VAX 4000
Model 100

Troubleshooting and Diagnostics Information

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This manual describes the troubleshooting and diagnostic procedures that you can use to solve basic problems with the VAX 4000 Model 100 system.

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Preface

This manual describes the troubleshooting and diagnostic procedures that you can use to solve basic problems with the VAX 4000 Model 100 system.

Audience

This manual is intended for people who have had some experience using computers.

Structure of This Manual

This manual has two chapters and an index.

Additional Information

See the *VAX 4000 Model 100 Operator Information* manual for the list of associated and related documents.

Conventions

The following conventions are used in this manual:

Convention	Description
MONOSPACE	Text displayed on the screen is shown in monospace type.
italic type	Italic type emphasizes important information and indicates the complete titles of manuals.
boldface type	Boldface type in examples indicates user input. Boldface type in text indicates the first instance of terms defined either in the text, in the glossary, or both.
Note	A note contains information that is of special importance to the user.

1
Troubleshooting and Diagnosing Problems

This chapter describes the troubleshooting procedures and diagnostic commands that you can use to solve basic problems with the VAX 4000 Model 100 system. It contains information on the following subjects:

- Troubleshooting
- Diagnostic tests and commands
- Contacting Digital™ Services

It also lists the information that you must give to your Digital Services representative and tells you where to find this information.

1.1 Troubleshooting

If a problem occurs, you must first make sure that all the cables, loopback connectors, and terminators are correctly connected and that the connectors are not damaged, for example, the pins may be broken or short-circuited. Follow these steps:

1. Shut down the operating system following the procedures described in the operating system documentation.

2. Turn off the console terminal and all the peripheral devices such as printers and modems.

3. Turn off all the expansion boxes.

4. Turn off the system unit.

5. Check that the following cables, if installed, are correctly connected at both ends and that the connectors are not damaged:

   - Console terminal cable (linking the console terminal to the system unit)
   - Console terminal power cord
   - System unit power cord
   - Expansion box SCSI cables

- Expansion box Q–bus cables

- Expansion box DSSI cable

- Expansion box power cords

- ThinWire™ Ethernet cable or standard Ethernet cable

6. Check that the following terminators, if installed, are correctly connected and are not damaged:

- DSSI terminator

- SCSI terminator

- ThinWire Ethernet terminator (T-connector and two terminators)

If you have correctly followed steps 1 to 5, the on/off switches on all the components are set to the off (O) position, and you have solved any problems caused by incorrectly connected cables or terminators.

7. Set the on/off switches on the following equipment to the on (|) position in the following order:

a. Expansion boxes

b. Peripherals

c. Console terminal

d. System unit

The system responds with the power-up test display. If it does not, see Section 1.1.1.

1.1.1 Using the Troubleshooting Table

Table 1–1 suggests the corrective actions for certain system problems. If you have a problem with the system, follow these steps:

1. Write down the symptoms of the problem.

2. Check the Symptom column in Table 1–1 for a match.

3. Check the causes of the symptom in the Possible Cause column. If the column lists more than one possible cause, check the possible causes and their suggested solutions in the order listed.

4. Follow the advice in the Suggested Solution column.

5. See Section 1.3 if the problem persists.

Table 1–1 Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
System Problems		
The system unit fan is off or the power light is off.	The power cord is not connected. The power cord may be faulty. The power socket may not be working.	Make sure that all the power cords are connected correctly at both ends. Try a power cord that works or test the power socket with an appliance that works.
	The overload protection circuitry of the power supply may have shut down because of an abnormal condition on the power line.	Turn the system off and then turn it back on.
	The power supply unit (PSU) is faulty.	Contact your Digital Services representative.
The power-up display does not show after 20 seconds.	The console terminal is plugged into port 0.	The console only functions via port 3. Move connection to port 3.
	The power cord is not connected. The power cord may be faulty. The power socket may not be working.	Make sure that all the power cords are connected correctly at both ends. Try a power cord that works or test the power socket with an appliance that works.
	The terminal fuse may have blown.	Replace the blown terminal fuse. See the terminal documentation.
	The terminal settings may be incorrect.	See the *VAX 4000 Model 100 Operator Information* manual for the list of correct terminal settings. See the terminal documentation for information on setting up the terminal.
	The port to which the terminal connects may be faulty.	Try connecting the terminal to another system. If this solution works, the port to which the terminal was connected is faulty. If the terminal still does not operate, it is faulty. In either case, contact your Digital Services representative.

Table 1–1 (Cont.)   Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
System Problems		
	The terminal cable may be faulty.	Connect the terminal cable and the terminal to another system. If the connected terminal works, the console circuitry or MMJ connector is faulty. Otherwise, the cable is faulty. Contact your Digital Services representative.
	The break/enable switch is in the wrong position.	Turn off the system unit. Set the break/enable switch to the down position, then turn on the system unit.
The power-up test display contains unexpected characters.	The terminal settings are incorrect or the console circuitry is faulty.	Make sure the terminal settings are correct, then run the power-up test again. If the terminal is set correctly, contact your Digital Services representative.
The system fails to boot the operating system.	The system defaults are incorrectly set.	Set the system defaults as described in the *VMS Factory Installed Software User Guide*, then try booting the system again. If the system still fails to boot, contact your Digital Services representative.
RRD42 Compact Disc Drive Problems		
The drive does not accept the caddy.	The disc is upside-down in the caddy or it is not placed correctly in the caddy.	Remove the disc from the caddy and reinsert it properly.
The eject button fails to eject the caddy.	The eject button is disabled by software.	Reenable the eject button or manually eject the caddy.
	The system does not have power.	Set the system unit on/off switch to the on (	) position and press the eject button again.

