. Use the Exchange utility to copy CIBOO.COM and CIGEN. from the console TU58 to your current directory on the system disk. Enter the following commands and press Return after each one:

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

4. Use an editor to add the following commands to both CIBOO.COMD and CIGEN.
 - a. Add a command to deposit the unit number of the drive holding the system disk in register 3 (R3). Use hexadecimal notation. For example, suppose the system disk is on an RA60 disk drive with a controller designation of B and a unit number of three. Add the following line to both files:

```
DEPOSIT R3 3 !DISK DRIVE UNIT NUMBER
```

- b. Add a command to deposit the HSC node number in register 2 (R2). 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), add the following command:

```
DEPOSIT R2 120A
```

The following example shows CIBOO.COMD after you add commands to boot from a disk drive with a unit number of 3 (hexadecimal 3) that is connected to an HSC with a node number of 12 (hexadecimal C).

```
.
.
.
D/G R0 20          !CI PORT DEVICE
D/G R1 E           !CI TR=E
D/G R2 C           !HSC NODE NUMBER
D/G R3 3           !DEVICE UNIT NUMBER
D/G R4 0           !BOOT BLOCK LBN (NOT USED)
D/G R5 A0004000   !SOFTWARE BOOT CONTROL FLAGS
.
.
.
```

5. **Rename the files. Enter the following commands and press Return after each one:**

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

6. **Copy the edited boot command procedures to the console TU58. Enter the following commands and press Return after each one:**

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

7. **Before you can use DEFBOO.COM or DEFGEN. to boot automatically, you need to write the boot block on the console TU58 using the Writeboot utility. Do the following:**

- a. **To start the Writeboot utility, enter the following command and press Return:**

```
$ RUN SYSS$SYSTEM:WRITEBOOT
```

- b. **When the procedure displays the following message, type CSA1:BOOT58.EXE and press Return. For example:**

```
Target system device (and boot file if not VMB.EXE):? CSA1:BOOT58.EXE
```

- c. **The procedure displays the following message:**

```
Enter VBN of boot file code (default is one):
```

Press Return to accept the default.

- d. **When the procedure displays the following message, type C000 and press Return. For example:**

```
Enter load address of primary bootstrap in HEX (default is 200): C000
```

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

```
$ DISMOUNT CSA1
```

9. **To secure the console TU58 from unauthorized access, you must enter the following command and press Return:**

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

Now you can use DEFBOO.CMD and DEFGEN. to boot the VMS operating system from a system disk on an HSC drive. If you change the system configuration in the future, use the previous procedure to modify DEFBOO.CMD and DEFGEN.CMD.

To use DEFBOO.CMD to boot from a system disk on an HSC drive, see Section 8.7.1.1. To use DEFGEN. to boot from a system disk on an HSC drive, see Section 8.7.6.2.

8.7.6 Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want to interrupt 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

When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process. For more information about these SYSGEN commands, see the *VMS System Generation Utility Manual*.

8.7.6.1 Local Drive

The simplest way to perform a conversational boot when the system disk is on a local drive is to set the Boot Device switch. Use the following procedure:

1. Make sure the console TU58 is in the console tape cassette drive and the keylock switch is set to Local.
2. Set the Boot Device switch to correspond to the disk drive that contains the system disk.
3. If the VMS operating system is not running, go to step 4.

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

```
$ @SYSSSYSTEM: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
```

4. Press Ctrl/P.
5. Enter the following BOOT command and press Return:

```
>>> B/1
```

NOTE

If this command does not boot the operating system, the boot block of the system disk might be corrupted.

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

You can also use the BOOT58 program to perform a conversational boot from a local drive. Use the following procedure:

1. Make sure the console TU58 is in the console tape cassette drive and the keylock 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:

```
$ @SYSSSYSTEM: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.
4. Enter the following command and press Return:

```
>>> B/800 DDAO
```

5. If the drive holding the system disk does not have a controller designation of A, go to step 6.

If the drive holding the system disk has a controller designation of A, enter the BOOT command in the following format:

```
BOOT58> @dduGEN.CMD
```

Substitute the device code of the drive holding the system disk for *dd*. Substitute the unit number of the drive for *u*. For the list of device codes, see device codes table.

For example, suppose the system disk is on an RP07 disk drive that has a controller designation of A and a unit number of one. Enter the following command and press Return:

```
BOOT58> @DB1GEN.CMD
```

Go to step 7.

6. If the drive holding the system disk does not have a controller designation of A, use the following procedure:
 - a. Deposit the unit number of the drive in register 3 (R3), as follows:

```
BOOT58> D/G 3 unit-number
```

Substitute a hexadecimal value that represents the unit number of the drive for *unit-number*. For example, if the drive has a unit number of one, enter the following command and press Return:

```
BOOT58> D/G 3 1
```

- b. Enter the BOOT command in the following format:

```
BOOT58> @ddcGEN.CMD
```

Substitute the device code of the drive holding the system disk for *dd*. Substitute the controller designation of the drive for *c*. For the list of device codes, see the device code table.

For example, suppose the system disk is on an RP07 disk drive that has a controller designation of C and a unit number of one. Enter the following commands and press Return after each one:

```
BOOT58> D/G 3 1  
BOOT58> @DBCGEN.CMD
```

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

8.7.6.2 HSC Drive

To perform a conversational boot from a system disk on an HSC drive, use the following procedure:

1. Make sure the console TU58 is in the console tape cassette drive and the keylock switch is set to Local.
2. Set the Boot Device switch to A.
3. If the VMS operating system is not running, go to step 4.

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

```
$ @SYSS$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
```

4. Press Ctrl/P.
5. If you have created DEFGEN., enter the following command and press Return:

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

If you have not created DEFGEN., do the following:

- a. Enter the following command and press Return:


```
>>> B/800 DDA0
```
- b. At the BOOT58> prompt, enter the following command and press Return:


```
BOOT58> @CIGEN.
```
6. When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

8.7.7 Booting from SYSF During an Upgrade

When you perform a VMS upgrade, you must boot the system from the SYSF directory on the system disk. To boot from [SYSF], create a command procedure named SYSFBOO.CMD.

To create SYSFBOO.CMD, use the following procedure:

NOTE

This procedure assumes that you have installed and booted the VMS operating system and are logged in to the SYSTEM account.

1. Make sure that the console TU58 is in the console tape cassette drive.
2. To connect the console drive to the system, enter the following commands and press Return after each one:

```
$ RUN SYSSYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

3. Use the Exchange utility to copy the appropriate boot command procedure from the console TU58 to your current directory on the system disk. If the system disk is on an HSC drive and you have created DEFBOO.CMD as described in Section 8.7.5.1, enter the following command and press Return:

```
$ EXCHANGE COPY CSA1:DEFBOO.CMD DEFBOO.CMD
```

If the system disk is on a local drive, copy the boot command procedure that matches the drive that holds the system disk. For example, suppose the system disk is on an RP06 drive and has a controller designation of A and a unit number of one. Enter the following command and press Return:

```
$ EXCHANGE COPY CSA1:DB1BOO.CMD DB1BOO.CMD
```

4. Edit the boot command procedure by changing the line that deposits a value in register 5 (R5) so that the left-most digit of the value reflects the name of the [SYSF] root directory as shown in the following example:

```
D/G/L R5 F0000000
```

5. Rename the boot command procedure to SYSFBOO.CMD using the following format:

```
$ RENAME nnnBOO.CMD SYSFBOO.CMD
```

For example, if the boot command procedure is DEFBOO.CMD, enter the following command and press Return:

```
$ RENAME DEFBOO.CMD SYSFBOO.CMD
```

6. Use the Exchange utility to copy SYSFBOO.CMD back to the console TU58:

```
$ EXCHANGE COPY SYSFBOO.CMD CSA1:SYSFBOO.CMD
```

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

```
$ DISMOUNT CSA1
```

8. To secure the console TU58 from unauthorized access, you must enter the following command and press Return:

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

9. Make sure the console TU58 is in the console tape cassette drive and the keylock switch is set to Local.

10. Set the Boot Device switch to position A.

11. If the VMS operating system is not running, go to step 4.

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 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
```

12. Press Ctrl/P.

13. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> B/800 DDAO
```

14. At the `BOOT58>` prompt, enter a command in the following format:

```
BOOT58> @SYSFBOO.CMD
```

8.7.8 Booting from a Different Directory on the System Disk

The VMS operating system is installed on the system disk in a 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 root directory on the system disk.

To boot from a directory other than `[SYS0]`, create a command procedure named `SYnBOO.CMD`, where *n* stands for the name of the other root directory on the system disk.

To create `SYnBOO.CMD`, use the following procedure:

NOTE

This procedure assumes that you have installed and booted the VMS operating system and are logged in to the SYSTEM account.

1. Make sure that the console TU58 is in the console tape cassette drive.
2. To connect the console drive to the system, enter the following commands and press Return after each one:

```
$ RUN SYSSSYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

3. Use the Exchange utility to copy the appropriate boot command procedure from the console TU58 to your current directory on the system disk. If the system disk is on an HSC drive and you have created `DEFBOO.CMD` as described in Section 8.7.5.1, enter the following command and press Return:

```
$ EXCHANGE COPY CSA1:DEFBOO.CMD DEFBOO.CMD
```

If the system disk is on a local drive, copy the boot command procedure that matches the drive that holds the system disk. For example, suppose the system disk is on an RP06 drive and has a controller designation of A and a unit number of one. Enter the following command and press Return:

```
$ EXCHANGE COPY CSA1:DB1BOO.CMD DB1BOO.CMD
```

4. Edit the boot command procedure. Change the line that deposits a value in register 5 (R5). This line contains the comment *!software boot flags*. The value is a hexadecimal number with eight digits. For example:

```
D/G R5 0      !software boot flags
```

Change the left-most 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:

```
D/G/L R5 C0000000      !designated root is SYSC
```

5. Rename the boot command procedure to SYnBOO.CMD, where *n* stands for the name of the other root directory. Use the following format:

```
$ RENAME nnnBOO.CMD SYnBOO.CMD
```

For example, if the boot command procedure is DEFBOO.CMD and the directory is named [SYSC], enter the following command and press Return:

```
$ RENAME DEFBOO.CMD SYCBOO.CMD
```

6. Use the Exchange utility to copy SYnBOO.CMD back to the console TU58. Use the following format:

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

For example, if the file name is SYCBOO.CMD, enter the following command and press Return:

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

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

```
$ DISMOUNT CSA1
```

8. To secure the console TU58 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 TU58 is in the console tape cassette drive and the keylock switch is set to Local.
2. Set the Boot Device switch to position A.
3. If the VMS operating system is not running, go to step 4.

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

```
$ @SYSS$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
```

4. Press Ctrl/P.
5. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> B/800 DDA0
```

6. At the **BOOT58>** prompt, enter a command in the following format:

```
BOOT58> @SYnBOO.CMD
```

For example, to boot from [SYSC], enter the following command and press Return:

```
BOOT58> @SYCBOO.CMD
```

8.7.9 Orderly Shutdown with SHUTDOWN.COM

To use the SHUTDOWN command procedure, log in to the **SYSTEM** account, enter the following command, and press Return:

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

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

8.7.10 Emergency Crash

NOTE

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

The following commands cause the system to fail, resulting in immediate shutdown. To force your system to fail, do the following:

1. Make sure the console TU58 is in the console tape cassette drive and the keylock switch is set to Local.
2. Set the Boot Device switch to A.
3. Press Ctrl/P.
4. Enter the following commands and press Return after each:

```
>>> E/G F
>>> E P
>>> E/I 0
>>> E/I 1
>>> E/I 2
>>> E/I 3
>>>
>>> E/I 1
>>> E/I 2
>>> E/I 3
>>> E/I 4
>>> D/G F FFFFFFFF
>>> D P 1F0000 E/I 4
>>> D/G F FFFFFFFF
>>> D P 1F0000
>>> C
```

NOTE

If the **E P** command results in a value where 4 is the second leftmost digit (such as X4XXXXXX), the **D P** command should use the value 041F0000.

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

5. If the system does not reboot automatically, reboot it manually.
6. After the system reboots, you can examine the dump file. To examine the dump file, log in to the SYSTEM account. Enter the following commands and press Return after each one:

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

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

8.8 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 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 the 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 of the system 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 you use a fixed (nonremovable) system disk, back it up to a disk or magnetic tape. Then restore the files to the original system disk.

This section contains information on the following:

- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on TU58 tape cassettes
- Backing up and restoring the system disk

You should also make a copy of the console TU58 in case the original becomes damaged. Section 8.8.2 describes using CONSCOPY.COM to do this.

8.8.1 Using Standalone BACKUP

You can keep standalone BACKUP on the system disk, on TU58 tape cassettes, or on any other media that your system supports. Digital recommends that you keep standalone BACKUP on the system disk and on tape cassettes. Usually you boot standalone BACKUP from the system disk because it saves time. However, you need a copy of standalone BACKUP on tape cassettes in case the system disk becomes damaged.

8.8.1.1 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 in to the SYSTEM account.
2. Enter the following command and press Return:

```
$ @SYSSUPDATE:STABACKIT SYSS$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. Create a boot command procedure that lets you boot standalone BACKUP from [SYSE]. For more information, see Section 8.8.1.2.

8.8.1.2 Booting Standalone BACKUP from the System Disk

The following sections describe booting standalone BACKUP from a system disk on a local drive and on an HSC drive.

8.8.1.3 Local Drive

If the system disk is on a local drive, use the following procedure to boot standalone BACKUP from [SYSE]:

1. Make sure the console TU58 is in the console tape cassette drive and the keylock switch is set to LOCAL.
2. Set the BOOT DEVICE switch to correspond to the drive that holds the system disk.
3. If the VMS operating system is not running, go to step 4.

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

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

Answer the questions. 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
```

4. Press Ctrl/p.
5. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> B/5 E0000000
```

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 15:00
```

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 DJA2:    device type RA60
Available device 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 15:00
$
```

If you have not yet made a backup copy of the system disk, follow the directions in the backup procedures section.

8.8.1.4 HSC Drive

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

You can choose any unique name in the form xxxBOO.CMD 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.CMD, name the new file XEFBOO.CMD.

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

1. Make sure the console TU58 is in the console tape cassette drive.
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 SYSSYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

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

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

5. Edit **XEFBOO.CMD**. Change the line that deposits a value in register 5 (R5). Change the left-most digit so that it specifies the **[SYSE]** directory. For example:

```
D/G/L 5 E0000000    !designated root is SYSE
```

6. Exit from the editor to save the modified version of the file.
7. To copy **XEFBOO.CMD** to the console TU58, enter the following command and press Return:

```
$ EXCHANGE COPY XEFBOO.CMD CSA1:XEFBOO.CMD
```

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

```
$ DISMOUNT CSA1
```

9. To secure the console TU58 from unauthorized access, you must enter the following command and press Return:

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

After you copy **XEFBOO.CMD** to the console TU58, you can use it to boot standalone **BACKUP** from a system disk on an HSC drive. To boot standalone **BACKUP** from **[SYSE]**, use the following procedure:

1. Make sure the console TU58 is in the console tape cassette drive and the keylock 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:

```
$ @SYSSSYSTEM:SHUTDOWN
```

Answer the questions. 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.
4. At the console-mode prompt (>>>), enter the following command and press Return:

```
>>> B/800 DDAO
```

5. At the BOOT58> prompt, enter the following command and press Return:

```
BOOT58> @XEFBOO.CMD
```

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 15:00
```

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 DJA2:    device type RA60
Available device 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 15:00
$
```

If you have not yet made a backup copy of the system disk, follow the directions in the section on backup procedures.

8.8.1.5 Installing Standalone BACKUP on Tape Cassettes

Digital recommends that you keep standalone BACKUP on tape cassettes in case the system disk becomes damaged. To install standalone BACKUP on tape cassettes, use the following procedure.

NOTE

If you have the VMS magnetic tape distribution kit, you already have standalone BACKUP on tape cassettes. If the original tape cassettes become damaged or you want to make extra copies, use this procedure.

1. Obtain six TU58 tape cassettes. Affix a paper label to each one. Use a felt-tip pen to write a name on each one. Use the following names:

S/A BKUP TU58 V5.4 1/6
S/A BKUP TU58 V5.4 2/6
S/A BKUP TU58 V5.4 3/6
S/A BKUP TU58 V5.4 4/6
S/A BKUP TU58 V5.4 5/6
S/A BKUP TU58 V5.4 6/6

A paper label is the label affixed to a tape cassette. The procedure displays a volume label, not the paper label, in messages. A volume label is the name the VMS operating system uses to refer to a tape cassette.

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

```
$ @SYSSUPDATE:STABACKIT
```

4. The procedure asks you for the name of the target device. Enter 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  
SYSGEN CONNECT CONSOLE was used to make the console device available.
```


5. The procedure displays the following messages. Press Return (for YES) after each question.

The standalone kit requires six TU58 cartridges. The first five TU58 cartridges contain the standalone VMS system files, the last TU58 cartridge contains the BACKUP application image.

The system kit and the application kit can be built separately.

Do you want to build the system kit? [Yes/No, default Yes]:

Do you want to build the application kit? [Yes/No, default Yes]:

6. The procedure gives you two options that you can use to verify the reliability of the standalone BACKUP kit. It uses the ANALYZE /MEDIA utility to check for bad blocks. ANALYZE/MEDIA is only relevant for diskettes and disks.

The procedure can also verify each file that it copies. This adds another hour and a half to the time it takes the procedure to run. Digital suggests that you enter Y and press Return when the procedure asks the following question:

Do you want to verify copies? [Yes/No, default No]: Y

7. The procedure displays the following messages:

Sysgen parameters for standalone VMS have been placed in file
SYS\$SYSROOT:<SYSUPD>VAXVMSSYS.PAR-TEMP-46E00121;1

Please place the first system TU58 cartridge in drive _CSA1:.
This volume will receive the volume label SYSTEM_1.

Enter "YES" when ready:

8. Insert the first tape cassette into the console tape cassette drive. When you are ready to continue, enter Y and press Return.
9. The procedure mounts the tape cassette, copies a set of system files, and displays a number of informational messages. For example:

```
%MOUNT-I MOUNTED, SYSTEM_1 mounted on _CSA1:
%CREATE-I-CREATED, _CSA1:<SYS0.SYSEXE> created
%CREATE-I-CREATED, _CSA1:<SYS0.SYS$LDR> created
```

```
.
.
.
```

10. When the last file is copied, the procedure asks you to insert the next tape cassette. Remove the tape cassette that is in the drive, and insert the next one in the sequence. When you are ready to continue, enter Y and press Return. For example:

Please place the second system TU58 cartridge in drive _CSA1:.
This volume will receive the volume label SYSTEM_2.

Enter "YES" when ready: Y

11. Repeat step 10 until the files are copied to the last tape cassette, and the procedure displays the following message:

The console volume will be mounted /NOWRITE for protection.
Please make sure that the original console TU58 cartridge is
in the drive CSA1:.

Enter "YES" when ready:

12. Remove the last tape cassette and insert the console TU58. When you are ready to continue, enter Y and press Return. When the procedure finishes, it displays the following message:

The kit is complete.

8.8.1.6 Booting Standalone BACKUP from Tape Cassettes

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from TU58 tape cassettes. You need the six tape cassettes that contain standalone BACKUP. They are labeled similarly to the following:

Paper Label ¹	Volume Label ²
S/A BKUP TU58 V5.4 1/6	SYSTEM_1
S/A BKUP TU58 V5.4 2/6	SYSTEM_2
S/A BKUP TU58 V5.4 3/6	SYSTEM_3
S/A BKUP TU58 V5.4 4/6	SYSTEM_4
S/A BKUP TU58 V5.4 5/6	SYSTEM_5
S/A BKUP TU58 V5.4 6/6	BACKUP

¹A paper label is a label affixed to a tape cassette.

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

The procedure asks you to place the tape cassettes containing standalone BACKUP, successively, in the console drive. Booting standalone BACKUP from tape cassettes takes approximately 1-1/2 hours.

1. Make sure the console TU58 is in the console tape cassette drive and the keylock 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:

```
$ @SYSSSYSTEM:SHUTDOWN
```

Answer the questions. 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.
4. At the console-mode prompt (>>>), start the BOOT58 program. Enter the following command and press Return:

```
>>> B/800 DDA0
```

5. At the BOOT58> prompt, enter the following command and press Return:

```
BOOT58> @CSABOO.CMD
```

The red light next to the console tape cassette drive flashes. The RUN light glows green. The procedure displays a series of messages similar to the following:

```
!   CS1 BOOT COMMAND FILE - CS1BOO.CMD
!
D/G 0 40           ! CONSOLE BLOCK STORAGE
.
.
.
```

Please remove the volume "750 console" from the console device. Insert the first standalone system volume and enter "YES" when ready:

6. Remove the console TU58 and insert the first standalone BACKUP tape cassette into the console tape cassette drive. When you are ready to continue, enter Y and press Return. The procedure displays the following messages:

```
Resuming load operation on volume "SYSTEM_1", please stand by...
```

```
Please remove the volume "SYSTEM_1" from the console device.  
Insert the next standalone system volume and enter "YES" when ready:
```

Notice that the red light to the left of the console tape cassette drive glows and flashes while the tape is being read.

7. Remove the standalone BACKUP tape that is in the drive, and insert the next one in the sequence. When you are ready to continue, type Y and press Return. The procedure displays messages similar to the following:

```
Resuming load operation on volume "SYSTEM_2", please stand by...
```

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

```
Please remove the volume "SYSTEM_2" from the console device.  
Insert the next standalone system volume and enter "YES" when ready:)
```

8. Repeat step 7 until the procedure prompts 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
```

9. 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 DJA2:    device type RA60  
Available device 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.

10. The procedure displays the following messages:

Please remove the volume "SYSTEM_5" from the console device.

Insert the standalone application volume and enter "YES" when ready:

Remove the tape cassette in the drive, and insert the last standalone BACKUP tape cassette into the drive. When you are ready to continue, enter Y and press Return. The procedure displays the following message:

Resuming load operation on volume "BACKUP", please stand by...

11. 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 15:00
$
```

To backup the system disk, go to the section on backup procedures.

To restore the system disk, follow the directions in the restoring the system disk section.

8.8.2 Backing Up the Console TU58

Make a backup copy of the console TU58 to protect against corruption or loss of the original. First, use CONSCOPY.COM to restore the files on the console TU58 to a directory on the system disk. Then use CONSCOPY.COM to *restore* the files to a new tape cassette.

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

1. Make sure the console TU58 is in the console tape cassette drive.
2. Log in to the SYSTEM account.
3. 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 750]:
```

4. Press Return. 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, enter SAVE and press Return. For example:

Do you want to SAVE or RESTORE your console TU58?: SAVE

6. The procedure asks you for the name of the *virtual disk* that you want the files to be saved 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. Enter CSA1: and press Return. For example:

Enter console device drive (DDCU:): CSA1:

9. When the procedure displays the following message, press Return (the console TU58 is already in the drive):

Put your console TU58 cartridge into drive _CSA1:,
and enter Return when ready:

After you press Return, the procedure mounts the console TU58 and uses the Exchange utility to begin the *save* operation. The procedure displays several EXCHANGE messages, file header information, and a list of the files that are being saved. When the procedure is complete, it displays the following message:

The SAVE of your console TU58 cartridge is complete.

To save the files that are on the system disk to a new tape cassette, 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 750]:
```

2. Press Return. 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, enter **RESTORE** and press Return. For example:

```
Do you want to SAVE or RESTORE your console TU58 cartridge?: RESTORE
```

4. The procedure asks for the name of the *virtual disk* from which the files are to be restored. 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 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. Enter **CSA1:** and press Return. For example:

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

7. The procedure displays the following message:

Put your console TU58 cartridge into drive _CSA1:,
and enter Return when ready:

Remove the console TU58 from the console tape cassette drive. Insert the new tape cassette in the drive. When you are ready to continue, press Return.

8. The procedure mounts the tape cassette and uses the Exchange utility to begin the *restore* operation. The procedure displays several EXCHANGE 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 TU58 cartridge is complete.

Use the console TU58 that you just created to make sure it works. Treat the original as the backup copy.

9

MicroVAX 3400, 3600, and 3900 Systems

9.1 Hardware

Your system's hardware differs depending on which model it is.

This section includes illustrations of the following hardware components:

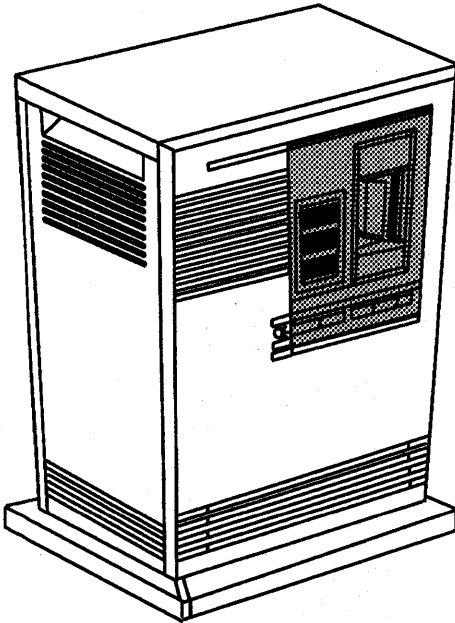
- Model controls and indicators (all models except VAXstation 3200)
- System control panel (VAXstation 3200 only)
- CPU panel (VAXstation 3200 only)
- Console terminal
- Tape cartridge drives and tape cartridges
- Compact disc drive

This section is not a detailed description of hardware; it is a description of the hardware you need to perform system management operations. For a detailed description of hardware for your configuration, see the hardware information for your system. The hardware information includes books on hardware installation, operation, troubleshooting, and technical information.

9.2 System Models

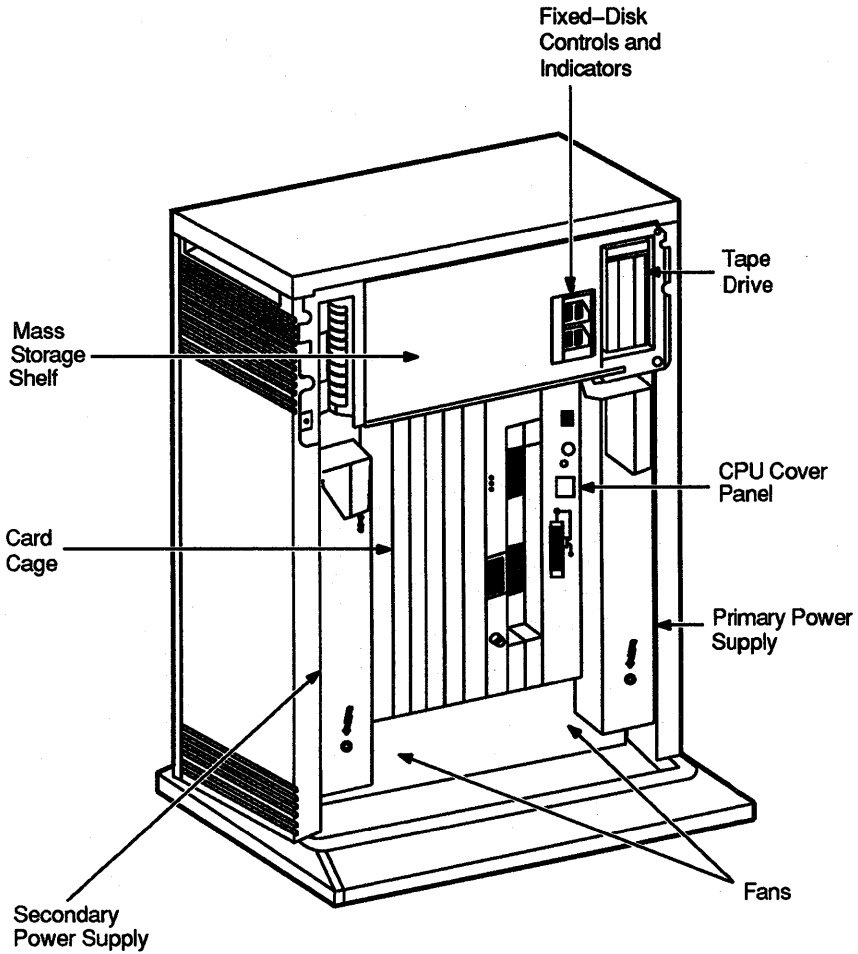
This section contains illustrations of the MicroVAX 3300, MicroVAX 3400, MicroVAX 3500, MicroVAX 3600, VAXstation 3200, VAXstation 3500, and VAXserver 3600, 3602 models.

Figure 9-1 MicroVAX,VAXserver 3300 Model



ZK-7825-GE

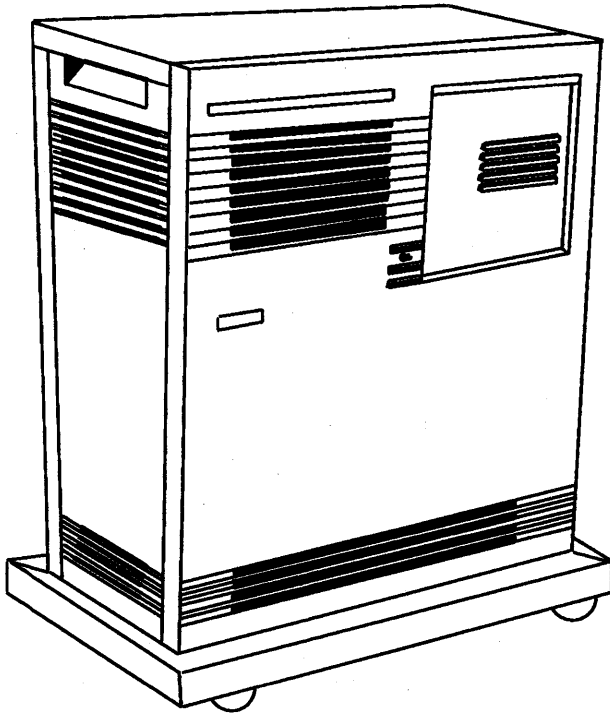
Figure 9-2 MicroVAX, VAXserver 3400 and 3800 Models



ZK-7826-GE

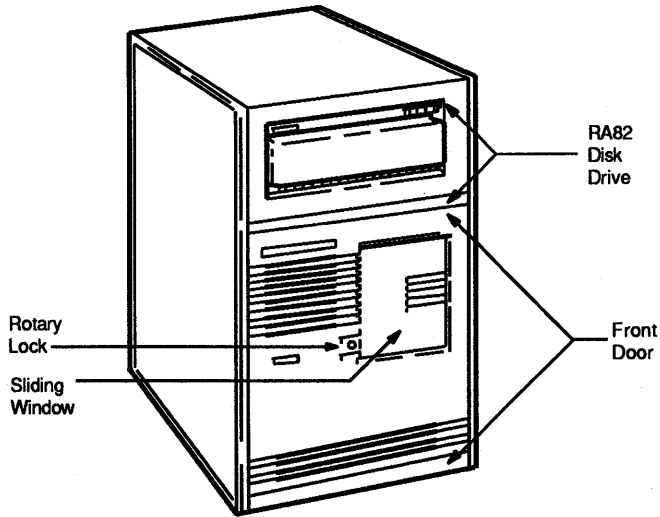
9-4 MicroVAX 3400, 3600, and 3900 Systems

Figure 9-3 MicroVAX 3500 Model



ZK-6513-GE

Figure 9-4 MicroVAX 3600 Model



ZK-6514-GE

9.3 System Control Panel (VAXstation 3200 Only)

The system control panel contains controls and indicator lights and is located on the front of the VAXstation 3200 system. (Section 9.5 describes and illustrates the controls and indicator lights on the other models.) Figure 9-9 is a detailed illustration of the system control panels on the VAXstation 3200 model. Table 9-1 describes each of the controls and indicator lights on the system control panel.

