

VAX 4000 Model 105A/106A

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 VAX 4000 Model 105A and Model 106A systems.

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Preface

This manual describes the troubleshooting and diagnostic procedures that you can use to solve basic problems with VAX 4000 Model 105A/106A systems.

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

This manual has two chapters and an index.

See *VAX 4000 Model 105A/106A Operator Information*, EK-513AA-OP, 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.
<i>italic type</i>	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 procedure that you can use to solve basic problems with VAX 4000 Model 105A and Model 106A systems.

1.1 Troubleshooting Procedure

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(s)
 - 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(s)
 - 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 1.2.

1.2 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 2.2 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-up display does not show after 20 seconds.	The power supply unit (PSU) is faulty.	Contact your Digital services representative.
	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 <i>VAX 4000 Model 105A / 106A Operator Information</i> 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.

(continued on next page)

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 <i>OpenVMS Factory Installed Software User Guide</i> , then try booting the system again. If the system still fails to boot, contact your Digital services representative.
EF/RF-Series Integrated Storage Element (ISE) Problems¹		
A write error message is displayed; the Write-Protect button glows orange. For EF/RF ISEs, Mounted wrtlck displays when DCL command SHOW DEVICE DI is issued.	The ISE is write-protected.	Press and release the Write-Protect button. For EF/RF, remove Write-Protect.
The fault indicator is lit or blinking.	The bus node ID plug is not installed.	Install the appropriate plug.
	Two or more devices have the same node ID on the same bus.	Make sure all devices and controllers or adapters on the same bus have unique IDs.

¹Only RF3X drives are internal; all other RF-series drives are external.

(continued on next page)

Table 1–1 (Cont.) Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
EF/RF-Series Integrated Storage Element (ISE) Problems¹		
	Problem in the controller or ISE.	If the Fault indicator stops blinking, the system may have corrected itself. Run MDM. If the Fault indicator remains lit, call your Digital service representative.
A read error message displayed; the Run/Ready button is out.	ISE is not spun up.	Press the Run/Ready button to the in position. When the green indicator lights, the ISE is available for use.
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 system does not have power.	Set the system unit on/off switch to the on () position and press the eject button again.
RRD43 Compact Disc Drive Problems		
The drive does not accept the disc.	The disc is upside-down or not placed correctly in the drive.	Remove the disc from the drive and reinsert it properly.
	The system does not have power.	Set the system unit on/off switch to the on () position and press the eject button again.

¹Only RF3X drives are internal; all other RF-series drives are external.

(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 <i>VAX 4000 Model 105A / 106A Operator Information</i> 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 <i>VAX 4000 Model 105A/106A Operator Information</i> manual.

(continued on next page)

Table 1–1 (Cont.) Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
TLZ06/TLZ07 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 <i>VAX 4000 Model 105A/106A Operator Information</i> 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 <i>VAX 4000 Model 105A/106A Operator Information</i> manual for information on cleaning the drive head.
TZK10/TZK11 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 <i>VAX 4000 Model 105A/106A Operator Information</i> 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.

2

Diagnostic Tests and Commands

This chapter describes the diagnostic commands that you can use to solve basic problems with VAX 4000 Model 105A and Model 106A systems. If you need to contact Digital services for further assistance, this chapter also lists the information that you must give to your Digital services representative, and tells you where to find this information.

2.1 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-tests¹
- Configuration display¹
- Error display¹

The following sections describe these tests and commands.

2.1.1 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:

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 105A/106A Customer Technical Information* manual for information on the console security feature.

```
KA53-A Vn.n, VMB 2.14 ❶  
Performing normal system tests. ❷  
74..73..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..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:

```
KA53-A Vn.n, VMB 2.14
Performing normal system tests.
74..73..72..71..70..69..68..67..66..65..64..63..62..

? 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=FFFFFFF
dser=0000 cesr=00000000 icsr=01 pcsts=F800 pcctl=FC00 cctl=00000006
bcetsts=03E0 bcedsts=0400 cefsts=00007E80 neststs=00 mmcdsr=01FFFE40
mesr=00000000

Error: SIMM Set 0 (0A,0B,0C,0D), SSR = E04E
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.

