MicroVAX

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MicroVAX 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.

This book contains troubleshooting information for all MicroVAX/VAXserver systems: MicroVAX II, and MicroVAX 3000-series systems. Appendix A contains diagrams of each MicroVAX system. Using the diagram of your system, 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.

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.

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	Bold type is used to indicate user input. For example: **>>> BOOT MUA0** This line shows that the user must type BOOT MUA0 at the ">>>" prompt.
WARNING	Provides information to prevent personal injury.
CAUTION	Provides information to prevent damage to equipment or software.
NOTE	Provides general information about the current topic.

Chapter 1
Troubleshooting During Power-On

When you power on your system, the MicroVAX processor performs a series of self-tests and start-up routines. After successful completion of the self-tests, if the Break Enable/Disable[1] switch is set to disable, the system attempts to autoboot system software.

1.1 Autobooting the MicroVAX System

The MicroVAX autoboot function is different for each MicroVAX series system.

1.1.1 Autobooting MicroVAX 3500 and 3600 Systems

The MicroVAX 3500 or 3600 system attempts to autoboot a specific drive when you use 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 using the Set Boot command again.

If you have not used the Set Boot command, the system attempts to autoboot by looking for bootable software the same way that a MicroVAX II system looks for bootable software. See Section 1.1.2 for more information.

1.1.2 Autobooting MicroVAX II Systems

When a MicroVAX II system attempts to autoboot, it looks for bootable software on the following devices in the order shown below:

1. Removable disks and diskettes (RX33, RX50, and RA60 in ascending unit number)
2. Fixed-disk drives (RD-series/RA-series in ascending unit number)
3. Tape cartridges (TK50/TK70, TS05, TU81–Plus)
4. EPROM
5. Ethernet adapter

[1] MicroVAX II systems have a Halt Enable/Disable switch.

Normally, your system automatically boots system software which has been installed on a fixed-disk drive. When booting a fixed-disk drive, you must remove all removable disks and place all disks ahead of the disk containing the system software off-line. For example, if you want to boot system software from an RA81 or RA82 fixed disk, place all removable media, as well as all RD-series disks and RA60 disks (if any), off-line. (See operating instructions for each drive in your system-specific MicroVAX *Operation* manual.)

To boot software from a TK50 or TK70 tape cartridge, or the Ethernet, you must place all removable and fixed-disk drives off-line.

An alternative to placing disks off-line is to boot your system manually from from the console terminal using the BOOT *device name* command in console mode. (See MicroVAX *Operation* for more information.)

1.2 Troubleshooting Power-On Problems

If you do not observe the correct power-on and boot sequence responses, refer to the possible problems and corrective actions described 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 corrective action. 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 on/off switch is turned on (switch is not lit).	System is not plugged in.	Set the on/off switch to 0. Plug in the system. Set the on/off 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.

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

Problem	Possible Cause	Corrective Action
	Circuit breaker(s) has tripped.	Set the on/off switch to 0. Reset the circuit breaker(s).[1] Set the on/off switch to 1. If the circuit breaker(s) trips again, call your DIGITAL service representative.
	Power cable is incorrectly installed.	Set the on/off switch to 0. Check that the cable is fully seated in the socket. Set the on/off switch to 1.
The system has power (the on/off switch is lit), but no display appears 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 not installed correctly.	Make sure the cable is installed properly at both ends.
	Console terminal Set-Up has not been done correctly.	Reread the section, Install the Console Terminal, in MicroVAX *Installation*.
	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-Up Mode switch on the CPU panel 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 passes self-tests, run MDM diagnostics to check the status of the terminal.

[1] Locate and reset the circuit breaker(s) on your system using the diagrams in Appendix A.

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

Problem	Possible Cause	Corrective Action
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 last number of the error message or summary and call your DIGITAL service representative.
The system loses power, but the on/off switch is lit.	Power supply failure.	Call your DIGITAL service representative.
General Problems During Boot Sequence		
The system returns to the BOOT prompt after four minutes.	Sanity timer is enabled on the DELQA module.	Disable sanity timer. Refer to *DELQA-SA Option Installation Guide.*
Instead of automatically starting, system power-on results in >>> being displayed on the console terminal.	Break Enable/Disable[2] switch is set to enable. The system is in console mode.	To autoboot, set the Break Enable/Disable[2] switch (located on the CPU panel) to the disable position. Reset the system by pressing the Reset[3] button, located on the power supply. If you prefer to boot manually from console mode, use the BOOT command (>>>BOOT device-name).
The message "?54 RETRY" appears on the console terminal twice.	No bootable media was found.	See actions listed in the subsequent sections of this table for the boot device you are using.
The countdown does not continue from 2 through 0, even though the Break Enable/Disable[2] switch is set to disable.	The system cannot load system software from either a disk drive or a tape drive.	See actions listed in the subsequent sections of this table for the boot device you are using.

[2] MicroVAX II systems have a Halt Enable/Disable switch.

[3] MicroVAX II systems have a Restart button located on the front panel.

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

Problem	Possible Cause	Corrective Action
Problems Booting from an RD-Series Fixed Disk		
The countdown continues from 2 to 0; however, operating system error messages display on the console terminal.	The system disk is write-protected.	Release the write-protection on the disk. Make sure you know which Write-Protect button/switch corresponds to the disk containing system software. Refer to your system-specific MicroVAX *Operation* manual for instructions on operating your RD-series fixed disk.
The countdown does not continue from 2 through 0, even though the Halt Enable/Disable switch is set to disable. The message "?4D DEV-OFFLINE" appears on the console terminal.	The system disk is offline.	Set the Ready button to the out position (glows green).
The countdown does not continue from 2 through 0, even though the Halt Enable/Disable switch is set to disable. The message "?42 NOSUCH-FILE" appears on the console terminal.	The system disk contains no bootable system software.	Install system software.
The countdown does not continue from 2 through 0, even though the Halt Enable/Disable switch is set to disable. The message "?4C CTRL ERR" appears on the console terminal.	A problem exists with the controller or fixed disk.	Run the MDM software as described in Chapter 3.

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

Problem	Possible Cause	Corrective Action
Problems Booting from an RA60 Removable Disk Drive		
The countdown does not continue from 2 through 0, even though the Break Enable/Disable[2] switch is set to disable. The system cannot load system software from the RA60 disk.	The system disk is write-protected. The Write-Protect button is in (lit).	Push in and release the Write-Protect button to the out position. Make sure you know which Write-Protect button corresponds to the disk containing system software.
	The disk is not spun-up. The Run/Stop button on the disk drive control panel was not set to the in position.	Set the Run/Stop button on the disk drive control panel to the in position. Open the front door of the cabinet and press the Reset[3] button on either power supply.
	The RA60 drive door is unlocked.	Close the RA60 drive door and make sure the lock release button is out.
	The disk drive circuit breaker is tripped.	Press the Run/Stop button on the disk drive control panel to the out position. Reset the circuit breaker on the disk drive by pushing it down, then up again. Press the Run/Stop button to the in position. Press the Reset[3] button on either power supply.
	A problem exists with the controller or fixed disk.	Run the MDM software as described in Chapter 3.

