

VAX 4000

digital

Troubleshooting and Diagnostics

VAX 4000 Troubleshooting and Diagnostics

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Preface

Troubleshooting is the process of isolating and diagnosing problems with your system. When your system does not operate as described in *Operation*, use the information in this guide to diagnose the problem.

Using the diagram in Appendix A, follow the troubleshooting procedures recommended in this guide.

This manual contains three chapters:

- Chapter 1 describes problems you may experience at power-on and corrective actions.
- Chapter 2 describes problems you may have during normal operation of your system and corrective actions.
- Chapter 3 describes the MicroVAX Diagnostic Monitor (MDM), a diagnostic tool you can use to test your system periodically or to isolate a particular problem.
- Appendix A contains a diagram showing the location of the controls and indicators.

The troubleshooting techniques described in this manual do not identify all possible problems with your system, nor do the actions suggested remedy all problems. If the actions suggested do not solve the problem, call your Digital service representative.

NOTE: *You will find a Glossary in the Operation manual to help with word definitions and acronyms.*

Conventions

The following conventions are used in this book:

Convention	Meaning
Key	A symbol denoting a terminal key used in text and examples in this book. For example, Break indicates that you press the Break key on your terminal keypad. Return indicates that you press the Return key on your terminal keypad.
Ctrl/C	A symbol indicating that you hold down the Ctrl key while you press the C key.
BOLD	This bold type indicates user input. For example: >>> BOOT MUA0 This line shows that the user must type BOOT MUA0 at the console prompt.
NOTE	Provides general information about the current topic.
CAUTION	Provides information to prevent damage to equipment or software.
WARNING	Provides information to prevent personal injury.

Chapter 1

Troubleshooting During Power-On

When you power on your system, the VAX processor performs a series of self-tests and start-up routines. After successful completion of the self-tests, if the Break Enable/Disable switch is set to disable, the system attempts to autoboot system software.

1.1 Autobooting the VAX 4000 System

The VAX 4000 system attempts to boot automatically (autoboot) from a specified drive when you have entered the Set Boot command (`SET BOOT device name`) from console mode. The system continues to boot from the specified device each time it is powered on until you specify differently by entering the Set Boot command again.

If you have not entered the Set Boot command, the system boots automatically from the Ethernet port, EZA0.

1.2 Troubleshooting Power-On Problems

If you do not observe the correct power-on and boot sequence responses, refer to the descriptions of problems and corrective actions in Table 1-1. If the actions listed do not solve the problem, call your Digital service representative.

NOTE: *Table 1-1 occasionally recommends that you run MDM as a service tool to help diagnose problems. Refer to Chapter 3 of this manual for instructions on using MDM.*

Table 1-1: Troubleshooting Power-On Problems

Problem	Possible Cause	Corrective Action
Problems During Self-Tests		
No response when the power switch is turned on (AC Present indicator is not lit).	System is not plugged in.	Set the power switch to 0. Plug in the system. Set the power switch to 1.
	No power at the wall outlet.	Use a different wall outlet, or check the circuit breaker controlling power to the wall outlet.
	Circuit breaker(s) (which is the power switch) has tripped (is in position 0).	Set the power switch to position 1. If the circuit breaker(s) trips again, call your Digital service representative.
	Power cable is incorrectly installed.	Set the power switch to 0. Check that the cable is fully seated in the socket. Set the power switch to 1.
AC Present indicator is lit, DC OK is not lit.	Power supply or module failure.	Call your Digital service representative.
The system has power (AC Present indicator is lit), but nothing displays on the console terminal.	Console terminal is turned off.	Turn on the console terminal.
	Console terminal is off line.	Put the terminal on line. Refer to the terminal documentation for instructions.
	Console terminal cable is incorrectly installed.	Make sure the cable is installed properly at both ends.
	Console terminal set-up has not been done correctly.	Reread the section, <i>Install the Console Terminal</i> , in your <i>Installation</i> manual.
	Baud rate setting of the system and the terminal do not match.	Set the terminal baud rate to match the system. The normal operating setting is 9600.
	Power-On Mode switch on the console module is set to T.	Set the switch to Run (indicated by an arrow).
	Terminal is defective.	Turn off terminal and turn it on again to see if it passes its self-tests. If it fails self-tests, call your Digital service representative.

Table 1–1 (Cont.): Troubleshooting Power-On Problems

Problem	Possible Cause	Corrective Action
The system has power (AC Present and DC OK indicators are lit), but nothing is displayed on the console terminal.	Problem with CPU.	Call your Digital service representative.
The system has power (DC OK is lit), but nothing is displayed on the console terminal. The LED on the console module displays an E or F.	Problem with CPU.	Call your Digital service representative.
The self-tests halted and an error message or error summary displays on the console terminal.	The system detected an error while running its self-tests.	Copy the number following the question mark in the error message or summary and call your Digital service representative.
The Language Selection Menu does not appear.	The baud rate on the console terminal is different from the baud rate on the system. The terminal does not support the multi-national character set (MCS).	Check that the baud rate on the console terminal and on the system is set to 9600. Obtain a terminal that supports MCS.
General Problems During Boot Sequence		
The system returns to the BOOT prompt after four minutes.	Sanity timer is enabled on the DESQA module.	Disable sanity timer. Refer to <i>DESQA Option Installation Guide</i> .
Instead of automatically starting, system power-on results in >>> being displayed on the console terminal.	Break Enable/Disable switch is set to enable. The system is in console mode.	To autoboot, set the Break Enable/Disable switch (located on the console module) to disable (down). Reset the system by pressing the Restart button, located on the System Control Panel. If you prefer to boot manually from console mode, use the BOOT command (>>>BOOT <i>device-name</i>).
The message “?54 RETRY” is displayed twice on the console terminal.	No bootable media was found.	See actions listed in the subsequent sections of this table for the boot device you are using.