(continued on next page)

Table 1–1 (Cont.) Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
TZ30 Tape Drive Problems		
The TZ30 green LED flashes rapidly.	The drive mechanism is faulty or the tape cartridge is damaged.	Press and release the unload button to clear the fault. If the LED continues to flash, do not try to remove the tape cartridge or use the tape drive. Contact your Digital Services representative.
The TZ30 does not operate.	The drive does not contain a tape cartridge.	Insert the tape cartridge and press the unload button.
The operate lever does not slide.	The tape cartridge is in use.	Wait for the green LED to turn on and try again. If the problem persists, do not use the drive. Contact your Digital Services representative.
The operate lever does not lock.	The tape cartridge is not inserted correctly.	Reinsert the tape cartridge. If the problem persists, contact your Digital Services representative.
The tape does not load.		Press and release the unload button. Wait for the green LED to turn on before sliding the lever and removing the tape. If the LED flashes, contact your Digital Services representative.
The system cannot write to the tape.	The write-protect switch is in the write-protect position.	If the write-protect LED is on, remove the tape, reset the switch and try writing to the tape again. If the problem persists, contact your Digital Services representative.
The data read from the tape cartridge is corrupted.	The tape drive head may be dirty.	See the *VAX 4000 Model 100 Operator Information* manual for information on cleaning the drive head.
The tape does not eject.	The tape is not rewound. The operate lever is in the lock position.	Follow the procedure for removing a tape from the TZ30 described in the *VAX 4000 Model 100 Operator Information* manual.

Table 1–1 (Cont.)   Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
TLZ06 Cassette Tape Drive Problems		
The system cannot write to the cassette tape.	The write-protect switch is in the write-protect position.	If the write-protect LED is on, remove the tape, reset the switch and try writing to the tape again. If the problem persists, contact your Digital Services representative.
	The cassette tape is not loaded.	Load the cassette tape.
The write-protect LED flashes.	The tape drive heads are dirty or the tape is worn.	Clean the drive heads (see the *VAX 4000 Model 100 Operator Information* manual). If that doesn't work, use a new tape.
The data read from the cassette tape is corrupted.	The tape drive heads may be dirty.	See the *VAX 4000 Model 100 Operator Information* manual for information on cleaning the drive head.
TZK10 Quarter Inch Cartridge (QIC) Tape Drive Problems		
The data read from the QIC tape is corrupted.	The drive head is dirty.	Clean the drive head. See the *VAX 4000 Model 100 Operator Information* manual.
The system cannot write to the QIC tape.	The write-protect switch is in the write-protect position.	Remove the QIC tape, reset the switch and try writing to the QIC tape again. If the problem persists, contact your Digital Services representative.
The system cannot read from or write to the QIC tape.	The QIC tape may be faulty.	Remove the QIC tape. If the amber LED turns off when you remove the QIC tape, the tape is probably faulty. Try a different QIC tape. If the amber LED stays on or if the problem persists, contact your Digital Services representative.

1.2 Diagnostic Tests and Commands

There are a number of diagnostic tests and commands that can help you to isolate a problem with the system unit. These tests and commands are as follows:

- Power-up tests
- Self-tests[1]
- Configuration display[1]
- Error display[1]

The following sections describe these tests and commands.

---

[1] You can use these tests and commands in privileged console mode only if the console security feature is enabled and the password is set. See the *VAX 4000 Model 100 Customer Technical Information* manual for information on the console security feature.

1.2.1 Power-Up Tests

The system runs the power-up tests each time you turn on the system. If the system passes the tests, it responds with a display similar to the following example:

```
KA52-A V1.1, VMB 2.14  ❶
Performing normal system tests.
72..71..70..69..68..67..66..65..64..63..62..61..60..59..58..57..
56..55..54..53..52..51..50..49..48..47..46..45..44..43..42..41..  ❷
40..39..38..37..36..35..34..33..32..31..30..29..28..27..26..25..
24..23..22..21..20..19..18..17..16..15..14..13..12..11..10..09..
08..07..06..05..04..03..
Tests completed.  ❸
>>>   ❹
```

❶ Central Processing Unit (CPU) Name, Firmware Version Number, and Virtual Memory Boot (VMB) Version Number

❷ Read-Only Memory (ROM) based diagnostics countdown

❸ Status Message

❹ Console Prompt

If SIMM_OD is not present or not plugged in correctly, the system responds
with a display similar to the following example:

```
KA52-A V1.1, VMB 2.14
Performing normal system tests.
72..71..70..69..68..67..66..65..64..63..62..
                                                        ❶
? Test_Subtest_DC_88  Loop_Subtest=05  Err_Type=FF   DE_NO_Memory_present.lis
Vec=0000  Prev_Errs=0000   P1=E04EE04E   P2=00000000   P3=00000000  P4=00001006
P5=00000000  P6=7F337F7F   P7=00000000   P8=00000000   P9=FFFF0000 P10=2006270C
r0=00000008  r1=21018000   r2=E04EE04E   r3=80000000   r4=01000000  r5=04000000
r6=00000002  r7=00000000   r8=00000000   r9=20140758  r10=FFFFFFFE r11=FFFFFFFF
 dser=0000 cesr=00000000 icsr=01 pcsts=F800 pcctl=FC00 cctl=00000006
 bcetsts=03E0 bcedsts=0400 cefsts=00007E80 nests=00 mmcdsr=01FFFE40
 mesr=00000000

Error:  SIMM Set 0 (0A,0B,0C,0D), SSR = E04E                         ❷
 SIMM_0A = 16MB      SIMM_0B = 16MB      SIMM_0C = 16MB      SIMM_0D = 00MB ??

Total of 0MB, 0 good pages, 0 bad pages, 0 reserved pages
Normal operation not possible. ❸

>>>
```

❶ Error Message

❷ Error Summary

❸ Status Message

1.2.2 Self-Tests

Self-tests perform the same tests as the power-up tests except for one difference; the power-up tests test all the devices in the system, whereas the self-tests allow you to test a single device.