Figure 9-5 VAXstation 3200 Model

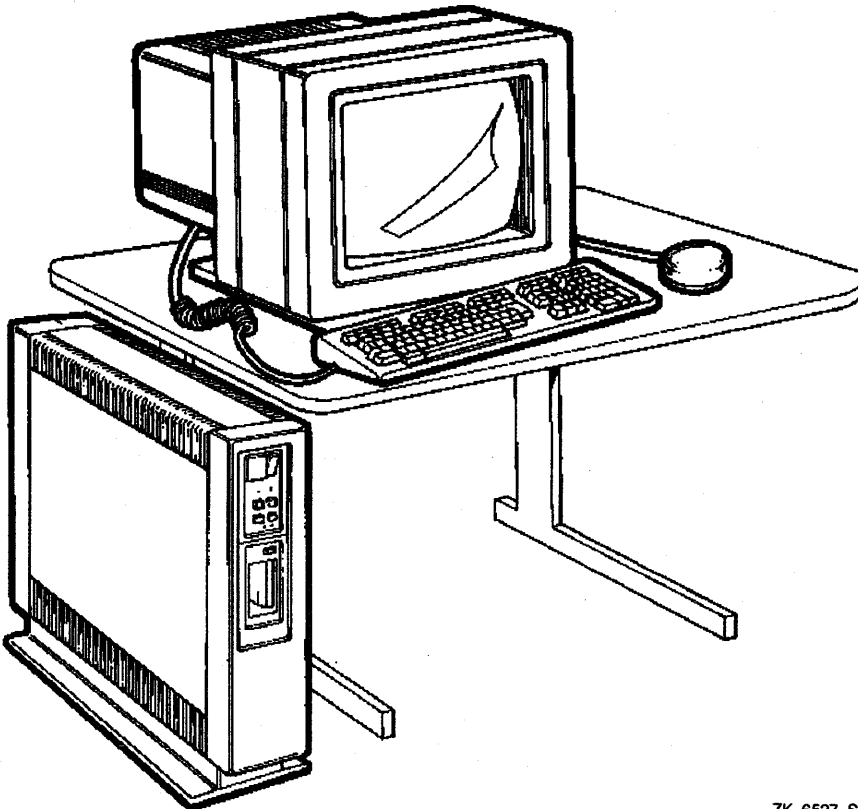
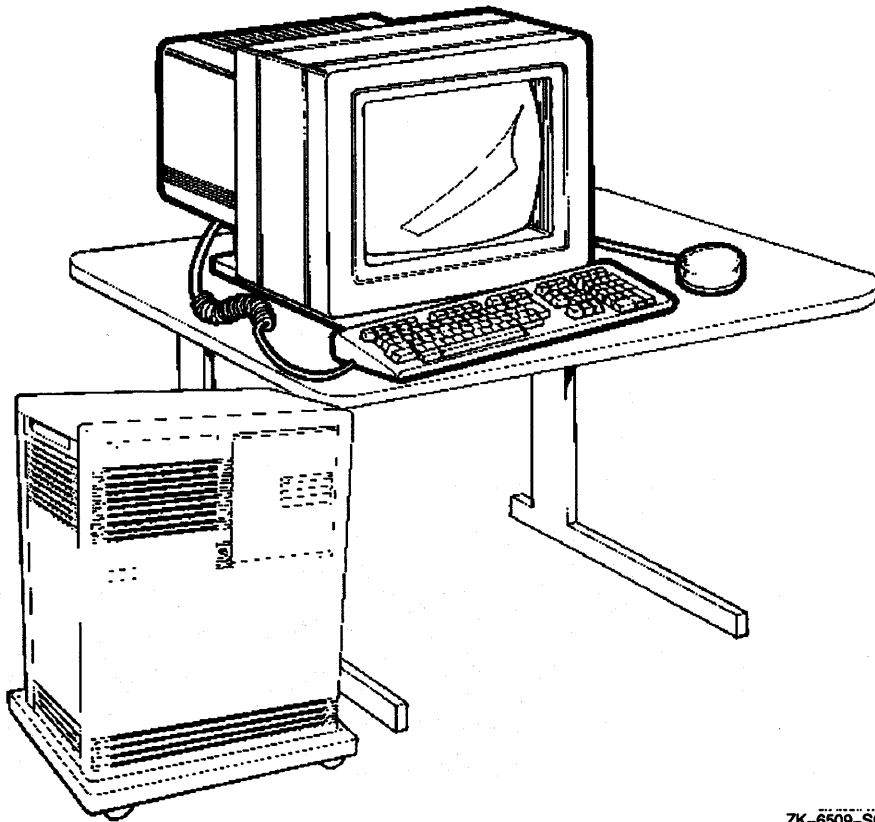
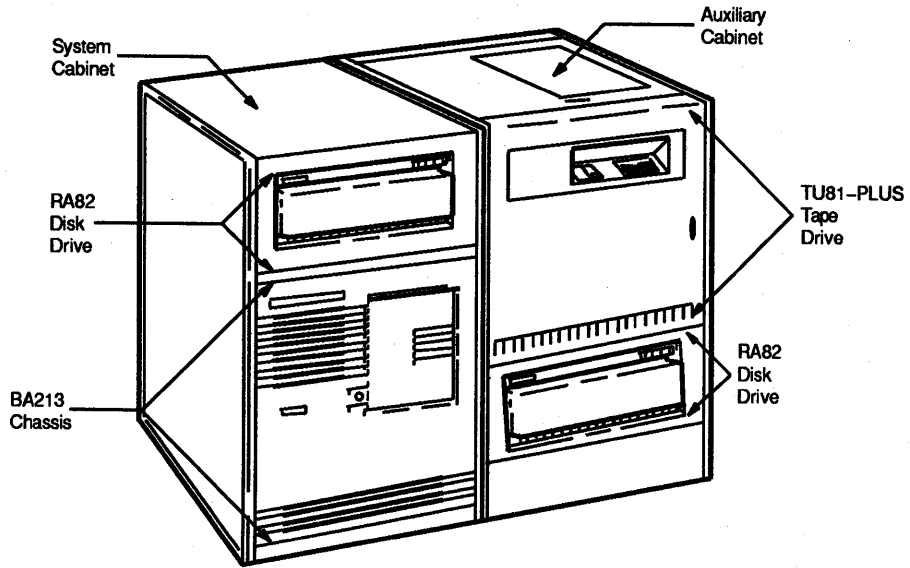


Figure 9-6 VAXstation 3500 Model



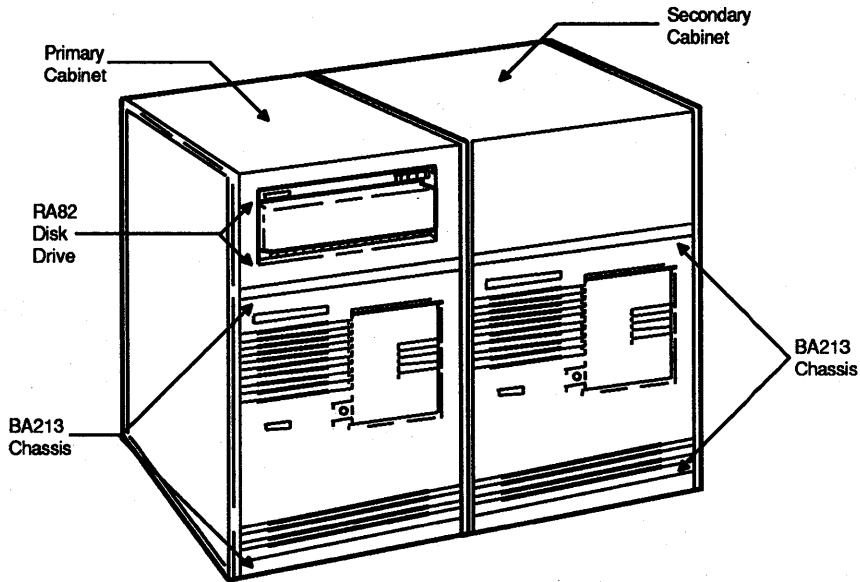
ZK-6509-SC

Figure 9-7 MicroVAX, VAXserver 3600 System with Auxillary Cabinet



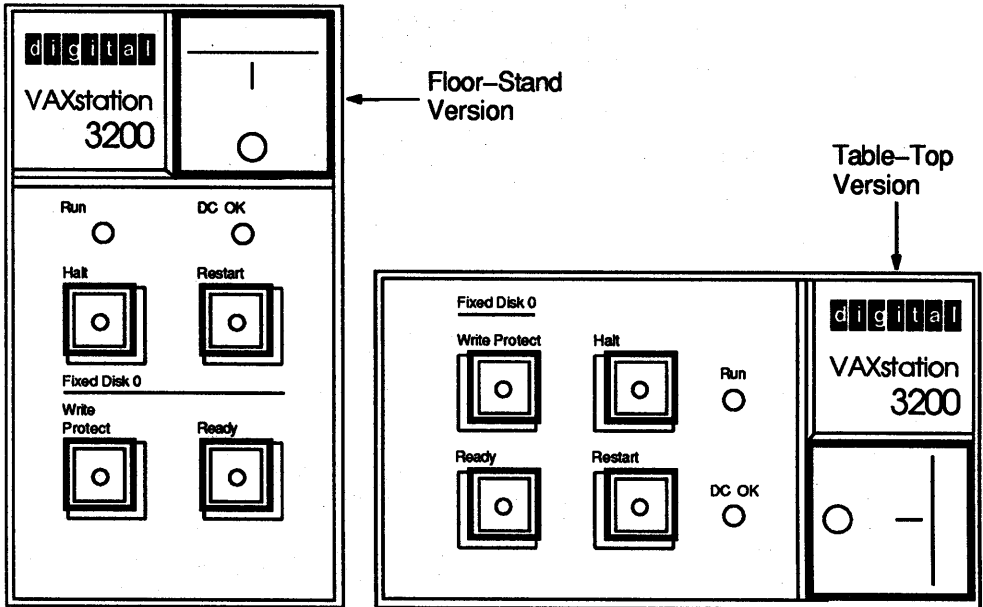
ZK-6511-GE

Figure 9-8 Standard VAXserver 3602 System



ZK-6510-GE

Figure 9-9 VAXstation 3200 Model System Control Panels



ZK-6515-GE

Table 9-1 Controls and Indicator Lights on the System Control Panel

Control/Indicator Light	Description
Power switch	Turns the ac power on. This rocker switch is labeled 1/0 (on/off). Most power switches on this system contain an orange light that glows when power to the system is on.
Run light	Glows green when the system is running (not stopped).
DC OK light	Glows green if the dc voltages are within the correct operating range.
Halt button	Stops the system. When you push the HALT button in, it glows red and stays in. When you release the HALT button, by pressing it again, it goes off and the system enters console mode. The Break Enable /Disable switch on the CPU panel must be set to the Enable position for the F5 (BREAK) key to stop the system. Note that the F5 (BREAK) key on the console terminal works the same way as the HALT button to stop the system.
Reset button	Restarts a running system. Pressing this button has no effect if the system is stopped.
Write Protect button	Prevents writing to a fixed disk. When you press the Ready button, the button glows red and the disk is write-protected.
Ready button	Prevents writing to or reading from a fixed disk. When pushed in, the disk is protected from reading or writing. When the button is released, the button glows green; the disk is available for reading and writing. The ready button blinks when data are read from or written to the fixed disk.

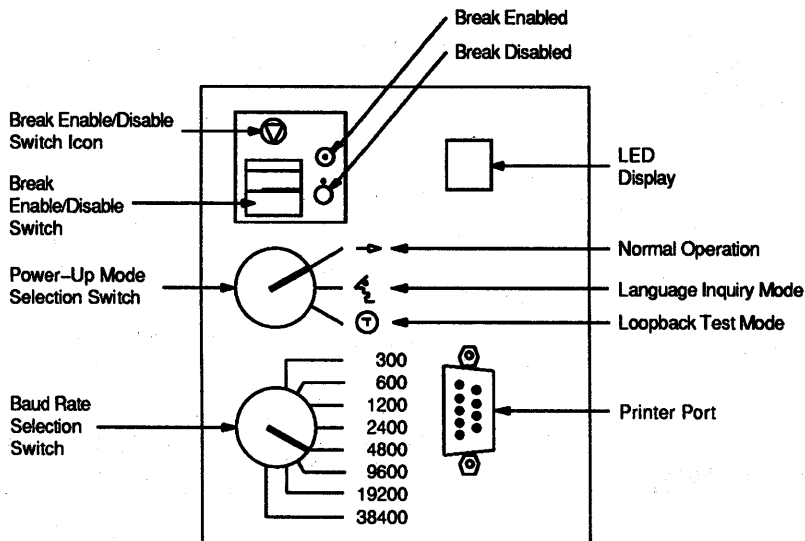
9.4 CPU Panel (VAXstation 3200 Only)

The CPU (Central Processing Unit) panel is located on the back of the VAXstation 3200 system. (See Section 9.5 for a description of the CPU panel on the other models.) You can set the following three controls on the CPU panel:

- Baud-rate control knob
- Break Enable/Disable switch
- Power-up mode switch

Figure 9-10 shows the CPU panel.

Figure 9-10 VAXstation 3200 CPU Panel



9.4.1 Baud-Rate Control Knob (VAXstation 3200 Only)

The baud-rate control knob determines the speed at which characters are received from and transmitted to the console terminal. Section 9.6 describes the console terminal.

For the console terminal to communicate with the system, the baud rates set on the terminal and on the system must be identical. Digital recommends that you set the baud rate for both the console terminal and the system to 9600.

The baud-rate control knob for these systems is located at the bottom of the CPU panel (or on the left of a horizontal model). The different baud rate positions are displayed on the panel. Figure 9-10 shows the CPU panel with the baud-rate control knob set to 9600.

9.4.2 Break Enable/Disable Switch (VAXstation 3200 Only)

The Break Enable/Disable switch controls whether the F5 (BREAK) key can stop the system.

The Break Enable/Disable switch must be set to **ENABLE** for the F5 (BREAK) key on the alternate console terminal to stop the system and transfer control to the console program.

For normal system operations, the Break Enable/Disable switch should be set to **DISABLE**. This prevents the system from being stopped if the F5 (BREAK) key on the alternate console terminal is pressed accidentally. Also, if you disable breaks, a system boots automatically when power to the system is turned on.

If your system does not have a BREAK key, the only way to stop the system is to press the HALT button.

The Break Enable/Disable switch is located at the top of the CPU panel, or on the right of a horizontal system. It is labeled with an encircled triangle, the international symbol for halt. You enable or disable breaks as follows:

- You *enable* breaks when you push the switch toward the circle with the dot inside it.
- You *disable* breaks when you push the switch toward the circle with the dot outside it.

See Figure 9-10 for an illustration of the Break Enable/Disable switch on the CPU panel.

9.4.3 Power-Up Mode Switch (VAXstation 3200 Only)

The power-up mode switch is located in the middle of the CPU panel. This switch allows you to select one of three symbols that indicate a power-up mode. The power-up mode controls the behavior of the machine when power is turned on.

- The *arrow symbol* is the original factory setting and the setting for normal system operations. The system performs full diagnostics when power is turned on at this setting. After the diagnostics complete, and if breaks are enabled on your system, the console-mode prompt (>>>) appears on the console terminal screen. If breaks are disabled, your system boots automatically. If the system has been turned off for many days, however, you may be prompted to choose the console-mode language you want to use.
- The *face in profile symbol* is the language inquiry setting. The system performs full diagnostics when power is turned on at this setting. After the diagnostics complete, and if the console terminal supports the Digital Multinational Character Set, the language selection menu is displayed. After you choose the language, and if breaks are enabled on your system, the console-mode prompt (>>>) appears on the console terminal screen. If breaks are disabled, your system boots automatically. Turn the switch to the arrow setting after selecting a console-mode language.
- The *encircled T symbol* is the test setting. Do not use this setting. It is reserved for use by Digital Customer Services.

If your console terminal supports the Digital Multinational Character Set and is not responding in the language you want to use, do the following:

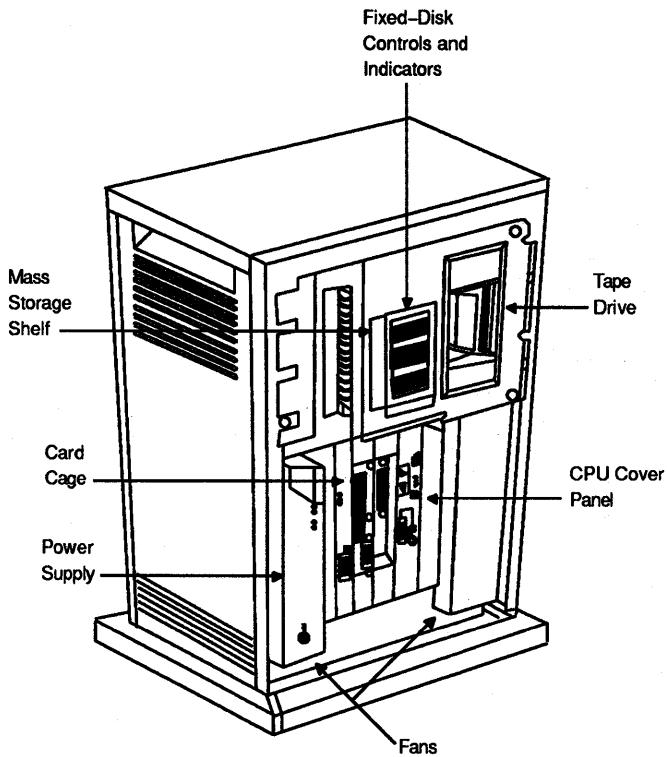
- Press the system power switch to 0 (off).
- Reset the power-up mode switch to the language inquiry position (face in profile).
- Press the system power switch to 1 (on).
- Select the language when prompted.
- Turn the power-up mode switch to the arrow position.

See Figure 9-10 for an illustration of the power-up mode switch.

9.5 Controls and Indicators

All controls and indicator lights on the MicroVAX 3300, 3400, 3500, 3600, 3800, 3900, and VAXstation 3500 models are located on the front of the system. Figure 9-11, Figure 9-12, and Figure 9-13 are detailed illustrations of the front of these models.

Figure 9-11 Front View of the Chassis (MicroVAX 3300 Only)



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Figure 9-12 Front View of the Chassis (MicroVAX 3400 and 3800 Only)

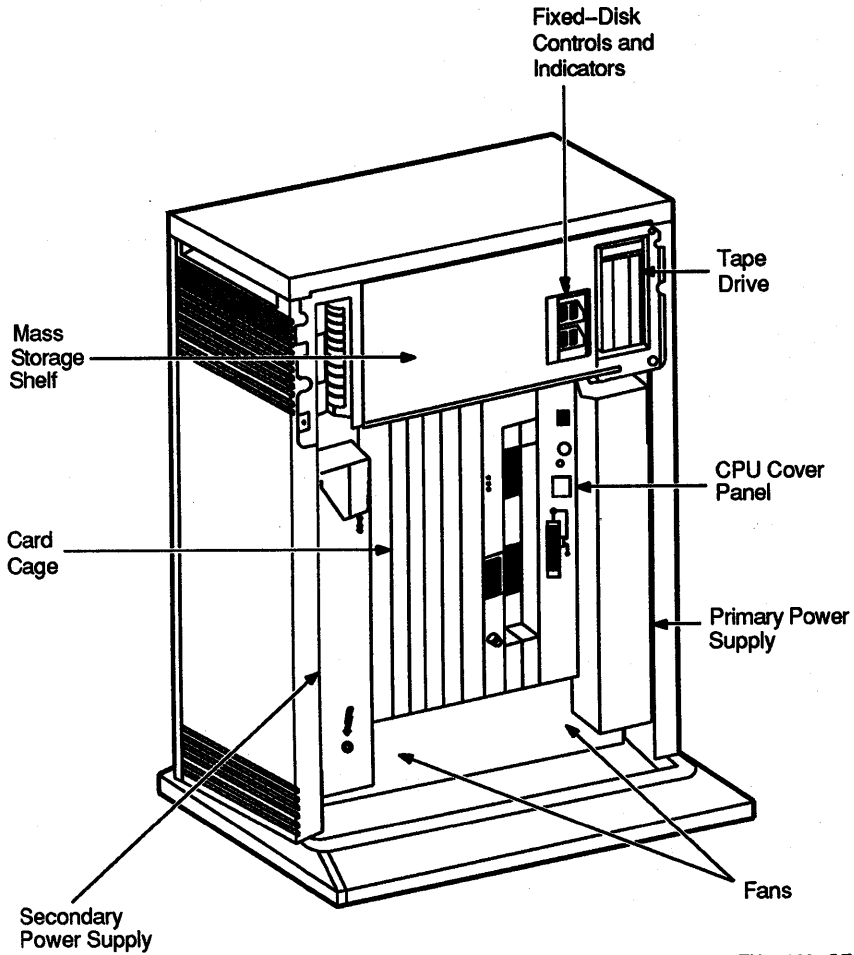
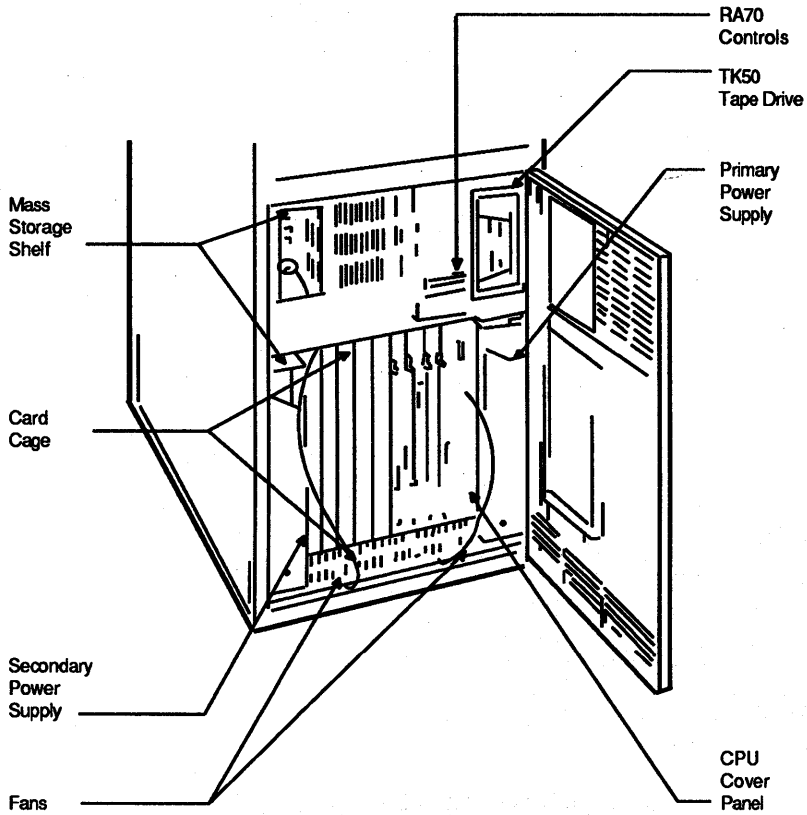


Figure 9-13 Front View of the Chassis (MicroVAX 3500, 3600, 3900, and VAXstation 3500 Only)



ZK-6516-GE

Table 9-2 describes the controls and indicator lights on the MicroVAX 3400, MicroVAX 3500, MicroVAX 3600, MicroVAX 3800, MicroVAX 3900, and VAXstation 3500 models. All these models have a power supply on both the right and the left. They also have two sets of power supply controls and indicator lights. Figure 9-14, Figure 9-15, Figure 9-16, Figure 9-17, Figure 9-18, Figure 9-19, Figure 9-20, Figure 9-21, and Figure 9-22 are detailed illustrations of the controls and indicator lights described in Table 9-2.

Table 9-2 Controls and Indicator Lights

Control/Indicator Light	Description
Power switch	A rocker switch that turns on the ac power. This switch is labeled 1/0 (ON/OFF) and is located below the tape drive. The power switch glows orange when power to the system is on.
DC OK light	Light on the mass storage tray. When the DC OK light is lit, the DC voltages are within the correct operating range. When not lit, the DC OK light indicates a problem with one of the power supplies. Check the DC OK light on each power supply to determine which power supply has failed.
Halt button	Your system may have <i>no</i> HALT button. If breaks are enabled on your system, press the F5 (BREAK) key on the console terminal keyboard to stop the system.
Restart button	The MicroVAX 3500, MicroVAX 3600, and VAXstation 3500 models have <i>no</i> RESTART button. This button is located on the mass storage tray next to the tape drive. When you press the RESTART button, the system reboots system software.
Fixed disk write-protect buttons	These buttons are located on the mass storage tray next to the tape drive. When they are pressed in and glow, the disk is write-protected. The system can read data from the fixed disk but cannot modify existing data or write new data to the fixed disk. When these buttons are released and do not glow, the disk is not write-protected. The system can read data from the fixed disk, modify existing data, and write new data to the fixed disk.

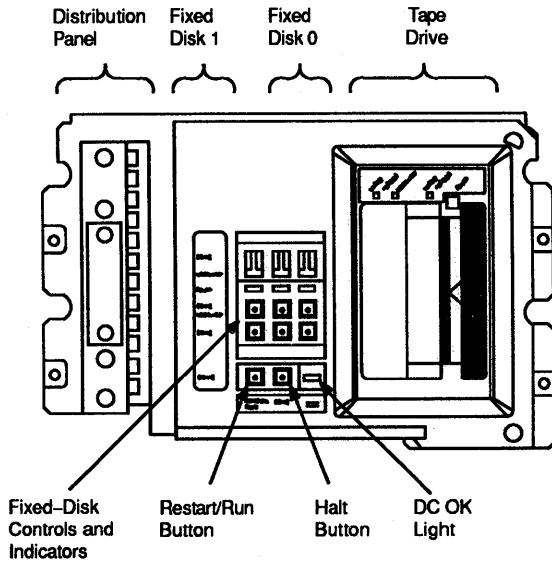
Table 9-2 (Cont.) Controls and Indicator Lights

Control/Indicator Light	Description
Run lights	The MicroVAX 3500, MicroVAX 3600, MicroVAX 3900, and VAXstation 3500 models have RUN lights located on the mass storage tray next to the tape drive. The RUN light glows when the drive is spinning. When the READY light glows, the drive is ready to use.
Fault lights	Located on the mass storage tray next to the tape drive. When the FAULT light glows, a fault is occurring in the disk drive.
Ready lights	Located on the mass storage tray next to the tape drive. When the READY light blinks, the drive is performing continuous seek operations. When the READY light glows, the disk drive is ready to read or write information on the disk. When the READY light does not glow, the drive is spinning up or dismounted.
Tape drive activity lights	Three activity lights located above the tape drive cartridge-release handle. The orange light glows when the tape cartridge is write-protected. The yellow light glows when the tape is loaded. When the green light glows, the tape is unloaded; it is safe to move the cartridge-release handle. Move the cartridge-release handle only when the green light glows and when the yellow and/or orange lights are off.
Tape drive unload button	Press this button in and release it to rewind and unload a tape.
Power supply DC OK light	Glow green if the DC voltages are within the correct operating range. An unlit DC OK light indicates a problem with the power supply. Turn off your system and call Digital Customer Services.
Power supply reset button	A recessed reset button that enables you to restart the system after a power interruption without turning off the system power. Use your fingertip or a small tool to press this button. You also can use this button to restart the power supply if the circuit breaker is tripped.

Table 9-2 (Cont.) Controls and Indicator Lights

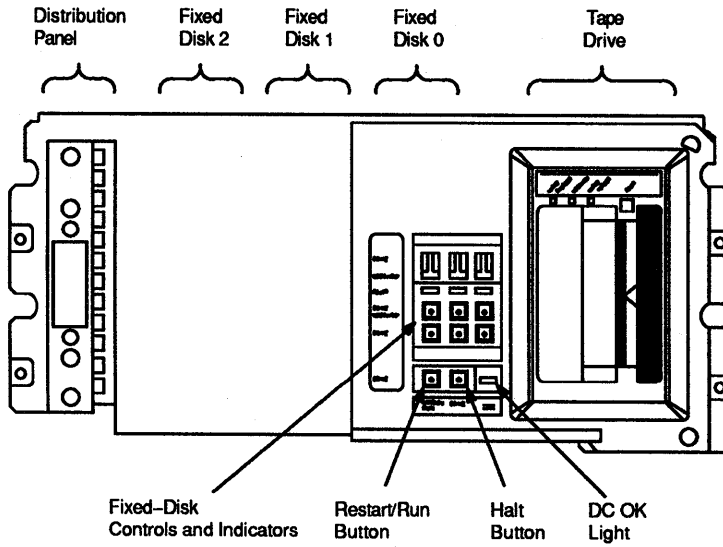
Control/Indicator Light	Description
Power supply circuit breaker	Located near the bottom of the power supply, a circuit breaker protects the system from electrical surges. When tripped, the circuit breaker is released. To reset the circuit breaker, press it in. Then press the power supply reset button.
Break Enable/Disable switch	A switch on the upper left side of the CPU cover panel; it is labeled with an encircled triangle, the international symbol for halt. Breaks are <i>disabled</i> when the switch is pushed toward the circle with the dot outside it. Breaks are <i>enabled</i> when the switch is pushed toward the circle with the dot inside it. When breaks are enabled, pressing F5 (BREAK) stops the system and transfers control to the console program.
Power-up mode switch	A rotary switch located on the CPU cover panel to the right of the Break Enable/Disable switch. It allows you to select one of three settings that indicate a power-up mode. Table 9-3 describes the three settings.
Baud rate control knob	The MicroVAX 3800, MicroVAX 3900, MicroVAX 3300, MicroVAX 3400, MicroVAX 3500, MicroVAX 3600, and VAXstation 3500 models have no baud rate control knob on the front of the CPU cover panel. The baud rate is preset to 9600 baud. Digital recommends that you do not change the baud rate setting. See the technical information shipped with your system for instructions only if it is absolutely necessary for you to change the baud rate.