Table 1-1 (Cont.): Troubleshooting Power-On Problems

Problem	Possible Cause	Corrective Action
The countdown does not continue from 2 through 0, even though the Break Enable/Disable switch is set to disable.	The system cannot load system software from either a disk drive, a tape drive, or the Ethernet.	See actions listed in the subsequent sections of this table for the boot device you are using.
Problems Booting from an RF-Series Integrated Storage Assembly (ISA)		
The countdown continues from 2 through 0, however, the console terminal displays operating system error messages.	The system disk is write-protected. The Write-Protect button is in (glows orange).	Push in and release the Write-Protect button to the out (unlit) position. Make sure you know which Write-Protect button corresponds to the system disk.
The countdown continues from 2 through 0, however, the console terminal displays console error messages.	The system disk contains no bootable system software.	Install system software.
The countdown does not continue from 2 through 0, even though the Break Enable/Disable switch is set to disable.	The system disk is off line. (The Ready button is in the in position.)	Press the appropriate Ready button on the system disk to the out position. Press the Restart/Run button on the SCP.
The Fault indicator is lit or begins to flash.	A problem exists with the controller or ISA.	If the Fault indicator stops flashing, your system may have corrected itself. Run the MDM software as described in Chapter 3. If the Fault indicator remains lit, call your Digital service representative.
Problems Booting from a Tape Cartridge		
System does not boot (the countdown does not continue from 2 to 0) or boots from another device (the wrong software is displayed on the console terminal).	No tape cartridge in the tape drive.	Insert a cartridge containing system software into the tape drive.

Table 1-1 (Cont.): Troubleshooting Power-On Problems

Problem	Possible Cause	Corrective Action
	Fixed-disk drive is on line. Your system starts from the fixed disk, if it is on line.	Place the fixed disk off line.
	Tape is not bootable (does not contain a bootstrap program).	Use a tape containing a bootstrap program to start system software.
	Tape is worn or damaged.	Try another tape cartridge.
	A problem exists with the controller or tape drive.	Call your Digital representative.

Chapter 2

Troubleshooting During Normal Operation

Problems that occur during normal operation of your system may result from a defect in the system, from faulty settings, or from incorrect procedures.

Table 2-1 lists problems, possible causes, and corrective actions. If the actions listed do not solve the problem, call your Digital service representative.

Table 2-1: Troubleshooting Operation Problems

Problem	Possible Cause	Corrective Action
System Problems		
The system has power (the DC OK is lit), but nothing displays on the console terminal. The LED on the console module displays an E or F.	Problem with CPU.	Call your Digital service representative.
System loses power during operation. The AC Present indicator is not lit.	The system is not plugged into the wall outlet.	Set the power switch to 0. Plug in the system. Set the power switch to 1.
	No power at the wall outlet.	Use a different wall outlet, or check the circuit breaker controlling power to the wall outlet.
	Power switch has tripped.	Set the power switch to 1. If it trips again, call your Digital service representative.
	Power cable is incorrectly installed.	Set the power switch to 0. Check that the cable is fully seated in the socket. Set the power switch to 1.

Table 2-1 (Cont.): Troubleshooting Operation Problems

Problem	Possible Cause	Corrective Action
System loses power during operation, the DC OK is not lit.	The power supply has failed.	Check the DC OK light(s). An unlit DC OK indicates a power supply problem. Turn off your system and call your Digital service representative.
System loses power during operation, the power switch is off (position 0).	The power switch, which also acts as the system circuit breaker, has tripped.	To reset the circuit breaker, turn power switch to off (position 0). Wait 30 seconds. Set switch to on (position 1). If switch trips off again, call your Digital service representative.
The Over Temperature Condition indicator is lit, system loses power during operation.	The system is automatically shut down to prevent overheating.	Make sure vents are clear; make sure system is not near a heat source; make sure the room temperature is within the guidelines in the <i>VAX 4000 Site Preparation</i> . Turn power switch to off. Wait five minutes, then turn switch on. If switch trips off again, call your Digital service representative.
System loses power during operation. The Fan Failure indicator is lit.	One of the two fans has failed.	Call your Digital service representative.
System halts unexpectedly during normal operation. The console mode prompt >>> is displayed on the console terminal.	The Break key or Ctrl/P on the console terminal was pressed inadvertently. The Hold Screen key on the console terminal was pressed inadvertently. The console terminal was momentarily turned off or disconnected.	Type "C" and press Return . To prevent recurrences, set the Break Enable/Disable switch on the console module to disable (position 0) and press the Run/Ready button to restart the system. Note that pressing Restart causes the system to reboot.
System suddenly reboots.	The Run/Ready button was pressed inadvertently.	Let rebooting run to completion. To prevent recurrences, you can disable the Restart/Run button. Call your Digital service representative to perform this service.
RF-Series Integrated Storage Assembly (ISA) Problems		
ISA write error message is displayed.	ISA is write-protected. (Write-Protect button glows orange).	Press and release Write-Protect button (not lit).