Execution of the SHOW CONFIG command produces the display showing the failure of the device DZ.

Example 1–1 Show Configuration Command

```
>>>show conf

KA52-A V1.1, VMB 2.14
08-00-2B-2B-16-91
80MB

TstNbr  DevNam     Info
------  --------   ------------------------
    0    CPU_BD    OK
   A8    MEMORY    OK
   E4        DZ    ?? 001 0048 ❶
   E0      SCSI    OK
                   3-RZ24L   6-Adapter 7-RRD42
   5F        NI    OK
   5C      DSSI    OK
    0      QBUS    OK
   E8      COMM    OK
                   DSW41/42 2 CHANNEL V3.11-47
   EC     ASYNC    OK
                   DHW41/2 V1.6
>>>
```

❶ Listing showing failure of DZ

If you encounter an error in the power-up test display or the show configuration display, specific steps should be followed.

1. Make sure that all the required cables and terminators are securely connected to the proper ports by following the procedure described in Section 1.1.

2. Run the self-test on each device that failed.

In the example in this section, the show configuration display shows the the DZ device has failed. The self-test number for this device is E4. See Example 1–2 . Test E4 should be run by entering **T E4** at the console prompt. If the error remains, show the test results to your Digital Services representative.

To obtain a listing of the specific tests for the desired device, enter the command shown in the display.

Example 1–2 Listing Diagnostics

```
>>>t 9e ❶

Test
#   Address   Name              Parameters
_____
    20053800  SCB
    20054590  De_executive
30  200637BC  Memory_Init_Bitmap  *** mark_Hard_SBEs ******
31  20064094  Memory_Setup_CSRs   **********
32  20064464  NMC_registers       **********
33  20064600  NMC_powerup         **
34  2005D0A4  SSC_ROM             ***
35  20067394  B_Cache_diag_mode   bypass_test_mask *********
37  200681C4  Cache_w_Memory      bypass_test_mask *********
40  2006242C  Memory_count_pages  SIMM_set0 SIMM_set1 Soft_errs_allowed *****
41  200579C0  Board_Reset         *
42  2005B56C  Chk_for_Interrupts  **********
46  200670D4  P_Cache_diag_mode   bypass_test_mask *********
47  20063D7C  Memory_Refresh      start_a end incr cont_on_err time_seconds ***
48  20061558  Memory_Addr_shorts  start_add end_add * cont_on_err pat2 pat3 ***
4A  200634E0  Memory_ECC_SBEs     start_add end_add add_incr cont_on_err ******
4B  20061D78  Memory_Byte_Errors  start_add end_add add_incr cont_on_err ******
4C  20062E90  Memory_ECC_Logic    start_add end_add add_incr cont_on_err ******
4D  200613BC  Memory_Address      start_add end_add add_incr cont_on_err ******
4E  20061AF8  Memory_Byte         start_add end_add add_incr cont_on_err ******
4F  20062628  Memory_Data         start_add end_add add_incr cont_on_err ******
51  2005BA5C  FPA                 **********
52  2005BED8  SSC_Prog_timers     which_timer wait_time_us ***
53  2005C1A8  SSC_TOY_Clock       repeat_test_250ms_ea Tolerance ***
54  2005B670  Virtual_Mode        ********
55  2005C360  Interval_Timer      *****
58  200602F0  SHAC_RESET          port_number time_secs not_pres
59  2005F584  SGEC_LPBCK_ASSIST   time_secs **
5C  2005FAEC  SHAC                bypass_test_mask *******
5F  2005E870  SGEC                loopback_type no_ram_tests ******
```