Figure 9-14 Mass Storage Tray (MicroVAX, VAXserver 3300)



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Figure 9-15 Mass Storage Tray (MicroVAX, VAXserver 3400 and 3800)



ZK-7830-GE

Figure 9-16 Mass Storage Tray (MicroVAX 3500, 3600 and 3900, and VAXstation 3500)

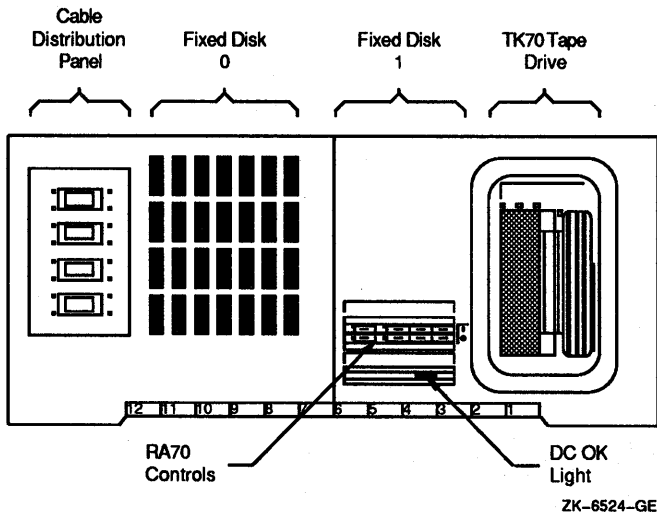


Figure 9-17 CPU Cover Panel (MicroVAX, VAXserver 3300)

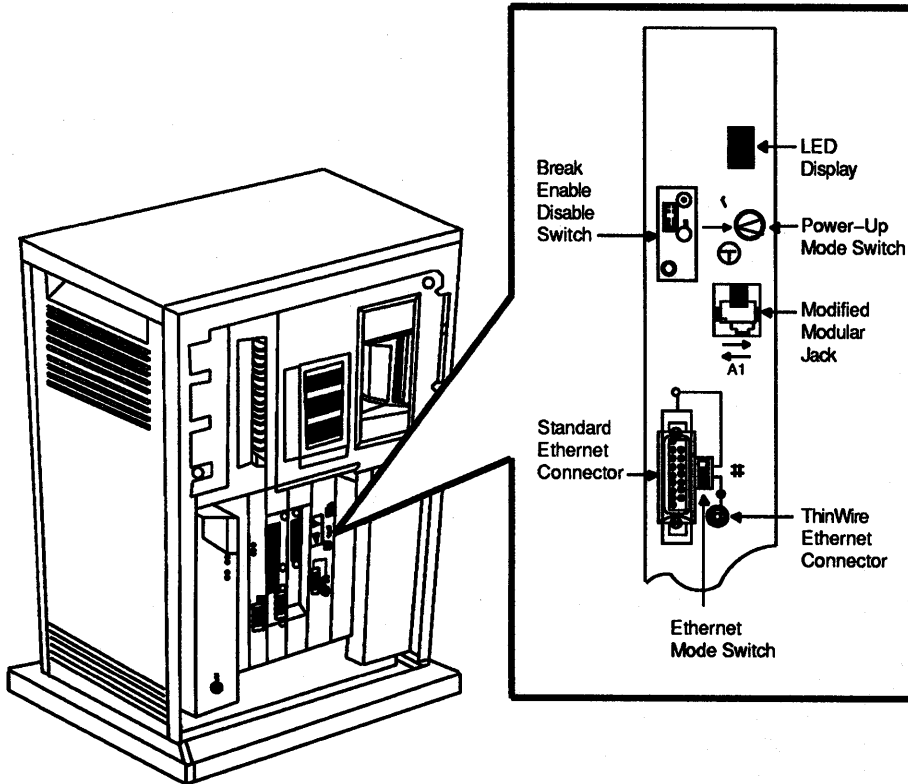


Figure 9-18 CPU Cover Panel (MicroVAX, VAXserver 3400)

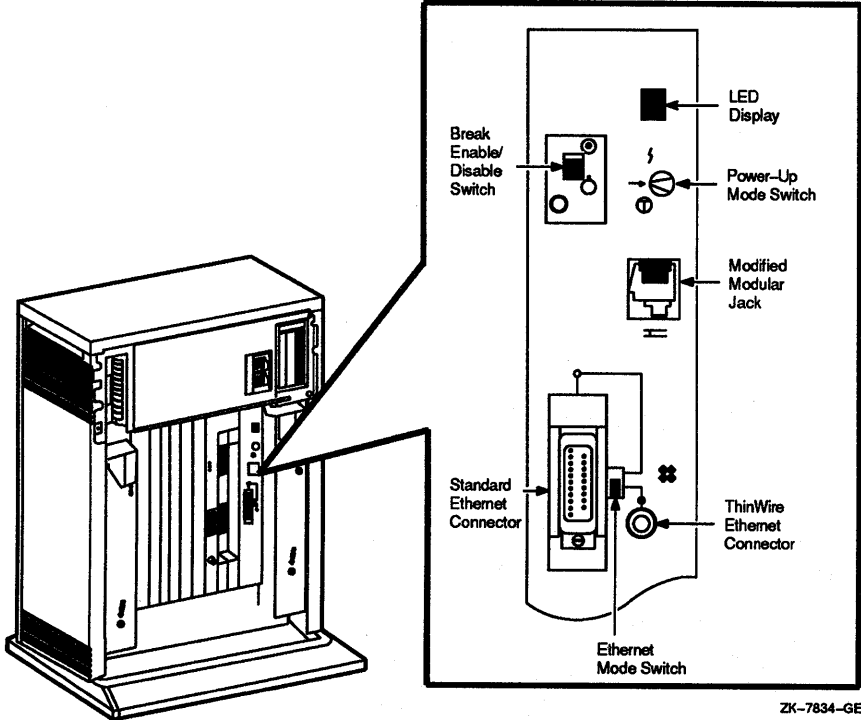


Figure 9-19 CPU Cover Panel (MicroVAX 3500, 3600, 3800, 3900, and VAXstation 3500)

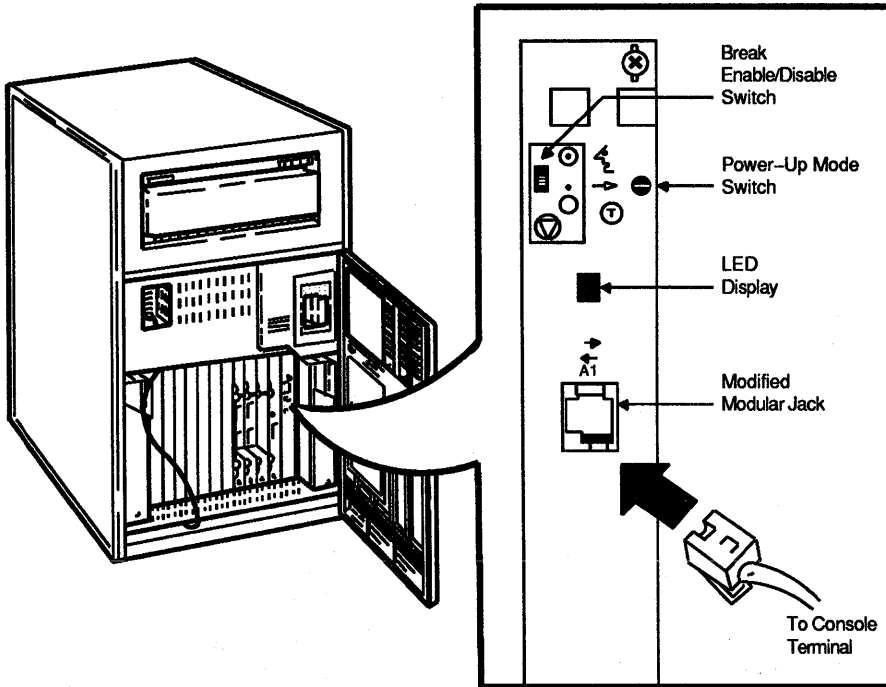
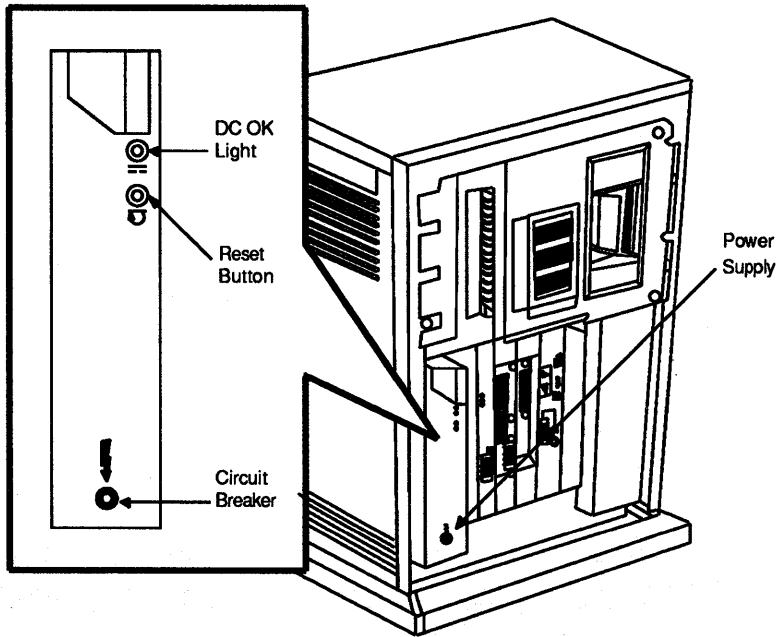


Figure 9-20 Power Supply (MicroVAX, VAXserver 3300)



ZK-7831-GE

Figure 9-21 Power Supply (MicroVAX, VAXserver 3400 and 3800)

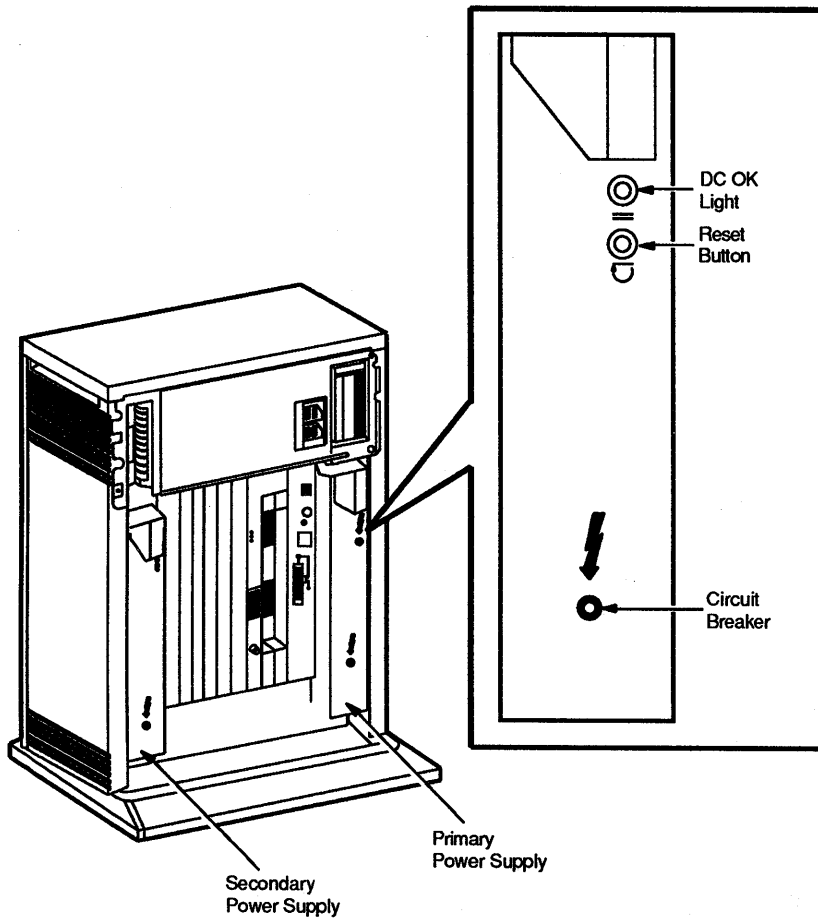
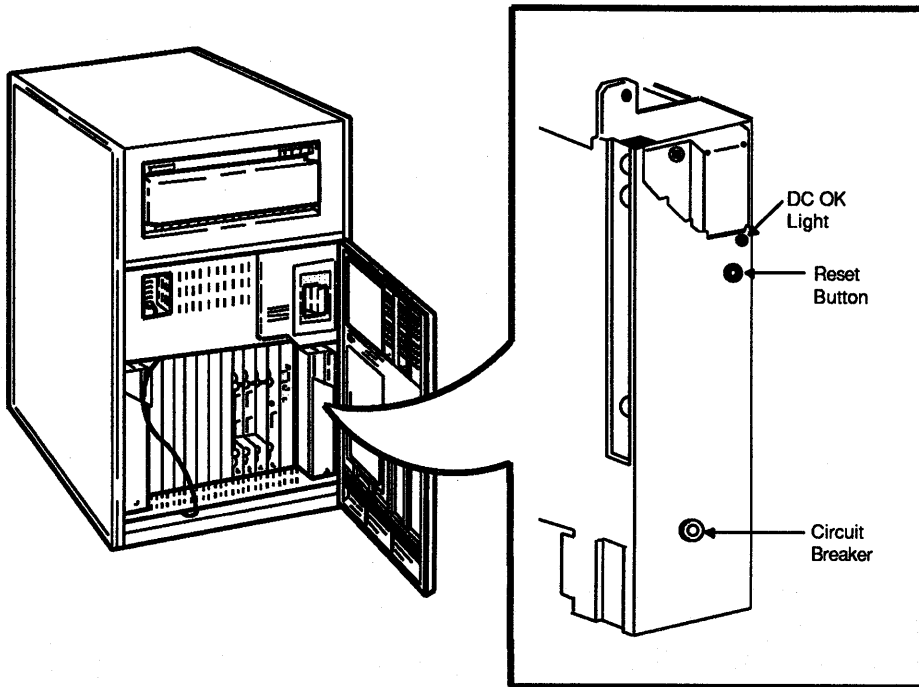


Figure 9-22 Power Supply (MicroVAX 3500, 3600, 3900, and VAXstation 3500)



ZK-6518-GE

Table 9-3 describes the settings of the power-up mode switch.

Table 9-3 Settings of the Power-Up Mode Switch

Setting	Meaning
Arrow	The original factory setting and the setting for normal system operations. The system performs full diagnostics when power is turned on at this setting. After the diagnostics complete, and if halts are enabled on your system, the console-mode prompt (>>>) appears on the console terminal screen. If halts are disabled, your system boots automatically. If the system has been off for many days, however, you might be prompted to choose the console-mode language you want to use.
Face in profile	The language inquiry setting. The system performs full diagnostics when power is turned on at this setting. After the diagnostics complete, and if the console terminal supports the Digital Multinational Character Set, the language selection menu appears. After you choose the language, and if halts are enabled on your system, the console-mode prompt (>>>) appears on the console terminal screen. If halts are disabled, your system boots automatically. Turn the switch to the arrow setting after selecting a console-mode language.
Encircled T	The test setting. Do not use this setting. It is reserved for use by Digital Customer Services.

9.6 The Console Terminal

The console terminal is the only terminal attached to the system that can operate in console mode, the mode in which you enter console commands — such as the BOOT command. When the system is in program mode, the console terminal may be used as a user terminal.

There is only one console terminal for each model. If your terminal is the only one on the system, it is the console terminal. If your system has several terminals attached to it, the console terminal is the one attached to the port located on the CPU panel. The console terminal is connected directly to the CPU cover panel at the modified modular jack labeled A-1.

NOTE

If you have a VAXstation 3200 or VAXstation 3500 system, the workstation display monitor is the console terminal. The console terminal is connected to the video boards, not to the port in the CPU panel.

9.7 Overview of Booting

Booting is the process of loading system software into the processor's memory. These systems use an internal memory device to boot the VMS operating system from the system disk into memory.

You can boot from an MSCP disk drive, a TMSCP tape drive, a PROM or from the DEQNA, DELQA, or integral Ethernet device.

9.8 Sniffer Boot (MicroVAX, VAXstation, and VAXserver 3600 Series)

If you do not set a default boot device, the MicroVAX, VAXstation, and VAXserver 3600 series systems (console firmware less than V5.X) perform a sniffer boot on automatic boots and reboots. A sniffer boot lets you boot without specifying a device name. To perform a sniffer boot, do the following:

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

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

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

Answer the questions. 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
```

2. Stop the system. If your system has a HALT button, press it twice. Make sure the light on the HALT button goes off. If your system does not have a HALT button, press the F5 (BREAK) key.
3. Enter the following command and press RETURN:

```
>>> B
```

The system searches in the following order for a device from which it can boot:

- Fixed disks
- TK50 and TK70 tape cartridges
- The network

The system searches only for disks with unit numbers ranging from 0 to 15 (decimal). If the system does not find any devices from which to boot, it continues to alternate indefinitely between trying to boot from tape and from the network.

NOTE

The system disk must have a unit number between 0 and 15 (inclusive) to work in the sniffer boot sequence.

9.9 Automatic Boot

The MicroVAX, VAXstation, and VAXserver 3600 series and the MicroVAX and VAXserver 3400 series, and the MicroVAX and VAXserver 3900 series systems boot automatically under the following circumstances:

- If you selected the auto reboot option during normal system shutdown
- After a system crash
- If the Break Enable/Disable switch is set to DISABLE when power to the processor is turned on

During an automatic boot, the system boots from the boot device defined in the last SET BOOT console-mode command.

To display the default boot device, enter the following command:

```
>>> SHOW BOOT
```

To set the default boot device, enter a command in the following format:

```
>>> SET BOOT ddcu
```

For example, to boot from DUA2 on subsequent automatic boots, enter the following command:

```
>>> SET BOOT DUA2
```

You might be asked to enter the date and time during the automatic boot.

9.9.1 MicroVAX, VAXstation, and VAXserver 3600 Series

The MicroVAX, VAXstation, and VAXserver 3600 series (console firmware less than V5.X) does a sniffer boot during an automatic boot under the following conditions:

- You have not specified a default boot device with the console-mode command SET BOOT.
- You have cleared the default boot device by entering the following command:

```
>>> SET BOOT
```

For more information about the sniffer boot, see Section 9.8.

9.9.2 MicroVAX and VAXserver 3400 and 3900 Series

MicroVAX and VAXserver 3400 and 3900 series (as well as VAXserver 3600 series computers with V5.X firmware) do not perform the sniffer boot on automatic boots. If you have not specified a default boot device or if the default has been cleared by a loss of backup power, the console program prompts you for a boot device. If you do not enter a default boot device within 30 seconds, the system boots from the primary Ethernet device (ESA0 or XQA0).

9.10 Manual Boot

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

1. Make sure that your computer is set up properly and turned on.
2. Make sure that your console terminal is set up properly and turned on.
3. If the VMS operating system is not running, go to step 4.

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

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

Answer the questions. 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
```

4. Stop the system. If your system has a **HALT** button, press it twice. Make sure the light on the **HALT** button goes off. If your system does not have a **HALT** button, press the **F5 (BREAK)** key.
5. Enter the **BOOT** command in the following format and press **RETURN**:

```
>>> B ddcu
```

Substitute the device name of the system disk for *ddcu*. The unit number of the drive may have a value between 0 and 255. For example, to boot from a drive with a device name of DUA2, enter the following command:

```
>>> B DUA2
```

If you do not specify a device name, MicroVAX, VAXstation, and VAXserver 3600 series computers (console firmware earlier than V5.X) perform a sniffer boot.

MicroVAX and VAXserver 3400 or 3900 series computers (and VAXserver 3600 series computers with V5.X console firmware) boot from the default boot device. If you have not specified a default device or the default device has been cleared by a loss of backup power, the console program prompts you for a device. If you do not enter a default device within 30 seconds, the system boots from the primary Ethernet device (ESA0 or XQA0).

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

```
VAX/VMS Version V5.2 Major version id = 01 Minor version id = 00
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-APR-1990 13:00
```

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

```
VAX/VMS Version V5.2 19-APR-1990 13:00

%SET-I-INTSET, login interactive limit=64, current interactive value = 0
SYSTEM          job terminated at 19-APR-1990 13:00:00.00
```

9.11 Booting from [SYSF] During an Upgrade

In the future you may 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 RETURN:

```
>>> B/F0000000 ddcu
```

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

For example, to boot from an RD53 fixed disk, enter the following command and press RETURN:

```
>>> B/F0000000 DUA0
```

9.12 Booting from a Different Directory on the System Disk

The VMS operating system is installed on the system disk in a root directory named [SYS0]. If you have enough room on the system disk, you can use VMSKITBLD, described in the *Guide to Setting Up a VMS System* or the CLUSTER_CONFIG.COM procedure to add a copy of the VMS operating system to another root directory on the system disk. To boot from a directory other than [SYS0], enter the BOOT command in the following format and press RETURN:

```
>>> B/n0000000 ddcu
```

Substitute the number of the other root directory on the system disk for *n* and the device name of the system disk for *ddcu*.

For example, to boot from root [SYS1] on an RD54 fixed disk, enter the following command and press RETURN:

```
>>> B/10000000 DUA0
```

9.13 Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want 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 is the most direct:

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

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

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

Answer the questions. 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
```

2. If your system has a **HALT** button, press it twice. Make sure the light on the **HALT** button goes off. If your system does not have a **HALT** button, press the **F5 (BREAK)** key.
3. To begin the conversational boot, enter the **BOOT** command in the following format and press **RETURN**:

```
>>> B/1 [ddcu]
```

If you do not specify a device name, the MicroVAX, VAXstation, and VAXserver 3600 series system (console less than V5.X) performs a sniffer boot when you finish using the **SYSGEN** commands. The MicroVAX and VAXserver 3400 and 3900 series system (and VAXserver 3600 series with V5.X console) boots from the default boot device when you finish using the **SYSGEN** commands.

4. At the **SYSBOOT>** prompt, you can enter any of the **SYSGEN** commands. For more information about these **SYSGEN** commands, see the *VMS System Generation Utility Manual*.
5. When you finish using the **SYSGEN** commands, enter the **CONTINUE** command to complete the boot process.

9.14 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 operating system to reboot automatically, set the Break Enable/Disable switch to **DISABLE** by pushing the switch toward the circle with the dot outside it. If you want to enter console-mode commands after the shutdown, set the Break Enable/Disable switch to **ENABLE** by pushing the switch toward the circle with the dot inside it.

9.14.1 Types of Shutdowns

You can perform the following three types of shutdown operations:

1. **An orderly shutdown with `SYSSYSTEM:SHUTDOWN.COM`.**
This 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 command procedure, log into the SYSTEM account, enter the following command, and press RETURN:

```
$ @SYSSYSTEM:SHUTDOWN
```


To halt the system after the procedure completes, press the HALT button twice. Make sure the light on the HALT button goes off. If your system does not have a HALT button, press the F5 (BREAK) key.
For more information about the SHUTDOWN command procedure, see the *Guide to Setting Up a VMS System*.
2. **An emergency shutdown with CRASH commands.** Use these emergency shutdown commands if OPCCRASH fails. Section 9.14.2 describes the CRASH commands.

9.14.2 Emergency Shutdown with CRASH Commands

NOTE

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

CRASH commands cause the system to fail, resulting in immediate shutdown. To force your MicroVAX, VAXstation, and VAXserver 3600 and 3900 series or MicroVAX and VAXserver 3400 series system to fail, use the following procedure:

1. Set the Break Enable/Disable switch to the **ENABLE** position.
2. Stop the system. If your system has a **HALT** button, press it twice. Make sure the light on the **HALT** button goes off. If your system does not have a **HALT** button, press the **F5 (BREAK)** key.
3. Enter the following commands and press **RETURN** after each one:

```
>>> E PSL
>>> E/I 0
>>> E +
>>> E +
>>> E +
>>> E +
>>> D PC FFFFFFFF
>>> D PSL 1F0000
>>> C
```

CRASH commands display 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** to cause an exception condition that sends the contents of memory to the dump file on the system disk. Later you can read the dump file to determine why the system did not respond.

4. **CRASH** commands stop the system, display the contents of the program counter, and display the console-mode prompt (>>>).

After the **CRASH** commands execute, the system reboots from the boot device defined in the last **SET BOOT** console-mode command. If you have not specified a default boot device with the **SET BOOT** command, MicroVAX, VAXstation, and VAXserver 3600 series computers (console less than V5.X) perform a sniffer boot. The MicroVAX and VAXserver 3400 and 3900 series (and VAXserver 3600 series with V5.X console) will prompt you for a device. If the system does not reboot automatically, reboot it manually.

5. 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 *VMS System Dump Analyzer Utility Manual*.

9.15 If the System Fails

Your system can fail in the following ways:

- **Bugcheck** — The system displays a bugcheck message on the console terminal and shuts itself down. This happens because the system encountered a problem that made further operation impossible or dangerous. Boot the system manually as explained in Section 9.10 or let it reboot automatically as explained in Section 9.9.
- **Hang** — The system stops responding to your commands. The problem could be a failure in a system software or hardware component or a power failure.
- **Erratic behavior** — The system does not respond according to specifications. The problem could be a failure in system software or a hardware component.

To see if the failure is a system problem and not something you have done, do the following:

- Make sure that you did not press the F1 key (the NO SCROLL key on a VT100 series terminal).
- Press Ctrl/T to check the status of your process. A status line should be displayed, indicating the name of the program that is executing and other information. If the status line is not displayed, the system is probably hung. If the status line is displayed, the program you are executing may 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 that the cable connecting the console terminal 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 that has not been saved on disk is lost.

If the system is hung, you must reboot without a normal shutdown. If your system has a HALT button, press it twice. Make sure the light on the HALT button goes off. If your system does not have a HALT button, press the F5 (BREAK) key. Enter the CRASH commands as described in Section 9.14.2.

The console-mode prompt (>>>) is displayed on the console terminal. Boot the system as described in Section 9.10.

If you have a problem with the system that Digital has not previously warned you about, note in detail the sequence of events that caused the problem and notify Digital Customer Services.

9.15.1 Backup Procedures

This section describes the following procedures:

- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on a tape cartridge
- Backing up and restoring the system disk

9.15.2 Overview of Standalone BACKUP

You can keep standalone BACKUP on the system disk, on a tape cartridge, or on any other media that the system supports. 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, you need to keep a copy of standalone BACKUP on a tape cartridge in case the system disk becomes damaged. If you have a tape cartridge distribution kit, you received standalone BACKUP on a tape cartridge.

9.15.3 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 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 is finished, it displays the following message:

```
The kit is complete.
```

3. To boot standalone BACKUP from the system disk, go to Section 9.15.4.

9.15.4 Booting Standalone BACKUP from the System Disk

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

1. Set the Break Enable/Disable switch to ENABLE.
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:

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

Answer the questions. 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. Stop the system. If your system has a HALT button, press it twice. Make sure the light on the HALT button goes off. If your system does not have a HALT button, press the F5 (BREAK) key.
4. Enter the BOOT command in the following format and press RETURN:

```
>>> B/E0000000 ddcu
```

Substitute the device name of the system disk for *ddcu*. For example:

```
>>> B/E0000000 DUA1
```

5. A few minutes later the procedure will ask 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-APR-1990 13:00
```

6. 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 MUA0:      device type TK50
```

```
.
```

```
:
```

```
.
```

Check 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.

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

```
%BACKUP-I-IDENT, Standalone BACKUP V5.2; the date is 19-APR-1990 13:00
$
```

9.15.5 Installing Standalone BACKUP on a Tape Cartridge

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

If you have the VMS tape cartridge distribution kit, you have standalone BACKUP on tape cartridge. If the original tape cartridge becomes damaged, or if you want to make extra copies, use this procedure.

1. Obtain a blank tape cartridge. Write the name on the paper label. For example, you would use the name S/A BKUP V5.2 TK50 to build a V5.2 kit. Insert the label into the label slot.
2. Write-enable the tape cartridge.
3. Insert the tape cartridge that contains standalone backup in the tape cartridge drive.
4. Log into the SYSTEM account.
5. Enter the following command and press RETURN:

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

6. The procedure asks for the name of the target device. Type MUA0 and press RETURN. For example:

```
Enter the name of the device on which to build the kit: MUA0
```

7. The procedure displays the following message:

```
.  
.  
.
```

```
Please place the scratch tape cartridge in drive _MUA0:.  
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 RETURN.

9. The procedure displays verification messages informing you that files are being copied.
10. When the procedure finishes, it displays a message similar to the following:

```
Ending time    19-APR-1990 13:45:29.90
Starting time 19-APR-1990 13:22:39.05
```

The kit is complete.

11. Remove the tape cartridge labeled S/A BKUP V5.2 from the tape cartridge drive.

Write-protect the tape cartridge and store it in a safe place.