Table 2-1 (Cont.): Troubleshooting Operation Problems

Problem	Possible Cause	Corrective Action
The Fault indicator is lit or begins to flash.	A problem exists with the controller or ISA.	If Fault indicator stops flashing, the system may have corrected itself. Run the MDM software as described in Chapter 3. If Fault remains lit, call your Digital service representative.
ISA read error message is displayed.	ISA is not spun-up because the Run/Ready button is in the in position.	Press the Ready button to the out position. When the green indicator light comes on, the ISA is available for use.
TK70 Tape Drive Problems		
Green light blinks rapidly after you insert the tape.	Tape cartridge leader is defective.	Pull the handle open and remove the cartridge. Use another cartridge.
Orange, yellow, and green lights blink in unison.	A problem with the drive.	Press the Unload button once. If the orange and green lights go out and the yellow light blinks, the cartridge is unloading. When the green light comes on and you hear the beep, remove the tape cartridge. If all three lights continue to blink after you press the Unload button, the fault is not cleared. Do not try to remove the cartridge. Call your Digital service representative.
Handle does not move.	Power-on test is still in progress.	If you are trying to insert a cartridge, wait for the orange and yellow lights to go off and the green light to remain on steadily. Then try again.
	Tape drive is active.	Do not attempt to move the handle while the yellow light is on.
Handle does not lock.	Cartridge is not inserted properly.	Reinsert the tape cartridge. If the problem persists, call your Digital service representative.
Cartridge does not unload.	Unload button is not working properly.	Try unloading the cartridge with a software command. Refer to your system software manuals.
TK70 passes power-on self-test but does not work.	The controller may be bad, or the connection between the drive and the controller may be loose.	Call your Digital service representative.

Chapter 3

Running the MicroVAX Diagnostic Monitor (MDM)

The MicroVAX Diagnostic Monitor (MDM) is a software package containing diagnostic tests designed to isolate and identify faults in your VAX 4000 system. MDM also permits you to display your system configuration and test how devices work together. The diagnostic tests are packaged with your system on a tape cartridge (labeled MV DIAG CUST TK50). MDM operating instructions begin in Section 3.2.

CAUTION: *If your system is connected to a cluster, notify your cluster manager before halting the system to load MDM.*

You generally run MDM in three situations:

- Before you install system software on a new system
- When you receive an error message or experience a problem with your system
- When you want to test your system periodically to ensure that all components are operating correctly

How the MDM Tests Work

MDM tests individual internal devices in your system, however, it performs limited diagnostics:

- MDM performs reads from each drive and checks each controller. The customer tests do not write to the drives as writing to the drives could destroy data.

NOTE: *MDM will test a tape drive or diskette drive only when the media (tape or diskette) is inserted in the drive.*

- MDM checks only devices and not the connections or lines between peripheral devices and the system.
- MDM does not check each device as thoroughly as the service diagnostic tests, which are described below.

If devices pass the customer tests but you still experience problems, contact a Digital service representative for further testing.

Customers requiring more complete diagnostic testing should purchase the MicroVAX Maintenance Kit. The maintenance kit includes the system maintenance guide and the service diagnostic tests. The MDM version that you receive with your system is a subset of the service version.

NOTE: *Only qualified service personnel should use the service diagnostic tests.*

3.1 Preparing to Run MDM

Running MDM on certain systems requires additional or special procedures. Read Section 3.1.1 if you plan to run MDM on a diskless or tapeless system. Read Section 3.1.2 if you plan to install MDM on a hard disk or RF-series Integrated Storage Assembly (ISA). Read Section 3.1.3 if you plan to run MDM on a dual-host system.

3.1.1 Preparing to Run MDM on Diskless or Tapeless Systems

If you have a diskless or tapeless system that is part of a local area network (LAN), you must obtain the MicroVAX Ethernet Server Customer Diagnostics Kit. Run MDM using the diagnostics in the kit that is labeled MV DIAG ENET CUST.

Refer to the *MicroVAX Diagnostic Monitor Ethernet Server User's Guide* at this time. Once you have installed and down-line loaded MDM software, refer again to this manual for specific instructions on running MDM.

NOTE: *If you have a diskless or tapeless system that is not part of a local area network (LAN), you cannot run MDM. To diagnose problems, call a Digital service representative.*

3.1.2 Preparing to Run MDM on RF-Series ISA or Hard Disk

MDM software can be installed on an RF-series ISA or hard-disk drive using the MDM Hard Disk Kit. Installation of the MDM Hard Disk Kit requires the completion of the "Diagnostic Software Installation Acknowledgment" by the customer. See the *MicroVAX Diagnostic Monitor Hard Disk User's Guide* for the licensing requirements and installation instructions.

NOTE: *The MDM Hard Disk Kit is required for dual-host systems where one host is a tapeless system.*

3.1.3 Preparing to Run MDM on a Dual-Host System

In a dual-host configuration, two systems in the same VAXcluster share their ISAs through a Digital Storage System Interconnect (DSSI) bus. Each system can directly access any of the ISAs in either system; this can include a shared common system disk.

Before running MDM diagnostics on a dual-host system, your system must be properly configured (systems ordered as dual-host systems are properly configured at the factory) and the DSSI cable connecting the two hosts must be in place.