Example 1–2 (Cont.) Listing Diagnostics

```
63  2005CF48  QDSS_any            input_csr selftest_r0 selftest_r1 ******
80  200649FC  CQBIC_memory        bypass_test_mask *********
81  2005CBA8  Qbus_MSCP           IP_csr ******
82  2005CD70  Qbus_DELQA          device_num_addr ****
83  20058C70  QZA_Intlpbck1       controller_number ********
84  2005A328  QZA_Intlpbck2       controller_number *********
85  20057EE4  QZA_memory          incr test_pattern controller_number *******
86  200583A0  QZA_DMA             Controller_number main_mem_buf ********
90  2005BE54  CQBIC_registers     *
91  2005BDE8  CQBIC_powerup       **
99  200647D0  Flush_Ena_Caches    dis_flush_VIC dis_flush_BC dis_flush_PC
9A  2005D1DC  INTERACTION         pass_count disable_device ****
9B  20064680  Init_memory         ***
9C  2005D1A8  List_CPU_registers  *
9D  2005DEC4  Utility             Modify_CPU_type *********
9E  2005C518  List_diagnostics    script_number *
9F  20060888  Create_A0_Script    **********
C1  20057B90  SSC_RAM_Data        *
C2  20057D68  SSC_RAM_Data_Addr   *
C5  2005E770  SSC_registers       *
C6  20057AD4  SSC_powerup         *********
D0  20066C98  V_Cache_diag_mode   bypass_test_mask *********
D2  20065220  O_Bit_diag_mode     bypass_test_mask *********
DA  20067FE8  PB_Flush_Cache      **********
DB  20065A18  Speed               print_speed *********
DC  200642BC  NO_Memory_present   *
DD  200661FC  B_Cache_Data_debug  start_add end_add add_incr *******
DE  20065DB4  B_Cache_Tag_Debug   start_add end_add add_incr *******
DF  20065614  O_BIT_DEBUG         start_add end_add add_incr seg_incr ******
E0  20068498  SCSI                environment reset_bus time_s ******
E1  20068578  SCSI_Utility        environment util_nbr target_ID lun ******
E2  20068630  SCSI_MAP            bypass_test addr_incr_data_tst ********
E4  200689D4  DZ          ❷      environment *********
E8  20068B4C  SYNC                environment *********
E9  20068BF4  SYNC_Utility        environment *********
EC  20068CAC  ASYNC               environment *********

Scripts
#   Description
```

(continued on next page)

Example 1–2 (Cont.) Listing Diagnostics

```
A0  User defined scripts
A1  Powerup tests, Functional Verify, continue on error, numeric countdown
A3  Functional Verify, stop on error, test # announcements
A4  Loop on A3 Functional Verify
A6  Memory tests, mark only multiple bit errors
A7  Memory tests
A8  Memory acceptance tests, mark single and multi-bit errors, call A7
A9  Memory tests, stop on error
B2  Extended tests plus BF
B5  Extended tests, then loop
BF  DZ, SYNC, ASYNC with loopbacks
>>>
```

❶ Command to list the self-tests

❷ Specific test for the DZ device

1.3 Contacting Digital Services

———————— WARNING ————————

Only authorized service personnel should service this equipment.

———————————————————————

If you have followed the procedures in this chapter but the problem remains unsolved, your Digital Services representative can help you. Before you place your call, follow these steps:

1. Write down a description of the problem, including the error messages and the number of the self-tests that failed.

2. Look at the status LED display on the back of the system unit and write down the numbers of the LEDs that are on (see Figure 1–1).

3. List the steps you have taken to correct the problem and the results you got.

4. Write down the serial and model numbers of the system unit and any connected peripheral devices. These numbers are usually printed on a label on the back of the device.

Figure 1–1 Status LED Display
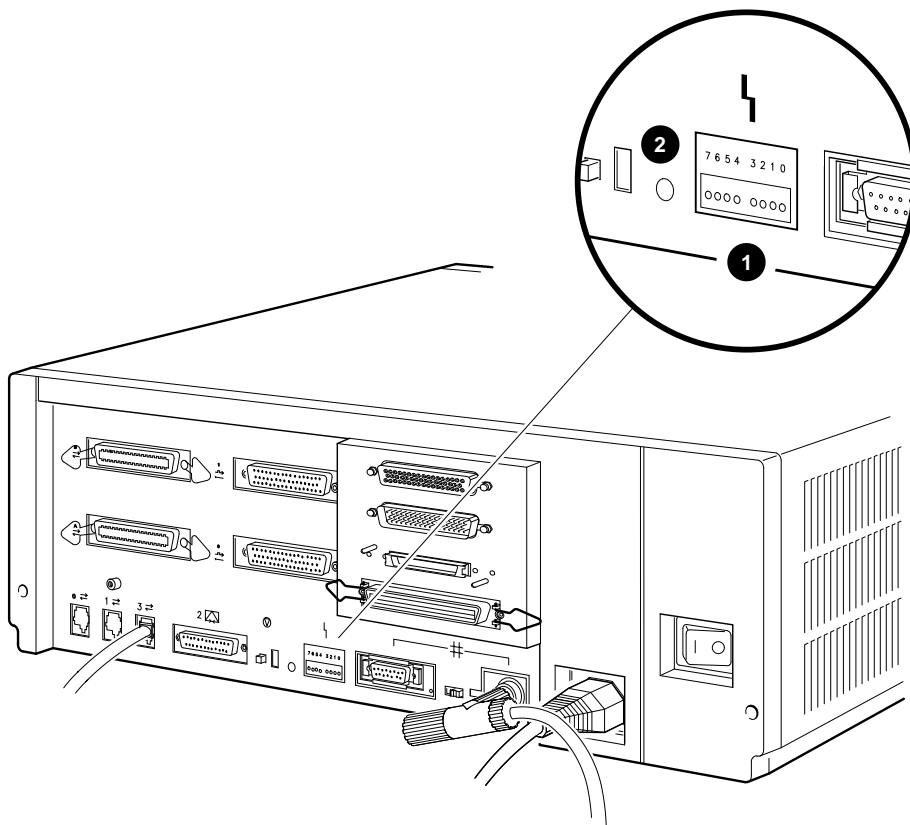
MLO-009357

❶ Status LED Display

❷ Break Enable LED

Table 1–2 Status LED Display and Break Enable Meanings

LED Number	Color	Meaning
LED 0, 1, 2, 3	Green	Binary readout indicating certain system tests and functions.