[2] MicroVAX II systems have a Halt Enable/Disable switch.

[3] MicroVAX II systems have a Restart button located on the front panel.

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[2] switch is set to disable. The message "?4D DEV-OFFLINE" appears on the console terminal.	The RA60 is off-line. Neither the A nor the B button on the disk drive control panel was set to the in position when the system was turned on.	Set the appropriate port button, A or B (or both), on the disk drive control panel to the in position. Press the Reset[3] button on either power supply.
The countdown does not continue from 2 through 0, even though the Break Enable/ Disable[2] switch is set to disable. The message "?42 NOSUCH-FILE" appears on the console terminal.	The system disk contains no bootable system software.	Install system software.
The Fault light is lit. The message "?4C CTRL ERR" appears on the console terminal.	A problem exists with the controller or fixed disk.	Press the Fault button twice. RA60 lights and indicators may begin to flash. If the RA60 lights and indicators do not flash or stop flashing, your system may have corrected itself. Run the MDM software as described in Chapter 3. If RA60 lights and indicators continue to flash, there is a problem with the controller or fixed disk. Call your DIGITAL service representative.

[2] MicroVAX II systems have a Halt Enable/Disable switch.

[3] MicroVAX II systems have a Restart button located on the front panel.

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

Problem	Possible Cause	Corrective Action
Problems Booting from an RA80-Series Fixed Disk		
The countdown does not continue from 2 through 0, even though the Break Enable/Disable[2] switch is set to disable. The system cannot load system software from a fixed disk.	The system disk is write-protected. The Write-Protect button is in (lit).	Push in and release the Write-Protect button to the out (unlit) position. Make sure you know which Write-Protect button corresponds to the disk containing system software.
	The disk is not spun-up. The Run/Stop button on the disk drive control panel was not set to the in position.	Set the Run/Stop button on the disk drive control panel to the in position. Open the front door of the cabinet and press the Reset[3] button on either power supply.
	The disk drive circuit breaker is tripped.	Press the Run/Stop button on the disk drive control panel to the out position. Reset the circuit breaker on the disk drive by pushing it down, then up again. Press the Run/Stop button to the in position. Press the Reset[3] button on either power supply.
	A problem exists with the controller or fixed disk.	Run the MDM software described in Chapter 3.

[2] MicroVAX II systems have a Halt Enable/Disable switch.

[3] MicroVAX II systems have a Restart button located on the front panel.

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[2] switch is set to disable. The message "?4D DEV-OFFLINE" appears on the console terminal.	The RA80 is off-line. Neither the A nor the B button on the disk drive control panel was set to the in position when the system was turned on.	Set the appropriate port button, either A or B (or both), on the disk drive control panel to the in position. Press the Reset[3] button on either power supply.
The countdown does not continue from 2 through 0, even though the Break Enable/Disable[2] switch is set to disable. The message "?42 NOSUCH-FILE" appears on the console terminal.	The system disk contains no bootable system software.	Install system software.
The Fault light is lit. The message "?4C CTRL ERR" appears on the console terminal.	A problem exists with the controller or fixed disk.	Press the Fault button twice. RA80 lights and indicators may begin to flash. If the RA80 lights and indicators do not flash or stop flashing, your system may have corrected itself. Run the MDM software as described in Chapter 3. If RA80 lights and indicators continue to flash, there is a problem with the controller or fixed disk. Call your DIGITAL service representative.

[2] MicroVAX II systems have a Halt Enable/Disable switch.

[3] MicroVAX II systems have a Restart button located on the front panel.

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

Problem	Possible Cause	Corrective Action
Problems Booting from an RA70 Fixed Disk		
The countdown continues from 2 through 0, however, operating system error messages display on the console terminal.	The system disk is write-protected. The Write-Protect button is in (lit).	Push in and release the Write-Protect button to the out (unlit) position. Make sure you know which Write-Protect button corresponds to the disk containing system software.
	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[2] switch is set to disable. The message "?4D DEV-OFFLINE" appears on the console terminal.	The RA70 is off-line. Neither the A nor the B button on the disk drive control panel was set to the in position when the system was turned on.	Set the appropriate port button, either A or B (or both), on the disk drive control panel to the in position. Press the Reset[3] button on either power supply.
	The RA70 has not finished self-tests.	Wait until the Ready light comes on and press the Reset[3] button on either power supply.
The countdown does not continue from 2 through 0, even though the Break Enable/Disable[2] switch is set to disable. The message "?42 NOSUCH-FILE" appears on the console terminal.	The system disk contains no bootable system software.	Install system software.

[2] MicroVAX II systems have a Halt Enable/Disable switch.

[3] MicroVAX II systems have a Restart button located on the front panel.

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

Problem	Possible Cause	Corrective Action
The Fault light is lit. The message "?4C CTRL ERR" appears on the console terminal.	A problem exists with the controller or fixed disk.	Press the Fault button twice. RA70 lights and indicators may begin to flash. If the RA70 lights and indicators do not flash or stop flashing, your system may have corrected itself. Run the MDM software described in Chapter 3. If RA70 lights and indicators continue to flash, there is a problem with the controller or fixed disk. Call your DIGITAL service representative.
Problems Booting from an RX-Series Diskette Drive		
System does not boot (the countdown does not continue from 2 to 0) or boots from another device (the wrong software appears on the console terminal).	No diskette in diskette drive.	Insert a diskette containing startable system software into the diskette drive.
	Diskette drive door or latch is not closed.	Close the diskette drive door or latch.
	Diskette is in the drive upside-down.	*RX50 Diskette Drives:* Check that the orange arrow on the diskette matches the orange stripe on the drive. Refer to MicroVAX *Operation* for instructions on inserting and removing diskettes. *RX33 Diskette Drives:* Check that the write-protect notch is at the bottom. Refer to MicroVAX *Operation* for instructions on inserting and removing diskettes.

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

Problem	Possible Cause	Corrective Action
	Diskette is not bootable (does not contain a bootstrap program).	Use a diskette containing a bootstrap program to start system software.
	Diskette is worn or damaged.	Try another diskette.
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 appears on the console terminal).	No tape cartridge in the tape drive.	Insert a cartridge containing system software into the tape drive.
	Fixed-disk drive is online. Your system starts from the fixed disk, if it is online.	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		
System loses power during operation. The on/off switch is not lit.	The system has become unplugged.	Set the on/off switch to 0. Plug in the system. Set the on/off 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) has tripped.	Set the on/off switch to 0. Reset the circuit breaker(s).[1] Set the on/off switch to 1. If the circuit breaker(s) trips again, call your DIGITAL service representative.
	Power cable is incorrectly installed.	Set the on/off switch to 0. Check that the cable is fully seated in the socket. Set the on/off switch to 1.