Diagnostics must be performed separately for each host. The procedure for running diagnostics differs depending on whether one host is a tapeless system (no tape drive) or each host has its own tape drive. Use the following instructions to prepare to run diagnostics in a dual-host system with one tape drive. Use the instructions in the section after it to prepare to run diagnostics in dual-host systems with a tape drive in each host.

3.1.3.1 Preparing to Run MDM on a Dual-Host System with One Tape Drive

To run MDM on dual-host systems with one tape drive (one tapeless host) you must use the MDM Hard Disk Kit. Complete the "Diagnostic Software Installation Acknowledgment" and install the kit on an RF-series ISA according to the procedure in the *MicroVAX Diagnostic Monitor Hard Disk User's Guide*.

When the installation is complete, use the following procedure to run the diagnostics:

1. If software is installed on the system, warn all users to log off and perform system shutdown, as described in your system software manuals. Turn off both hosts.
2. Set the Break Enable/Disable switch on the console module of each host to enable (up). Turn on both hosts. If the hosts are already powered-on, press Break.

Result: The system displays the console mode prompt on your terminal.

>>>

3. Use the command `BOOT/100 DIAn` (for KA670 CPU-based DSSI) or `BOOT/100 DUAn` (for KFQSA-based DSSI), where *n* is the unit number of the disk containing the MDM Hard Disk Kit.

Result: The system prompts for the bootfile:

Bootfile:

Enter the name of the file image: [SYS0.SYSEXEXE]MDMSHA.SYS for systems with on-board DSSI, or [SYS0.SYSEXEXE]MDM.SYS for systems using the KFQSA storage adapter. Press **RETURN** to continue booting.

4. Run the diagnostics as described in Section 3.2.
5. When you have completed the tests on the first host, make sure the Break Enable/Disable switch is set to enable (up) and press the Restart/Run button on that same host. When the countdown completes and the >>> prompt is displayed, boot the diagnostics from the second host using the commands described in steps 2 and 3, and run the diagnostics as you did for the first host.

3.1.3.2 Preparing to Run MDM on a Dual-Host System with Two Tape Drives

Run diagnostics on dual-host systems with two tape drives according to the following procedure:

NOTE: *You can also use the MDM Hard Disk Kit as described in the previous section.*

1. If software is installed on the system, warn all users to log off and perform system shutdown, as described in your system software manuals. Turn off both hosts.
2. Make sure the Write-Protect switch on the tape cartridge containing the MDM diagnostics is in the write-protect position.
3. Set the Break Enable/Disable switch on both hosts' console modules to enable (up).
4. Turn on both hosts.

Result: The normal power-on countdown should appear on the console terminal. After the countdown, you should see the >>> prompt indicating console mode.

5. Insert the tape cartridge containing the MDM software into the tape drive in one host and lock it into place. On the same host, enter the command **BOOT MUA0** to tell your system to load the MDM software from the tape cartridge.
6. Run the diagnostics as described in Section 3.2.
7. When you have completed the tests on the first host, remove the tape cartridge by following the procedure described in *Operation*. Press the Restart/Run button on that same host. When the countdown completes and the >>> prompt is displayed, insert the tape cartridge into the tape drive in the second host and lock it into place. Enter the command **BOOT**

MDAO to boot the tape and run the diagnostics as you did for the first host.

3.2 Starting MDM

You must start the diagnostic tests differently for different media. If you are booting MDM from a tape cartridge, read Section 3.2.1. If you are booting MDM from an RF-series ISA fixed-disk drive, refer to the *MicroVAX Diagnostic Monitor Hard Disk User's Guide*.

NOTE: *Unless instructed to do so, do not change any settings or manipulate devices while the tests are running. The diagnostic software interprets any change of state as an error.*

3.2.1 TK70 Instructions

Before you run the MDM software, be sure you understand the instructions in your *Operation* manual (contained in this documentation kit) for using the TK70 tape drive.

CAUTION: *Make sure the tape cartridge is write-protected.*

The diagnostics run the same way whether or not system software, such as VMS or VAXELN, has been loaded. You can manually boot the diagnostic software or use the autoboot feature to automatically boot the software. The following sections explain how to boot MDM manually and automatically. Follow the directions carefully for setting switches.

NOTE: *If your system is part of a local area network (LAN), you may want to reduce the time required to load MDM on each system by obtaining the MicroVAX Ethernet Server Customer Diagnostics Kit. The kit enables you to install MDM software on a host VMS operating system and down-line load MDM to other systems that are part of the LAN, using the DECnet/Ethernet network facilities. When MDM is down-line loaded to target systems from a host system, the time required to load MDM is reduced significantly.*

3.2.1.1 Booting MDM Manually

NOTE: *Before booting MDM on a system with software installed, warn all users to log off and perform system shutdown, as described in your system software manuals.*

1. Make sure the Write-Protect switch on the tape cartridge is in the write-protect position.

2. If your system contains system software, write-protect all disk drives and RF-series ISAs.
3. Move the Break Enable/Disable switch on the console module to enable (position 1).
4. Press the Restart button if the system is running or turn on the system if the system is off.
5. When the green light on the tape drive glows steadily (if you are using a TK70 tape drive, orange and yellow lights go out), insert the tape cartridge containing the MDM software into the tape drive and lock it into place.

Result: While you are inserting and loading the tape cartridge, the normal power-on countdown should appear on the console terminal. After the countdown, you should see the >>> prompt indicating console mode.