Table 1–2 (Cont.)   Status LED Display and Break Enable Meanings

LED Number	Color	Meaning
LED 4	Green	Reset indicator; when extinguished, indicates that the reset is active.
LED 5, 6	—	Not used
LED 7	Amber	Clock protection indicator
Break Enable LED	Green	When the break/enable switch is in the up position, the LED is on and you can halt the system by pressing the break key on the console terminal keyboard. When the break/enable switch is in the down position the LED is off and the system cannot be halted from the console terminal keyboard.

2

Running the Diagnostic Monitor

The MicroVAX Diagnostic Monitor (MDM) is an optional software package containing diagnostic tests that isolate and identify faults in your system. MDM also lets you display your system configuration and test how devices work together.

MDM is on tape, in a cartridge labeled MV DIAG CUST TK50. MDM operating instructions begin in Section 2.2.

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 four situations:

- Before you install software on a new system

- After you add a device to your system

- After you receive an error message or experience a system problem

- When you want to test your system periodically to ensure that all components are operating correctly

2.1 MDM Limitations

MDM tests internal devices in your system, but it performs limited diagnostics.

- MDM reads from each drive and checks each controller, but it does not write to the drives because that could destroy data.

Note

MDM tests a tape or diskette drive only after the medium (tape or diskette) is inserted into the drive.

- MDM checks devices on the system as well as the system and interconnects.

- MDM checks terminal interfaces (but not terminals) by means of feedback connectors.

If your devices pass the tests but you still experience problems, call your Digital service representative for further testing.

If you require more complete diagnostic testing, purchase the MicroVAX Maintenance Kit. That kit includes a system maintenance guide and the service diagnostic tests. The MDM version you receive with your system is a subset of the service version.

_____ **caution** _____

Only qualified service personnel should use the service diagnostic tests.

_____

2.2 Preparing to Run MDM

Running MDM on some systems requires additional or special procedures:

Read Section 2.2.1 if you plan to run MDM on a diskless or tapeless system.

Read Section 2.2.2 if you plan to install MDM on a hard disk or RF-series Integrated Storage Element.

Read Section 2.2.3 if you plan to run MDM on a DSSI VAXcluster.

You can run MDM on an RRD-series disc drive by using the MDM CDROM Kit.

2.2.1 Preparing to Run MDM on a Diskless or Tapeless System

To run MDM on a diskless or tapeless system that is part of a local area network, you must:

- Obtain a MicroVAX Ethernet Server Customer Diagnostics Kit.

- Run MDM using the diagnostics in that kit, labeled MV DIAG ENET CUST.

Refer to the *MicroVAX Diagnostic Monitor Ethernet Server User's Guide* at this time. After you install and downline load MDM, refer again to that manual for instructions on running MDM.

_____ **Note** _____

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

_____

2.2.2 Preparing to Run MDM on an RF-Series Integrated Storage Element (ISE) or Hard Disk

You can install MDM on an RF-series ISE or hard-disk drive by using the MDM Hard Disk Kit. Installation of that kit requires your completion of the Diagnostic Software Installation Acknowledgment. See the *MicroVAX Diagnostic Monitor Hard Disk User's Guide* for licensing requirements and installation instructions.

2.2.3 Preparing to Run MDM on a DSSI VAXcluster

_____ **Note** _____

The MDM Hard Disk Kit is required for a two-system DSSI VAXcluster where one host is a tapeless system, and the other uses the TKxx tape drive.

TF-series tape drives are DSSI devices and can be shared between systems in a DSSI VAXcluster. Both systems in a two-system DSSI VAXcluster can boot MDM from the same drive, However you must run MDM separately from each host.

_____

Before running MDM:

- Your system must be properly configured.

- The Digital Storage Systems Interconnect (DSSI) cable connecting the multiple hosts must be installed.

You must run MDM separately for each host. For TKxx based systems, the procedure to use depends on whether one host is a tapeless system (no tape drive) or each host has its own tape drive.

Use the procedure in Section 2.2.3.1 to prepare to run MDM in a DSSI VAXcluster with one TKxx tape drive.

Use the procedure in Section 2.2.3.2 to prepare to run MDM in a DSSI VAXcluster with a TKxx tape drive in each host.

2.2.3.1 MDM on a DSSI VAXcluster with One TKxx Tape Drive

To run MDM on a DSSI VAXcluster with one TKxx tape drive (one or more tapeless hosts):

- Use the MDM Hard Disk Kit.

- Complete the Diagnostic Software Installation Acknowledgment.

- Install the kit on a hard disk or an RF-series ISE as described in the *MicroVAX Diagnostic Monitor Hard Disk User's Guide*.

After the installation is complete, use the following procedure to run MDM.

1. If software is installed on your system:

   a. Warn all users to log off.

   b. Perform system shutdown as described in your software manuals.

2. Set the Break Enable/Disable switch on the host to be tested to enable (up).

3. Insert a blank tape cartridge into the tape drive and lock it in place.

4. Restart the host to be tested.

5. Enter one of these commands, where u is the unit number of the disk containing the Hard Disk Kit and c is the controller port letter.

   BOOT/100 DIAu (CPU-based DSSI)

   BOOT/100 DUcu (KFQSA adapter or KDA50 controller)

   The system prompts for the boot file name by displaying `Bootfile:`

6. Enter one of these file names.

   [SYS0.SYSEXE]MDMSHA.SYS (CPU-based DSSI)

   [SYS0.SYSEXE]MDM.SYS (KFQSA adapter or KDA50 controller)

   Then press Return to continue booting.