9.15.6 Booting Standalone BACKUP from a Tape Cartridge

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from a TK50 or TK70 tape cartridge. You need a tape cartridge that contains standalone BACKUP (either the distribution tape cartridge or one you created). To boot standalone BACKUP from a tape cartridge, use the following procedure:

1. Set the Break Enable/Disable switch to ENABLE.
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
```

Answer the questions. 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. If your system has a HALT button, press it twice. Make sure the light on the HALT button goes off. If your system does not have a HALT button, press the F5 (BREAK) key.
4. Insert the tape cartridge containing standalone BACKUP in the tape cartridge drive.

5. Enter the following command and press RETURN:

```
>>> B MUA0
```

NOTE

Booting standalone BACKUP from a TK50 tape cartridge using a TK70 tape drive might take between 20 and 75 minutes.

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

```
VAX/VMS Version V5.2 19-APR-1990 12:59  
PLEASE ENTER DATE AND TIME (DD-MMM-YYY HH:MM) 19-APR-1990 13:00
```

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 MUA0:      device type TK50  
.  
.  
.
```

Check 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.

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

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.2; the date is 19-APR-1990 13:00  
$
```

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

9.15.7 Copying an Existing Computer Disk

If you copy an existing computer disk to an RF disk rather than perform an installation on that disk, make sure you modify the following SYSGEN parameters by editing SYS\$SYSTEM:MODPARAMS.DAT:

- ALLOCLASS to match RF's allocation class
- MSCP_SERVE_ALL is set to 1

Be sure that you run AUTOGEN after booting your computers.

10

VAXstation 3520, 3540 Systems

10.1 Hardware

This section describes the hardware you use to install the VMS operating system and perform system management operations. For a complete description of the VAXstation 3520, 3540 hardware, see the hardware manuals. The hardware manuals include information on hardware installation, operation, troubleshooting, and technical information.

10.2 Controls and Indicators

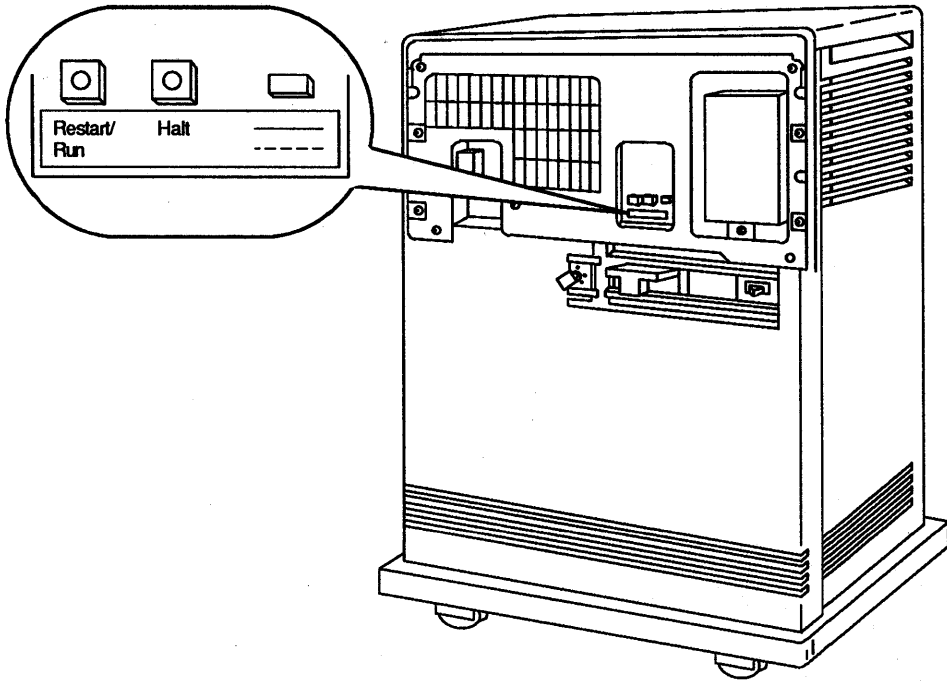
All controls and indicator lights on the VAXstation 3520 are located on the front of the system. Figure 10-1 shows the control panel and Table 10-1 describes the various controls and lights.

A three-position keylock switch controls the position of the plastic panel door. When the keylock switch is in the top position, you can see the controls and indicator lights, but you cannot touch them.

When the keylock switch is in the middle position, you can open the panel door part way to use the tape cartridge drive and operate the write-protect switches for the fixed disk drives.

When the keylock switch is in the bottom position, you can open the panel door all the way to change the setting of the power switch, and you can release the latch that secures the front panel.

Figure 10-1 Control Panel



ZK-7894-GE

Table 10-1 Controls and Indicator Lights on the Control Panel

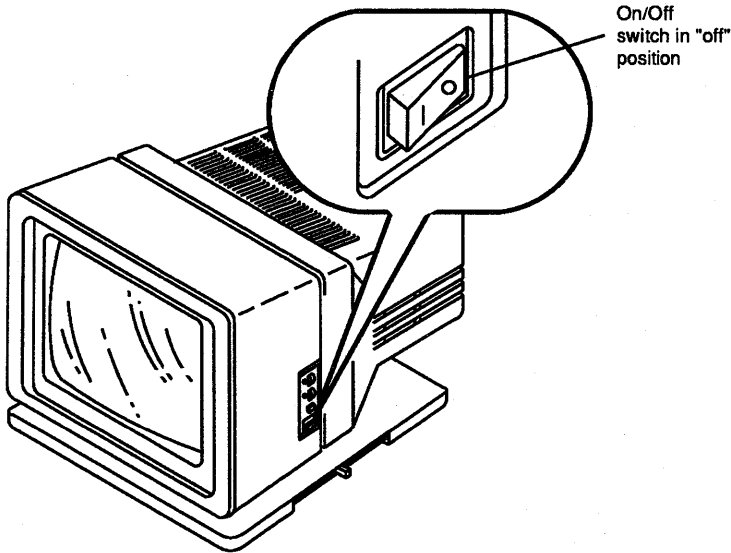
Control/Indicator Light	Description
Power switch	Turns on (or off) the ac power. This rocker switch is labeled 1/0 (on/off). It has an orange light that glows when power to the system is on.
Power supply light	Glows green when the system is running.
Halt button	Stops the system. When you push the Halt button in, it glows red and the system enters console mode.
Restart/Run button	Restarts a running system. Pressing this button has no effect if the system is stopped.

10.3 Turning On the Monitor

Turn on the monitor before turning on the system. To turn on the monitor, use the following procedure:

1. Make sure that the cable connecting the monitor to the system is secure.
2. Make sure that the power cable is connected to the monitor and plugged into a wall outlet.
3. Push the monitor power switch to the 1 (On) position. Figure 10-2 shows the location of the monitor power switch.

Figure 10-2 Monitor Power Switch



ZK-7895-GE

10.4 Turning On the System

Before turning on the system, check the following:

- Make sure that the system is plugged in properly and that all power cable, monitor cable, and other cable connections are secure.
- Make sure that the monitor is turned on.

To turn on the system, push the power switch to the 1 (On) position. The switch glows orange. The fans inside the system box go on.

The system performs diagnostic tests. During these self-tests, the system begins a countdown sequence. The numbers in the sequence depend on the hardware installed in the system and the devices attached to it.

The first time a VAXstation 3520, 3540 computer is turned on, it will display the language-mode selection menu. If you are prompted to select a language, select the one you want to use by entering the number associated with that language and pressing the Return key.

NOTE

If you wait for more than half a minute before choosing a language, your system automatically selects American English.

When the sequence completes, the console-mode prompt (>>>) should appear on the terminal screen. If the console-mode prompt (>>>) does not appear on the monitor screen, press the Halt button.

10.5 Booting the System

Booting is the process of loading system software into the processor's memory. The VAXstation 3520 uses an internal memory device to boot the VMS operating system from the system disk into memory.

By setting certain SYSGEN parameters, you can control how many CPUs are activated at boot time and the character of a multiprocessing system. In a multiprocessing system, the primary CPU is always booted. By default, all available CPUs are also booted. If you want to change this, you can set the SYSGEN parameter SMP_CPUS to tell the system which secondary CPUs to boot. For information on SYSGEN parameters that affect multiprocessing, see the *VMS System Generation Utility Manual*.

10.5.1 Manual Boot

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

1. Make sure the monitor is set up properly and turned on.
2. Make sure the computer is set up properly and turned on.
3. If the VMS operating system is not running, go to step 4.

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

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

Answer the questions. 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
```

4. Press the Halt button. See Figure 10-1 for the location of the Halt button.
5. Enter the BOOT command in the following format:

```
>>> B 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 DKA100, enter the following command and press Return:

```
>>> B DKA100
```

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

```
VAX/VMS Version V5.4 05-JUL-1990 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 05-JUL-1990 15:00:00.00
```

10.5.2 Booting from the Network

To boot from the network, enter the following command and press the Return key:

```
>>> B ESA0
```

10.5.3 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 what drive you want to boot from. Enter the SET BOOT command in the following format:

```
>>> SET 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 DKA100, enter the following command and press the Return key:

```
>>> SET BOOT DKA100
```

The next time you boot the system you can enter the BOOT command without specifying a device name. For example:

```
>>> B
```

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 Return:

```
>>> SET BOOT
```

If you have not used the SET BOOT command to tell the system which 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 primary Ethernet device, ESA0.

10.5.4 Automatic Boot

The VAXstation 3520 boots automatically under the following circumstances:

- If you selected the auto reboot option during normal system shutdown
- After a system crash

The system boots from the drive specified by the last SET BOOT command. You might be asked to enter the date and time during the automatic boot.

You can also use the SET BOOT console command to determine what happens when the system is turned on. See the hardware manuals for more information.

10.5.5 Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades.

Perform a conversational boot when you want 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 is the most direct:

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

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

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

Answer the questions. 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
```

2. Press the Halt button. See Figure 10-1 for the location of the Halt button.
3. To begin the conversational boot, enter the BOOT command in the following format:

```
>>> B/1 [device-name]
```

Substitute the device name of the drive from which you want to boot for *device-name*. If you do not specify a device name, the VAXstation 3520 will boot from the device specified by the last SET BOOT command.

4. At the SYSBOOT> prompt, you can enter any of the SYSGEN commands. For more information about these SYSGEN commands, see the *VMS System Generation Utility Manual*.
5. When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

10.5.6 Booting from a Different Directory on the System Disk

To boot the system from a directory other than [SYS0], enter the BOOT command in the following format and press the Return key:

```
>>> B/n0000000 device-name
```

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

For example, to boot from root directory [SYS1] on an RZ55 fixed disk with the device name DKA1, type the following command and press Return:

```
>>> B/10000000 DKA1
```

10.5.7 Booting from [SYSF] During an Upgrade

During the upgrade procedure, you will be instructed to boot the system from the [SYSF] directory.

To boot the system from the [SYSF] directory, enter the boot command in the following format and press the Return key:

```
>>> B/F0000000 device-name
```

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

For example, to boot from the [SYSF] directory on an RZ55 fixed disk with the device name DKA1, type the following command and press Return:

```
>>> B/F0000000 DKA1
```

10.5.8 Orderly Shutdown with SHUTDOWN.COM

To use the SHUTDOWN 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. See Figure 10-1 for the location of the Halt button.

If you use the Halt button to stop the system, you can enter the CONTINUE command to restart the system. For example, the following command restarts only the primary CPU:

```
>>> CONTINUE
```

The following command restarts all the CPUs:

```
>>> CONTINUE/ALL
```

10.5.9 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 **SHUTDOWN** or **OPCCRASH**.

CRASH commands cause the system to fail, resulting in immediate shutdown. To force your system to fail, use the following procedure:

1. Press the Halt button.
2. Enter the following commands and press the Return key after each one:

```
>>> E PSL
>>> E/I/N:4 0
>>> D PC FFFFFFFF
>>> D PSL 41F0000
>>> C
```

CRASH commands display 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 to cause an exception condition that sends the contents of memory to the dump file on the system disk. Later, you can read the dump file to determine why the system did not respond.

3. **CRASH** commands stop the system, display the contents of the program counter, and display the console-mode prompt (>>>).

After the **CRASH** commands execute, the system reboots from the boot device defined in the last **SET BOOT** command. If you have not specified a default boot device with the **SET BOOT** command, you will need to reboot the system manually.

4. After the system reboots, you can examine the dump file. To examine the dump file, log in to 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 *VMS System Dump Analyzer Utility Manual*.

10.6 If the System Fails

Your system can fail in the following ways:

- **Bugcheck** — The system displays a bugcheck message and shuts itself down. This happens because the system encountered a problem that made further operation impossible or dangerous. Boot the system manually as explained in Section 10.5.1, or let it reboot automatically as explained in Section 10.5.4.
- **Hang** — The system stops responding to your commands. The problem could be a failure in a system software or hardware component or a power failure.
- **Erratic behavior** — The system does not respond according to specifications. The problem could be a failure in system software or a hardware component.

To see if the failure is a system problem and not something you have done, do the following:

- Press **Ctrl/T** to check the status of your process. A status line should be displayed, indicating the name of the program that is executing and other information. If the status line is not displayed, the system is probably hung. If the status line is displayed, the program you are executing may 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 that the cable connecting the 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 that has not been saved on disk, is lost.

If the system is hung, you must reboot without a normal shutdown. Press the **Halt** button. See Figure 10-1 for the location of the **Halt** button. At the console-mode prompt (**>>>**) enter the **CRASH** commands as described in Section 10.5.9. Then, boot the system as described in Section 10.5.1.

If you have a problem with the system that Digital has not previously warned you about, note in detail the sequence of events that caused the problem and notify Digital Customer Services.

10.7 Backup Procedures

Standalone BACKUP makes an exact copy of the system disk. 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 deleted accidentally. *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.
- If the drive that holds the system disk malfunctions, you can restore the backup to a functioning disk and continue to use the system.
- To eliminate disk fragmentation. Fragmentation 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 the 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, which uses a subset of Backup utility qualifiers, to back up and restore the system disk.

This section describes the following procedures:

- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on a tape cartridge
- Backing up and restoring the system disk

10.7.1 Using Standalone BACKUP

You can keep standalone BACKUP on the system disk, on a tape cartridge, or on any other media that the system supports. 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, you need to keep a copy of standalone BACKUP on a tape cartridge in case the system disk becomes damaged. If you have a tape cartridge distribution kit, you received standalone BACKUP on a tape cartridge.

10.7.2 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 is finished, it displays the following message:

```
The kit is complete.
```

3. To boot standalone BACKUP from the system disk, go to Section 10.7.3.

10.7.3 Booting Standalone BACKUP from the System Disk

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

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

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

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

Answer the questions. 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
```

2. Press the Halt button. See Figure 10-1 for the location of the Halt button.
3. Enter the BOOT command in the following format and press Return:

```
>>> B/E0000000 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 DKA100, enter the following command and press Return:

```
>>> B/E0000000 DKA100
```

4. A few minutes later the procedure asks 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) 05-JUL-1990 13:00
```

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

```
Available device DKA0:    device type RZ55
Available device MUA0:    device type TK70
.
.
.
```

Check 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.

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 05-JUL-1990 13:00
$
```

10.7.4 Installing Standalone BACKUP on a Tape Cartridge

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

If you have the VMS tape cartridge distribution kit, you have standalone BACKUP on tape cartridge. If the original tape cartridge becomes damaged, or if you want to make extra copies, use this procedure.

1. Obtain a tape cartridge. Write the name S/A BKUP V5.4 on the paper label. Insert the label into the label slot.
2. Write-enable the tape cartridge.
3. Insert the tape cartridge labeled S/A BKUP V5.4 into the tape cartridge drive.
4. Log in to the SYSTEM account.

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

```
$ @SYS$UPDATE:STABACKIT MUA0
```

6. The procedure displays the following message:

```
.  
.  
.
```

```
Please place the scratch tape cartridge in drive _MUA0:.  
This volume will receive the volume label SYSTEM.
```

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

7. When you are ready to continue, type Y and press Return. The procedure displays verification messages informing you that files are being copied. When it finishes, it displays a message similar to the following:

```
Ending time 05-JUL-1990 13:45:29.90  
Starting time 05-JUL-1990 13:22:39.05
```

```
The kit is complete.
```

8. Remove the tape cartridge labeled S/A BKUP V5.4 from the tape cartridge drive.

Write-protect the tape cartridge and store it in a safe place.

10.7.5 Booting Standalone BACKUP from a Tape Cartridge

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

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

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

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

Answer the questions. 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
```

2. Press the Halt button. See Figure 10-1 for the location of the Halt button.
3. Insert the tape cartridge containing standalone BACKUP into the tape cartridge drive.
4. Enter the following command and press Return:

```
>>> B MUA0
```

NOTE

Booting standalone BACKUP from a tape cartridge takes between 25 and 75 minutes.

5. The procedure asks 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-YYY HH:MM) 05-JUL-1990 13:00
```

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

```
Available device DKA0:      device type RZ55
Available device MUA0:      device type TK70
.
.
.
```

Check 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.

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

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.4; the date is 05-JUL-1990 13:00
$
```

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

VAXstation, MicroVAX 3100 series

11.1 Systems Configurations

11.1.1 VS3100 (Model 30) Cabinet Overview

The VS3100 model 30 (VS42A-XX) consists of the system box, monitor, mouse or tablet, and keyboard. The label on the back of the system box indicates which model you are working on. The VS42A-XX model number on the label identifies the model 30 system and the VS42S-XX model number identifies the model 40 system.

The system box contains up to nine field replaceable units (FRUs): the system module, one or two memory modules, a graphics module, a power supply, one of two available mass storage controller (MSC) modules and up to three internal mass storage devices (TZ30 tape drive or an RX23 diskette drive and one or two RZ22 or RZ23 disk drives). There are also three expansion boxes available that contain additional mass storage devices (TK50Z expansion box, RZ55 disk drive expansion box, and an RRD40 compact disc expansion box). The monitor is a VR160 or VR290 color monitor or a VR150 or VR260 monochrome monitor. The keyboard is a LK201 keyboard.

The monitor is connected to the 15-pin video port. A printer can be connected to the printer port. A terminal or another printer can be connected to the communication port. Connection to the Ethernet is done through either the ThinWire Ethernet port or the standard Ethernet port depending on which type of Ethernet network is available.

The position of the Ethernet switch determines which of the Ethernet ports provides IEEE 802.3 network communications. An LED is lit next to the enabled port. The keyboard is connected to the keyboard port either on the back of the system box or on the monitor end of the video cable. The mouse or tablet is connected to the mouse port either on the back

of the system box or on the monitor end of the video cable. The external SCSI port is for connecting external mass storage devices to the system. The monitor or an external mass storage device can be plugged into the switched ac outlet.

11.1.2 VS3100 (Model 40) Cabinet Overview

The model 40 version (VS42S-XX) of the VS3100 consists of the system box, monitor, mouse, and keyboard. The label on the back of the system box indicates which model you are working on. The VS42S-XX model number on the label identifies the model 40 and the VS42A-XX model number identifies the model 30 systems.

The system box contains up to 10 field replaceable units (FRUs): the system module, memory module, graphics module, power supply, a mass storage controller (MSC) module and up to five internal mass storage devices (TZ30 tape drive, RRD40 compact disc drive, and three RZ23 disk drives). There are also three expansion boxes available that contain additional mass storage devices (TK50Z expansion box, RZ55 disk drive expansion box, and an RRD40 compact disc expansion box).

The monitor is a VR160 or VR290 color monitor or a VR150 or VR260 monochrome monitor. The keyboard is a LK201 keyboard.

The monitor is connected to the 15-pin video port. A printer can be connected to the printer port. A terminal or another printer can be connected to the communication port. Connection to the Ethernet is done through either the ThinWire Ethernet port or the standard Ethernet port depending on which type of Ethernet network is available.

The position of the Ethernet switch determines which of the Ethernet ports provides IEEE 802.3 network communications. An LED is lit next to the enabled port. The keyboard is connected to the keyboard port either on the back of the system box or on the monitor end of the video cable. The mouse or tablet is connected to the mouse or tablet port either on the back of the system box or on the monitor end of the video cable. The external SCSI port is for connecting external mass storage devices to the system. The **S3** is used when an alternate console terminal is needed. The monitor or an external mass storage device can be plugged into the switched ac outlet.

11.1.3 Boot Operation

Before you can boot the operating system, you need to determine which device you need to boot. If you already know which device you need to boot from, enter **BOOT device-name** and the system boots that device. If you do not know which device you need to boot from, enter **SHOW DEVICE** to see all of the bootable devices in the system. Figure 11-1 shows an example of the SHOW DEVICE command.

Figure 11-1 Example of the SHOW DEVICE Command

```
>>> SHOW DEVICE
  ESA0      SE0      08-00-2B-02-CF-A4

  DKA300    RZ3      A/3/0/00  DISK      103.5 MB  FX        RZ23
  MKA500    TZ5      A/5/0/00  TAPE      .....   RM
  ...HostID... A/6      INITR

  DKB100    RZ9      B/1/0/00  DISK      269.3 MB  FX        RZ55
  DKB200    RZ10     B/2/0/00  DISK      106.8 MB  FX        RZ23
  DKB300    RZ11     B/3/0/00  DISK      45.2 MB   FX        RZ22
  DKB400    RZ12     B/4/0/00  RODISK    xxxxxxxx  RM  WP    RRD40
  ...HostID... B/6      INITR

>>>
```

In the previous example, ESA0 is the Ethernet device and displays the Ethernet address of the system. The SCSI buses are listed next. Only one SCSI bus (SCSI-A) is listed on the model 30 systems that contain an ST506/SCSI MSC module. DKA300 is the RZ23 at address ID 3 on the SCSI-A bus and displays that it is a fixed disk (FX). MKA500 is the TZ30 at address ID 5 on the SCSI-A bus and displays that it is a tape drive which is removable (RM). HostID is the address ID of the SCSI-A controller (ID 6). DKB100 is the RZ55 expansion box at address ID 1 on the SCSI-B bus and is a fixed disk (FX). DKB200 and DKB300 are the RZ23 and RZ22 at address ID 2 and 3 on the SCSI-B bus and are both fixed disks. DKB400 is the RRD40 compact disc at address ID 4 on the SCSI-B bus and displays that it is a read-only disk (RODISK), removable media (RM), and is write-protected (WP). The second HostID is the address ID of the SCSI-B controller (ID 6).

The VS3100 systems include the following devices:

- DKAX00¹ — RZ22, RZ23, or RZ55 on SCSI-A bus
- DKBX00¹ — RZ22, RZ23, or RZ55 on SCSI-B bus
- DUA2 — RX23 in system box on model 30 systems only
- ESA0 — Ethernet booting device.
- MKAX00¹ — Tape drive on SCSI-A bus
- MKBX00¹ — Tape drive on SCSI-B bus

If no device name is specified when entering the BOOT command, the system checks NVR for a default device and boots off that device. If no device is stored in NVR, the system automatically assigns ESA0 as the boot device and sends out a boot inquiry over the Ethernet once every 30 seconds for 5 minutes. If no host responds within the first 5 minutes, the system waits for 5 minutes. The system then starts sending a boot inquiry again every 30 seconds for 5 more minutes. This pattern is repeated until a host boots the node or until you press the halt button.

11.2 Console Commands

BOOT	FIND	SHOW
COMMENT	HALT	START
CONTINUE	HELP	TEST
DEPOSIT	INITIALIZE	UNJAM
DTE	REPEAT	TRANSFER
EXAMINE	SET	

¹ The X indicates the SCSI address ID of the drive (0 to 7)

11.2.1 Special Keys

Table 11-1 Special Keys Used in Console Program Mode

Special Key	Explanation of use
Return	Terminates the command line so the console program can execute the command.
(X) (DELETE)	This is used to delete single characters within a command line. On video terminals and video monitors, the character(s) deleted disappears (the console program sends a BS/SP/BS). On hardcopy terminals, the deleted characters are retyped after a backslash delimiter as they are deleted. For unknown attached console devices, the console program assumes they are hardcopy.
Ctrl/C	Aborts the current command. The current program mode PC will be displayed, and the console prompt >>> is displayed on the next line. The console program echoes this as ^C.
Ctrl/O	Causes the console program to throw away transmissions to the console device until the next Ctrl/O is entered. Ctrl/O is echoed as ^O when it disables output, but is not echoed when it reenables output. Output is reenabled if the console program prints an error message or if the console prompts for a command from the console device. Output is also enabled by entering program I/O mode, and by Ctrl/C . Ctrl/O clears Ctrl/S .
Ctrl/R	Retypes the current command line. Deleted characters are not displayed.
Ctrl/S and Ctrl/Q	The console program supports Ctrl/S and Ctrl/Q on both the normal and attached console devices. These keys are equivalent to the corresponding line pacing control characters XOFF and XON. Characters received between the XOFF/XON pair may be ignored. The hold screen key on the normal console device is not used for line pacing.
Ctrl/U	Ignores the current command line. The console prompt >>> is displayed on the next line. This only affects entry of the current line. The console program echoes this as ^U. Pressing Ctrl/U when a command is executing does not abort the command.

11.3 Console Command Syntax

- The console program accepts commands up to 80 characters long. Longer commands result in an error message. The character count does not include rubouts, rubbed-out characters, or the terminating **Return**.
- Type-ahead is not supported. Characters received before the console prompt >>> appears on the screen are discarded. Only the following control sequences received before the console prompt >>> appears on the screen are recognized: **Ctrl/S**, **Ctrl/Q**, and **Ctrl/C**.
- Commands can be abbreviated by typing the first character in the command name. All commands are recognized by their first character. For example, B stands for the BOOT command and T stands for the TEST command.
- The console program treats multiple adjacent spaces and tabs as a single space. Leading and trailing spaces and tabs are ignored.
- Command qualifiers can appear after the command keyword or after any symbol or number in the command.
- All numbers (addresses, data, and counts) are hexadecimal except for symbolic register names which are decimal.
- The console program accepts uppercase and lowercase letters.

11.4 Command Description

11.4.1 Boot Command

>>> BOOT [<qualifier>][<device_name>]

The boot program is called virtual machine boot (VMB). The console program initializes and starts VMB running.

Qualifier

/R5:<data> - After initializing the processor and before starting VMB, R5 is loaded with the specified data (in hexadecimal). This allows a console user to pass a parameter to VMB.

Device_name

VMB boots the operating system from the device specified in the <device_name>. The device_name is in the form LLLD, where the first three characters are uppercase letters and the fourth character is a digit (0 through 9). A terminating colon in the device_name is acceptable, but is not required. Devices for the VS3100 systems are listed as follows:

- DKAX00 — RZ23, RZ24, or RZ55 on SCSI-A bus at address ID x (0 to 7)
- MKAX00 — Tape drive on SCSI-A bus at address ID x (0 to 7)
- DUA2 — RX23 in system box on model 30 systems only
- ESA0 — Ethernet booting device.
- DKBX00 — RZ23, RZ24, or RZ55 on SCSI-B bus at address ID x (0 to 7)
- MKBX00 — Tape drive on SCSI-B bus at address ID x (0 to 7)

Enter the **SHOW DEVICE** command to see the list of devices installed in the system.

If no device_name is specified, the console program automatically assigns ESA0 as the boot device and sends out a boot inquiry over the Ethernet once every 30 seconds for 5 minutes. If no host responds within the first 5 minutes, the console program waits for 5 minutes without sending out a boot inquiry. The console program then starts sending a boot inquiry again every 30 seconds for 5 more minutes. This pattern is repeated until a host boots the node or until you press the halt button.

11.4.2 COMMENT

>>> ! <comment>

The COMMENT command (the exclamation point) is ignored by the console program. It is used to annotate console I/O command sequences.

11.4.3 CONTINUE

>>> CONTINUE

The processor begins instruction execution at the address currently contained in the program counter. The address in the program counter is the address that was saved when the console program was started or is the address that was entered by the operator using the DEPOSIT command. Processor initialization is not performed. The console program enters program I/O mode (operating system such as VMS or ULTRIX).

11.4.4 DEPOSIT

>>> DEPOSIT [<qualifier>] <address><data>

Deposits the data into the specified address. If no address space or data size qualifiers are specified, the defaults are the address space and data size used in the last DEPOSIT or EXAMINE command. After processor initialization, the default address space is physical memory, the default address is zero, and the default data size is longword.

Qualifiers

- /B — The data size is byte.
- /W — The data size is word.
- /L — The data size is longword.
- /V — The address space is virtual memory. If memory mapping is not enabled, virtual addresses are equal to physical addresses.
- /P — The address space is physical memory.
- /I — The address space is internal processor registers.
- /G — The address space is the general registers (R0 through R15).
- /M — The address space is the machine register.
- /U — Enables access to console program memory.

- /N:<count> — The address is the first address in a range of addresses specified in count. The console program deposits to the first address and then to the specified number of succeeding addresses. Even if the address is the symbolic address “-”, the succeeding addresses are at the larger addresses. The symbolic address specifies only the starting address, not the direction of succession. For repeated references to preceding addresses, use “Repeat Deposit - <data>”.

Address

- Processor status longword (PSL) — The address space is set to /M automatically. Do not specify any address space qualifiers with PSL.
- Program counter (PC) (general register R15) — The address space is set to /G automatically.
- Stack pointer (SP) (general register R14) — The address space is set to /G automatically.
- General register (RN) — The register number is in decimal. The address space is /G.
- + (plus) — The location immediately following the last location referenced in a DEPOSIT or EXAMINE command. For references to physical or virtual memory spaces, the location referenced is the last address **plus** the size of the last reference (1 for byte, 2 for word, 4 for longword). For other address spaces, the address is the last address referenced **plus** one.
- - (minus) — The location immediately preceding the last location referenced in a DEPOSIT or EXAMINE command. For references to physical or virtual memory spaces, the location referenced is the last address **minus** the size of this reference (1 for byte, 2 for word, 4 for longword). For other address spaces, the address is the last address referenced **minus** one.

- * (asterisk) — The location last referenced in a DEPOSIT or EXAMINE command.
- @ (at sign) — The location addressed by the last location referenced in a DEPOSIT or EXAMINE command.

Data

- The data is specified as a hexadecimal number. The default number is zero.

11.4.5 DTE

>>> DTE

Converts the system into a dumb terminal emulator. This command is used when the boot node (server) needs a remote operator's console to run tests, boot the system, or whatever the regular operator's console is used for. If the boot node is a model 40 VS3100 system, the DTE switch on the back of the system box must be set to the up position before entering this command on the remote console. The boot node must also be plugged into the printer port on the back of the system box.

An * is added to the console prompt >>> when in the DTE command is entered to indicate that you are operating the boot node. Press **Ctrl/P** to return to normal console mode.

11.4.6 EXAMINE

>>> EXAMINE [<qualifier>] [<address>]

Examines the contents of the specified address. If no address is specified, + is assumed. The address may also be one of the symbolic addresses described in deposit.

Qualifiers

Same qualifiers as deposit.