6. Use the command `BOOT MUA0` to tell your system to load the MDM software from the tape cartridge. Loading the software takes several minutes. A yellow indicator light on the tape drive flashes while loading occurs. Section 3.3 describes the display you see when loading is completed.

3.2.1.2 Booting MDM Using Autoboot

NOTE: *Before booting MDM on a system with software installed, warn all users to log off and perform system shutdown, as described in your system software manuals.*

1. Make sure the Write-Protect switch on the tape cartridge is in the write-protect position.
2. Remove any removable disks and place all fixed-disk drives and RF-series ISAs off line.
3. Write-protect all disk drives and RF-series ISAs.
4. Turn off your system.
5. Move the Break Enable/Disable switch on the console module to disable (position 0).
6. Turn on your system.
7. When the green light on the tape drive glows steadily, insert the tape cartridge containing the MDM software into the tape drive and lock it in place.

Result: While the system loads MDM, the power-on countdown appears on the terminal. Loading the software takes several minutes. A yellow indicator light on the tape drive flashes while loading occurs.

Section 3.3 describes the display you see when loading is completed.

NOTE: *When loading is completed, place all RF-series ISAs on line. If the ISAs are not on line, they cannot be tested completely.*

3.3 MDM Introductory Screen

When MDM software is loaded, the MDM introductory screen is displayed. Make sure the current date and time in the introductory display are correct. If the date and time are correct, press `[Return]` to continue. If incorrect, type the correct date and time, using the format shown in the MDM introductory screen display. For example, enter 10-JAN-1990 02:30 and press `[Return]` to continue. The Main Menu appears. Section 3.4 describes options on the Main Menu.

3.4 Main Menu Options

The Main Menu provides six options, as shown in Figure 3-1. Choose an option by typing the number and pressing `[Return]`.

Figure 3-1: The Main Menu

```
MAIN MENU                               Release nnn   Version  xx.xx
1 - Test the System
2 - Display System Configuration and Devices
3 - Display the System Utilities Menu
4 - Display the Service Menu
5 - Display the Connect/Ignore Menu
6 - Select Single Device Tests

Type the number; then press the RETURN key. >
```

NOTE: *The MDM release and version numbers are represented by nnn and xx.xx in the sample screens provided throughout this chapter.*

Option 4, "Display the Service Menu," is available only if you have purchased the MicroVAX Maintenance Kit. The maintenance kit contains service diagnostics and the system maintenance guide. Only qualified service personnel should use the MicroVAX Maintenance Kit.

The next five sections describe the remaining options on the Main Menu.

3.4.1 Test the System

The "Test the System" option runs a general test of the devices in the system and how they work together. You can run the test at any time without jeopardizing data.

When you select "Test the System," the diagnostics are prepared for testing. If this is the first MDM option you have selected, the diagnostics are automatically loaded. The loading process takes several minutes. When preparations and loading are complete, you are prompted to press **[Return]**. A screen explaining the testing procedures then appears.

When you are ready to begin the test, press **[Return]**. The system displays the "Begin Device Tests."

As each device passes the test, it is listed on the screen.

NOTE: *Because of the internal similarity of some communications options, the diagnostic test sees these options as the same device. A DHV11 and DHQ11 appear the same to the diagnostic test. A generic device name, DH-CX0, is listed for similar communications options. The last letter in each device name differentiates among multiple devices of the same type. For example, DH-CX0A indicates one communications option, DH-CX0B a second, and so forth.*

If a device fails the test, you receive a failure message.

Each failure message identifies the device being tested, when the failure occurred, and the field-replaceable unit (FRU). Copy the failure message and report it to your Digital service representative. Figure 3-2 shows an example of an unsuccessful test.

Figure 3–2: Example of an Unsuccessful Test

```
BEGIN FUNCTIONAL TEST

Device                      Result
SGCA ..... FAILURE DETECTED

A failure was detected while testing the
      OPTION: SGCA Ethernet controller
The Field Replaceable Unit (FRU) identified is the:
      Ethernet controller
```

If your system has serious problems, the following message may appear:

All devices disabled, no tests run.

Report the message to your Digital service representative.

When a failure message occurs, the testing stops.

When all devices pass the first part of the test, the exerciser tests begin. These tests take about four minutes and test how the devices work together. If the tests pass, you receive a success message.

At the end of the system test, press to return to the Main Menu.

From the Main Menu you can either exit MDM by pressing the Restart button located on the System Control Panel (SCP), or by pressing and then releasing the Halt button located on the System Control Panel (SCP), or you can choose one of the other options.

3.4.2 Display System Configuration and Devices

The “Display System Configuration and Devices” screen identifies devices recognized by the diagnostic software.

When you select “Display System Configuration and Devices,” the diagnostics are prepared for testing. If this is the first MDM option you have selected, the diagnostics are automatically loaded. The loading process takes several minutes. When the preparations and loading are complete, you are prompted to press .

When you press , the configuration is displayed. Figure 3–3 shows a sample system configuration and devices screen.