7. Run MDM as described in Section 2.3.

8. After you complete the tests on the first host:

   a. Make sure the Break Enable/Disable switch is set to enable (up) and press the Restart button on that host.

   b. After the countdown completes and the `>>>` prompt displays, boot MDM from the second system using the procedure described in steps 2 through 6.

c. Run MDM as you did for the first system.

2.2.3.2 MDM on a DSSI VAXcluster with Two TKxx Tape Drives

To run MDM on a DSSI VAXcluster with two tape drives in each system:

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

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

---

1. If software is installed on your system:

   a. Warn all users to log off.

   b. Perform system shutdown as described in your software manuals.

2. Set the Break Enable/Disable switch on the host to be tested to enable (up).

3. Make sure the Write Protect switch on the tape cartridge containing the MDM diagnostic software is in the Write Protect Position.

4. Insert the tape cartridge containing MDM into the tape drive and lock it in place.

5. Restart (turn on) both hosts.

6. After the self-test countdown completes and the >>> prompt displays, enter the command BOOT MUcu, where c is the controller designator and u is the drive unit number, to boot the tape.

7. Run MDM as described in Section 2.3.

8. After you complete the tests on the first host:

   a. Remove the tape cartridge, by following the procedure described in your *Operation* manual, and press the Restart button on that host.

   b. After the self-test countdown completes and the >>> prompt displays, insert the tape cartridge into the tape drive in the second system and lock it in place.

   c. Enter the command BOOT MUcu, where c is the controller designator and u is the drive unit number, to boot the tape.

   d. Run MDM as you did for the first system.

2.3 Starting MDM

You must start MDM differently for different media:

If you are booting MDM from a tape drive, read Section 2.3.1.

If you are booting MDM from an RRD-series disc drive, read Section 2.3.2.

If you are booting MDM from a hard disk or an RF-series ISE, refer to the *MicroVAX Diagnostic Monitor Hard Disk User's Guide*.

_____ **CAUTION** _____

Unless instructed to do so, do not change any settings or manipulate devices while the tests are running. MDM interprets any change of state as an error.

_____

2.3.1 Tape Drive Instructions

Before you run MDM, be sure you understand the instructions in your Operator Information manual for using the tape drive.

MDM runs the same way whether or not system software is loaded.

- You can boot MDM manually from a TF-series, TK50 or TK70 tape drive (Section 2.3.1.1).

- You can use the autoboot feature to boot MDM only from a TK50 or TK70 tape drive (Section 2.3.1.2).

_____ **Note** _____

If your system is part of a local area network (LAN), you can reduce the time required to load MDM by obtaining the MicroVAX Ethernet Server Customer Diagnostics Kit. That kit lets you install MDM on a host system and downline load MDM to other systems that are part of the LAN, using the DECnet/Ethernet network facilities.

_____

2.3.1.1 Booting MDM Manually

Use this procedure to boot MDM from a TF-series, TK50 or TK70 tape drive.

1. If software is installed on your system:

   a. Warn all users to log off.

   b. Perform system shutdown as described in your software manuals.

2. Make sure the write protect switch on the tape cartridge is in the write-protect position.

3. If your system contains software, write-protect all disk drives and RF-series ISEs.

4. Move the Break Enable/Disable switch to enable (up).

5. Restart the system.

6. After the green light on the tape drive glows steadily (orange and yellow lights go out), insert the tape cartridge containing MDM into the tape drive and lock it in place.

7. Tell your system to load MDM from the tape cartridge:

   For a TK50 or TK70 tape drive, enter the command BOOT MUcu, where c is the controller designator and u is the drive unit number.

   For a TF-series tape drive, enter the command BOOT MImc, where m is the DSSI bus adapter and c is the drive unit number.

   Loading MDM takes several minutes. A green light on a TK50 drive or a yellow light on a TK70 or TF-series drive blinks while loading occurs. Section 2.4 describes the display you see after loading completes.

8. After loading completes, make sure all RF-series ISEs are on line.

2.3.1.2 Booting MDM Automatically

Use this procedure to boot MDM from a TK50 or TK70 tape drive. Do not use this procedure for a TF-series tape drive.

1. If software is installed on your system:

   a. Warn all users to log off.

   b. Perform system shutdown as described in your software manuals.

2. Enter the command SET BOOT MUcu, where c is the controller designator and u is the drive unit number.

3. Make sure the write protect switch on the tape cartridge is in the write-protect position.

4. Remove any removable disks, and place all fixed-disk drives and RF-series ISEs off line.

5. Write-protect all disk drives and RF-series ISEs.

6. Turn off your system.

7. Set the Break Enable/Disable switch to disable (down).

8. Turn on your system.

9. After the green light on the tape drive glows steadily, insert the tape cartridge containing MDM into the drive and lock it in place.

   Loading MDM takes several minutes. A green light on a TK50 drive or a yellow light on a TK70 drive blinks while loading occurs. Section 2.4 describes the display you see after loading completes.

10. After loading completes, make sure all RF-series ISEs are on line.

2.3.2 RRD-Series Compact Disc Instructions

If you are using an RRD-series disc drive connected to the internal SCSI controller, use the following procedure to boot MDM.

1. If software is installed on your system:

   a. Warn all users to log off.

   b. Perform system shutdown as described in your software manuals.