Address

Same address specifications as deposit.

The response is in the form: <address space><address><data>

11.4.7 FIND

>>> FIND [<qualifier>]

The console program searches main memory starting at address zero for a page-aligned 64 Kbyte segment of good memory or a restart parameter block (RPB). If the segment or block is found, its address plus 512 is left in the SP. If the segment or block is not found, an error message is issued and the contents of the SP are unpredictable. If no qualifier is specified, /RPB is assumed.

Qualifiers

- /Memory

Searches memory for a page-aligned 64 Kbyte segment of good memory. The search includes a read/write test of memory and leaves the contents of memory unpredictable.

- /RPB

Searches memory for a restart parameter block. The search leaves the contents of memory unchanged.

11.4.8 HALT

>>> HALT

The console prompt >>> is displayed. No action is taken.

11.4.9 HELP

>>> HELP

Brings up a summary of the console commands.

11.4.10 INITIALIZE

>>> INITIALIZE

A processor initialization is performed. The following registers are set (all values are hexadecimal).

Register	Value	Register	Value
PSL	041F.0000	IPL	1F
ASTLVL	4	SISR	0
ICCS	0	RXCS	0
TXCS	80	MAPEN	0

All other registers are unpredictable.

The defaults used to fill in unsupplied qualifiers for DEPOSIT and EXAMINE commands are set to physical address, longword size, and address 0.

11.4.11 REPEAT

>>>REPEAT <command>

The console program repeatedly displays and executes the specified command. The repetition is stopped when you type Ctrl/C. Any valid console command may be specified for the command with the exception of the repeat command.

11.4.12 SET

>>> SET <parameter-name> <value>

Set the console NVR parameter to the indicated value. The following console parameters and their acceptable values are defined:

Parameter-name

- **BOOT** — Set the default boot device. The value must be a valid boot device name as specified by the boot command. The only validation done is to verify the fourth character in the device name is a decimal number between zero and nine. Entering “.” resets the boot device to the default value which is ESA0.

Value

- **DKAX00** — RZ23, RZ24, or RZ55 on SCSI-A bus at address ID X (0 to 7)
- **MKAX00** — Tape drive on SCSI-A bus at address ID X (0 to 7)
- **DUA2** — RX23 is system box on model 30 systems only
- **ESA0** — Ethernet booting device.
- **DKBX00** — RZ23, RZ24, or RZ55 on SCSI-B bus at address ID X (0 to 7)
- **MKBX00** — Tape drive on SCSI-B bus at address ID X (0 to 7)
- **“.”** — Resets boot device to the ESA0 default device.
- **BFLG** — Set the default boot flags. The value must be a hexadecimal number of up to eight characters. The value entered is not checked for validity.
- **HALT** — Set the default halt action code. This code specifies the default action the console should take for all error halts and power up halts. The default value is stored in nonvolatile RAM and is retained across power cycles. If the nonvolatile RAM fails for any reason, the console initializes this field to the value of 2 (boot).

Value

- **A 1** sets the default action to restart.
- **A 2** sets the default action to boot.
- **A 3** sets the default action to halt.

- **KBD** — Set the console keyboard layout to 1 of the 16 supported as follows:

Value

- A 0 sets the keyboard layout to Dansk.
 - A 1 sets the keyboard layout to Deutsch.
 - A 2 sets the keyboard layout to Deutsch (Schweitz).
 - A 3 sets the keyboard layout to English.
 - A 4 sets the keyboard layout to English (British/Irish).
 - A 5 sets the keyboard layout to Espanol.
 - A 6 sets the keyboard layout to Francais.
 - A 7 sets the keyboard layout to Francais (Canadien).
 - An 8 sets the keyboard layout to Francais (Suisse Romande).
 - A 9 sets the keyboard layout to Italiano.
 - A 10 sets the keyboard layout to Nederlands.
 - An 11 sets the keyboard layout to Norsk.
 - A 12 sets the keyboard layout to Portugues.
 - A 13 sets the keyboard layout to Suomi.
 - A 14 sets the keyboard layout to Svenska.
 - A 15 sets the keyboard layout to Vlaams.
- **MOP** — Set the network listener to be enabled or disabled. The only acceptable values for this are listed as follows. If the Ethernet self-test had failed, then this command is an illegal command. If the nonvolatile RAM fails for any reason, the default value is set to 1 (enabled).

Value

- A 0 disables the network listener.
- A 1 enables the network listener.

- **PSWD** — Set the password for remote trigger verification. This allows a user to set the password that will be verified if a remote trigger is received by the network listener. An illegal command will be displayed if the Ethernet self-test has failed or remote triggers are not enabled. In order to set a new password, the password must be known unless it is the first time a password is set, in which case only a new password need be specified. There is no corresponding SHOW command. For security reasons, the password is one-way encrypted and cannot be displayed.
- **SCSIA** — Set the SCSI address ID of the SCSI-A controller. The address ID of the controller should be an ID of 6. However, the address ID can be changed for whatever reason using this command. Valid address IDs are 0 to 7. Enter >>> **SCSIA 6** to set the controller's ID to 6.
- **SCSIB** — Set the SCSI address ID of the SCSI-B controller. The address ID of the controller should be an ID of 6. However, the address ID can be changed for whatever reason using this command. Valid address IDs are 0 to 7. Enter >>> **SCSIB 6** to set the controller's ID to 6.
- **TRIG** — Set the remote trigger to be enabled or disabled. This allows a remote system to request a local boot of the system. If the Ethernet self-test has failed, then this is an illegal command. If the nonvolatile RAM fails for any reason, the default value is set to 0 (disabled, remote trigger is not allowed).

11.4.13 SHOW

>>> SHOW <parameter-name>

The SHOW command displays information about the parameter indicated.

Parameter-name

- **BOOT** — Displays the default boot device as defined in the previous SET command above. An empty field appears as "...".
- **BFLG** — Displays the default boot flags. If no flags are specified, then 00000000 is displayed.
- **DEVICE** — Displays the devices currently operating in the system including the drives and their SCSI address IDs on the SCSI buses.

- **ESTAT** — Displays the screens associated with the last execution of the system exerciser test. This command is provided as a means of determining the state of the system test if an abnormal error occurs which causes the system exerciser test to either wait or halt. It provides no more information than is available at the normal completion of the system exerciser test. T 55 performs the same task as show estat.
- **ETHERNET** — Displays the hardware Ethernet address. The Ethernet address ROM is validated and is displayed as ID YY-YY-YY-YY-YY-YY where YY is a valid two digit hexadecimal number. If the Ethernet address ROM is invalid, then ID XX-XX-XX-XX-XX-XX is displayed to indicate that the Ethernet address ROM is not valid.
- **HALT** — Displays the default action code.
- **KBD** — Displays the console keyboard type. The value displayed for this parameter is the same one for the previous SET command above.
- **MEM** — Displays information concerning the KA-42 system memory. The format of the display is as follows:

```
>>> SH MEM
      00400000
      00000000
      003fd400:003fffff
```

Where: The first eight-character field displays the total amount of memory in the system including the console data structures. The second eight-character field shows the first address of 256 Kbytes of contiguous memory, generally used by VMB. The final line of the display shows the address range of the area of memory that is not available to the operating system. This includes the area of memory that is reserved for use by the console program. This field will be repeated as many times as needed to display all of the address ranges that are not available to the operating system.

- **MOP** — Displays the state of the enabled network listener bit. If the value returned is 0, then the network listener is disabled. If the state of the value returned is 1, then the listener is enabled. If the Ethernet tests fail, then this command is an illegal command.

- **TRIG** — Displays the state of remote trigger enable. If the value returned is 0, then remote trigger are not allowed. If the state of the returned is 1, then remote triggers are allowed provided the remote trigger password is set correctly. If the Ethernet tests fail, then this command is an illegal command.
- **VER** — Displays information concerning the revision levels of four separate sections of program code within the system module ROMs. These sections are the self-test code, console code, VMB code, and the ROM code. All four sections have different internal revision levels. Enter **SHOW VER** to see the internal revision levels of the self-test, console, VMB, and ROM code displayed next to the KA42-B. The following is an example of these revision levels:

```
>>> SHOW VER
KA42-B V0.17C-0BF-V2.1-239
      PST: 0BF
      CON: 17C
      VMB: V2.1
      ROM: 239
```

Where: The V0.17C is for the self-test revision level, 0BF is the console code revision level, V2.1 is for the VMB revision level, and 239 is the ROM code revision level.

11.4.14 START

```
>>> START [<address>]
```

The console program starts instruction execution at the specified address. If no address is given, the current content of the PC is used. If no qualifier is present, macroinstruction execution is started. If memory mapping is enabled, macroinstructions are executed from virtual memory. The START command is equivalent to a deposit to PC followed by a CONTINUE command. No initialize is performed.

11.4.15 TEST

>>> TEST [<test number>]

The console program invokes a diagnostic test program specified by the test number. Test numbers for Field Service diagnostics are rejected if the loopback connector is not installed on the far right MMJ connector. Some of the test numbers are used to invoke utilities.

11.4.16 UNJAM

>>> UNJAM

A system reset is performed.

11.4.17 TRANSFER

>>> X <address><count><RETURN><data stream><checksum>

Transfers binary data to and from physical memory. This command is used by automatic systems communicating with the console program. It is not intended for operator use. The console program writes or reads in memory the specified number of data bytes, starting at the specified address.

Address — The physical address the binary data is transferred to or from. It is specified as a hexadecimal number.

Count — The number of bytes to be transferred. It is specified as a hexadecimal number. If the high order bit of the count is one, the data is transferred (read) from physical memory to the console device. If the high order bit is zero, the data is transferred (written) from the console device to physical memory.

RETURN — A carriage return.

Data stream — "Count" bytes of binary data.

Checksum — The two's complement checksum of the command string or data stream. The checksum is one byte of data expressed as a two digit hexadecimal number.

11.5 Hardware

Before you install the VMS operating system, you need to be familiar with the following hardware components:

- Workstation display monitor
- On/Off switch
- Halt button
- Disk and tape drives

This section does not provide a detailed description of the hardware; it describes only the hardware components you need to perform system management operations. For a detailed description of hardware for your configuration, see the hardware manuals supplied with your VAX computer.

11.6 Turning On the Monitor

Turn on the power to the monitor before turning on the power to the system. To turn on the monitor, use the following procedure:

1. Make sure that the cable between the monitor and the system is connected properly.
2. Make sure that all power cords are plugged in securely.
3. Press the power switch on the monitor.

The monitor runs in two different modes: console mode and program mode.

- **Console mode**—When the workstation display monitor is in console mode, the VMS operating system is not running and the console-mode prompt (>>>) is displayed. You can control and monitor system operations by entering console-mode commands.
- **Program mode**—When the workstation display monitor is in program mode, the VMS operating system is running and the dollar sign prompt (\$) is displayed. You can enter DCL commands, run programs, and receive system messages.

11.7 The On/Off Switch

The On/Off switch is on the back of the system unit. Setting the switch to 1 turns on the power. Setting the switch to 0 turns off the power.

11.8 The Halt Button

The Halt button is on the back of the system unit. It is underneath the Halt icon, an inverted triangle within a circle. The Halt button is a small square that projects from the back panel of the system unit.

Press the Halt button with your fingertip to stop the VMS operating system and put the system in console mode. The console-mode prompt (>>>) is displayed on the workstation monitor.

11.9 Alternate Console Terminal

Your VAX computer has a serial port to which you can attach a printer. A picture of a small printer appears above this serial port. You can also attach another terminal to this port to use as the console terminal when the workstation display monitor is not working. You can also do this when you want a printout of what happens during the installation procedure.

There are two ways to get a printout of the installation procedure. You can attach a hardcopy terminal to the serial port, or you can attach a video terminal to the serial port and then connect a printer to the video terminal.

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, use the following procedure:

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

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

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

Answer the questions. 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
```

2. Turn the On/Off switch on the system unit and any expansion boxes to the 0 (off) position. Also turn off the power to the monitor.

3. Turn the alternate console switch to the 1 (on) position. When this switch is turned to 1, the serial port becomes a terminal port.
4. 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.
5. Turn on the alternate console terminal.
6. 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.)
7. Turn the On/Off switch on the system unit and any expansion boxes to the 1 (on) position.
8. If the console-mode prompt (>>>) does 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

Do not turn off the alternate console terminal while the VMS operating system is running, because 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 RETURN to get the console-mode prompt (>>>), and entering the CONTINUE command.

If you do not have a hardcopy terminal, you can get a printout of the installation procedure 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 whatever is displayed on the screen is printed. To attach a printer to the alternate console terminal, use the following procedure:

1. Make sure the power to the system unit, the alternate console terminal, any expansion boxes, and the printer is turned off.
2. 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.
3. Turn on the printer.

4. Check the baud rate on the printer (see the documentation that came with your printer). The baud rate should meet the requirements of your terminal. (See the documentation that came with your terminal.)
5. Turn on the alternate console terminal.
6. Check the set-up 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 set up.
7. Turn on any expansion boxes and the system unit.

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

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

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

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

Answer the questions. 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
```

2. Turn the On/Off switch on the system unit and any expansion boxes to the 0 (Off) position.
3. Turn off the alternate console terminal and disconnect the RS423 serial line that attaches the alternate console terminal to the serial port of the VAXstation 3100.
4. Turn the alternate console switch to the 0 (Off) position. When this switch is turned to 0, you can use the serial port to attach a printer to the system.
5. Turn on components in the following order:
 - a. Turn on the monitor.
 - b. Turn on the RZ55 drive, if you have one.
 - c. Turn on the RZ56 drive, if you have one.
 - d. Turn on any other optional drives that you have.
 - e. Turn on the system unit.

11.10 Booting the System

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

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

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

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

Answer the questions. 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
```

2. Press the Halt button located on the back of the system unit.
3. Enter the BOOT command in the following format:

```
>>> B 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 RETURN:

```
>>> B DKA400
```

To boot from the network, enter the following command and press RETURN:

```
>>> B ESA0
```

```
VAX/VMS Version V5.3 19-APR-1990 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-APR-1990 15:00:00.00
```

11.11 The SET BOOT Command

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 what drive you want to boot from. Enter the SET BOOT command in the following format:

```
>>> SET 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 RETURN:

```
>>> SET BOOT DKA400
```

The next time you boot the system you can enter the BOOT command without specifying a device name. For example:

```
>>> B
```

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 RETURN:

```
>>> 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.

11.12 Automatic Boot

You can set the VAXstation 3100 and MicroVAX 3100 series to boot automatically or you can boot it manually. This section describes how to control whether the system boots automatically.

The VAXstation 3100 and MicroVAX 3100 series can boot automatically from the device designated in RAM. By default, the network device, ESA0, is the designated boot device. When you installed the VMS operating system, you designated the system disk as the default boot device. Section 11.11 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 entered Y at the auto reboot prompt)
- After a bugcheck
- If the system halts under program control

To control whether the system boots automatically in these situations, do the following:

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

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

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

Answer the questions. 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
```

2. Press the Halt button located on the back of the system unit.

3. 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 designated in RAM.

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 at the auto reboot prompt when you shut down the system with the SHUTDOWN.COM command procedure.

4. 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
```

11.13 Booting from [SYSF] During an Upgrade

In the future you may 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 RETURN:

```
>>> B/F0000000 [device-name]
```

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

```
>>> B/F0000000 DKA400
```

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

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

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

Answer the questions. 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
```

2. Press the Halt button located on the back of the system box.

3. To begin the conversational boot, enter the **BOOT** command in the following format:

```
>>> B/1 [device-name]
```

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

```
>>> B/1 DKA400
```

If you do not specify a device name, the system boots from the boot device specified by the last **SET BOOT** command.

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

11.15 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 11.12.

11.15.1 Types of Shutdowns

You can perform the following three types of shutdown operations:

- **An orderly shutdown with `SYSSYSTEM:SHUTDOWN.COM`.** This 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** command procedure, log into the **SYSTEM** account, enter the following command, and press **RETURN**:

```
$ @SYSSYSTEM:SHUTDOWN
```

To halt the system after the procedure completes, press the **Halt** button located on the back of the system box.

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

- **An emergency shutdown with OPCCRASH.EXE.** If you cannot perform an orderly shutdown with SHUTDOWN.COM, run the OPCCRASH emergency shutdown program. To run the OPCCRASH program, log into the SYSTEM account, enter the following command, and press RETURN:

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

To halt the system after the procedure completes, press the Halt button located on the back of the system box.

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

- **An Emergency Shutdown with CRASH Commands.** Use this emergency shutdown procedure if OPCCRASH fails. Section 11.15.2 describes using CRASH commands.

11.15.2 Emergency Shutdown with CRASH Commands

NOTE

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

To force your processor to fail, do the following:

1. Press the Halt button located on the back of the system box.
2. To examine processor registers, enter the following commands and press RETURN:

```
>>> 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.

3. Enter the following commands and press RETURN:

```
>>> 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 disk.

4. Enter the following command and press RETURN:

```
>>> CONTINUE
```

This causes the system to perform a bugcheck.

5. After the system reboots, you can examine the dump file. Log into the SYSTEM account.
6. 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 *VMS System Dump Analyzer Utility Manual*.

11.16 If the System Fails

Your system can fail in the following ways:

- **Bugcheck** — The system displays a bugcheck message on the console terminal and shuts itself down. This happens because the system encountered a problem that made further operation impossible. Reboot the system.
- **Hang** — The system stops responding to your commands. The problem could be a failure in system software or a hardware component or a power failure.
- **Erratic behavior** — The system does not respond according to specifications. The problem could be a failure in system software or a hardware component.

To see if the failure is a system problem and not something you have done, try 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 box is secure.

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

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

If you have a problem with the system that Digital has not warned you about, note in detail the sequence of events that caused the problem and notify Digital Customer Services.

11.17 Backup Procedures

This section describes the following procedures:

- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on a tape cartridge
- Backing up and restoring the system disk

11.17.1 Overview of Standalone BACKUP

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, you need to keep a copy of standalone BACKUP on a tape cartridge in case the system disk becomes damaged. As part of your distribution kit, you received standalone BACKUP on a tape cartridge.

11.17.1.1 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 into the SYSTEM account.
2. Enter the following command and press RETURN:

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

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. To boot standalone BACKUP from the system disk, go to Section 11.17.1.2.

11.17.1.2 Booting Standalone BACKUP from the System Disk

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

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

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

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

Answer the questions. When the procedure asks if an automatic system boot 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
```

2. Press the Halt button.

3. Enter the BOOT command in the following format:

```
>>> B/E0000000 device-name
```

Substitute the device name of the system disk for *device-name*. Note that these are zeros. For example, if the system disk has a device name of DKA400, enter the following command and press RETURN:

```
>>> B/E0000000 DKA400
```

```
VAX/VMS Version V5.3 Major version id = 01 Minor version id = 00
```

4. The procedure asks 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-APR-1990 15:00
```

5. 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.

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

```
%BACKUP-I-IDENT, Standalone BACKUP V5.3; the date is 19-APR-1990 15:00
$
```

11.17.1.3 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 S/A BKUP Version X on the paper label. Insert the label in the label slot.
2. Write-enable the tape cartridge.
3. Insert the tape cartridge labeled S/A BKUP into the drive.
4. Log into the SYSTEM account.
5. Enter the following command and press RETURN:

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

6. The procedure asks you for the name of the target device. Type MKA500 and press RETURN. 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:
```

7. When you are ready to continue, type Y (for YES) and press RETURN.
8. The system displays verification messages informing you that files are being copied.

9. When standalone BACKUP is installed, the procedure displays a message similar to the following:

```
Ending time 19-APR-1990 16:44:29.90
Starting time 19-APR-1990 16:30:39.05
```

The Kit is complete.

\$

10. Remove the tape cartridge labeled S/A BKUP V5.3 from the tape cartridge drive.
11. Write-protect the tape cartridge and store it in a safe place.

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

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

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

Answer the questions. When the procedure asks if an automatic system boot 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
```

2. Press the Halt button.
3. Insert the tape cartridge that contains standalone BACKUP into the tape cartridge drive.
4. To boot standalone BACKUP, enter the following command at the console-mode prompt (>>>) and press RETURN:

```
>>> B MKA500
```

5. Standalone BACKUP displays the following message:

```
VAX/VMS Version V5.3 Major version id = 01 Minor version id = 00
```

6. The procedure asks 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-APR-1990 15:00
```

7. 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
.
.
.
```

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

```
%BACKUP-I-IDENT, standalone BACKUP V5.3; the date is 19-APR-1990 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 11.17.2.

11.17.2 Using Standalone BACKUP

There are several reasons to back up a system disk:

- 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 does occur, you can restore the backup copy to 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 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. Fragmentation happens when files are not stored contiguously on the disk. Back up the system disk to a tape cartridge, diskettes, or another disk. Then restore the files to the original system disk. The BACKUP command creates a copy on which files are stored contiguously.

Digital recommends that you use standalone BACKUP, which 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	Creates 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 and its qualifiers, see the *VMS Backup Utility Manual*.

12

VAXstation, MicroVAX 2000 Systems

12.1 VAXstation 2000/MicroVAX 2000 Hardware

Before you install or upgrade the VMS operating system, you need to be familiar with the following VAXstation 2000/MicroVAX 2000 hardware components:

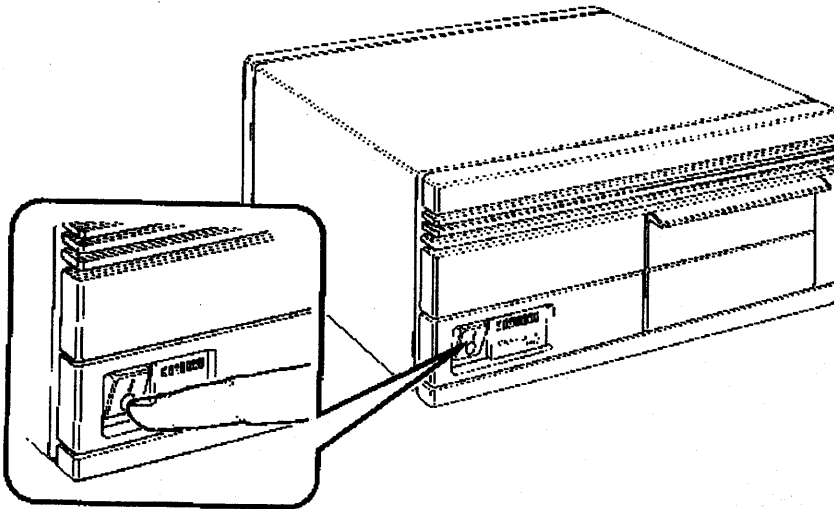
- ON/OFF switch
- HALT button
- Console terminal
- Optional expansion boxes
- Diskette drive
- Tape cartridge drive
- Fixed disk

This section describes the system hardware that you use during a VMS installation or upgrade. For a complete description of your system, see the hardware manuals supplied with your VAX computer.

12.2 The ON/OFF Switch

The ON/OFF switch, shown in Figure 12-1, is located on the front panel of the system box and any expansion boxes your system might have. Setting the switch to 1 turns the power on. Setting the switch to 0 turns the power off.

Figure 12-1 VAXstation 2000 ON/OFF Switch



ZK-7482-SC

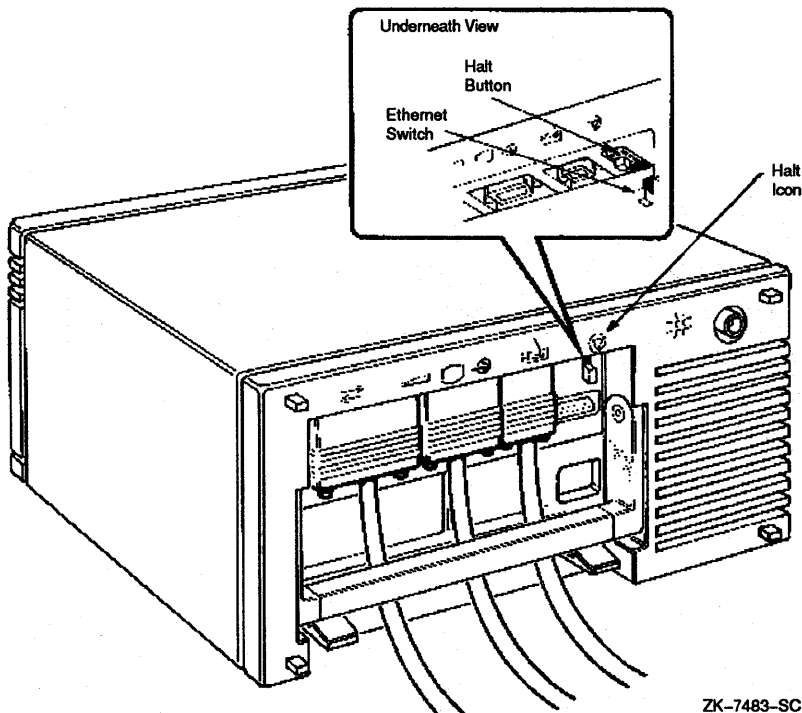
12.3 The HALT Button

The HALT button is located on the panel at the back of the system box, next to the line printer port. The button is indicated by the halt icon, which consists of an inverted triangle within a circle. Figure 12-2 shows the HALT button on the VAXstation 2000. To put the system in console mode, press the HALT button. When the system is in console mode, the console terminal displays the console-mode prompt (>>>).

NOTE

Although the back of the MicroVAX 2000 is slightly different from the VAXstation 2000, the HALT button is in the same location.

Figure 12-2 VAXstation 2000 HALT Button



12.4 The Console Terminal and Serial Lines

In general, use the console terminal to boot the operating system or to shut it down. During installation use the console terminal to boot the system and monitor the installation process.

- On the VAXstation 2000, the workstation display monitor and keyboard act as the console terminal.
- On the MicroVAX 2000, the terminal that is attached to connector 1 on the DEC423 converter acts as the console terminal. You can use any supported terminal (a VT220 or VT240, for example) as the console terminal on a MicroVAX 2000.

The console terminal runs in two different modes: program mode and console mode.

- **Program mode** — When the console terminal is in program mode, the VMS operating system is running. In program mode you can enter DCL commands, run programs, and receive system messages.
- **Console mode** — When the console terminal is in console mode, the VMS operating system is not running. The console terminal displays the console-mode prompt (>>>). In console mode, you can control and monitor system operations by entering console-mode commands.

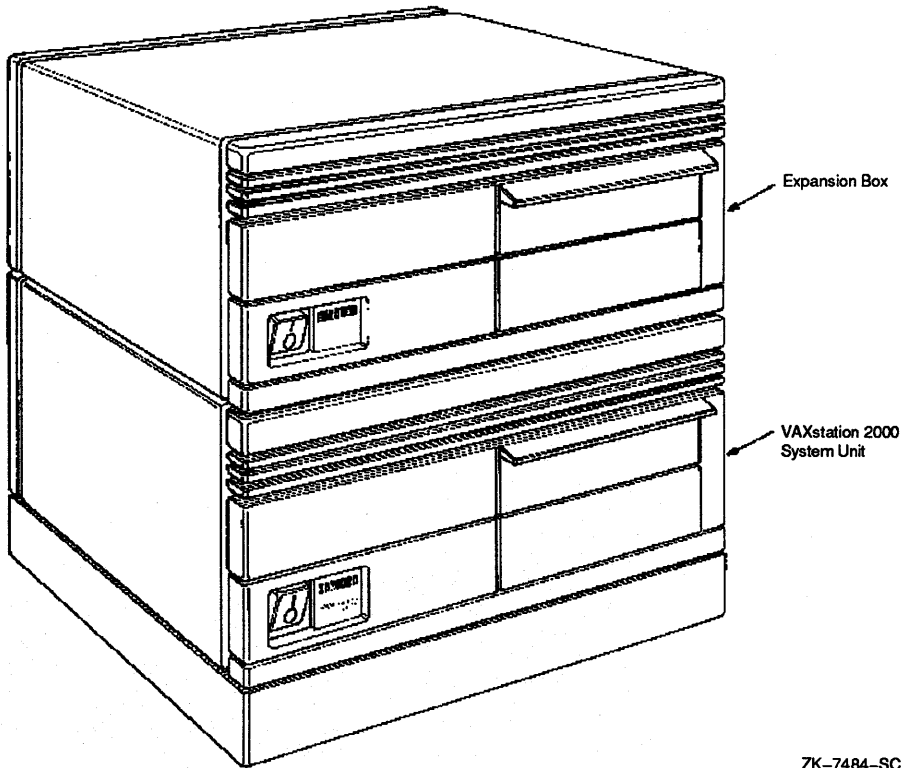
12.5 The Optional Expansion Box

Your VAXstation 2000/MicroVAX 2000 may be equipped with optional expansion boxes. These expansion boxes provide additional storage for the system. There are two different expansion box configurations:

- The tape cartridge expansion box, which contains a TK50 tape cartridge drive
- The fixed disk drive expansion box, which contains an RD53 or RD54 fixed disk

Your system configuration can contain one or both of these expansion boxes in addition to the system box. Each expansion box has an ON/OFF switch identical to the one on the system box. Figure 12-3 shows a VAXstation 2000 expansion box resting on top of the system unit.

Figure 12-3 VAXstation 2000 Expansion Box and System Box



12.6 Booting the System

The VAXstation 2000/MicroVAX 2000 uses an internal memory device to boot the VMS operating system from the system disk into memory.

12.6.1 Sniffer Boot

A sniffer boot lets you boot the system without specifying a device name.

To cause a sniffer boot, do the following:

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

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

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

Answer the questions. 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
```

2. Press the **HALT** button.
3. Enter the following command and press Return:

```
>>> B
```

The system successively tries boot devices until it finds one it can boot from. The system searches in the following order for a device from which it can boot:

- Floppy diskette drives
- Fixed disks
- Tape cartridge drives
- Network

If the system does not find any device from which to boot, it continues to try to boot from the network indefinitely.

When the system boots automatically, it does a sniffer boot if you have not specified a default boot device, or if you cleared the default boot device.

12.6.2 Automatic Boot

The VMS operating system can boot automatically from the disk designated in nonvolatile RAM. When you installed the system hardware, you designated the default boot device. If you want to boot automatically from a different device, you must change the designation in nonvolatile RAM (see Section 12.6.2.1).

You can set the system so it boots 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 entered Y at the auto reboot prompt)
- After a bugcheck
- If the system halts under program control

To control whether the system boots automatically in these situations, do the following:

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

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

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

Answer the questions. 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
```

2. Press the HALT button.
3. Type the following and press Return:

```
>>> TEST 53
```

The system displays a prompt that indicates whether the system can reboot automatically. For example:

```
2 ? >>>
```

In this case, the value has been set to 2. You can enter either of the following values at this prompt or press Return to accept the current value:

2 — If the power comes on or the system halts under program control, the system attempts to reboot from the default boot device designated in RAM.