Figure 3-3: System Configuration and Devices Screen

```
MAIN MENU                               Release nnn   Version  xx.xx
SYSTEM CONFIGURATION AND DEVICES
CPUA ... MicroVAX CPU
      KA670-AA MC=02 FW=2.6
MEMA ... MicroVAX memory system
      32 Megabytes. 65536 Pages.
      MS670 ... 32MB memory module
PDIA ... SHAC DSSI Subsystem
      SHAC Ver. 3.6
      RF71 ... Unit #0, Dssi Disk, Online
      RF71 ... Unit #1, Dssi Disk, Online
SGCA ... Second Generation Ethernet Controller
      SGEC
PDIB ... SHAC DSSI Subsystem
      SHAC Ver. 3.6
No Dg TKA ... Diagnostic not loaded.
Press the RETURN key to return to the previous menu. >
```

Up to two lines of information are provided for each device. One line lists the name of the device and gives a brief description, a second line may indicate the revision level of the device. The revision level can refer to hardware and/or microcode. For example, the KA670 CPU described in Figure 3-3 is at revision 2 for microcode (MC=02).

Besides the general information listed for each device, more information for specific devices may also be given. Some examples of this information follows:

- **CPUA** — Type of CPU, presence of a floating-point unit (FPU).
- **MEMA** — Total amount of memory in megabytes and pages, number and type of memory modules.
- **KFQSA** — For systems with the KFQSA storage adapter, the type of DSSI device and its unit number are displayed for each ISA.
- **KDA50**—For units with the KDA50 controller, the unit number, drive type, controller revision number.
- **PDIA** — Embedded DSSI adapter for Bus 0. The adapter is part of the KA670 CPU.
- **DESQA** — The Ethernet station address.
- **SGCA** — The onboard Ethernet controller which is part of the KA670 CPU.
- **PDIB** — Embedded DSSI adapter for Bus 1. The adapter is part of the KA670 CPU.
- **Communications devices** — The type of device and whether it has modem control.

In addition to showing information about testable device options, MDM displays messages indicating the presence of nontestable system devices. If a device is physically present in the system but is not described under the “System Configuration and Devices” display, one of the following two messages can indicate the reason.

Message 1:

```
No Dg KAA ... Diagnostic not loaded
```

The “No Dg” (no diagnostic) “KAA” (KA670 CPUA) message appears in place of the device name because a diagnostic was not loaded for the CPUA. This can happen when the media is not installed properly or the diagnostic is not present on the media.

MDM displays a “No Dg” message for each Digital device present in the system under these circumstances. For example, if MDM cannot find the TK70 tape drive diagnostic, the message “No Dg TKA” is displayed. TKA indicates that the device is a TK tape drive.

Message 2:

Unknown ... Diagnostic not loaded

The “Unknown” (unknown device) message indicates that a device not recognizable to MDM has been attached to the system. The message appears under the following circumstances:

- A device is configured to a nonstandard CSR address.
- A Digital device that has no diagnostic has been attached to the system. This may occur if a device not supported on a VAX 4000 system has been attached.
- A non-Digital device has been attached to the system.

Once all devices have been listed, you can return to the Main Menu by pressing **[Return]**.

To exit MDM, press **[Break]** or the Restart button on the SCP.

3.4.3 Display the System Utilities Menu

Choose “Display the System Utilities Menu” to display the System Utilities Menu. If system utilities in addition to the “IOADDRESS” option are available for your system configuration, they are listed on the menu.

When you select this option, the diagnostics are prepared for testing. If this is the first MDM option you have selected, the diagnostics are automatically loaded. The loading process takes several minutes. When the preparations and loading are complete, you are prompted to press **[Return]**.

When you press **[Return]**, the System Utilities Menu appears. Figure 3-4 shows a sample System Utilities Menu for a system with two RRD40/50 drives.

NOTE: *If your system does not have an RRD40/50 Optical Disk Subsystem, only one option, IOADDRESS, will be available.*

Figure 3-4: Sample System Utilities Menu

MAIN MENU

SYSTEM UTILITIES

Utility selections are:

- 1 - IOADDRES
- 2 - RRAA - Update drive unit number for RRD40 controller A.
- 3 - RRAB - Update drive unit number for RRD40 controller B.

Choose the option by typing the option number listed on the menu and pressing .

3.4.3.1 IOADDRES

NOTE: *The "IOADDRES" option is intended for users of Industrial VAX systems. This option is described in detail in the Industrial VAX Troubleshooting manual.*

The "IOADDRES" option supplies a listing of standard Control and Status Register (CSR) addresses and interrupt vectors that MDM uses in testing devices. The first available CSR and interrupt vector for configuring devices with a nonstandard address is also supplied.

The devices in your system were configured properly at the factory. Any new options added to your system are configured properly in the field by a Digital service representative.

3.4.4 Update Drive Unit Number for RRD40

This utility allows you to update the unit number for the RRD40 compact-disk subsystem. Refer to the *RRD40 Disk Drive Owner's Manual* for instructions.

3.4.5 Display the Connect/Ignore Menu

NOTE: *The "Connect/Ignore Menu" is intended for users of Industrial VAX systems. The options in this menu are described in detail in the Industrial VAX Troubleshooting manual.*

The "Connect/Ignore Menu" options allow you to customize MDM diagnostics. You can load your own diagnostics to a particular device, as well as load MDM diagnostics to a device with a nonstandard CSR address and interrupt vector.

3.4.6 Select Single Device Tests

The "Select Single Device Tests" option allows you to run tests for a single device. A test of the device's individual circuits, called a "functional test," is performed during the single device tests. The functional test is followed by an "exerciser test" to ensure that the device as a whole is working properly.

When you select the Single Device Tests from the Main Menu, the diagnostics are prepared for testing. If this is the first MDM option you have selected, the diagnostics are automatically loaded. The loading process takes several minutes.