[1] Locate and reset the circuit breaker(s) on your system using the diagrams in Appendix A.

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

Problem	Possible Cause	Corrective Action
The system loses power during operation, but the on/off switch is lit.	The power supply has failed.	Check the DC OK light(s). An unlit DC OK light indicates a power supply problem. Turn off your system and call your DIGITAL service representative.
System halts unexpectedly during normal operation. The console mode prompt >>> displays on the console terminal.	The Break key on the console terminal was pressed inadvertently.	Type "C" or "Continue" and press RETURN. To prevent recurrences, set the Break Enable/Disable[2] switch on the CPU panel to the disable position and press the Reset[3] button to reset the system. Note that pressing Reset[3] causes the system to reboot.
RA-Series Disk Problems		
Fixed disk write error message is displayed.	Disk is write-protected (Write-Protect button glows orange).	Press and release Write-Protect button (not lit).
The Fault light is lit.	A problem exists with the controller or disk drive.	Press the Fault button twice. Device lights and indicators may begin to flash. If the lights and indicators do not flash or stop flashing, your system may have corrected itself. To be certain that your system is operating correctly, run the MDM software described in Chapter 3. If lights and indicators continue to flash, there is a problem with the controller or disk drive. Call your DIGITAL service representative.

[2] MicroVAX II systems have a Halt Enable/Disable switch.

[3] MicroVAX II systems have a Restart button located on the front panel.

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

Problem	Possible Cause	Corrective Action
RA60/80-series Devices: Fixed disk read error message is displayed.	Disk is not spun-up because the Run/Stop button is in the out position (not lit).	Press the Run/Stop button to the in position (glows green) to spin up the drive. When the READY indicator comes on, the drive is available for use.
RD-Series Fixed Disk Problems		
Fixed disk write error message is displayed.	Disk is write-protected.	Release the write protection for the disk. Refer to your system-specific MicroVAX *Operation* manual for instructions on operating your RD-series fixed disks
Fixed disk read error message is displayed.	*MicroVAX II Systems:* Disk is off-line because the Ready button is in (not lit).	Press and release the Ready button (glows green) to put fixed disk online.
RX-Series Diskette Drive Problems		
Diskette read error message is displayed.	No diskette in the diskette drive.	Insert a diskette into the drive.
	Diskette drive door or latch is not closed.	Close the diskette drive door or latch.
	Diskette is in the drive upside-down.	*RX50 Diskette Drives:* Check that the orange arrow on the diskette matches the orange stripe on the drive. Refer to MicroVAX *Operation* for instructions on inserting and removing diskettes. *RX33 Diskette Drives:* Check that the write-protect notch is at the bottom. Refer to MicroVAX *Operation* for instructions on inserting and removing diskettes.
	Diskette is not formatted.	Use a preformatted RX50 diskette.

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

Problem	Possible Cause	Corrective Action
	Diskette is worn or damaged.	Try another diskette.
Diskette write error message is displayed.	No diskette in the diskette drive.	Insert a diskette into the drive.
	Diskette drive door or latch is not closed.	Close the diskette drive door or latch.
	Diskette is in the drive upside-down.	*RX50 Diskette Drives:* Check that the orange arrow on the diskette matches the orange stripe on the drive. Refer to MicroVAX *Operation* for instructions on inserting and removing diskettes.
		RX33 Diskette Drives: Check that the write-protect notch is at the bottom. Refer to MicroVAX *Operation* for instructions on inserting and removing diskettes.
	Diskette is not formatted.	Use a preformatted RX50 diskette.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write-protected.	Remove the write-protect tab.
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.

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

Problem	Possible Cause	Corrective Action
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.

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

Problem	Possible Cause	Corrective Action
TK50 Tape Drive Problems		
TK50 red light blinks rapidly, but no unusual sounds occur.	A problem exists in the tape drive.	Press the Load/Unload button four times. If the problem persists, do not attempt to use the tape drive or to remove the tape cartridge, if loaded. Call your DIGITAL service representative.
Red light blinks rapidly and you hear a whirring sound.	Leaders are not coupled properly.	Immediately turn off the system by setting the on/off switch to 0 (off). Call your DIGITAL service representative. Do not attempt to remove the cartridge.
Cartridge release handle does not move.	Power-on test is still in progress.	If you are trying to insert a cartridge, wait for the red light to go out and the green light to remain on steadily, then try again.
	Tape drive is active.	Do not attempt to move the handle until the red light is off and the green light is on steadily.
Cartridge release 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.	Load/Unload button is in the load (in) position.	Make sure the Load/Unload button is in the unload (out) position. Wait for the red light to go out and the green light to remain on steadily before trying to remove the cartridge.

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

Problem	Possible Cause	Corrective Action
	Load/Unload button is not working properly.	If you are trying to remove a cartridge, try loading and unloading the cartridge again. Set the Load/Unload button to the load (in) position for a few seconds, then press it again to the unload (out) position. Move the cartridge release handle only after the red light goes off and the green light comes on. If the problem persists, call your DIGITAL service representative.
TK50 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.
TS05 and TU81-Plus Tape Drive Problems		
The drive does not power up.	The circuit breaker(s) has tripped.	Set the on/off switch to 0. Reset the circuit breaker(s).[1] Set the on/off switch to 1. If the circuit breaker(s) trips again, call your DIGITAL service representative.
	The switch on the power controller is set to B.	Set the switch to A.
	No power at the wall outlet.	Use a different wall outlet or check the circuit breaker controlling power to the wall outlet.
	The system has become unplugged.	Set the on/off switch to 0. Plug in the system. Set the on/off switch to 1.

[1] Locate and reset the circuit breaker(s) on your system using the diagrams in Appendix A.

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 system. The MDM also permits you to display your system configuration, reformat disks, and, if your system has two or more megabytes of memory, test how devices work together. The diagnostic tests are packaged with your system on either RX50 diskettes (labeled MV DIAG CUST RX50) or a tape cartridge (labeled MV DIAG CUST TK50). MDM operating instructions begin in Section 3.1.

WARNING: *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 devices in your system, however, MDM tests perform limited diagnostics:

- They perform reads to each drive and check each controller, however, the customer tests do not write to the drives as writing to the drives could possibly destroy data.
- They do not check each device as thoroughly as the service diagnostic tests, which are described below.
- They check only devices themselves and not the connections or lines between peripheral devices and the system.

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 kit includes the system maintenance guide and the service diagnostic tests. The MDM version that you receive is a subset of this service version.

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

Running MDM Under Special Circumstances

If you have a diskless and 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.