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.

12.6.2.1 Changing the Default Boot Device

To change the default boot device, do the following:

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

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

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

Answer the questions. 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
```

2. Press the HALT button.
3. Type the following and press Return:

```
>>> TEST 51
```

4. The system displays a prompt that indicates the current default boot device. For example:

```
DUA0? >>>
```

5. To change the default boot device, enter a new device name from those listed in Table 12-1 and press Return. To clear the default boot device, enter a period (.) and press Return.

Table 12-1 Default Boot Device Names

Device	Name
Fixed disk in system box	DUA0
Fixed disk in expansion box	DUA1
Diskette drive	DUA2
Tape cartridge drive	MUA0
Network	ESA0

12.6.3 Manual Boot

To boot the system manually, use the following procedure:

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

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

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

Answer the questions. 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
```

2. Press the **HALT** button.
3. Enter the **BOOT** command in the following format and press Return:

```
>>> B ddcu
```

Substitute the name of the system disk for *ddcu*. For example, to boot from the fixed disk in the system box, enter the following command and press Return:

```
>>> B DUA0
```

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

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

5. The final message should look like the following:

```
SYSTEM          job terminated at 19-JUN-1990 15:14:32.13
```

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

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

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

Answer the questions. 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
```

2. Press the `HALT` button.
3. To begin the conversational boot, enter the following command and press Return:

```
>>> B/1 [ddcu]
```

Substitute the device name of the system disk for `ddcu`. If you do not specify a system disk, the system does a sniffer boot.

4. At the SYSBOOT> prompt, you can enter any of the SYSGEN commands.
5. When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

12.6.5 Booting from [SYSF] During an Upgrade

When you perform a VMS upgrade, you must boot the system from the SYSF directory on the system disk. To boot from [SYSF], enter the BOOT command in the following format and press Return:

```
>>> B/F0000000 [ddcu]
```

Substitute the device name of the system disk for *ddcu*. If you do not specify the device name of the system disk, the system does a sniffer boot.

12.6.6 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], enter the BOOT command in the following format and press Return:

```
>>> B/n0000000 [ddcu]
```

Substitute the boot name of the system disk for *ddcu*, and specify the system root for *n*. If you do not specify the device name of the system disk, the system does a sniffer boot.

For example, if you want to boot from the SYSC root on a device named DUA0, enter the following command:

```
>>> B/C0000000 DUA0
```

12.6.7 Orderly Shutdown with SHUTDOWN.COM

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 the HALT button on the back of the system box.

12.6.8 Emergency Shutdown with CRASH Commands

NOTE

Use **CRASH** commands only if the system is hung and you cannot log in to **SYSTEM** to use **SHUTDOWN** or **OPCCRASH**.

To force your computer to fail, do the following:

1. Press the **HALT** button.
2. To examine processor registers, enter the following command and press Return:

```
>>> E/G/N:F 0
```

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

3. Enter the following commands and press Return:

```
>>> 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 disk.

4. Enter the following command and press Return:

```
>>> CONTINUE
```

This causes the system to perform a bugcheck.

5. After the system reboots, you can examine the dump file. Log into the **SYSTEM** account.
6. Enter the following commands. 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 *VMS System Dump Analyzer Utility Manual*.

12.7 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 does occur, you can restore the backup copy to 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 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. Back up the system disk to a tape cartridge, diskettes, or another disk. Then restore the files to the original system disk. The BACKUP command creates a copy on which files are stored contiguously.

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

This section describes the following procedures:

- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on a diskette
- Installing and booting standalone BACKUP on a tape cartridge
- Backing up and restoring the system disk

12.7.1 Using Standalone BACKUP

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

12.7.2 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 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.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 12.7.3.

12.7.3 Booting Standalone BACKUP from the System Disk

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

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

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

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

Answer the questions. When the procedure asks if an automatic system boot 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
```

2. Press the HALT button.
3. Enter the BOOT command in the following format:

```
>>> B/E0000000 ddcu
```

Substitute the device name of the system disk for *ddcu*. The device name of the system disk is either DUA0 or DUA1, depending on whether your system disk is in the system box, or an expansion box. If you do not specify the device name of the system disk, the system does a sniffer boot.

4. Standalone BACKUP displays the following message:

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

5. 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
```

6. 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 DUA0:                device type Generic_DU
Available device MUA0:                device type TK50
```

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.

7. 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 15:00
$
```

12.7.4 Installing Standalone BACKUP on a Diskette

If your configuration includes a diskette drive, Digital recommends that you keep standalone BACKUP on a diskette in case the system disk becomes damaged. To install standalone BACKUP on an RX33 diskette, use the following procedure:

NOTE

If you have a diskette distribution kit, you should already have standalone BACKUP on a diskette. If the original diskette becomes damaged or if you need to make extra copies, use the procedure in this section.

1. Obtain one blank RX33 diskette. Write the name S/A BKUP V5.4 on the paper label. Affix the paper label to the diskette.
2. Log in to the SYSTEM account.
3. Insert the diskette labeled S/A BKUP V5.4 in the diskette drive.
4. Enter the following command and press Return:

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

NOTE

If you inserted the diskette in to the drive upside down, or if it is improperly aligned, you may receive the following error message:

```
%MOUNT-F-MEDOFL, medium is offline
```

If you receive this error message, remove the diskette from the drive and reinsert it.

5. The procedure asks for the name of the target device. Type DUA2 and press Return. For example:

```
%STABACKIT-I-SYMDEL, all global symbols deleted
Enter the name of the device on which to build the Kit: DUA2
```

6. The procedure displays the following message. Type Y (for YES) to initialize the diskette. For example:

```
Do you want to initialize _DUA2:?
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]: Y
```

The procedure displays verification messages informing you that files are being copied. When the procedure finishes, it displays a message similar to the following:

```
Ending time 19-JUN-1990 13:45:29.90
Starting time 19-JUN-1990 13:22:39.05
```

```
The Kit is complete.
```

```
$
```

7. Remove the diskette labeled S/A BKUP V5.4 from the diskette drive.
8. Write-protect the diskette and store it in a safe place.

12.7.5 Booting Standalone BACKUP from a Diskette

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from an RX33 diskette. You need an RX33 diskette that contains standalone BACKUP (either the distribution diskette or one that you created). To boot standalone BACKUP from diskettes, use the following procedure:

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

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

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

Answer the questions. When the procedure asks if an automatic system boot 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
```

2. Press the HALT button.

3. Insert the standalone BACKUP diskette in to the diskette drive (DUA2).
4. Enter the following command and press Return:

```
>>> B DUA2
```

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 15:00
```

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 DUA0:           device type Generic_DU  
Available device DUA2:           device type RX33
```

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 15:00  
$
```

8. Remove the standalone BACKUP diskette from the diskette drive.

12.7.6 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 S/A BKUP V5.4 on the paper label. Insert the label in the label slot.
2. Write-enable the tape cartridge.
3. Insert the tape cartridge labeled S/A BKUP V5.4 in to the drive.

4. Log in to the SYSTEM account.
5. Enter the following command and press Return:

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

6. The procedure asks you for the name of the target device. Type MUA0 and press Return. For example:

```
Enter the name of the device on which to build the kit: MUA0
```

7. The procedure displays the following message:

```
.  
.  
.
```

```
Please place the scratch tape cartridge in drive _MUA0:  
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 Return.
9. The system displays verification messages informing you that files are being copied.
10. When standalone BACKUP is installed, the procedure displays a message similar to the following:

```
Ending time 19-JUN-1990 16:44:29.90
```

```
Starting time 19-JUN-1990 16:30:39.05
```

```
The Kit is complete.
```

```
$
```

11. Remove the tape cartridge labeled S/A BKUP V5.4 from the tape cartridge drive.
12. Write-protect the tape cartridge and store it in a safe place.

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

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

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

Answer the questions. When the procedure asks if an automatic system boot 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
```

2. Press the HALT button.
3. Insert the tape cartridge that contains standalone BACKUP in to the tape cartridge drive.
4. To boot standalone BACKUP, enter the following command at the console-mode prompt (>>>) and press Return:

```
>>> B MUA0
```

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 15:00
```

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 DUA0:           device type Generic_DU
Available device MUA0:           device type TK50
```

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 15:50
$
```

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

13

VAXstation II, II/GPX, MicroVAX II Systems

13.1 MicroVAX II Hardware

Before you install the VMS operating system, you must be familiar with your system's hardware. This chapter describes hardware similarities and differences and includes illustrations of the four MicroVAX models. It also describes the following MicroVAX II hardware components:

- Processor control panel (all models except the BA200 series)
- CPU panel (all models except the BA200 series)
- Controls and indicators on the BA200 series model
- Console terminal
- Tape cartridge drive and tape cartridges
- Diskette drive and diskettes

Your system's hardware differs depending on whether it is a 630QY, 630QZ, 630QB, 630QE, or a BA200 series model.

This chapter does not include a detailed description of MicroVAX hardware; this chapter only describes the hardware you need to be familiar with to perform system management operations. For a more detailed description of MicroVAX hardware, see the hardware manuals supplied with your computer.

13.2 VAXstation II, II/GPX and MicroVAX II Common Features

The MicroVAX II super-microsystem is a member of the 32-bit VAX family of computers that is configured using the extended Q-bus. It is compatible with larger VAX computers.

The MicroVAX II performs a wide range of applications, including real-time applications, office automation, and general-purpose programming.

The MicroVAX II can be integrated into a network by using a DECnet or an Ethernet local area network interface. With the MicroVAX II, these options can send, share, and store files from systems in your department or in your organization.

Additional features include the following:

- 1 Mb of on-board memory
- Memory management
- Time-of-year clock with battery backup

13.3 VAXstation II, II/GPX and MicroVAX II Differences

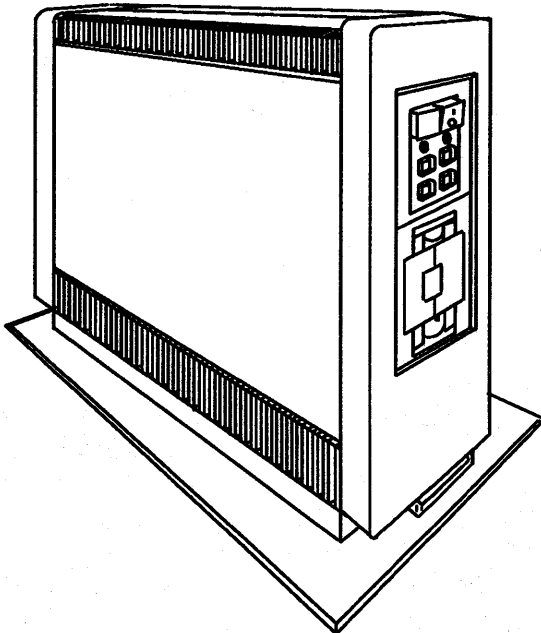
The VAXstation II, which is based on the MicroVAX II CPU, is a high-powered, single-user graphics workstation. It provides 2 Mb of memory and can be upgraded to 9 Mb. The VAXstation II is compatible with other VAX computers.

The VAXstation II/GPX color graphics workstation, which uses the MicroVAX II CPU with the GPX accelerator chipset, provides the same features as the VAXstation II. In addition, the VAXstation II/GPX offers increased speed and color graphics. Memory can be expanded to 9 Mb.

13.4 MicroVAX Models

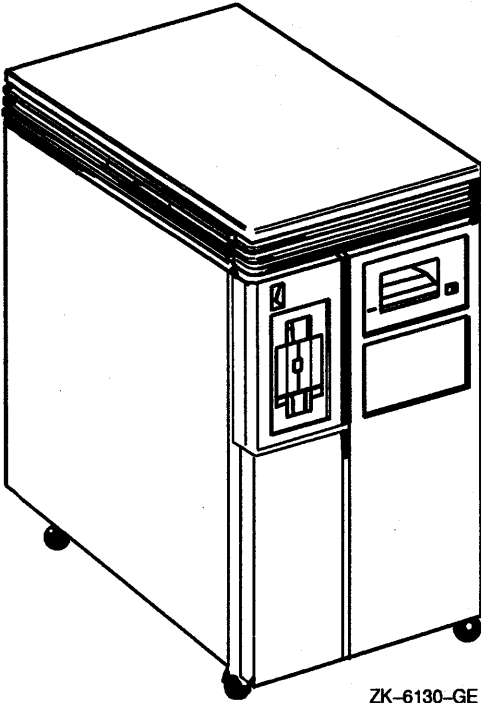
This section contains illustrations of the four MicroVAX models, pictured in Figure 13-1, Figure 13-2, Figure 13-3, and Figure 13-4.

Figure 13-1 MicroVAX II 630QY and 630QZ Models



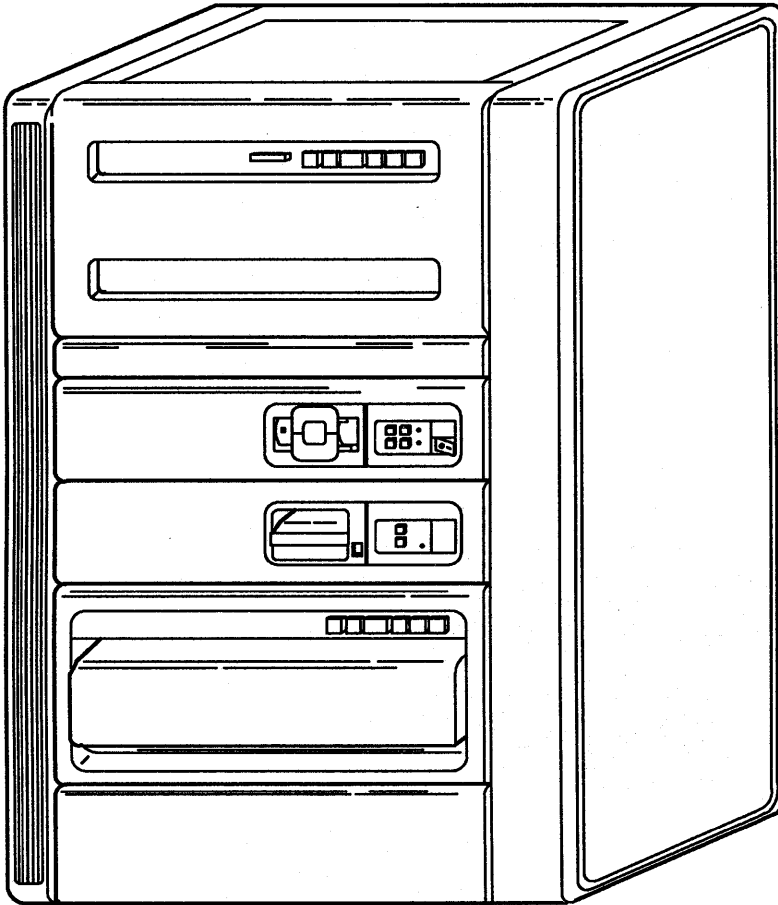
ZK-6129-GE

Figure 13-2 MicroVAX II 630QB Model



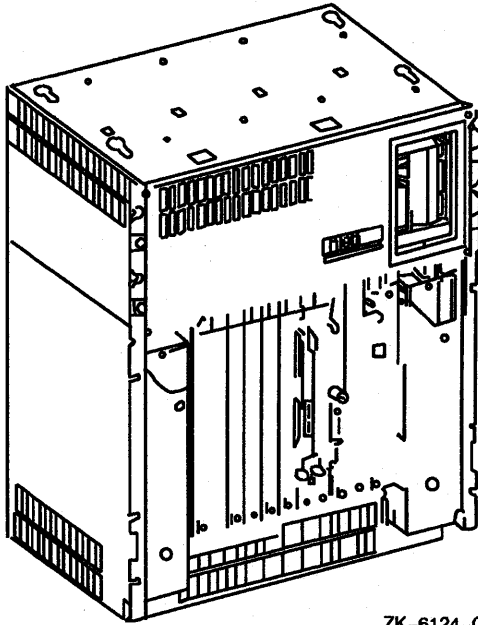
ZK-6130-GE

Figure 13-3 MicroVAX II 630QE Model



ZK-6121-GE

Figure 13-4 MicroVAX II BA200 Series Model



ZK-6124-GE

13.5 Processor Control Panel

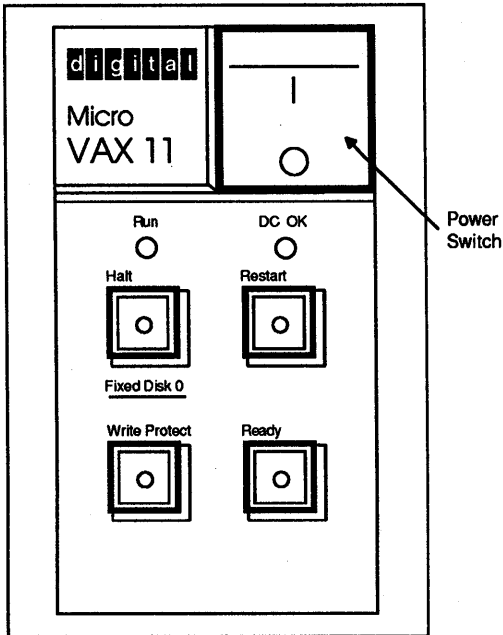
The processor control panel is located on the front of all MicroVAX processors except the BA200 series model. It consists of controls and indicator lights. (Section 13.7 describes and illustrates the controls and indicator lights on the BA200 series model.)

Figure 13-5 is an illustration of the processor control panels on the MicroVAX II 630QY and 630QZ models.

Figure 13-6 is an illustration of the processor control panel on the MicroVAX II 630QB model. Note that there may be additional write-protect and ready lights for additional fixed disks.

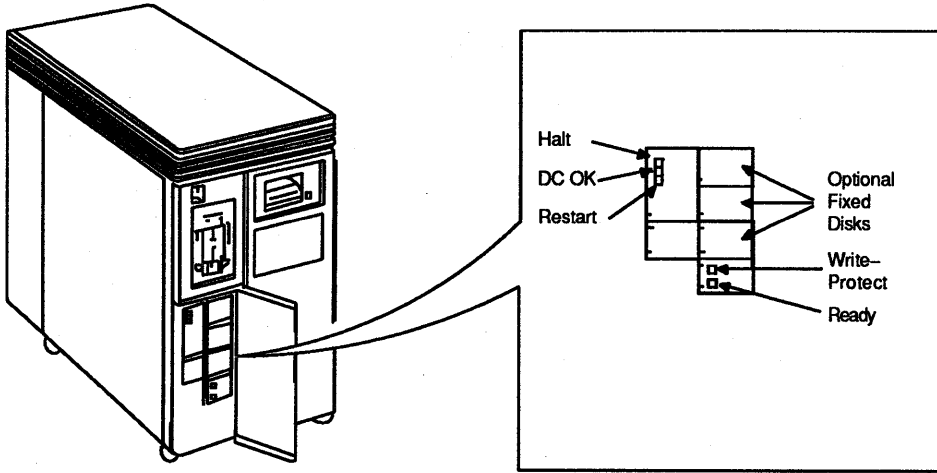
Figure 13-7 is an illustration of the processor control panel on the MicroVAX II 630QE model.

Figure 13-5 MicroVAX II 630QY and 630QZ Models Processor Control Panels



ZK-4147-GE

Figure 13-6 MicroVAX II 630QB Model Processor Control Panel



ZK-4206-GE

Figure 13-7 MicroVAX II 630QE Model Processor Control Panel

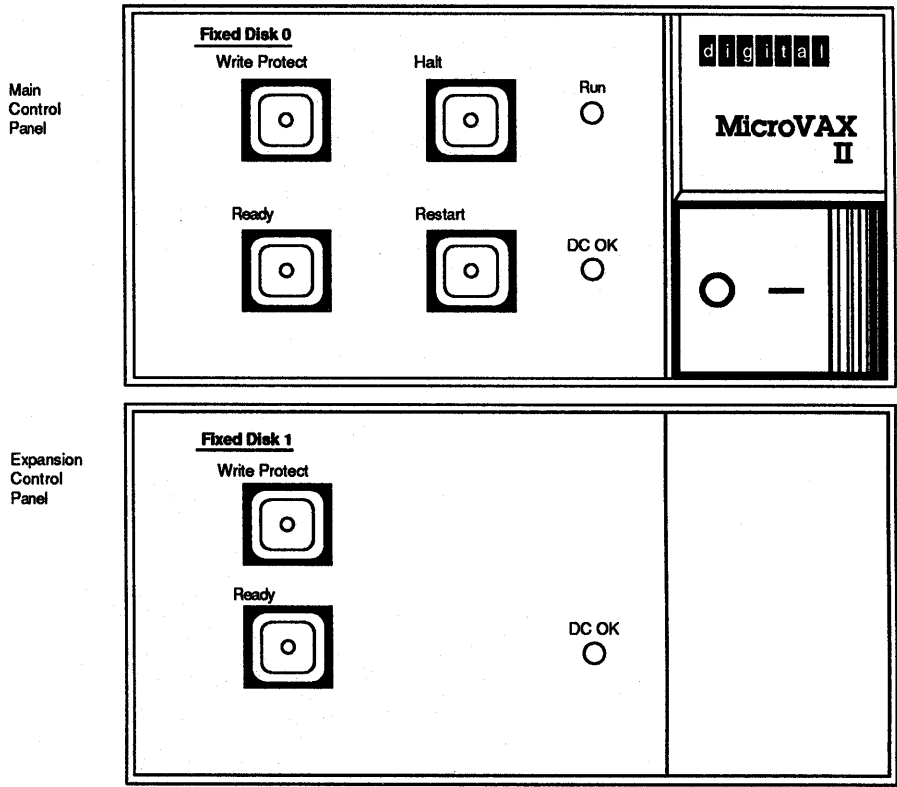


Table 13-1 describes the controls and indicator lights on the processor control panel.

Table 13-1 Controls and Indicator Lights on the Processor Control Panel

Control/Indicator Light	Description
Power switch	Setting this switch to 1 turns on the power; setting it to 0 turns off the power. Most MicroVAX power switches contain an orange light that glows when power to the system is turned on.
Run light	This light glows green when the processor is running.
DC OK light	This light glows green if all dc voltages are present and within tolerance levels.
Halt button	This button stops the processor. It contains a red light. When you push the HALT button in, the light on the button glows red and the button stays pushed in. When you release the HALT button, by pressing it again, the system enters console mode. On MicroVAX II processors, the Halt Enable/Disable switch on the CPU panel must be set to the Enable position for the HALT button to stop the processor. If the Halt Enable/Disable switch is set to the Disable position, pressing the HALT button causes the light on the button to glow red, but does not stop the system. Note that the F5 (BREAK) key on the console terminal works the same way as the HALT button.
Restart button	This button causes a simulated power down/up sequence to restart CPU operation. Pressing this button has no effect if the system is stopped.
Write Protect button	This button prevents writing to a fixed disk. When this button is pushed in, the light on the button glows red on a MicroVAX II.
Ready button	This button prevents writing to or reading from a fixed disk. When this button is pushed in, the disk is protected from reading or writing. When the button is released, the light on the button glows green; the disk is available for reading and writing. The light on the ready button blinks when data is read from or written to the fixed disk.

13.6 CPU Panel

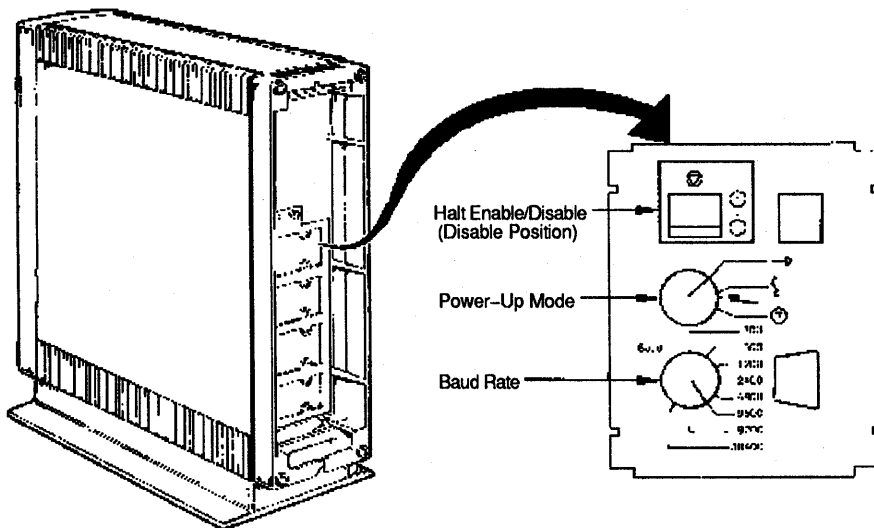
The CPU panel is located on the back of all MicroVAX processors except the BA200 series model. (See Section 13.7 for a description of the controls and indicators on the BA200 series model.)

On a MicroVAX II system, the CPU panel contains the following controls:

- Baud rate control knob
- Halt Enable/Disable switch
- Power-up mode switch
- Port used for the console terminal

Figure 13-8 shows the MicroVAX II CPU panel.

Figure 13-8 MicroVAX II CPU Panel



ZK-4099-SC

13.6.1 Baud Rate Control Knob

The baud rate control knob determines the speed at which characters are received from and transmitted to the console terminal. The baud rates set on the terminal and on the computer must be identical for the console terminal to communicate with the system. Digital recommends that you set the baud rate for both the console terminal and the system to 9600 baud.

On a MicroVAX II system, the baud rate control knob is located at the bottom of the CPU panel (or on the left of a horizontal model). The different baud rate positions are displayed on the panel. Figure 13-8 shows the CPU panel on a MicroVAX II with the baud rate control knob set to 9600 baud.

13.6.2 Halt Enable/Disable Switch

The Halt Enable/Disable switch is located at the top of the CPU panel (or on the right of a horizontal computer). It is labeled with an encircled triangle, the international symbol for halt. You enable or disable halts as follows:

- You *enable* halts when the switch is pushed toward the encircled triangle and aligned with the circle with the dot inside it.
- You *disable* halts when the switch is pushed away from the encircled triangle and aligned with the circle with the dot outside it.

The Halt Enable/Disable switch on a MicroVAX II system controls whether the system can be stopped. The Halt Enable/Disable switch must be set to the **ENABLE** position for the **HALT** button on the processor control panel or the **F5 (BREAK)** key to stop the system.

For normal system operations, set the Halt Enable/Disable switch to the **DISABLE** position. This prevents the system from being stopped if the **HALT** button on the system control panel is pressed accidentally. Also, if you disable halts, a system boots automatically when the system power is turned on. In addition, if you disable halts, the light on the **HALT** button glows if the **HALT** button is pressed.

Figure 13-8 illustrates the Halt Enable/Disable switch on the CPU panel.

13.6.3 Power-Up Mode Switch

The power-up mode switch is located in the middle of the CPU panel. This switch allows you to select one of three symbols that indicates a power-up mode. Table 13-2 describes the settings on the power-up mode switch.

Table 13-2 Settings on the Power-Up Mode Switch

Setting	Description
Arrow	This is the original factory setting and the setting for normal system operations. The system performs full diagnostics when it is turned on at this setting. After the diagnostics complete, if you enable halts, the console-mode prompt (>>>) appears on the console terminal screen. If you disable halts, your system boots automatically. If the system has been turned off for many days, however, you might be asked to choose the console-mode language you want to use. To select a language, turn the switch to the language-inquiry setting (face in profile). Digital recommends that this switch be set to the arrow during installation.
Face in profile	This is the language-inquiry setting. The system performs full diagnostics when it is turned on at this setting. After the diagnostics complete, if the console terminal supports the Digital Multinational Character Set, the console-mode language prompt is displayed. After you choose the language, you enable halts, and the console-mode prompt (>>>) appears on the console terminal screen. If you disable halts, your system boots automatically. First, select a console-mode language. Second, turn the power-up mode switch to the arrow.
Encircled T	This is the test setting. Do not use this setting. It is reserved for use by Digital Customer Services.

If your console terminal supports the Digital Multinational Character Set and does not respond in the language you want to use, do the following:

- Press the system power switch to 0 (OFF).
- Reset the power-up mode switch to the language inquiry setting (face in profile).
- Press the system power switch to 1 (ON).

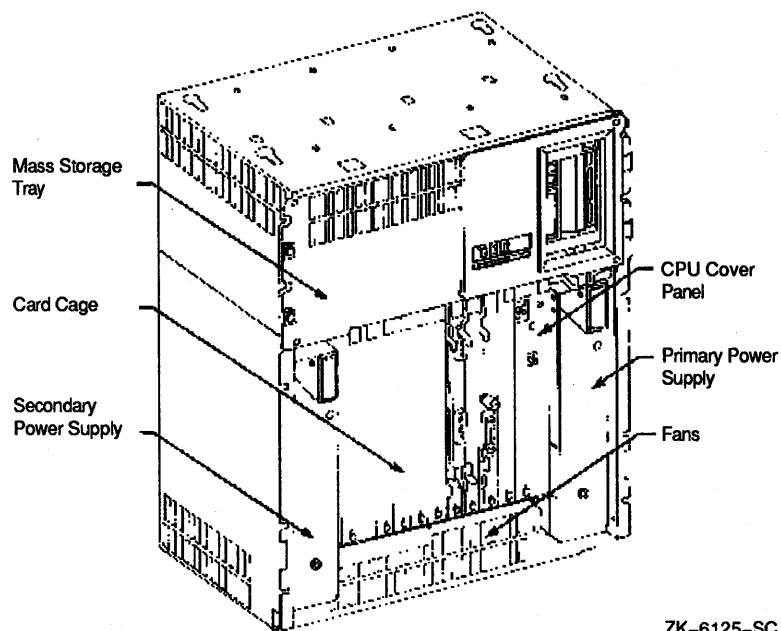
At the prompt, select the language and turn the power-up mode switch to the arrow setting.

Figure 13-8 illustrates the power-up mode switch.

13.7 Controls and Indicators on the BA200 Series Model

All controls and indicator lights on the BA200 series model are located on the front of the system. All BA200 series models have a power supply on both the right and the left. All models also have two sets of power supply controls and indicator lights. Figure 13-9 illustrates in detail the front of the BA200 series model.

Figure 13-9 Front View of the BA200 Series Chassis



ZK-6125-SC

Table 13-3 describes the controls on the BA200 series model.

Table 13-3 Controls on the BA200 Series Model

Control	Description
Power switch	Setting this switch to 1 turns on the power; setting it to 0 turns off the power. This switch is located below the tape drive. The power switch glows orange when power to the system is turned on.
Halt button	The BA200 series model has <i>no</i> HALT button. If you enable halts, press the F5 (BREAK) key on the console terminal keyboard to stop the system.
Fixed disk write-protect switches	These switches are located on the mass storage tray next to the tape drive, above the fixed disk activity lights. When these switches are set to the down position, the disk is write-protected. The system can read data from the fixed disk, but cannot modify data or write new data to the fixed disk.
Tape drive LOAD/UNLOAD button	This button is located above the cartridge-release handle on the tape drive. It contains a red light. When this button is pressed in, it is in the LOAD position. When this button is released, it is in the UNLOAD position.
Power supply reset button	This button enables you to restart the system after a power interruption without turning off the I/O system power switch. You also can use this recessed reset button to restart the power system if the circuit breaker is tripped. Use the eraser end of a pencil or a nonconductive small tool to press this button.
Power supply circuit breaker	This circuit breaker is located near the bottom of the power supply. It protects the system from electrical surges. When tripped, the circuit breaker is in the out position. To reset, press the circuit breaker in. Then press the power supply reset button.

Table 13-3 (Cont.) Controls on the BA200 Series Model

Control	Description
Halt Enable/Disable switch	This switch is located on the upper left side of the CPU cover panel. It is labeled with an encircled triangle, the international symbol for halt. When the switch is down (dot outside the circle), halts are disabled. When the switch is up (dot inside the circle), halts are enabled. When you enable halts, press the F5 (BREAK) key on the console terminal keyboard to stop the system and transfer control to the console program. When you disable halts, the system boots automatically.
Baud rate control knob	The BA200 series model has no baud rate control knob. The baud rate is preset to 9600 baud. Digital recommends that you do not change the baud rate setting. If it is absolutely necessary for you to change the baud rate, see the technical information shipped with your system for instructions.
Power-up mode switch	This switch is located on the CPU cover panel to the right of the Halt Enable/Disable switch. This rotary switch lets you select one of three settings that indicates a power-up mode. Table 13-5 describes these settings.

Table 13-4 describes the indicator lights on the BA200 series model.

Table 13-4 Indicator Lights on the BA200 Series Model

Control	Description
DC OK light	This light is located on the mass storage tray to the right of the fixed disk activity lights.
	<p>Glow The dc voltages are within tolerance levels.</p> <p>Does not glow There is a problem with one of the power supplies. Check the DC OK light on each power supply to determine which power supply has failed.</p>
Power supply DC OK light	This light glows green if the dc voltages to the power supply are present and within tolerance levels. If this light does not glow, there is a problem with the power supply. Turn off your system and call Digital Customer Services.
Fixed disk activity lights	There are three green activity lights, one for each fixed disk. These lights are located on the mass storage tray next to the tape drive, below the fixed disk write-protect switches.
	Steady glow Power to the system is turned on.
	Quick blink Data is being read from or written to the corresponding fixed disk.
Tape drive activity light	This green light is located below the tape drive cartridge-release handle.
	Blink Drive is active. Data is being written to or read from the tape.
	Steady glow Drive is either empty or inactive and positioned at the beginning of the tape. If a tape is in the drive and this light does not glow, the drive is inactive but the tape is not positioned at its beginning.

Figure 13-10, Figure 13-11, and Figure 13-12 are detailed illustrations of the controls and indicator lights described in Table 13-3 and Table 13-4.

Figure 13-10 Mass Storage Tray — BA200 Series

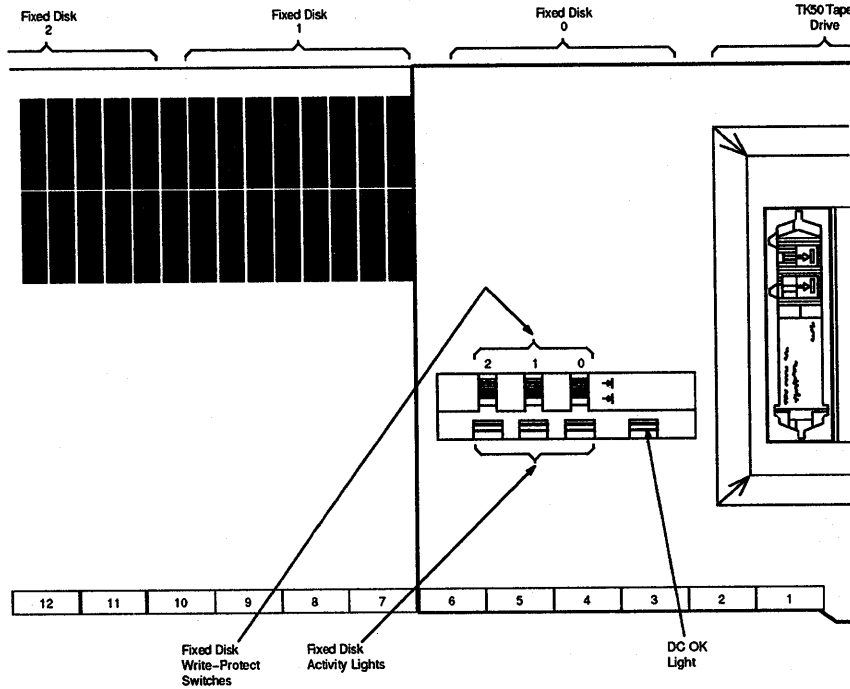
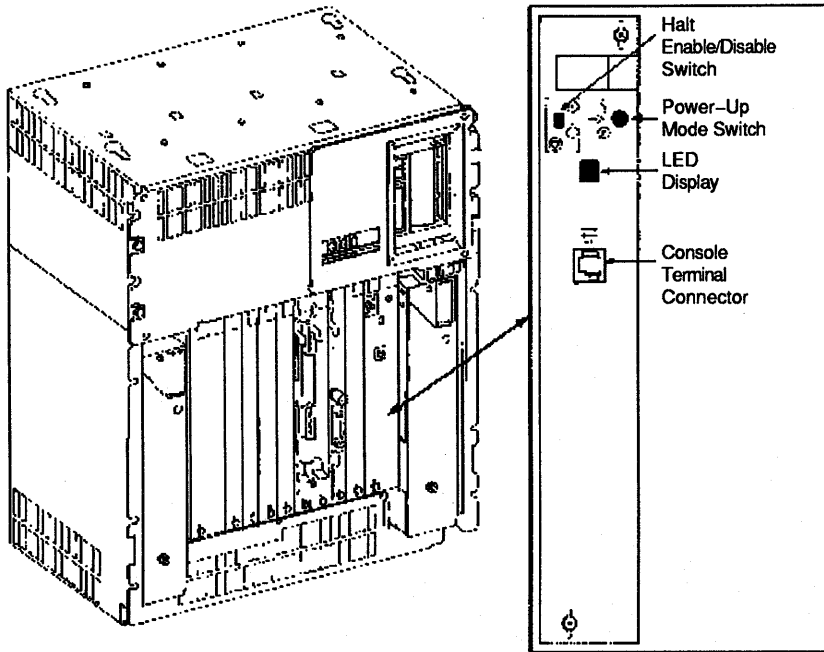
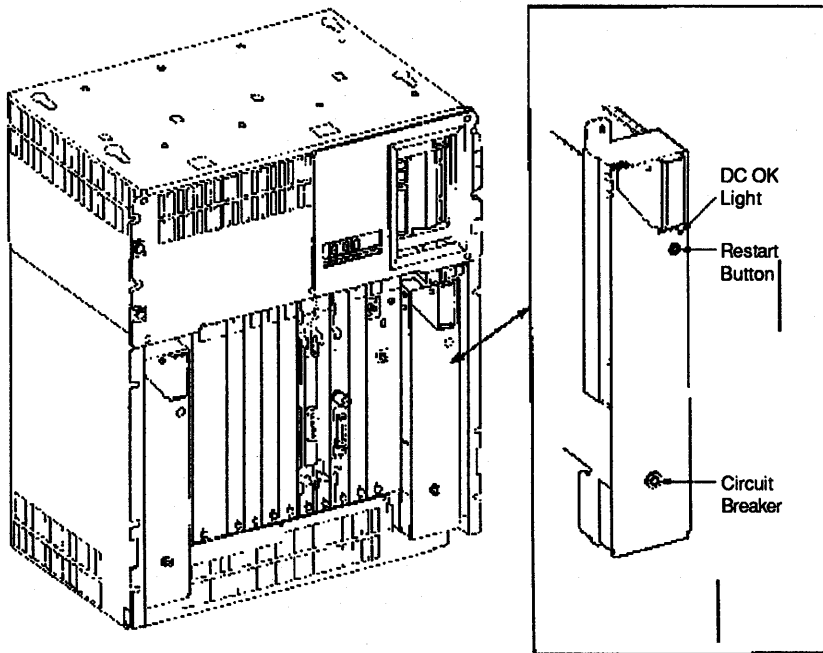


Figure 13-11 CPU Cover Panel — BA200 Series



ZK-6126-SC

Figure 13-12 Power Supply — BA200 Series



ZK-6127-SC

Table 13-5 describes the settings of the power-up mode switch on the BA200 series model.

Table 13-5 Settings of the Power-Up Mode Switch on the BA200 Series Model

Setting	Description
Arrow	This is the original factory setting and the setting for normal system operations. The system performs full diagnostics when it is turned on at this setting. After the diagnostics complete, if you enable halts, the console-mode prompt (>>>) appears on the console terminal screen. If you disable halts, your system boots automatically. If the system has been turned off for many days, however, you might be asked to choose the console-mode language you want to use.
Face in profile	This is the language-inquiry setting. The system performs full diagnostics when it is turned on at this setting. After the diagnostics complete, if the console terminal supports the Digital Multinational Character Set, the console-mode language prompt appears. After you choose the language, you enable halts and the console-mode prompt (>>>) appears on the console terminal screen. If you disable halts, your system boots automatically. First, select a console-mode language. Second, turn the power-up mode switch to the arrow.
Encircled T	This is the test setting. Do not use this setting. It is reserved for use by Digital Customer Services.

13.8 Console Terminal

In general, use the console terminal to examine and deposit data in memory or processor registers, to stop the computer, and to boot the operating system. During installation, use the console terminal to boot the computer and monitor the installation process.

- There is only one console terminal for each MicroVAX system. If your terminal is the only one on the system, it is the console terminal. If your system has several terminals attached to it, the console terminal is the one attached to the port located on the CPU panel.

On the BA200 series model, the console terminal is connected directly to the CPU cover panel at the modified modular jack labeled A-1.

- If you have a VAXstation, the workstation display monitor is the console terminal.

The console terminal runs in two different modes: console mode and program mode.

- **Console mode** — When the console terminal is in console mode, the VMS operating system is not running and the CPU is stopped. The console-mode prompt (>>>) is displayed. You can control and monitor system operations.

To go from console mode to program mode, boot the VMS operating system.

- **Program mode** — When the console terminal is in program mode, the VMS operating system is running and the dollar sign prompt (\$) is displayed. You can enter DCL commands, run programs, and receive system messages.

If the VMS operating system is running and you want to go to console mode, follow the shutdown procedure.

13.9 Overview of Booting

Booting is the process of loading system software into the processor's memory. The MicroVAX II uses an internal memory device to boot the VMS operating system from the system disk into memory.

13.10 Sniffer Boot

A sniffer boot allows you to boot the system without specifying a device name. When the system boots automatically, it always does a sniffer boot.

To perform a sniffer boot, do the following:

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

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

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

Answer the questions. 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
```