When the preparations and loading are complete, you are prompted to press **Return**. A screen listing the devices included in your system is displayed. Figure 3-5 shows an example of such a display.

Figure 3-5: The Single Device Tests Menu

```
MAIN MENU                               Release nnn   Version xx.xx
SELECT SINGLE DEVICE TEST

Select the device number to be tested.  The functional tests
will be run followed by the exercisers for 4 minutes.

1 - CPUTA - MicroVAX CPU
2 - MEMA - MicroVAX memory system
3 - PDIA - SHAC DSSI Subsystem
4 - SGCA - Second Generation Ethernet Controller
5 - PDIB - SHAC DSSI Subsystem
6 - No Dg TKA - Diagnostic not loaded.

Type the number; then press the RETURN key,
or type 0 and press the RETURN key to return to the Main Menu. >
```

NOTE: *Because of the internal similarity of some communications options, the diagnostic tests see these options as the same device. A DHV11 and DHQ11 appear the same to the diagnostic test. A generic device name, DH-CX0, is listed for similar communications options. The last letter in each device name differentiates among multiple devices of the same type. For example, DH-CX0A indicates one communications option, DH-CX0B a second, and so forth.*

Select a device for testing by typing the corresponding number and pressing **Return**.

When you press **Return**, the system configures the device diagnostics and testing begins. If the device passes the functional test, a message to that effect is displayed, and the exerciser test begins. The exerciser tests run for

approximately four minutes. Figure 3-6 shows an example of a successful test.

Figure 3-6: Example of a Successful Test

```
BEGIN FUNCTIONAL TEST
      Device                      Result
      CPUTA ..... PASSED
BEGIN EXERCISER TEST
      Results are reported at the end of the testing.
SINGLE DEVICE TEST PASSED
```

If a device fails the test, you receive a failure message. Each failure message identifies the device being tested when the failure occurred and the field-replaceable unit (FRU). Copy the failure message and report it to your Digital service representative. Figure 3-7 shows an example of an unsuccessful test.

Figure 3-7: Example of an Unsuccessful Test

```
BEGIN FUNCTIONAL TEST
      Device                      Result
      SGCA ..... FAILURE DETECTED
      A failure was detected while testing the
          OPTION: SGCA Ethernet controller
      The Field Replaceable Unit (FRU) identified is the:
          Ethernet controller
```

When a failure message occurs, the testing stops.

Press **Return** to return to the Single Device Menu for more testing.

To exit MDM, press **Break** or the Restart button on the SCP.

3.5 Exiting MDM

Exit MDM by doing one of the following:

- Press **Break**.
- Press and then release the Halt button on the SCP.
- Press the Restart button on the SCP.

Remove the tape cartridge, as explained in your *Operation* manual.

If you have run MDM on a new system, you are ready to install your system software. Follow the instructions in your system software manuals. Set the Write-Protect button to write-enable and install system software.

If you have run MDM on a system containing system software, you must reboot your system software.

You can reboot your system software in one of two ways:

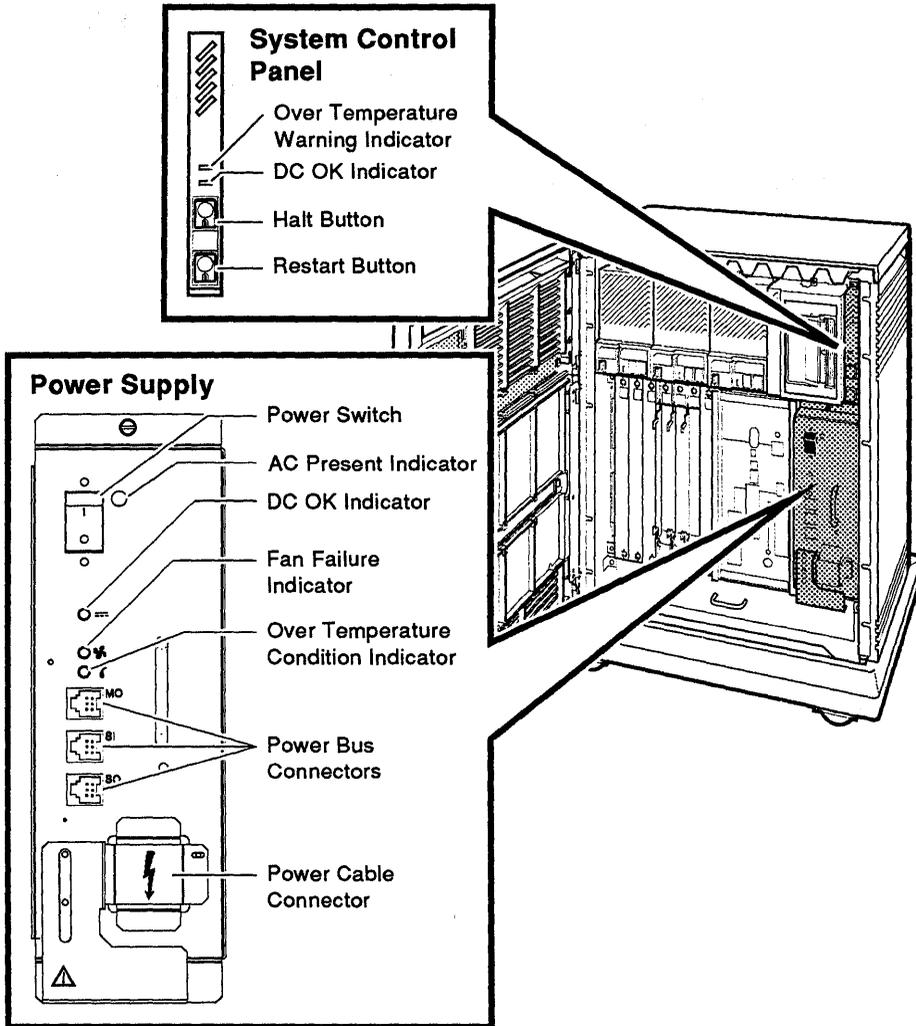
- At the console mode prompt (>>>), use the command `BOOT Dxxx`, where `Dxxx` is the device name of the fixed disk or RF-series ISA containing your system software. Use `DUxx` if this is an RA-series disk drive or an RF-series ISA (with the KFQSA storage adapter). Use `DIxx` if this is an RF-series ISA (with the KA670 CPU). After the system software is loaded, set the Break Enable/Disable switch to disable (position 0), to avoid inadvertently halting the system by pressing the **Break** key.
- Set the Break Enable/Disable switch to disable (position 0) and press the Restart button. This causes your system to begin the power-on sequence again and automatically load system software.