NOTES:

1. *If you have a diskless and tapeless system that is not part of a local area network (LAN), you cannot run MDM. To diagnose problems, call a DIGITAL service representative.*
2. *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 MicroVAX Ethernet Server Customer Diagnostics Kit enables you to install MDM software on a host VMS or MicroVMS 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.*

If you have a VAXserver 3602 system, the CPU in the secondary cabinet cannot boot diagnostic software from a tape cartridge. You must down-line load the diagnostic software from the primary cabinet.

The MicroVAX Ethernet Server Customer Diagnostics Kit contains the MDM diagnostic software and a *MicroVAX Diagnostic Ethernet Server User's Guide*. The user's guide describes how to install MDM software on a host VMS or MicroVMS operating system and how to down-line load MDM to a diskless target system, using the DECnet/Ethernet network facilities.

If you have a diskless system that is part of a LAN, 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.

3.1 Starting MDM

CAUTION: *Before you run the MDM software, be sure you understand the instructions in your system-specific MicroVAX Operation manual (contained in this documentation kit) for using the device appropriate for your diagnostic media —either the RX50 diskette drive or the TK50/TK70 tape drive. Make sure the media (tape cartridge or RX50 diskette) is write-protected.*

You must start the diagnostic tests differently for different media. If you are booting MDM from an RX50 diskette, read Section 3.1.1. If you are booting MDM from a tape cartridge, read Section 3.1.2.

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.*

NOTE: *If you are using an RX33 diskette drive, follow the instructions for running MDM from RX50 diskettes.*

3.1.1 RX50 Diskette Instructions

Because the system automatically boots first from an RX50 diskette, you can run MDM software whether or not the system software has been installed on the system.

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.*

To run diagnostic software from RX50 diskettes, do the following:

1. Press the fixed disk 0 Ready button on the system control panel to the out position.
2. Insert diskette RX50A into one of the drives (be careful to align the orange arrow on the diskette with the orange stripe on the drive) and close the door.
3. Press the Restart button if the system is running, or turn on the system if the system is off.

   Result: A countdown from 7 through 3 should appear on the console terminal as the system performs self-tests. The countdown continues from 2 to 0 as the system loads the diagnostic software.
4. At this point, you may be prompted to remove diskette RX50A and insert the next boot diskette. Remove diskette RX50A and insert diskette RX50B.

Result: Within a few moments you should see the MDM introductory display.

5. 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 display screen. For example, enter 25-DEC-1987 02:30 and press Return to continue.

   Result: Within moments you receive a message that the system is preparing for testing.

6. Insert additional diskettes in order when prompted by the system. If your system does not request all the diskettes containing diagnostic software, your configuration does not need the additional diskettes for testing.

   Result: After a few minutes, you receive a message that the system is ready for testing.

When you press Return, the Main Menu appears. Section 3.2 describes options on the Main Menu.

3.1.2 TK50/TK70 Instructions

The diagnostic tests run the same way whether or not system software has been loaded. You must start the diagnostic tests differently, however, depending on whether system software has been loaded. The following sections explain how to run MDM on systems without system software, systems with system software, and VAXserver 3602 systems. Carefully follow the directions for setting switches.

NOTE: *Before running MDM on your TK50 or TK70 tape drive, you may want to reread the tape drive operating instructions found in your system-specific MicroVAX Operation manual.*

3.1.2.1 Systems without System Software

If your system does not contain system software:

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 off-line.
3. Turn off your system.

4. Move the Break Enable/Disable[1] switch on the CPU cover panel to disable (dot outside the circle).

5. Turn on your system.

6. 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 in place.

   If you are using a TK50, press the Load/Unload button to the load (in) position.

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

   If you are using a TK50 tape drive, a green light flashes. If you are using a TK70 tape drive, a yellow light flashes.

Section 3.1.2.4 describes the display you see when loading is completed.

3.1.2.2 Systems with Installed System Software

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.*

If your system contains system software:

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 off-line.

3. Move the Break Enable/Disable[1] switch on the CPU panel to enable (dot inside the circle).

4. Press the Reset[2] 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.

   If you are using a TK50 tape drive, press the Load/Unload button to the load (in) position.

---

[1] MicroVAX II Systems have a Halt Enable/Disable switch.

[2] MicroVAX II systems have a Restart button located on the front panel.

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. An indicator light on the tape drive flashes while the loading occurs.

   If you are using a TK50 tape drive, a green light flashes. If you are using a TK70 tape drive, a yellow light flashes.

Section 3.1.2.4 describes the display you see when loading is completed.

3.1.2.3 VAXserver 3602 Systems

You must run MDM software differently for each cabinet in the VAXserver 3602 system. To run MDM in the primary cabinet, follow the instructions in either of the previous two sections. To run MDM in the secondary cabinet, you must load the Ethernet server diagnostic software into the primary cabinet and down-line load it to the secondary cabinet.[3] The Ethernet server diagnostic software is supplied with your system on a tape cartridge labeled MV ENET CUST DIAG. Instructions for down-line loading the software to the secondary cabinet are in the *MDM Ethernet Server User's Guide* supplied with your system.

3.1.2.4 MDM TK50/70 Introductory Screen

When MDM software is loaded, the MDM introductory screen displays. 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 25–DEC–1987 02:30 and press Return to continue. In a few moments you receive a message that the system is preparing for testing.

Test preparation includes loading the remainder of the diagnostic software. The loading process takes several minutes. When the loading is complete, you receive a message that the system is ready for testing.

When you press Return, the Main Menu appears. Section 3.2 describes options on the Main Menu.

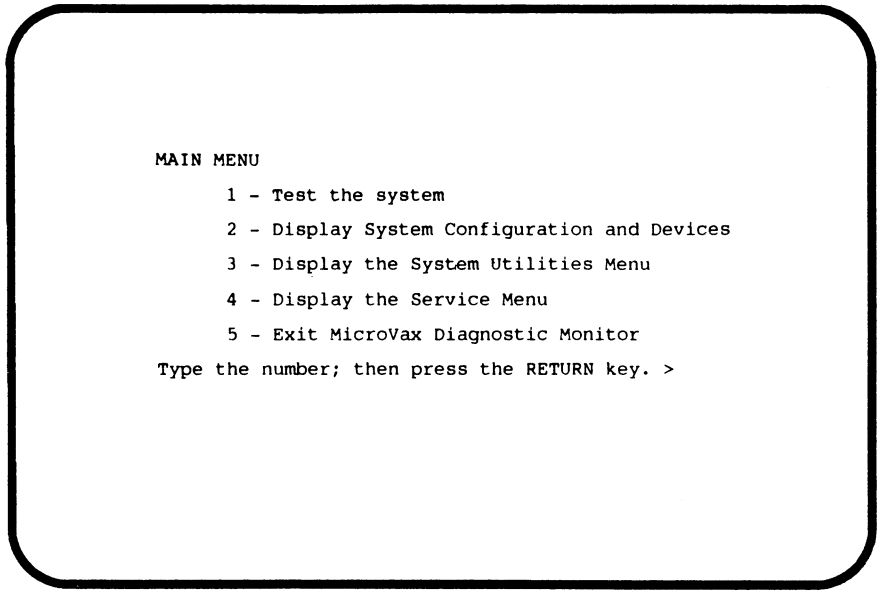
---

[3] To run MDM in the secondary cabinet, VMS or ULTRIX operating system must be installed in the primary cabinet.