2. Turn off your system.

3. Set the Break Enable/Disable switch to enable (up).

4. Turn on your system and await the completion of the power-up sequence.

5. Press the Halt button to put the system in console mode.

6. Insert the disc caddy into the RRD series disk drive:

   a. Remove the disc from its package.

   b. Insert the disc into the caddy (See MDM CDROM booklet.).

   c. Insert the caddy into the drive slot:

      For an RRD40 drive, push the caddy in until it stops. Then withdraw the caddy. The disc remains in the drive.

      For another RRD-series drive, the caddy stays in the drive. Do not remove it.

7. Tell your system to load MDM from the disc:

> For an internal adapter, enter the command BOOT DKxnnn, where x is the adapter designator and nnn is the drive unit number.

> For a KRQ50 controller, enter the command BOOT/100 DUcu, where c is the controller designator and u is the drive unit number. Then, when your system displays `Bootfile:`, enter [SYS0.SYSEXE]MDMCD.SYS (the boot file name).

Loading MDM takes several minutes. Section 2.4 describes the display you see after loading completes.

8. After loading completes, place all hard disks and RF-series ISEs on line.

2.4 MDM Introductory Display

After MDM is loaded, the introductory display appears. Make sure the date and time in that display are correct.

- If the date and time are correct, press Return to continue.

- If the date and time are not correct, type the correct date and time using the format shown in the display. For example, enter 10–SEP–1992 02:30 and press Return to continue.

The Main Menu appears. Section 2.5 describes the options on that menu.

2.5 Main Menu Options

The Main Menu provides six options as shown below.

```
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 respectively in the displays provided throughout this chapter.

───────────────────────────────────────

Select an option by typing its number and $\boxed{\text{Return}}$.

The next six sections describe the options on the Main Menu.

2.5.1 Test the System Option

The Test the System option tests the devices it sees in your system and how they work together. You can select this option at any time without jeopardizing data.

After you select this option, the diagnostics are prepared for testing. If this is the first option you selected, the diagnostics are loaded and configured. Loading and configuring takes several minutes. After configuring is complete, you are prompted to press $\boxed{\text{Return}}$.

After you press $\boxed{\text{Return}}$, an explanation of the testing procedures appears.

When you are ready to begin the test, press $\boxed{\text{Return}}$. Your system displays `Begin Device Tests`.

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

_____ **Note** _____

Because of the similarity of some communication options, MDM sees them as the same device. A CXA16 and CXB16 appear the same to MDM. A generic device name, DH–CX0, is listed for such options, and the last letter in each name shows the difference. For example, DH–CX0A indicates one option, DH–CX0B a second, and so forth.

_____

If a device fails the test, you receive a failure message which identifies:

- The device tested
- When the failure occurred
- The field-replaceable unit (FRU)

Copy the failure message and report it to your Digital service representative.

This shows an 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 appears.

```
All devices disabled, no tests run.
```

Report that message to your Digital service representative.

After a failure message appears, the testing stops.

After all devices pass the first part of the test, the exerciser tests begin. Those tests take about 4 minutes and test how the devices work together. If the devices pass, you receive a success message.

At the end of the tests, press Return to return to the Main Menu.

From the Main Menu you can exit MDM as described in Section 2.6 or you can select one of the other options.

2.5.2 Display System Configuration and Devices Option

The Display System Configuration and Devices option identifies devices recognized by MDM.

After you select this option, the diagnostics are prepared for testing. If this is the first option you selected, the diagnostics are loaded and configured. Loading and configuring takes several minutes. After configuring is complete, you are prompted to press Return.

After you press Return, the configuration is displayed. See Example 2–1

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 or microcode. For example, the KA5n (n can = 2 or 3) CPU described above is at revision 3.9 for microcode (MC=01).

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

- CPUA — Type of CPU and the presence of a floating-point unit

Example 2–1 Typical Configuration

```
MAIN  MENU                            Release nnn   Version  xx.xx

SYSTEM CONFIGURATION AND DEVICES

CPUA ... VAX 4000 CPU
     KA52 MC=01 FW=3.9
MEMA ...  VAX 4000 memory system
     64 Megabytes. 131072 Pages.
          MS44-DC ... 64MB memory module
          MS44-DC ... 64MB memory module
PDIA ... SHAC DSSI Subsystem
     SHAC Ver. 3.6
          RF73 ...  Unit #0, Dssi Disk, Online
          TF85 ...  Unit #1, Dssi Tape, Online
          RF73 ...  Unit #11, Dssi Disk, Online
SGCA ... Second Generation Ethernet Controller
     SGEC V4 08-00-2B-19-60-66
PDIB ... SHAC DSSI Subsystem
     SHAC Ver. 3.6
```

- MEMA — Total amount of memory in megabytes and pages, and number and type of memory modules

- KFQSA — Type of DSSI device and its unit number for each ISE

- KDA50 — Unit number, drive type, and controller revision number

- PDIA — DSSI adapter, for Bus 0 embedded in KA5n CPU

- DESQA — Ethernet station address

- SGCA — On-board Ethernet controller embedded in KA5n CPU

- PDIB — DSSI adapter for Bus 1, embedded in KA5n CPU

- Communication devices — 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 in your system but is not listed in the System Configuration and Devices display, one of the following two messages can indicate the reason.

```
No Dg xxx ... Diagnostic not loaded
```

MDM displays a `No Dg` (no diagnostic) message for each nontestable Digital device in your system, where xxx indicates the device. 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. Such a message can appear when:

- The medium is not installed properly.

- The diagnostic is not on the medium.