Appendix A

VAX 4000 Controls and Indicators

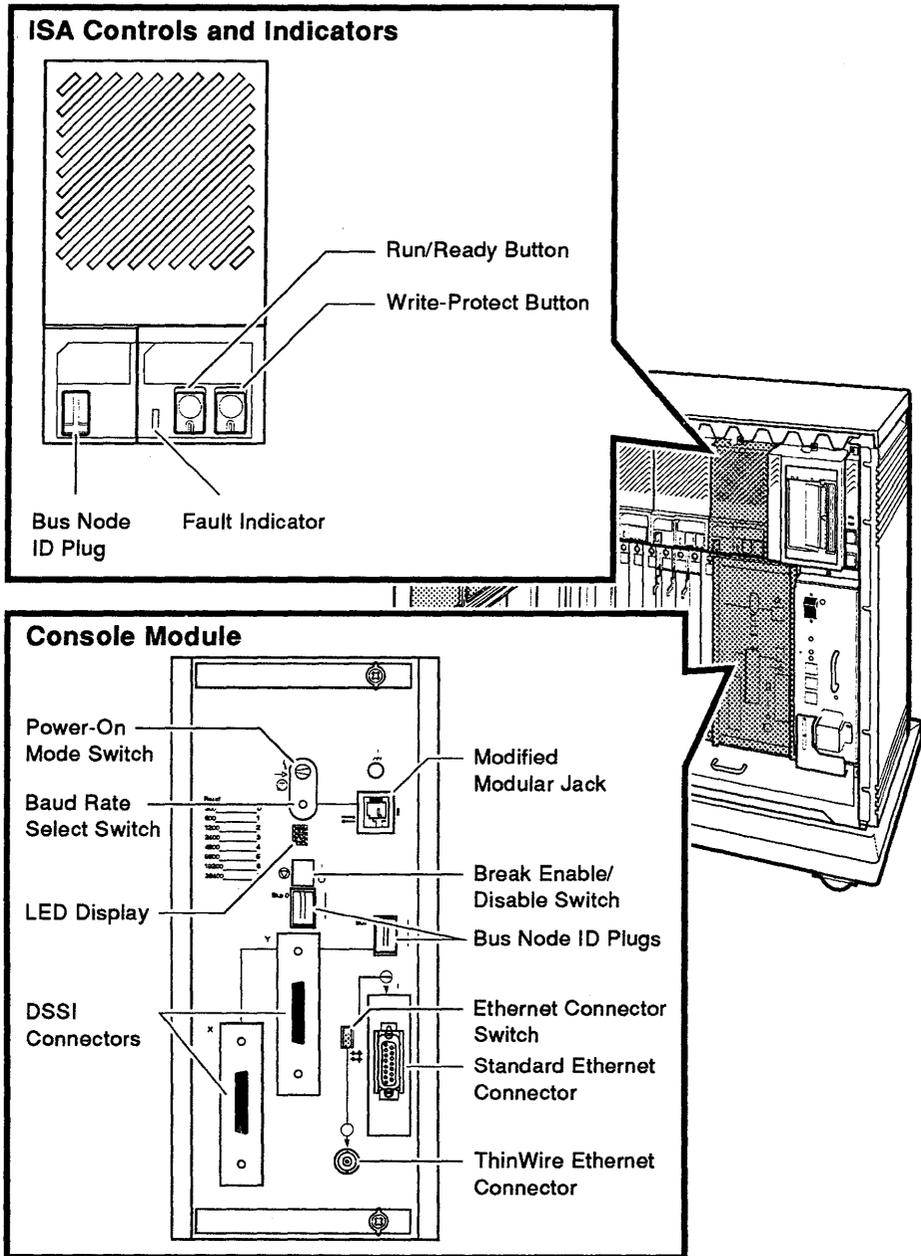
The diagrams in this appendix show the controls and indicators on the VAX 4000 Model 300 system.

Figure A-1: VAX 4000 Controls and Indicators—Sheet 1 of 2



MLO-004050

Figure A-2: VAX 4000 Controls and Indicators—Sheet 2 of 2



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