3.2 Main Menu Options

The Main Menu has five options, as shown in Figure 3–1. Choose an option by typing the number and pressing Return.

Figure 3–1: MDM Main Menu



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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 four sections describe the remaining options on the Main Menu.

3.2.1 Test the System

Test the System runs a quick, 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, a screen explaining the testing procedures appears.

When you are ready to begin the test, press Return. The Begin Device Tests screen appears.

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.

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.

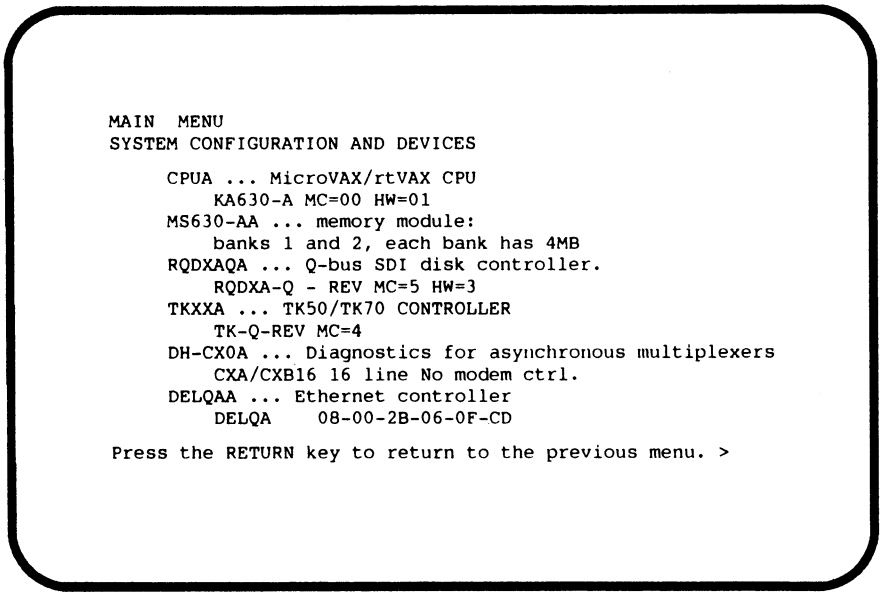
When all devices pass the first part of the test, the exerciser test begins. This test takes about four minutes and tests how the devices work together. At the end of the test, you receive a success message.

At the end of the system test, press Return. The Main Menu appears. From the Main Menu you can either exit MDM by choosing option 5, or you can choose one of the other options.

3.2.2 Display System Configuration and Devices

The Display System Configuration and Devices screen identifies devices recognized by the diagnostic software. Figure 3–2 shows a sample system configuration and devices screen.

Figure 3–2: Sample System Configuration and Devices Display



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At least two lines of information are provided for each device. The first line lists the name of the device and gives a brief description. The second line indicates the revision level of the device. The revision level can refer to hardware and/or microcode. For example, the KDA50 controller described in Figure 3–2 is at revision 5 for microcode (MC=5) and revision 3 for hardware (HW=3).

Besides the general information listed for each device, additional information for specific devices is listed as follows:

- CPU—type of CPU, presence of a floating-point unit (FPU)
- MEM—total amount of memory in megabytes and pages, number and type of memory modules
- RQDX3—type, unit number, and description of each mass storage device connected to the controller
- DELQA/DEQNA—the Ethernet station address

- 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 systems 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" (KA630 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" appears. TKA indicates that the device is a TK tape drive.

Message 2:

```
Invld Dev ... Diagnostic not loaded
```

The "Invld Dev" (invalid 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 MicroVAX 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.

3.2.3 Display the System Utilities Menu

When you choose Display the System Utilities Menu, you see the System Utilities Menu. If system utilities are available for your system configuration, they are listed on the menu. Choose the option by typing the option number listed on the menu and pressing Return. If no utilities are available for your system configuration, you see the following message:

```
No utilities for this system configuration.
```

If your system allows you to format RX33 diskettes, or to format fixed-disk drives, use the following guidelines to make formatting easier.

NOTE: *Running the formatting utility destroys all data on the disk. Use this utility only if you want to erase the contents of a disk and reinstall system software.*

Formatting Instructions

If you are formatting an RX33 diskette, remove the diskette's write-protect tab, insert the diskette into the diskette drive, and lock the lever.

If you are formatting a fixed-disk drive, set the drive's Write-Protect button to write-enable (out).

When you are ready to begin formatting a diskette or a fixed-disk drive, proceed with the following instructions:

1. To begin the formatting operation, type 1 and press Return. Write-protect all drives except the one you want to format.
2. Press Return when you are ready to continue. A list of the drives and their unit numbers appears.
3. You are prompted to enter the unit number of the drive you want to format. Type the number and press Return. Verify that you have input the unit number of the drive that you want to format.
4. If the unit number is incorrect, type 0, press Return, and re-enter the unit number. If the unit number is correct, type 1 and press Return. The formatting operation begins.

   Result: As the operation progresses, you receive status messages. At the completion of a successful formatting operation, a success message is displayed.
5. If you want to format another unit, type 1 and press Return. The formatting process will begin again. For example, if you want to format another

RX33 diskette, remove the diskette that you have formatted, insert another diskette, and repeat the process from step 1. Otherwise, type 0 and press Return. The Utilities Menu displays.

6. To return to the MDM Main Menu, type 0 and press Return.

3.2.4 Exit MDM

Choose this option when you are ready to leave MDM. Type 5 and press Return. You receive the exit message.

Remove the RX50 diskette or tape cartridge, as explained in your MicroVAX *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. If you have used the Disk Formatter Utility to format a fixed disk or a diskette, you must reinstall system software. Set write-protection to write-enable, then 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 two ways.

- Press Break or the Halt button on the control panel. At the console mode prompt >>>, use the command BOOT Dxxx, where Dxxx is the device name of the fixed disk containing your system software. (Use DUxx if this is an RD or an RA disk drive. Use DIxx if this is an RF disk drive.) After the system software is loaded, set the Break Enable/Disable[4] switch to disable, indicated by the dot outside the circle, to avoid inadvertently halting the system by pressing the Break key.
- Set the Break Enable/Disable[4] switch to disable and press the Reset[5] button. This causes your system to begin the power-on sequence again and automatically load system software.