```
Unknown ... Diagnostic not loaded
```

The `Unknown` (unknown device) message indicates that a device not recognized by MDM is attached to your system. That message appears when:

- A device is configured to a nonstandard CSR address.

- A Digital device that has no diagnostic is attached to your system. That can occur if a device not supported on your system is attached.

- A non-Digital device is attached to your system.

After all devices are listed, you can return to the Main Menu by pressing Return .

From the Main Menu you can exit MDM as described in Section 2.6 or you can select one of the other options.

2.5.3 Display the System Utilities Menu Option

The Display the System Utilities Menu option displays the System Utilities Menu. If system utilities in addition to the IOADDRES function are available on your system, they are listed on that menu.

After you select this option, the diagnostics are prepared for testing. If this is th first option you selected, the diagnostics are loaded and configured. Loading and configuring takes several minutes. After configuring is complete, you are prompted to press Return .

After you press Return , the System Utilities Menu appears:

```
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.
```

Note

If your system does not have an RRD-series drive connected to a KRQ50 controller, only one function, IOADDRES, is available.

Select a function by typing its number and pressing Return .

2.5.3.1 IOADDRES Function

Note

The IOADDRES function is for users of Industrial VAX systems. It is described in the Industrial VAX troubleshooting manual.

The IOADDRES function gives you a list of standard CSR addresses and interrupt vectors that MDM uses in testing devices. It also gives you the first available CSR and interrupt vector for configuring devices with a nonstandard address. IOADDRES does not look at devices on the bus; it lists devices supported by Digital Customer Services.

The devices in your system were configured at the factory. Any new devices added to your system should be configured by a Digital service representative.

2.5.3.2 Update Drive Unit Number for RRD-Series Function

The Update Drive Unit Number function lets you update the unit number for an RRD-series disc drive connected to a KRQ50 controller. Refer to the appropriate RRD-series disc drive owner's manual for instructions.

2.5.4 Display the Service Menu Option

The Display the Service Menu option is available only if you purchased the MicroVAX Maintenance Kit. That kit contains service diagnostics and the system maintenance guide.

CAUTION

Only qualified service personnel should use the MicroVAX Maintenance Kit.

2.5.5 Display the Connect/Ignore Menu Option

_____ Note _____

The Connect/Ignore Menu is for users of Industrial VAX systems. Its options are described in the Industrial VAX troubleshooting manual.

_____

The Display the Connect/Ignore Menu option lets you customize MDM diagnostics. You can load your own diagnostics as well as MDM diagnostics on a device with a nonstandard CSR address and interrupt vector.

See the _Industrial VAX Troubleshooting_ manual for more information. Use this option with caution.

2.5.6 Select Single Device Tests Option

The Select Single Device Tests option lets you run tests for a single device.

- A functional test is performed on the device circuits.

- An exerciser test ensures that the device works properly.

After you select this option, the diagnostics are prepared for testing.If this is the first option you selected, the diagnostics are loaded and configured. Loading and configuring takes several minutes. After configuring is complete, you are prompted to press Return .

After you press Return , a list of the devices in your system is displayed:

```
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 - CPUA - VAX 4000 CPU
2 - MEMA - VAX 4000 memory system
3 - PDIA - SHAC DSSI Subsystem
4 - SGCA - Second Generation Ethernet Controller
5 - PDIB Shac DSSI subsystem.

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

Because of the similarity of some communication options, MDM sees
them as the same device. A CXA16 and CXB16 appear the same to
MDM. A generic device name, DH–CX0, is listed for such options,
and the last letter in each name shows the difference. For example,
DH–CX0A indicates one option, DH–CX0B a second, and so forth.

_____

Select a device for testing by typing its number and $\boxed{\text{Return}}$.

After you press $\boxed{\text{Return}}$, your system configures the device diagnostics and
testing begins. If the device passes the functional test, a message to that
effect appears and the exerciser test begins. The exerciser test runs for
approximately 4 minutes.

This shows an example of a successful test.

```
BEGIN FUNCTIONAL TEST

    Device                      Result

    CPUA ..................      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 which identifies:

- The device tested

- When the failure occurred

- The field-replaceable unit (FRU)

Copy the failure message and report it to your Digital service representative.

This shows an 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
```

After a failure message appears, the testing stops.

Press Return to return to the Select Single Device Test menu for more testing.

To exit MDM, press Break or the Restart button. For more information, see Section 2.6.

2.6 Exiting MDM

Exit MDM in one of the following ways:

- Press Break.

- Press and then release the Halt button.

Remove the tape cartridge as described in your Operator Information manual.

If you ran MDM on a new system, you are ready to install your software. Set the write protect button to write-enable and then follow the instructions in your software manuals.

If you ran MDM on a system containing software, you must reboot that 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 ISE containing your system software.

    Use DUxx for an RA-series disk drive, or an RF-series ISE with a KFQSA adapter.

    Use DIxx for an RF-series ISE with a CPU-based DSSI.

    After your system software is loaded, set the Break Enable/Disable switch to disable (down) to avoid halting the system by pressing Break.

- Set the Break Enable/Disable switch to disable (down) and press the Restart button. That begins the self-test sequence and loads system software.

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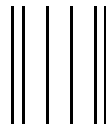
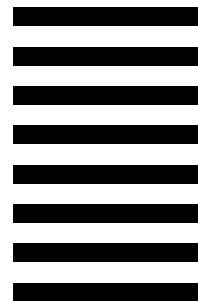## BUSINESS REPLY MAIL

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