>>>
```

- ❶ Error Message
- ❷ Error Summary
- ❸ Status Message

2.1.2 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, as shown in Example 2-1.

Example 2-1 Show Configuration Command

```
>>>SHOW CONF
KA53-A Vn.n, 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, follow these specific steps:

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 2–2. 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 2–2 Listing Diagnostics

>>>**T 9E**

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_LPBACK_ASSIST	time_secs **
5C	2005FAEC	SHAC	bypass_test_mask *****
5F	2005E870	SGEC	loopback_type no_ram_tests *****

(continued on next page)

Example 2-2 (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           ❶ environment *****
E8 20068B4C SYNC          environment *****
E9 20068BF4 SYNC_Utility  environment *****
EC 20068CAC ASYNC          environment *****

```

```

Scripts
# Description

```

(continued on next page)

Example 2–2 (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 Specific test for the DZ device

2.2 Contacting Digital™ Services

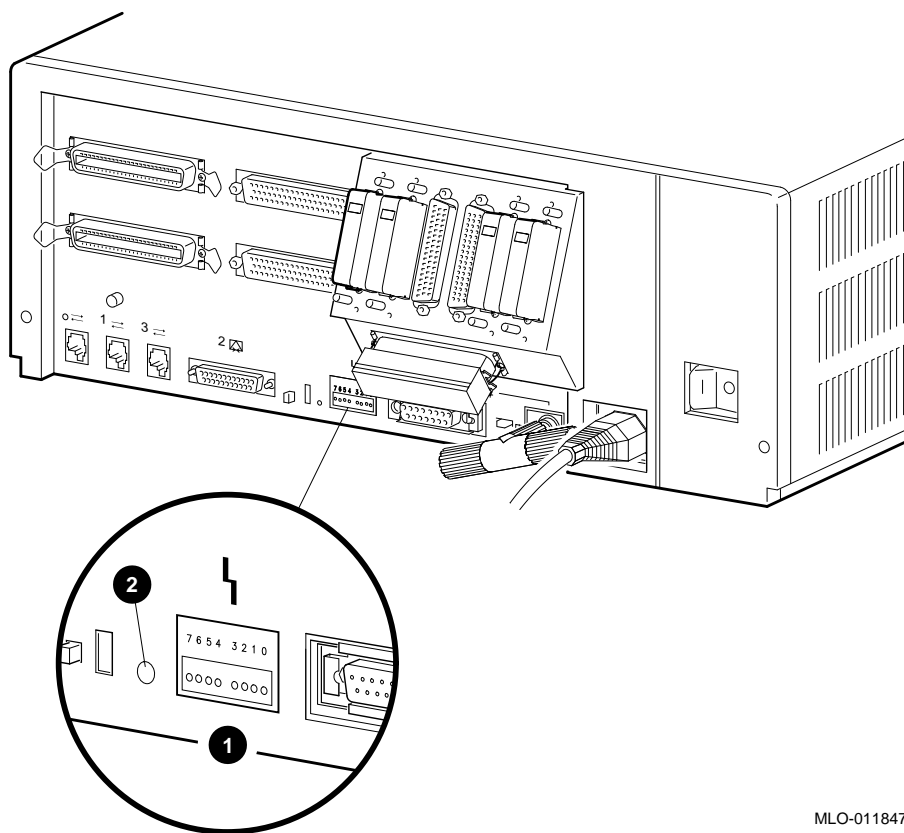
WARNING

Only authorized service personnel should service this equipment.

If you have followed the procedure 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 2–1 and Table 2–1).
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 2-1 Status LED Display



MLO-011847

- 1** Status LED Display
- 2** Break Enable LED

Table 2-1 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.
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.

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Reader's Comments

VAX 4000 Model 105A/106A
Troubleshooting and Diagnostics Information
EK-515AA-TS. B01

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Thank you for your assistance.

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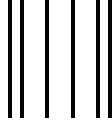
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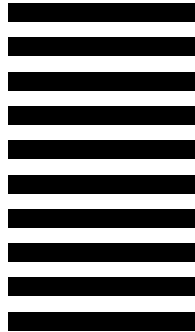
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