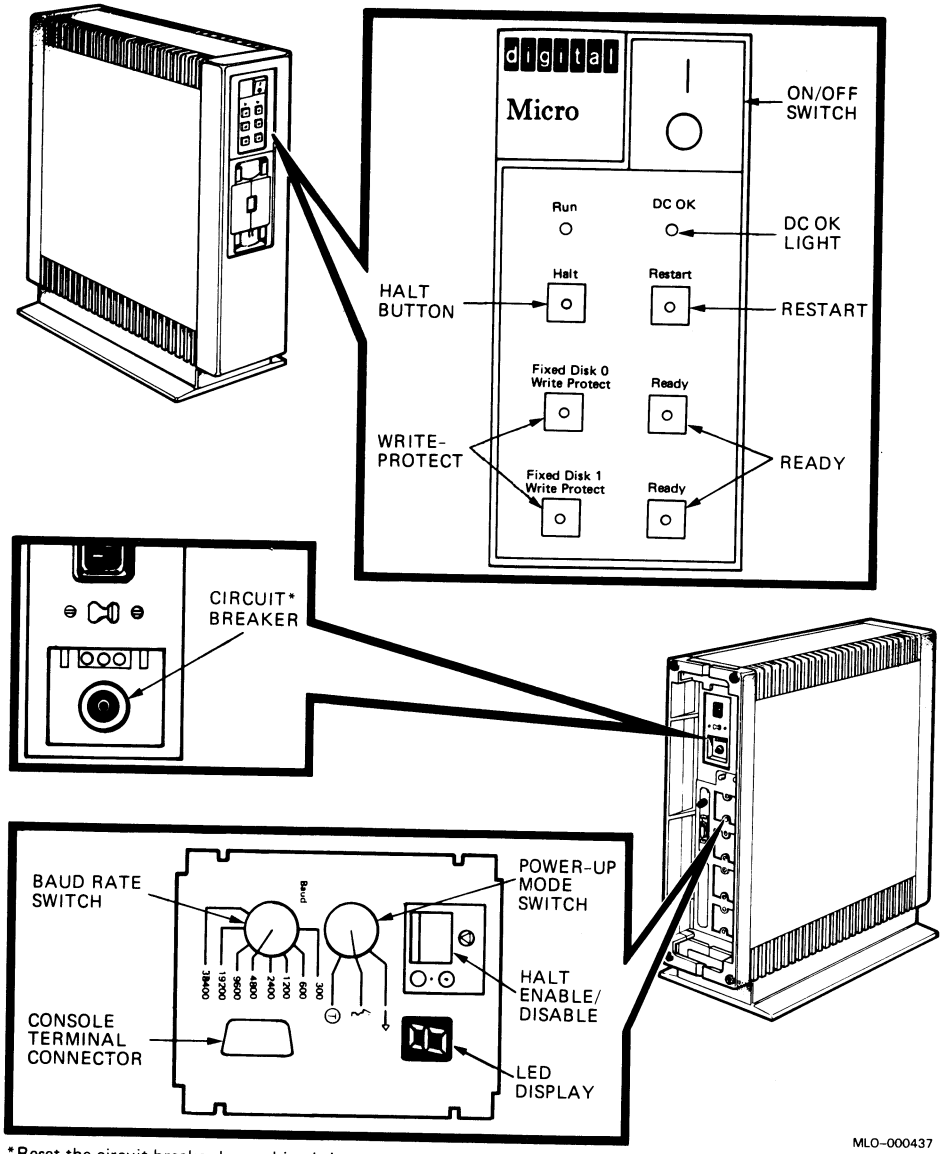
[4] MicroVAX II systems have a Halt Enable/Disable switch.

[5] MicroVAX II systems have a Restart button located on the front panel.

Appendix A
Diagrams for Locating Controls on Your MicroVAX System

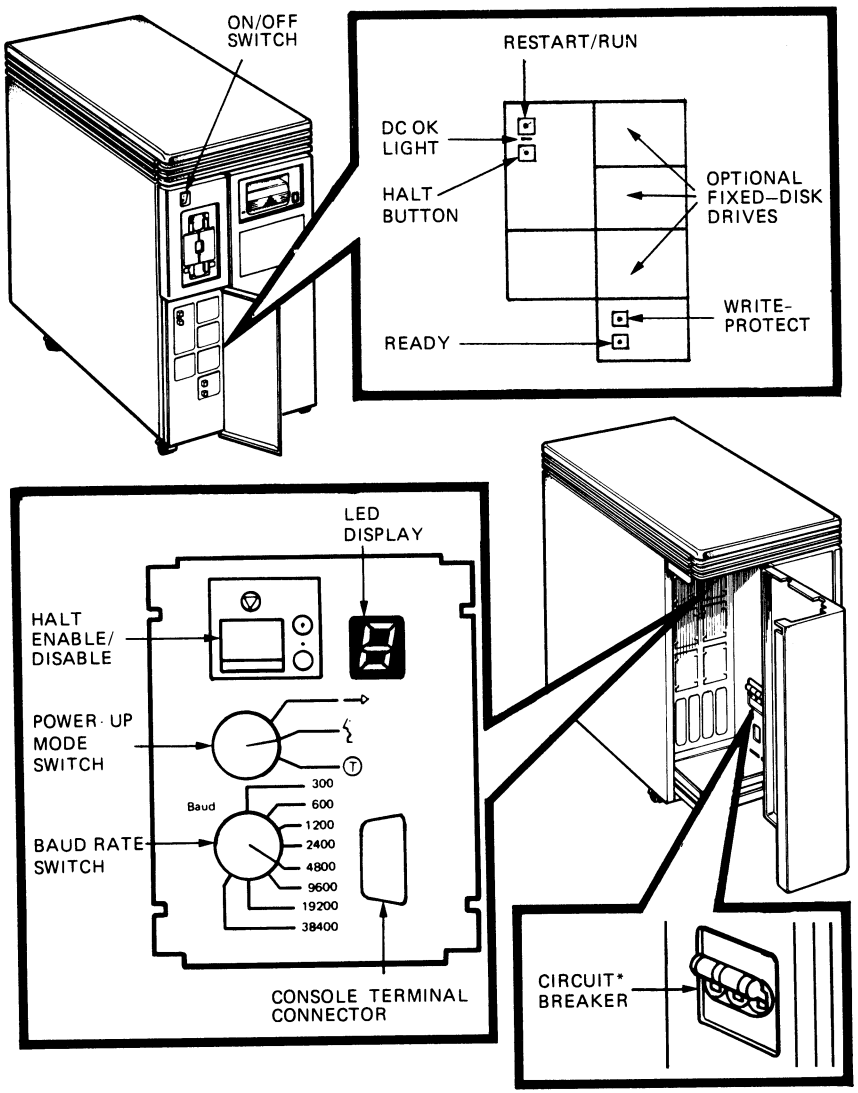
The diagrams in this appendix are to aid in locating the controls on your system that may be referenced during troubleshooting procedures.