2. Stop the system. If your system has a **HALT** button, press it twice. If your system does not have a **HALT** button, press the **F5 (BREAK)** key.
3. Enter the following command and press **RETURN**:

```
>>> B
```

The system successively tries to boot devices until it finds one from which it can boot. The system searches in the following order for a device from which it can boot:

- Fixed disks
- TK50 tape cartridge drives
- The network

If the system does not find any devices from which to boot, it continues to alternate between trying to boot from tape and from the network indefinitely.

13.11 Automatic Boot

The VMS operating system can boot automatically from the system disk. When the system boots automatically, it always does a sniffer boot. For more information on the sniffer boot, see Section 13.10.

You can cause the system to boot automatically whether the system is turned on or turned off.

- If the system is turned off, do the following:
 1. Set the Halt Enable/Disable switch to **DISABLE** by pushing the switch toward the circle with the dot outside it.
 2. Turn on the system.
 3. The procedure displays several console-mode and VMS messages and it might ask you for the date and time.

The automatic boot completes without asking you for the date and time.

4. The final message should look like the following:

```
SYSTEM      Job terminated at 19-APR-1990 13:00:00.00
```

- If the system is turned on, set the Halt Enable/Disable switch to **DISABLE** by pushing the switch toward the circle with the dot outside it. The operating system boots automatically under the following conditions:
 - When the system turns on after a power failure
 - After you shut down the CPU using the `SYS$SYSTEM:SHUTDOWN.COM` command procedure (if you entered Y to specify automatic reboot)
 - After the CPU shuts down because of a bugcheck

13.12 Manual Boot

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

1. Make sure that your computer is set up properly and turned on. Make sure the processor control panel (all models except the BA200 series) is set for normal operations. Only the READY button, the DC OK light, and the power switch should glow. On the BA200 series model, only the DC OK light and the power switch should glow.
2. Make sure that your console terminal is properly set up and turned on.
3. If the VMS operating system is not running, go to step 4.

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

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

Answer the questions. 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
```

4. Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.
5. Enter the BOOT command in the following format and press RETURN:

```
>>> B ddcu
```

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

For example, to boot from a floppy diskette drive with a unit number of one, use the following command:

```
>>> B DUA1
```

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

```
VAX/VMS Version BI50 Major version id = 01 Minor version id = 00
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 19-APR-1990 13:00
```

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

```
VAX/VMS Version V5.2 19-APR-1990 13:00
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
19-APR-1990 13:00:00.00
SYSTEM      job terminated at 19-APR-1990 13:00:00.00
```

13.13 Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want 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 is the most direct:

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

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

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

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press RETURN for NO. When the CPU is stopped, the procedure displays the following message:

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


2. Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.
3. To begin the conversational boot, enter the BOOT command in the following format and press RETURN:

```
>>> B/1 [ddcu]
```

If you do not specify a device name, the system performs a sniffer boot when you finish using the SYSGEN commands.

4. At the SYSBOOT> prompt, you can enter any of the SYSGEN commands. For more information about these SYSGEN commands, see the *VMS System Generation Utility Manual*.
5. When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

13.14 Booting from [SYSF] During an Upgrade

In the future you may 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 RETURN:

```
>>> B/F0000000 ddcu
```

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

For example, to boot from root directory [SYSF] on an RD53 fixed disk, enter the following command and press RETURN:

```
>>> B/F0000000 DUA0
```

13.15 Booting from a Different Directory on the System Disk

The VMS operating system is installed on the system disk in a root directory named [SYS0]. If you have enough room on the system disk, 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 root directory on the system disk. To boot from a directory other than [SYS0], enter the BOOT command in the following format and press RETURN:

```
>>> B/n0000000 ddcu
```

Substitute the name of the other root directory on the system disk for *n* and the device name of the system disk for *ddcu*.

For example, to boot from root directory [SYS1] on an RD54 fixed disk, enter the following command and press RETURN:

```
>>> B/10000000 DUA0
```

13.15.1 Shutting Down the System

1. **An orderly shutdown with SYSSYSTEM:SHUTDOWN.COM.**
To use the SHUTDOWN command procedure, log in to the SYSTEM account, enter the following command, and press RETURN:

```
$ @SYSSYSTEM:SHUTDOWN
```

To stop the system after the procedure completes, press the HALT button twice. If your system does not have a HALT button, press the F5 (BREAK) key.

2. **An emergency shutdown with CRASH commands.** Use these emergency shutdown commands if OPCCRASH fails. To force a MicroVAX II to fail, see Section 13.15.2.

13.15.2 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 SHUTDOWN or OPCCRASH.

CRASH commands cause the system to fail, resulting in immediate shutdown. CRASH commands display 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 to cause an exception condition that sends the contents of memory to the dump file on the system disk. Later you can read the dump file to determine why the system did not respond.

To force your MicroVAX II to fail, do the following:

1. Set the Halt Enable/Disable switch to ENABLE.

2. Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.
3. Enter the following commands and press RETURN after each one:

```
>>> E PSL
>>> E/I 0
>>> E +
>>> E +
>>> E +
>>> E +
>>> D PC FFFFFFFF
>>> D PSL 041F0000
>>> C
```

4. CRASH commands stop the system, display the contents of the program counter, and display the console-mode prompt (>>>). If you want to read the contents of the dump file later to determine why the system did not respond, write down the values of the PC and the PSL.

The system reboots. If the system does not reboot automatically, reboot it manually.

5. After the system reboots, you can examine the dump file. To examine the dump file, log in to 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 *VMS System Dump Analyzer Utility Manual*.

13.16 If the System Fails

Your system can fail in the following ways:

- **Bugcheck** — The system displays a bugcheck message on the console terminal and shuts itself down. This happens because the system encountered a problem that made further operation impossible. Boot the system manually as explained in Section 13.12 or let it reboot automatically as explained in Section 13.11.
- **Hang** — The system stops responding to your commands. The problem could be a failure in system software or a hardware component or a power failure.
- **Erratic behavior** — The system does not respond according to specifications. The problem could be a failure in system software or a hardware component.

To see if the failure is a system problem and not something you have done, try the following:

- Make sure that you did not press the F1 key (the NO SCROLL key on a VT100 series terminal) accidentally.
- 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 system is probably hung. If the status line does appear, the program you are executing may 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 that the cable connecting the terminal to the processor is secure.

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

If the system is hung, you must reboot without a normal shutdown. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key. The system displays the console-mode prompt (>>>). Boot the system as described in Section 13.12.

If you have a problem with the system that Digital has not warned you about, note in detail the sequence of events that caused the problem and notify Digital Customer Services.

13.17 Backup Procedures

This section describes the following procedures:

- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on an RX33 floppy diskette
- Installing and booting standalone BACKUP on a TK50 tape cartridge
- Backing up and restoring the system disk

13.17.1 Overview of Standalone BACKUP

You can keep standalone BACKUP on the system disk, an RX33 floppy diskette, a TK50 tape cartridge, or any other media that the system supports. Digital recommends that you keep standalone BACKUP on the system disk and on a floppy diskette or a tape cartridge.

Usually you boot standalone BACKUP from the system disk because it saves time. You should, however, keep a copy of standalone BACKUP on a floppy diskette or on a tape cartridge in case the system disk becomes damaged. If you have a floppy diskette or tape cartridge distribution kit, you received standalone BACKUP on a floppy diskette or a tape cartridge.

13.17.1.1 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 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. To boot standalone BACKUP from the system disk, go to Section 13.17.1.2.

13.17.1.2 Booting Standalone BACKUP from the System Disk

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

1. Set the Halt Enable/Disable switch on the MicroVAX II to ENABLE.
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
```

Answer the questions. 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. Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.
4. Enter the BOOT command in the following format and press RETURN:

```
>>> B/E0000000 ddcu
```

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

5. A few minutes later the procedure asks 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-APR-1990 13:00
```

6. 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 MUA0:    device type TK50
```

```
·  
·  
·
```

Check 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.

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

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.2; the date is 19-APR-1990 13:00:00.00
$
```

13.17.1.3 Installing Standalone BACKUP on Diskettes

Digital recommends that you keep standalone BACKUP on floppy diskettes in case the system disk becomes damaged. To install standalone BACKUP on RX33 floppy diskettes, use the following procedure:

NOTE

If you have a floppy diskette distribution kit, you already have standalone BACKUP on floppy diskettes. If the original floppy diskettes become damaged, or if you need to make extra copies, use the procedure in this section.

1. Obtain a number of blank RX33 floppy diskettes. For example, to build Version 5.2 of standalone BACKUP, you need three floppy diskettes. Affix a paper label to each one. Use a felt-tip pen to write a name on each one. For example, you would use the following names to build a Version 5.2 kit:

```
S/A BKUP RX33 V5.2 1/3
S/A BKUP RX33 V5.2 2/3
S/A BKUP RX33 V5.2 3/3
```

2. Log in to the SYSTEM account.
3. Enter the following command and press RETURN:

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

4. The procedure asks for the name of the target device. Enter the device name of the drive holding the floppy diskette and press RETURN. For example:

```
%STABACKIT-I-SYMDEL, all global symbols deleted
Enter the name of the device on which to build the kit: DUA2
```

5. The procedure displays the following message. Press RETURN (for YES) after each question.

The standalone kit requires three floppy diskettes: The first two floppy diskettes contain the standalone VMS system files; the last floppy diskette contains the BACKUP application image.

The system kit and the application kit can be built separately.

Do you want to build the system kit? [Yes/No, default Yes]:

Do you want to build the application kit? [Yes/No, default Yes]:

6. The procedure gives you two options that you can use to verify the reliability of the standalone BACKUP kit. It asks if you want to use the ANALYZE/MEDIA utility to check for bad blocks on the target floppy diskettes. Using ANALYZE/MEDIA adds 5 minutes to the time it takes the procedure to run.

It also asks if you want to verify each file that it copies. Verifying files adds another 5 minutes to the time it takes the procedure to run.

Digital suggests that you type Y (for YES) and press RETURN when the procedure asks the following question:

Do you want to scan for bad blocks? [Yes/No, default No]:

The procedure displays the following message:

Do you want to verify copies? [Yes/No, default No]:

Press RETURN (for NO). Copy verification is relevant only for tape media.

7. The procedure displays the following messages:

Sysgen parameters for standalone VMS have been placed in file
SYSS\$SYSROOT:

```
<SYSUPD>  
VAXVMS$SYS.PAR-TEMP-46E0021;1
```

Please place the first system floppy diskette in drive _ddcu:
This volume will receive the volume label SYSTEM_1.

Enter "YES" when ready:

8. Insert the floppy diskette labeled S/A BKUP RX33 V5.2 1/3 in the diskette drive.

NOTE

If you inserted the diskette into the drive upside down, or if it is improperly aligned, the system might display the following error message:

```
%MOUNT-F-MEDOFFL, medium is offline
```

If the system displays this error message, remove the diskette from the drive and reinsert it. When you are ready to continue, type Y (for YES) and press RETURN.

The procedure displays the following message:

```
Analyzing floppy diskette in _ddcu: for bad blocks . . .
```

If there are bad blocks, the procedure displays the following message:

```
Please replace the defective floppy diskette in _ddcu: with
another blank floppy diskette.
```

Discard the floppy diskette with bad blocks. Obtain and label a new floppy diskette and insert it in the diskette drive.

9. After running ANALYZE/MEDIA, the procedure mounts the floppy diskette, copies a set of system files, and displays a number of informational messages. For example:

```
%MOUNT-I-MOUNT, SYSTEM_1 mounted on _ddcu
%CREATE-I-CREATED, ddcu:<SYS0.SYSEXEXE> created
%CREATE-I-CREATED, ddcu:<SYS0.SYS$LDR> created
```

```
.
.
```

10. When the last file is copied, the procedure asks you to insert the next floppy diskette. Remove the floppy diskette labeled S/A BKUP RX33 V5.2 1/3. Insert the floppy diskette labeled S/A BKUP RX33 V5.2 2/3. When you are ready to continue, type Y (for YES) and press RETURN. For example:

```
Please place the second system floppy diskette in drive _ddcu:.
This volume will receive the volume label SYSTEM_2.
```

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

The ANALYZE/MEDIA utility runs as described above.

11. Repeat steps 8 through 10 for the third floppy diskette. (maximum)
12. The procedure displays verification messages informing you that files are being copied. When the procedure finishes, it displays a message similar to the following:

```
Ending time   19-APR-1990 13:45:29.90
Starting time 19-APR-1990 13:22:39.05

The kit is complete.
```

13. Remove the floppy diskette labeled S/A BKUP RX33 V5.2 3/3 from the drive.
14. Write-protect the diskettes and store them in a safe place.

13.17.1.4 Booting Standalone BACKUP from Diskettes

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from RX33 diskettes. You need the RX33 floppy diskettes that contain standalone BACKUP (either the distribution floppy diskettes or ones you created). If you are booting from a Version 5.2 kit, the floppy diskettes would be labeled as follows:

Paper Label¹	Volume Label²
VMS V5.2 RX33 S/A BKUP 1/3	SYSTEM_1
VMS V5.2 RX33 S/A BKUP 2/3	SYSTEM_2
VMS V5.2 RX33 S/A BKUP 3/3	BACKUP

¹A paper label is a label affixed to a diskette.

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

The procedure asks you to place the floppy diskettes containing standalone BACKUP, successively, in the diskette drive. To boot Version 5.2 of standalone BACKUP, use the following procedure:

1. Set the Halt Enable/Disable switch on the MicroVAX II to ENABLE.
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
```

Answer the questions. 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. Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.
4. Insert the floppy diskette labeled S/A BKUP RX33 V5.2 1/3 in the diskette drive.
5. Enter the BOOT command in the following format and press RETURN:

```
>>> B ddcu
```

Substitute the device name of the drive holding the floppy diskette for *ddcu*.

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

```
VAX/VMS Version V5.2 Major version id = 01 Minor version id = 00
PLEASE ENTER DATE AND TIME (DD-MMM-YYY HH:MM) 19-APR-1990 13:00
```

7. The procedure displays the following message:

```
Configuring devices . . .
```

```
Please remove the volume "SYSTEM_1" from the console device.
```

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

Remove the floppy diskette labeled VMS V5.2 RX33 S/A BKUP 1 /3 from the diskette drive and insert the floppy diskette labeled VMS V5.2 RX33 S/A BKUP 2/3 in the drive. When you are ready to continue, type Y (for YES) and press RETURN.

8. The procedure displays the following message:

Resuming load operation on volume "SYSTEM_2", please stand by . . .

9. 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 MUA0: device type TK50

.
.
.

Check 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.

10. The procedure displays the following message:

Please remove the volume "SYSTEM_2" from the console device.

Insert the standalone application volume and enter "YES" when ready:

Remove the floppy diskette labeled VMS V5.2 RX33 S/A BKUP 2/3 from the diskette drive and insert the floppy diskette labeled VMS V5.2 RX33 S/A BKUP 3/3 in the drive. When you are ready to continue, type Y (for YES) and press RETURN.

11. The procedure displays the following message:

Resuming load operation on volume "BACKUP", please stand by . . .

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

%BACKUP-I-IDENT, stand-alone BACKUP V5.2; the date is 19-APR-1990 13:00:00.00
\$

13. Remove the floppy diskette labeled VMS V5.2 RX33 S/A BKUP 3/3 from the diskette drive.

13.17.1.5 Installing Standalone BACKUP on a Tape Cartridge

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

If you have a tape cartridge distribution kit, you already have standalone BACKUP on a tape cartridge. If the original tape cartridge becomes damaged, or if you need to make extra copies, use the procedure in this section.

1. Obtain a blank tape cartridge. Write the name on the paper label. For example, you would use the name S/A BKUP V5.2 TK50 to build a Version 5.2 kit. Insert the label into the label slot.

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

2. Write-enable the tape cartridge.
3. Insert the tape cartridge labeled S/A BKUP V5.2 TK50 in the tape cartridge drive.
4. Log in to the SYSTEM account.
5. Enter the following command and press RETURN:

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

6. The procedure asks for the name of the target device. Type MUA0 and press RETURN. For example:

```
%STABACKIT-I-SYMDEL, all global symbols deleted
Enter the name of the device on which to build the kit: MUA0
```

7. The procedure displays the following message:

```
.
.
.

Please place the scratch tape cartridge in drive _MUA0:.
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 RETURN.
9. The procedure displays verification messages informing you that files are being copied.
10. When standalone BACKUP is installed, the procedure displays a message similar to the following:

```
Ending time 19-APR-1990 13:45:29.90
Starting time 19-APR-1990 13:22:39.05
```

The kit is complete.

11. Remove the tape cartridge labeled S/A BKUP V5.2 TK50 from the tape cartridge drive.
12. Write-protect the tape cartridge and store it in a safe place.

13.17.1.6 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. Set the Break Enable/Disable switch to ENABLE.
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
```

Answer the questions. 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. Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.
4. Insert the tape cartridge containing standalone BACKUP in the tape cartridge drive.

5. Enter the following command and press RETURN:

```
>>> B MUA0
```

6. The procedure asks for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
VAX/VMS Version V5.2 Major version id = 01 Minor version id = 00
```

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYY HH:MM) 19-APR-1990 13:00
```

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 MUA0:    device type TK50
```

```
.  
.  
.
```

Check 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.

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

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.2; the date is 19-APR-1990 13:00:00.00  
$
```

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

14

Peripherals

14.1 TK50 and TK70 Tape Cartridge Drives

This section briefly describes the TK50 and TK70 tape cartridge drives. See the hardware information for your system for a complete description of the tape cartridge drive.

The tape cartridge drive is located in the upper left corner on the front of the cabinet.

NOTE

In general, tape cartridges cannot be exchanged between TK70 and TK50 tape drives. However, the TK50 tape cartridge can be read on (but not written to) a TK70 drive.

14.1.1 TK50 Tape Cartridge Drive

When using the TK50 tape cartridge drive, you should be aware of the following:

- The green light flashes when the tape in the drive is actually moving (being read from or written to). If a tape cartridge is in the drive and this light is off, the drive is inactive and the tape is not positioned at its beginning.

The green light glows when the drive is empty. It also glows when the drive is inactive and positioned at the beginning of a tape. The only time you can remove a tape cartridge is when the green light is glowing steadily.

CAUTION

Never attempt to remove a tape when the green light is flashing or when it is off; you might damage both the tape and the drive.

- The red Load/Unload button controls the loading of the tape.

When the button is pressed in, it is in the Load position. The red light on the button glows when the tape is loaded. It flashes *slowly* when the tape is rewinding. It flashes *quickly* when there is a tape error (for some reason the tape could not be read). To clear a tape error, press the button four times.