Figure A–1: MicroVAX II 630QY, 630QZ Controls and Indicators



*Reset the circuit breaker by pushing it in.

Figure A–2: MicroVAX II 630QB Controls and Indicators



*Reset the circuit breaker by pushing it down and then lifting it to the up position.

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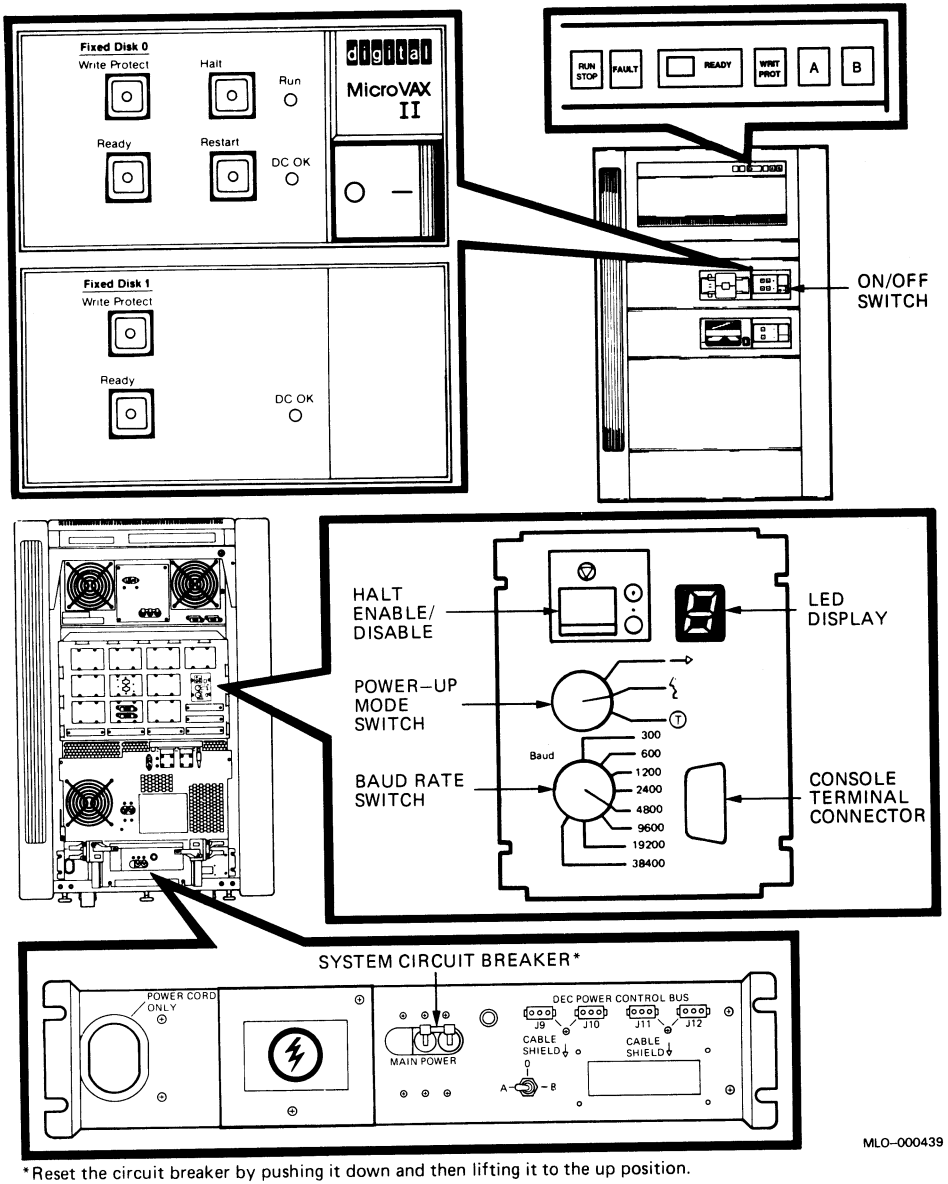
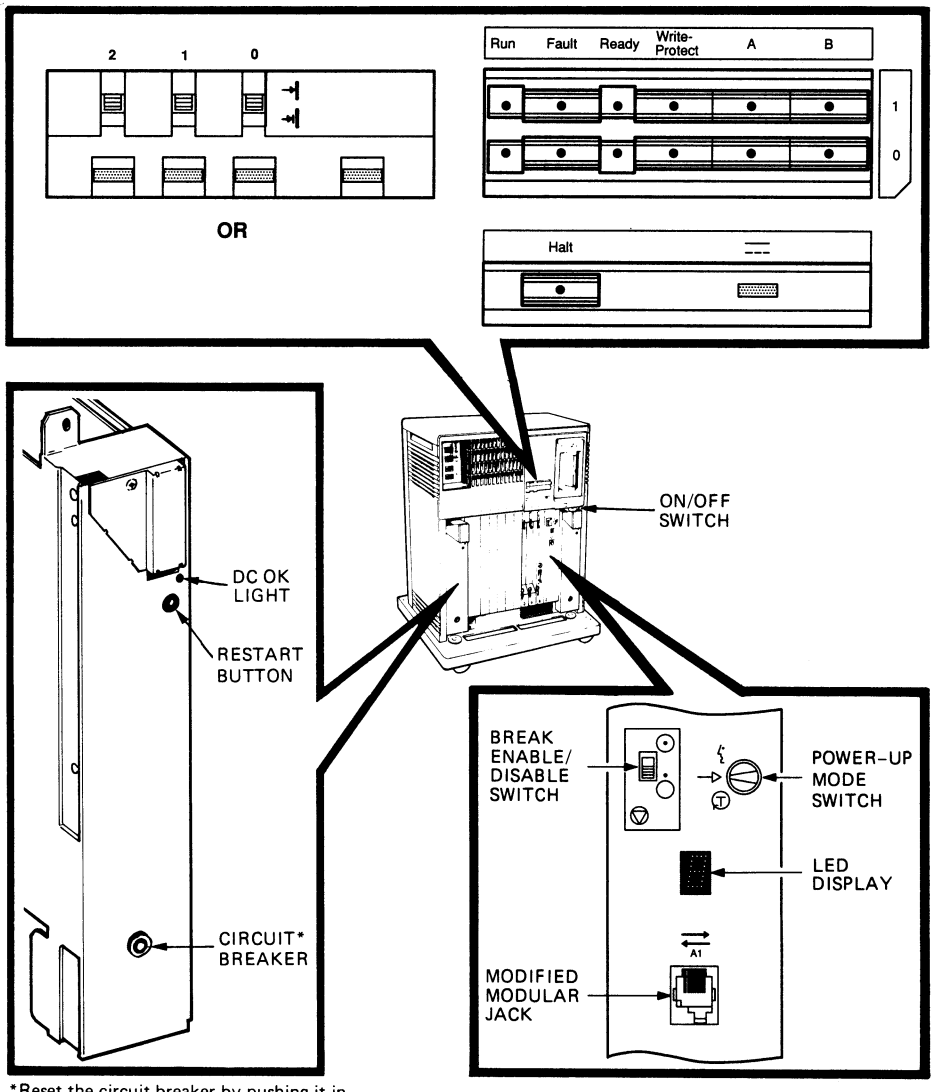
Figure A–3: MicroVAX II 630QE Controls and Indicators



*Reset the circuit breaker by pushing it down and then lifting it to the up position.