CAUTION

Never attempt to remove a tape when the Load/Unload button is in the Load (in) position (the red light is on); you might damage both the tape and the drive.

When the Load/Unload button is released, it is in the Unload (out) position. The only time you can remove a tape is when this button is in the Unload (out) position (the red light is off).

- The cartridge release handle is located next to the tape access slot. This handle controls the position of the tape drive spindle. Pull the handle open to insert or remove a tape cartridge.

CAUTION

Pull the cartridge release handle open *only* when all three of the following are true:

- **The green light is glowing steadily.**
- **The Load/Unload button is in the Unload (out) position.**
- **The red light on the Load/Unload button is off.**

Otherwise, you might damage both the tape and the drive.

Table 14-1 summarizes the tape cartridge drive controls. Table 14-2 describes the tape cartridge drive lights.

Table 14-1 TK50 Controls

Control	Position	Function
Load/Unload button	In	Loads the tape (15 seconds to 3-1/2 minutes).
	Out	Rewinds and unloads the tape.
Cartridge release handle	Open	Lets you insert or remove a tape after rewind and unload operations are complete.
	Closed	Locks tape in operating position.

Table 14-2 TK50 Indicator Lights

Red Light	Green Light	Condition
Off	Off	No power to the tape drive.
Off	On	Safe to move cartridge release handle. Power is turned on.
On	Off	Do not move the cartridge release handle. One of the following conditions exists: <ul style="list-style-type: none"> • Power-on self-test is occurring. • Cartridge is inserted but handle is still in the up position. • Tape is loading or unloading. • Tape is stopped.
On	On	Tape loaded successfully.
On	Flashing	Tape is moving (except rewind). Read/write commands are being processed. Irregular, rapid flashing means tape calibration is occurring.
Flashing	Flashing	Tape is rewinding.
Rapid flashing	Off	A fault is occurring. Press and release the Load/Unload button four times. If the problem persists, do not attempt to remove the tape cartridge. Call Digital Customer Services.

14.1.2 TK70 Tape Cartridge Drive

NOTE

TK70 tape drives can read all TK50 tape cartridges; they cannot write to TK50 tape cartridges.

When using the TK70 tape drive shown you should be aware of the following:

- The orange light glows when the tape cartridge is write-protected.
- The yellow light glows when the tape is loaded.
- The green light glows when the tape is unloaded.

CAUTION

Never remove a tape when the green light is off or when the orange or yellow light (or both) is on; you might damage both the tape and the drive.

- You use the Unload button to rewind and unload the tape.
- The cartridge release handle is located next to the tape access slot. This handle controls the position of the tape drive spindle. Pull the handle open to insert or remove a tape cartridge.

CAUTION

Pull the cartridge release handle open only when the green light glows steadily and the yellow light is off. Otherwise you might damage both the tape and the drive.

Table 14-3 summarizes the TK70 tape drive controls. Table 14-4 describes the indicator lights.

Table 14-3 TK70 Controls

Control	Position	Function
Unload button	Pressed in	Rewinds and loads the tape (15 seconds to 3-1/2 minutes).
Cartridge release handle	Open	Lets you insert or remove a tape after rewind and unload operations are completed.
	Closed	Locks tape in operating position.

Table 14-4 TK70 Indicator Lights

Orange	Yellow	Green	Condition
Off	Off	Off	No power to the tape drive.
On briefly	On briefly	On briefly	Power to the tape drive.
Off	Flashes	Off	The tape is moving or the tape drive is initializing the tape.
Off	Off	On	Drive beeps. Safe to move the handle and insert or remove a tape.
Off	On	Off	Tape loaded successfully.
Off	Off	Flashes	The cartridge leader may be defective. Pull open the handle and remove the cartridge from the drive. Do not use the cartridge.
Flashes	Flashes	Flashes	A fault is occurring. Press the Unload button. The orange, yellow, and green lights glow briefly and the drive reinitializes. If the problem persists, do not attempt to remove the tape cartridge. Call Digital Customer Services.

14.1.3 Disks

The RRD40 is available as a tabletop version (expansion box) or a half-height version in the model 40 system box. Operating the drive is the same regardless of the location of the RRD40 drive.

14.1.3.1 RRD40 Expansion Box

The front panel consists of a disc access door, an activity indicator, and a power indicator. The activity indicator lights when a disc is properly loaded into the RRD40 drive. The indicator flashes when the disc is transferring data. The power indicator lights when power is on.

14.1.3.2 RRD40 Drive in the Model 40 System

The front panel consists of a disc access door and one activity indicator. The activity indicator lights when a disc is properly loaded into the RRD40 drive. The indicator flashes when the disc is transferring data.

The RX23 is a half-height, high density, 3.5 inch, double-sided, diskette drive. It has a formatted capacity of 1.47 Mbytes. The RX23 can read and write industry-compatible 3.5 inch, high density, diskette media. The RX23 is compatible with field-formatted industry standard, 18 sector format on 700 oersted type media.

The RX23 is a single FRU. If a failure is detected in the RX23, the entire drive is replaced.

The media for the RX23 diskette drive is a 3.5 inch diskette. This diskette can be either 1 or 2 Mbytes. A notch on the diskette determines the byte capacity of the diskette. A microswitch in the front of the drive detects which size diskette is loaded.

14.1.4 Loading and Unloading the Drive

To load the RX23, first make sure that the front LED is not lit. Then insert diskette. The diskette slides straight in and drops down to its load position.

To unload the RX23, first make sure that the front LED is not lit. Then press the eject button on the lower right side of the drive. The diskette unloads and emerges from the drive.

14.2 The TZ30 Tape Cartridge Drive

If you have a TZ30 tape cartridge drive, you can install the VMS operating system from a tape cartridge.

When using the TZ30 tape cartridge drive you should be aware of the following:

- The orange light glows when the tape cartridge is write-protected.
- The yellow light glows when the tape is loaded and blinks when the tape is in use.
- The green light glows when the tape is unloaded and blinks when the drive detects a tape cartridge error.

CAUTION

Never attempt to remove a tape cartridge under any of the following circumstances:

- The green light is off.
- The yellow light is on or blinking.
- You press the Unload button to rewind and unload the tape. When the tape is unloaded, the green light goes on and the tape drive beeps.
- The cartridge-release lever is located below the tape access slot. This lever controls the position of the tape drive spindle. Move the lever to the right to insert a tape cartridge and to the left to remove a tape cartridge.

CAUTION

Do not force the cartridge-release lever. Move it *only* when the green light glows steadily or blinks and the yellow light does not blink or glow. Otherwise, you might damage both the tape and the drive.

Table 14-5 summarizes the tape cartridge drive controls. Table 14-6 describes the tape cartridge drive lights.

Table 14-5 TZ30 Drive Controls

Control	Position	Function
Unload button	Pressed in	Rewinds and unloads the tape (15 seconds to 2 minutes).
Cartridge-release lever	Left	Lets you insert or remove a tape after rewind and unload operations are complete.
	Right	Locks tape in operating position.

Table 14-6 TZ30 Indicator Lights

Light	State	Condition
Orange — Write Protected	On	Tape is write-protected.
	Off	Tape is write-enabled.
Yellow — Tape in Use	On	Tape is loaded.
	Blinking	Tape is being used. Fast blinking (four times a second) indicates that a read or write operation is in progress. Medium blinking (two times a second) indicates that the tape is loading or unloading. Slow blinking (once a second) indicates that the tape is rewinding.
Green—Operate Lever	On	You can operate the lever to load or unload a tape.
	Off	Do not operate the lever.
	Blinking	Cartridge error detected.
All	On	Power-up diagnostics are running. All three lights stay on for a few seconds to test themselves. If all three lights remain lit for a long time, the power-up diagnostics have failed.
	Blinking	Drive fault.

14.2.1 Tape Cartridges

Follow these guidelines when using tape cartridges:

- Tape cartridges come in clear, plastic, protective cases. You should keep tape cartridges in these cases when you are not using them.
- Store tape cartridges in a vertical position.
- The label slot holds the label that provides information about the contents of the tape cartridge. Label a tape cartridge if you are going to copy files to it (distribution tape cartridges are already labeled).

To label a tape cartridge, insert a slide-in label into the slot located on the front of the tape cartridge.

CAUTION

Use only the label slot to label a tape cartridge. Applying adhesive labels or writing on the tape cartridge can damage it or the drive.

- The write-protect switch is a movable switch on the tape cartridge that controls whether you can write to the tape. To write-protect a tape cartridge, slide the write-protect switch toward the label slot. An orange rectangle is visible when the tape cartridge is write-protected.

Always write-protect the distribution tape cartridge before an installation.

14.3 Compact Disc Drive

Depending on the system you have, you can have either a compact disc drive in the system unit or a compact disc drive in an expansion box. The compact disc drive is a read-only drive that reads data stored on removable compact discs. A compact disc can store 600 Megabytes of data.

14.3.1 Inserting a Compact Disc

A compact disc is contained within a clear plastic *caddy*. When you insert a compact disc in the drive, insert the entire caddy. DO NOT remove the disc from the caddy.

To insert a compact disc in the drive, do the following:

1. Make sure the power to the drive is on. The power light on the front of the drive should be lit.
2. Examine the caddy. Make sure it is not cracked or damaged in any way.
3. Examine the disc inside the caddy. One side of the disc is labeled. The label should always be facing up as you insert the disc in the drive. When the label is facing up, the four notches on the caddy are on the left. These notches line up with four similar notches on the front of the drive.
4. Insert the caddy. Make sure the notches on the left side of the disc caddy line up with the notches on the door of the drive. Slide the caddy in as far as it will go and then remove it. When you remove the caddy, notice that the disc remains in the drive. Only the clear plastic caddy comes out.
5. The front activity light should go on within five seconds.

If the drive accepted the disc and the activity light does not light, the disc might be sitting incorrectly in the caddy. Unload the disc and try again.

For more information on using a compact disc drive, see the hardware manuals.

14.3.2 Removing a Compact Disc

Before removing a compact disc, make sure the activity light is not flashing. If it is flashing, wait for it to stop before you proceed.

To remove a compact disc from a drive, do the following:

1. Position the clear plastic caddy by matching the four notches on the disc to the four notches on the drive. Make sure the arrow is going into the drive first.
2. Insert the caddy into the drive door as far as it will go.
3. Remove the caddy. The disc will be back in the caddy. The activity light will go out.

14.4 Using RX23 Floppy Diskettes

You can use the following types of diskettes in the RX23 drive:

- **Double Density (DD)** — A double density diskette contains 9 sectors (512 bytes per sector), 80 cylinders, and 2 heads.
- **High Density (HD)** — A high density diskette contains 18 sectors (512 bytes per sector), 80 cylinders, and 2 heads.

You can only read double density diskettes that have been formatted and written on by another computer. You cannot write on a double density diskette.

You can read and write on a high density diskette. Before you can use a high density diskette you must format it. After you boot the VMS operating system, put the diskette you want to format in the drive. Enter a command in the following format:

```
$ INITIALIZE/DENSITY=DOUBLE device-name: volume-label
```

For example, if the device name of the RX23 drive is DUA2 and the volume label is ROHBA, enter the following command and press RETURN:

```
$ INITIALIZE/DENSITY=DOUBLE DUA2: ROHBA
```

Note that in some cases you might need VOLPRO privilege to format a diskette.

Do not build a standalone BACKUP kit on an RX23 diskette. You cannot boot the VMS operating system from an RX23 diskette. Digital recommends that you build one standalone BACKUP kit on the system disk and one on a tape cartridge.

14.4.1 RX23 LEDs and Buttons

The RX23 floppy drive has one LED on the front of the drive that indicates when the drive is operating. Do not attempt to load or unload a diskette when this LED is lit. The diskette eject button is also on the front of the drive.

14.5 RL02 Disk Drive

14.5.1 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.

14.5.2 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.

14.6 Turning on the Console Terminal

Turn on the console terminal before turning on the system. To turn on the console terminal, use the following procedure:

1. Make sure that the cable connecting the console terminal and the system is secure.
2. Make sure that the power cable is connected to the terminal and plugged in to a wall outlet.
3. Switch the terminal power switch to the ON position.

The terminal power switch is located in different positions on different types of console terminals. Table 14-7 describes how to turn on some supported terminals and how each should respond. If your terminal is not listed, see the owner's manual for your terminal.

Table 14-7 Turning on the Console Terminal

Terminal Type	Power Switch Location	Terminal Response
VT100 series terminals	Power switch is on the back left.	The terminal beeps and a blinking cursor (either a rectangle or an underscore) is visible on the screen.
VT220 terminal	Power switch is on the back left.	The terminal beeps and displays VT220 OK in the middle of the screen.
VT240 terminal	Power switch is on the left corner at the front of the accompanying terminal box. (On VT200 series graphics terminals, there is also a power switch on the right back of the terminal screen.)	The terminal beeps and displays VT240 OK in the middle of the screen.
VT330 terminal	Power switch is on the left side of the terminal screen.	The terminal beeps and displays VT330 OK in the middle of the screen.

Table 14-7 (Cont.) Turning on the Console Terminal

Terminal Type	Power Switch Location	Terminal Response
VT340 terminal	Power switch is on the left side of the terminal screen.	The terminal beeps and displays VT340 OK in the middle of the screen.
LA34 hardcopy terminal	Power switch is on the back left.	The type head moves to the first position on a line.
LA120 hardcopy terminal	Power switch is on the left front, halfway down the stand.	The type head moves to the first position on a line.

NOTE

If you have a VAXstation 3200 or VAXstation 3500 system, the workstation display monitor is the console terminal.

14.6.1 Checking the Baud Rate on the Console Terminal

If you are booting a VT300, VT200, or VT100 series terminal, you must check the baud rate of the console terminal using the terminal set-up screens. If you are booting a VAXstation 3200 or VAXstation 3500 system, both the transmit speed and receive speed should be set to 9600 baud. For any other type of console terminal, see the owner's manual to determine the values of the transmit and receive speed. Reset both speeds if they are not equal to 9600 baud.

On a VT300 series terminal, do the following to check the baud rate:

1. Press the F3 key to use the set-up menu.
2. Use the down-arrow key to highlight the communications set-up.
3. Press the ENTER key to select the communications set-up.
4. Use the arrow keys to highlight Transmit Speed.
5. Press the ENTER key to select the speed.
6. Press the SELECT key.
7. Press the F3 key.

On a VT200 series terminal, do the following to check the baud rate:

1. Press the F3 key once.
2. Press the right arrow twice.

3. Press the ENTER key once.

This causes the communications set-up screen, which includes the fields Transmit=X and Receive=X, to appear on your terminal. If the transmit and receive speeds are not 9600 baud, see the owner's manual for your terminal for instructions on setting the baud rate. If they are 9600 baud, press F3 once.

On a VT100 series terminal, do the following to check the baud rate:

1. Press the SET-UP key once.
2. Press the 5 key that is located above the letter "T" on the keyboard. The fields T SPEED and R SPEED appear on the bottom right-hand corner of your terminal.
3. If the values for T SPEED and R SPEED are not 9600 baud, see the owner's manual for your terminal for instructions on setting the baud rate.
4. If they are 9600 baud, press the SET-UP key once.

NOTE

If your console terminal is an LA120, it must be set to 8 bits, no parity transmit, and no parity receive. See the owner's manual provided with your LA120 terminal for instructions on checking these settings.

14.6.2 Setting the Console Terminal to No Parity

The console terminal must be set to generate no parity. Although no parity is the default setting for most video terminals, you must set this characteristic manually on hardcopy terminals. The "no parity" setting is "2" on the DECwriter III.

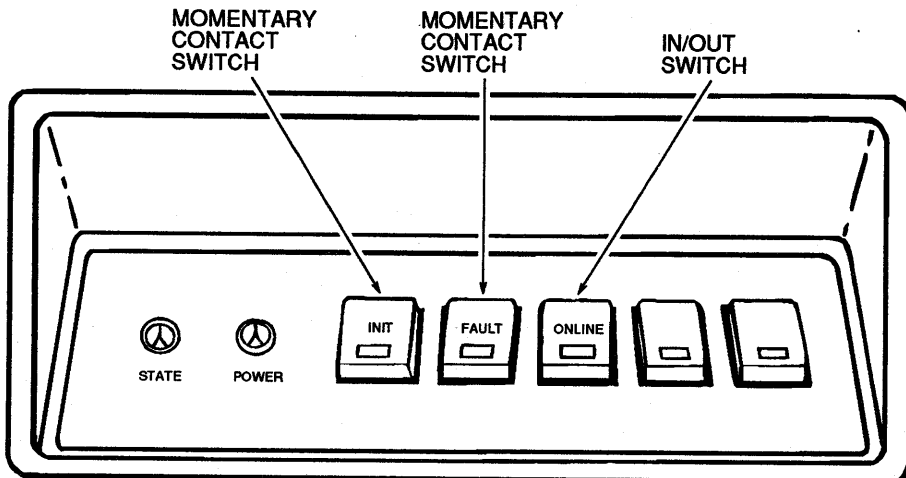
14.7 HSC Operation and Utilities

To get information on the state of the HSC, the system manager uses the SETSHO utility and the HSC indicator lights. This section will cover SETSHO and the HSC indicators, and also HSC operation.

14.7.1 HSC Operator Control Panel

The operator control panel (OCP) is located on the front of the HSC. Figure 14-1 shows the OCP, Table 14-8 describes its indicator lights, and Table 14-9 describes its switches.

Figure 14-1 HSC Operator Control Panel



TTB_X0499_88_S

Table 14-8 Indicators on the HSC Operator Control Panel

Indicator	State	Meaning
STATE	Blinking	The HSC is operating normally.
	Steady on or off	The HSC is booting, halted, or hung.
POWER	On	Power is at the correct level.
INIT	On	The HSC is booting.
FAULT	On	The HSC has detected a fatal error and halted.
ONLINE	Off	No host has a virtual circuit open to the HSC.

Table 14-8 (Cont.) Indicators on the HSC Operator Control Panel

Indicator	State	Meaning
	On	A host has established a virtual circuit to the HSC.
Blanks		(Used in the fault code display)

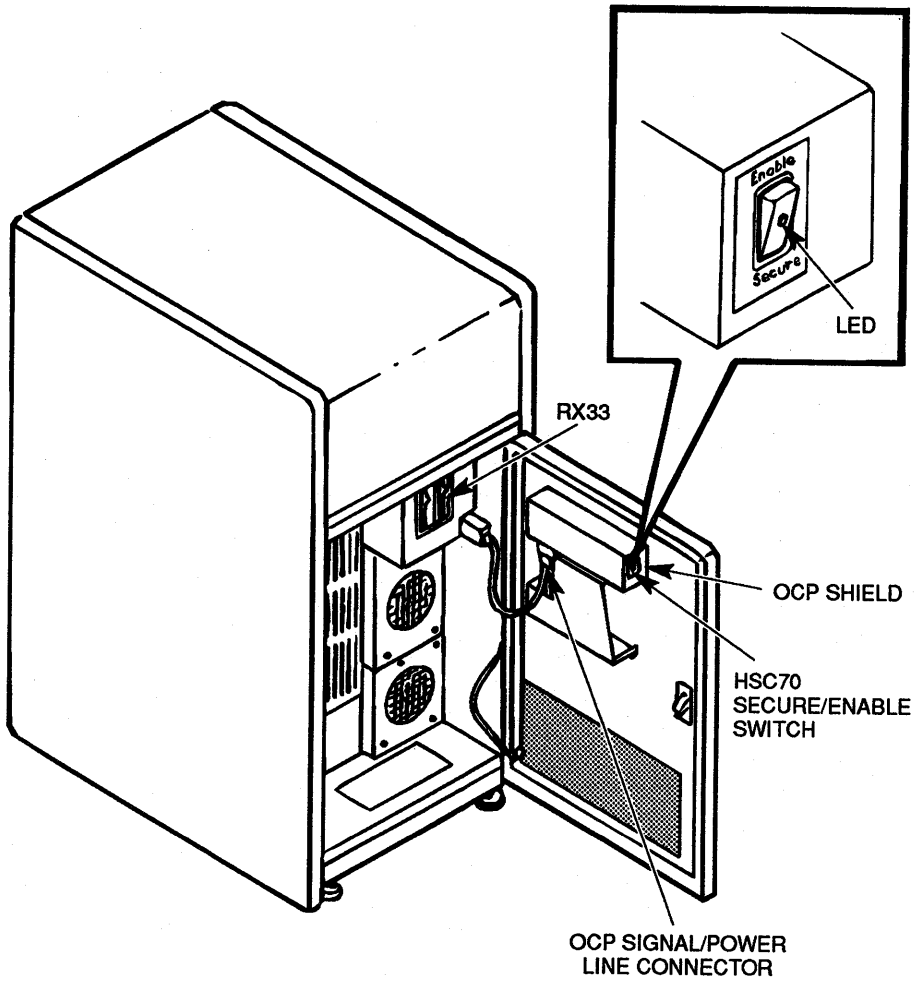
Table 14-9 Switches on the HSC Control Panel

Switch	Function
INIT	Push and release to reboot the HSC
FAULT	Hold in to test indicators (turn all lamps on) Hold in while pressing INIT to reinitialize the HSC system tape (erase values set with the SETSHO utility, and replace them with default values)
	Push and release to display the fault code
ONLINE	Push in to place the HSC on-line (allow hosts to establish virtual circuits) Release to prevent further hosts from establishing virtual circuits (does not break existing virtual circuits)
Blanks	No function

14.7.2 HSC Interior

Figure 14-2 shows the switches and indicators inside the front door of the HSC50 (the HSC70 is similar), and Table 14-10 lists their functions. You can prevent operation of the interior switches by locking the door.

Figure 14-2 HSC50 Interior



GSF_000085_01_MPS

Table 14-10 Switches and Indicators Inside the HSC

Switch or Indicator	Purpose
SECURE/ENABLE switch	<p>The SECURE position prevents:</p> <ul style="list-style-type: none"> Use of the SET utility Use of the INIT switch Entering ODT when the terminal transmits a BREAK (may require reboot) <p>SECURE still permits use of the FAULT and ONLINE switches.</p>
ENABLE LED	On when the SECURE/ENABLE switch is in the ENABLE position.
RUN LED	On when the corresponding diskette or TU58 is in motion.
Self-test LEDs	On when the corresponding TU58 has passed its self-test (HSC50 only).
DC power switch	Turns the HSC on or off.

14.7.3 HSC Console Terminal Settings

To run any HSC utility, such as SETSHO, you use the LA12 console terminal connected to the HSC. If you have trouble getting the HSC to respond, make sure its communications parameters are properly set; see the *LA12 User's Guide* if you need to display or change the parameter settings of your LA12. Example 14-1 is the display produced by an LA12 that is correctly set up for communication with the HSC.

Example 14-1 HSC Console Terminal Settings

```

Auto-Ansbk=no
Buffer=1024
Comm port=EIA
Disc-HDX=none
Echo-local=no
Fault=xoff (DC3)
G-HDX start mode=Rcv
H-Hi Speed (bps)=9600
L-Lo Speed (bps)=300
M-line prot=FDX-data leads
O-Rcv error override=no
Parity=7/M
Q-SRS polarity=Lo
Restraint=xon/xof
S-Speed select=Hi
Turn char=none
U-power up=line
V-Frequency=Bell 103

```

14.7.4 HSC SETSHO Utility

You can obtain information on the HSC status and parameter settings with the SETSHO utility. After typing Ctrl/Y or Ctrl/C to get the HSC50> or HSC70> prompt, you can invoke SETSHO with any of these commands:

- SHOW ALL (to display all parameters)
- SHOW parameter (to show the given parameter)
- SET parameter (to set the given parameter)
- RUN SETSHO (to enter interactive SETSHO)

In interactive SETSHO, you can use the commands SET and SHOW. The *HSC User Guide* has a list of the parameters you may specify. You can also get a list of parameters by entering interactive SETSHO, then issuing the command HELP.

When each of your HSCs is running, you should enter a SHOW ALL command at every console terminal. Keep the resulting printouts for later reference, in case any of the parameters change.

Example 14-2 shows output from the HSC SHOW ALL command. The notes at the end of each sheet explain the important fields.

14-22 Peripherals

Example 14-2 HSC SHOW Output

```
HSC> SHOW ALL
 ① 9-Nov-1988 16:39:25.32 ② Boot: 28-Oct-1988 13:02:19.32 ③ Up: 291:37
 ④ Version: V350 ⑤ System ID: %X0000000000003 ⑥ Name: CLOWN
Front Panel-secured Sector size-512 ⑦
Console Dump Enabled Load Device Dump Disabled
Restart - Warm
Automatic Diagnostics Enabled
Periodic Diagnostic Interval- 1 Enabled
DISK allocation class = 1 TAPE allocation class = 5 ⑧
Start command file Disabled
-----
Current modules that will be loaded:
    Central Error Logging
    Demon
    DUP
-----
Error Levels Displayed Next Reinitialization:
    Error
    Fatal
Current Error Levels Displayed:
    Error
    Fatal
-----
Outband Levels Displayed Next Reinitialization:
    Error
    Fatal
Current Outband Levels Displayed:
    Error
    Fatal
-----
Current ODT setting:
-----
 ⑨ Disabled/Enabled Hosts (Node Number):
```

Example 14-2 Cont'd on next page

Example 14-2 (Cont.) HSC SHOW Output

Node	Status
0	Enabled
1	Enabled
2	Enabled
3	Enabled
4	Enabled
5	Enabled
6	Enabled
7	Enabled
8	Enabled
9	Enabled
10	Enabled
11	Enabled
12	Enabled
13	Enabled
14	Enabled
15	Enabled

R #	Status	Type	Version
9	Enabled	Req. empty	
8	Enabled	Req. empty	
7	Enabled	K.sti	MC- 27 DS- 2
6	Enabled	Req. empty	
5	Enabled	Req. empty	
4	Enabled	Req. empty	
3	Enabled	K.sdi	MC- 40 DS- 3
2	Enabled	K.sdi	MC- 40 DS- 3
1	Enabled	K.ci	MC- 43 DS- 2 Pila-65 K.pli-5
0	Enabled	P.ioc	

Unit #	R #	Port	Type	State / Version
0	2	1	RA82	online - host access / MC- 8 HV- 8
1	3	2	RA82	online - host access / MC- 7 HV- 6

Drives stored in saved NOHOST table
 SETSHO-I The NOHOST_ACCESS table is empty.

Unit #	R #	Port	Type	State / Version
0	7	0	TA79	unavailable/offline / DMC-0 DHV-0 FMC-4 FHV-255

Drives stored in saved NOHOST table
 SETSHO-I The NOHOST_ACCESS table is empty.

Maximum Number of Tapes - 24

Maximum Number of Formatters - 24

Example 14-2 Cont'd on next page

14-24 Peripherals

Example 14-2 (Cont.) HSC SHOW Output

Statistics for node number ***all***

②
 Path A Path B
ACKs: 3596272 3593004
NAKs: 576490 576611
No Responses 1508383 1508573

Logging now enabled for node number ***all***

Virtual circuits are open to:

③ ④
Node 0 Path A Path B
Node 1 Path A Path B
2 - Available Nodes

 Free Lists
1131 - Control Blocks
 32 - Short Lifetime Control Blocks
 212 - Free Buffers

Disabled Memory List:

⑤
 None

Suspect Memory List:

 None

MAX MEMORY AVAILABLE

Program Memory: 131072 words
Control Memory: 65536 words
Data Memory: 65536 words

ACTUAL MEMORY AVAILABLE

Program Memory: 131072 words
Control Memory: 65536 words
Data Memory: 65536 words

Line - 0 Terminal noscope Enabled
Line - 2 Terminal scope Enabled
Line - 4 Terminal noscope Enabled
Line - 5 Terminal noscope Enabled
Line - 0 Reserved
Line - 1 Reserved
Line - 2 Reserved
Line - 3 Reserved

SETSHO-I Program Exit

Notes on Example 14-2

- ① Current date and time.
- ② Time of last reboot.
- ③ Time since last reboot, in hours and minutes.
- ④ HSC microcode version.
- ⑤ System ID, set with the SET ID command.
- ⑥ Node name, set with the SET NAME command.
- ⑦ Size of a disk block; should be 512.
- ⑧ Disk and tape allocation classes, set with the SET ALLOCATE command.
- ⑨ Hosts that are allowed to communicate with this HSC, set with the SET HOST command. By default, all hosts are enabled.
- ⑩ HSC hardware configuration.
- ⑪ Requestor number. A requestor is a slot for an HSC hardware component.
- ⑫ A Standard Disk Interface (SDI) module. Revision levels are given.
- ⑬ The HSC's CI port. Revision levels are given.
- ⑭ The HSC's I/O processor.
- ⑮ Disk configuration.
- ⑯ Unit number, as given by the unit plug on the disk drive.
- ⑰ Requestor number of the SDI.
- ⑱ Port number within the SDI.
- ⑲ Disk type.
- ⑳ Disk status. *Online* means the disk is being used by at least one host, *available* means it is not being used, and *not available* means it is being used under the control of another HSC.
- ㉑ Microcode and hardware revision levels of the disk drive.
- ㉒ Communication statistics. Numbers are cumulative since the last reboot.
- ㉓ Virtual circuits established with VAX nodes.

- 24 Functioning CI paths on VAX nodes.
- 25 HSC memory known or suspected to be bad. This information is maintained on the system tape.

14.7.5 HSC Diagnostic Messages and Fault Codes

When the HSC detects an error, it prints a diagnostic message at the console terminal. Contact Digital Customer Services personnel for an interpretation of this message.

If the HSC is unable to print a diagnostic message, it may be able to use the indicator lights to signal an error. First, the FAULT light will remain on. When you press the FAULT switch, the five indicators will light up in a pattern. Look up this pattern in the *HSC User Guide* to determine what kind of error has occurred.

Most of these faults require Digital Customer Services intervention. However, if the fault is TU58 FAILURE or MISSING REQUIRED FILES, you may remedy the fault by:

- Making sure the system tape is in TU58 drive 0
- Trying a backup system tape if necessary

You may try to recover from another fault by rebooting the HSC; if so, write down the fault code before you reboot so that you can inform your Customer Services representative.

It is important to check regularly for diagnostic information, especially if your disks are dual-ported between two HSCs. If an HSC stops working, the VAX VMS operating system initiates disk failover to the other HSC. Failover does not affect users or give you any notification, so you will usually not notice the absence of the first HSC until the second one also fails (unless you are in the habit of looking at the indicators and the console printout).

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