Figure A–4: MicroVAX 3500 Controls and Indicators



*Reset the circuit breaker by pushing it in.

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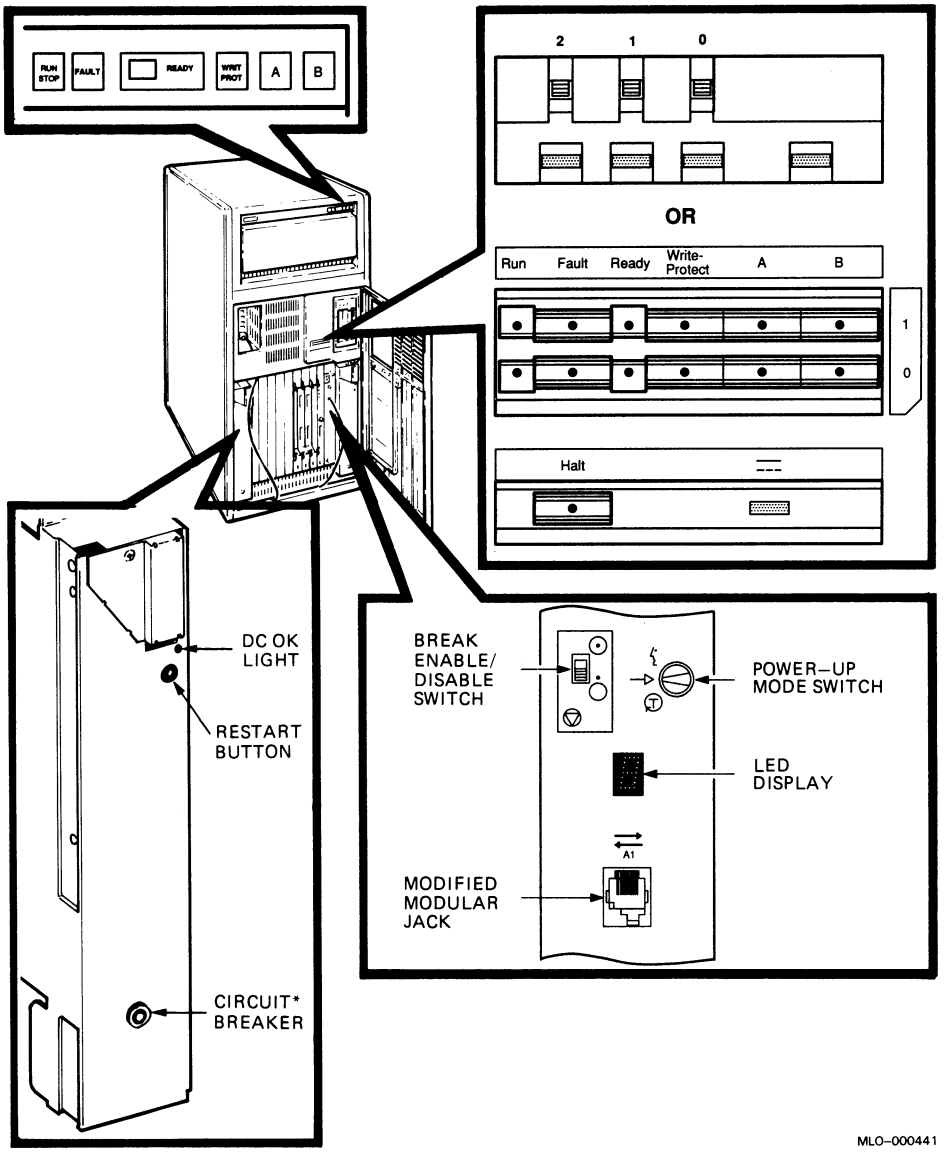
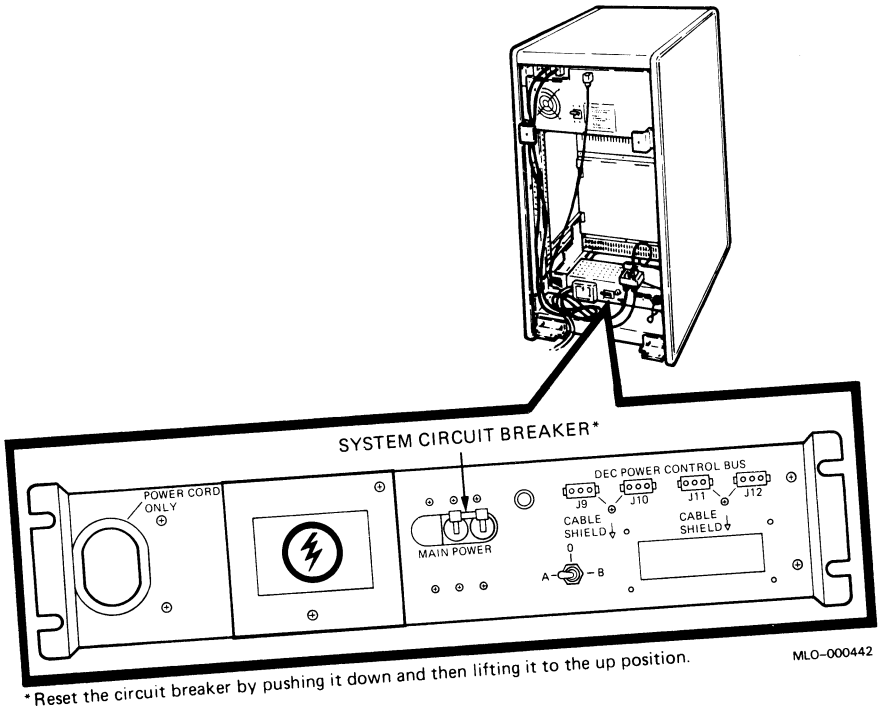
Figure A–5: MicroVAX 3600 Controls and Indicators, Front View



*Reset the circuit breaker by pushing it in.

Figure A–6: MicroVAX 3600 Controls and Indicators, Rear View



*Reset the circuit breaker by pushing it down and then lifting it to the up position.

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